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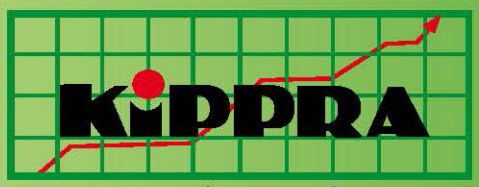

The KENYA INSTITUTE for PUBLIC POLICY RESEARCH and ANALYSIS

Analysis of Motor Vehicle Industry Value Chain in Kenya

Adan Guyo Shibia

DP/268/2022

THE KENYA INSTITUTE FOR PUBLIC POLICY RESEARCH AND ANALYSIS (KIPPRA)

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Kenya Institute for Public Policy
Research and Analysis

KIPPRA Discussion Paper No. 268
2022

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Published 2022

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ISBN 978 9966 817 82 2

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Abstract

The motor vehicle industry value chain in Kenya is prioritized for employment creation and growth of manufacturing sector as articulated in the Third Medium-Term Plan (MTP) of the Kenya Vision 2030 and the Sessional Paper No. 1 of 2022 on National Automotive Policy. The motor vehicle industry, particularly the manufacture of parts and components has, however, performed below expectations since it faces competitiveness challenges along the value chain. This study explores the constraints stifling the motor vehicle industry, with the aim of harnessing opportunities at the local, regional and global markets. There are cross-cutting constraints at the three levels of the value chain, including access to skills for technology upgrading, market uncertainties and competition from informal sector enterprises particularly those dealing in imported new and second-hand parts and components. At the input (upstream) level, the key constraints relate to inadequate budgetary allocations, cost of electricity, transport and trade logistics. At the processing (core motor vehicle manufacturing) level, key constraints relate to access to affordable finance, taxation, high costs of electricity, constrained market access, and weak Research and Development (R&D) investments within the innovation ecosystem. Further, although policy has focused on this level, progress has been more in growth of motor vehicle assembly than manufacture of parts and components. At the market level, high costs of finance, high taxation and access to land are among the key constraints. To revitalize the motor vehicle industry value chain, the following are priorities. At the input level, allocate adequate financial resources to strengthen the motor vehicle upstream industries such as iron and steel; fast-track finalisation of the iron and steel policy; support development and linkages with complementary industries including glass, rubber, leather and textiles manufacturing; and consider developing vehicle-end-of-life (scrappage) policy to boost supply of raw materials. At the processing (core motor vehicle manufacturing) level, intensify innovation and promote technology transfer with incentives for Research and Development (R&D) investments and attracting investments by Original Equipment Manufacturers (OEMs); deepen training in relevant courses such as mechatronics, mechanical, metallurgy and electronic engineering, and embrace futuristic policies to cope with the fast-evolving nature of the industry including greening, at the regional and global levels. At the market level, create avenues to tap into the expanded markets within the East African Community (EAC) and the larger African continent and the domestic market, with locally manufactured motor vehicle products that are competitive both in terms of quality, standards and costs to compete in the international competitive environment.

Abbreviations and Acronyms

AAAM	African Association of Automobile Manufacturers
AfCFTA	African Continental Free Trade Area
AfDB	African Development Bank
ASEAN	Association of South East Asian Nations
BEV	Battery Electric Vehicle
CKD	Completely-Knocked-Down
COMESA	Common Market for Eastern and Southern Africa
EAC	East African Community
ERSWEC	Economic Recovery Strategy for Wealth and Employment Creation
EV	Electric vehicle
FBU	Fully Built Unit
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GoK	Government of Kenya
HEV	Hybrid Electric Vehicles
ICDC	Industrial & Commercial Development Corporation
ICEV	Internal Combustion Engine Vehicle
ICT	Information and Communication Technology
IDB	Industrial Development Bank
KAM	Kenya Association of Manufacturers
KEBS	Kenya Bureau of Standards
KenInvest	Kenya Investment Authority
KEPSA	Kenya Private Sector Alliance
KEPROBA	Kenya Export Promotion and Branding Agency
KIBT	Kenya Institute of Business Training
KIE	Kenya Industrial Estates
KII	Key Informant Interview
KIRDI	Kenya Industrial Research and Development Institute
KITI	Kenya Industrial Training Institute
KNBS	Kenya National Bureau of Statistics

KRA:	Kenya Revenue Authority
KS:	Kenya Standards
MSEs:	Micro and Small Enterprises
MSMEs:	Micro, Small and Medium Enterprises
MTP:	Medium Term Plan
NITA:	National Industrial Training Authority
NMC:	Numerical Machining Complex
OEM:	Original Equipment Manufacturer
OICA:	*Organisation Internationale des Constructeurs d'Automobiles* (International Organization of Motor Vehicle Manufacturers)
PHEVs:	Plug-in Hybrid Electric Vehicles
R&D	Research and Development
SAPs:	Structural Adjustment Programmes
SEZA:	Special Economic Zones Authority
SKD:	Semi-Knocked-Down
STEM:	Science, Technology, Engineering and Mathematics
TVET:	Technical and Vocational Education and Training
UNIDO:	United Nations Industrial Development Organization
UNCTAD:	United Nations Conference on Trade & Development
VCA:	Value Chain Analysis

Definition of Key Terms

Fully Built Units (FBUs): Refers to situations where motor vehicles are imported as a completely built unit without further value addition.

Completely Knocked-Down (CKD): Means kits comprising of parts and sub-assemblies used for assembly of motor vehicles. It involves situations where motor vehicles are disassembled in the exporting country of origin and re-assembled in the importing country. Tax savings usually serves as a key motivation for CKD. Firms may also be motivated to import CKD to lower heavy plant investments while at the same time meet requirements for local content by importing countries. Parts are individual components that are not connected, while sub-assemblies mean components consisting of two or more parts connected/joined together.

Semi Knocked-Down (SKD): Refers to situations where motor vehicles are partially disassembled in the exporting/country of origin and re-assembled in the importing country. Like CKD, SKD has motivations for tax savings and lower plant investments while simultaneously satisfying local contents requirements compared to FBUs.

Original Equipment Manufacturer (OEM): A manufacturer of motor vehicle parts and sub-assemblies, where the manufacturer owns the intellectual property rights in the parts and sub-assemblies.

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1 Introduction

1.1 Background of the Study

The policy interests to develop motor vehicle manufacturing industry in Kenya is part of the broader efforts to promote growth of the industrial sector for wealth and employment creation. This industry comprises manufacture of motor vehicle parts, components, body building (coachwork), and motor vehicle assembly. Globally, 92 million motor vehicles were produced in 2019 with the main production regions being Asia-Oceania[1] (53.7%), Europe (23.2%) and America (21.9%), with Africa accounting for only 1.2 per cent of the global production (OICA, 2022). The global production reduced by 16 per cent to 78 million motor vehicles in 2020 as a result of adverse impacts of the COVID-19 pandemic, before slightly recovering to 80 million vehicles in 2021 (OICA, 2022). The production of motor vehicles within the African continent is concentrated in few countries, including South Africa, Morocco, Algeria and Egypt. The imbalance in production of motor vehicles against rising demand has translated into ballooning import bill for African countries, Kenya included. Motor vehicle trade deficit in Sub-Saharan Africa is over US$ 16.3 billion, which significantly contributes to the region's import bill (Black, Makundi and McLennan, 2017). During 2017 to 2021, Kenya's annual imports of parts and components of motor vehicles, and fully built motor vehicles averaged Ksh 11.3 billion and Ksh 90.2 billion, respectively; together accounting for 5.6 per cent of total imports (KNBS, 2022). Further, Kenya assembled 7,800 motor vehicles in 2019 against imports of 109,933 motor vehicles, which in 2020 declined to 7,725 and 94,565 units, respectively, due adverse impacts of COVID-19 pandemic (KNBS, 2022). In 2021, with ease of the COVID-19 pandemic, Kenya recorded 9,989 locally assembled motor vehicles against imported 103,859 motor vehicles (KNBS, 2022). These statistics reveal that the local demand is met mainly through imports, with implications such as higher importation bills, depressed investments, and low employment opportunities.

A well-developed motor vehicle industry value chain has some benefits to the economy. The motor vehicle industry provides backward linkages with extractives and other manufacturing sub-sectors such as iron, steel, aluminium, rubber, glass, plastics, textile, leather, chemicals, electrical and electronic components; thus, providing opportunities for a broader industrial development, employment and incomes (Layton and Rustandie, 2007). A study across 50 US states reveals that motor vehicle manufacturing has an employment multiplier of 4.7, suggesting that there are on average 3.7 indirect jobs for every direct employment in the motor vehicle industry (Hill et al., 2015). The multiplier effects are larger at

1 Includes China, Japan, India, South Korea, Thailand, Iran, Malaysia, Taiwan, Taiwan, Vietnam and Philippines.

processing level of motor vehicle manufacturing, such as manufacture of parts and components at about 7.0 compared to dealerships (market level) at 2.3. Further, a well-developed motor vehicle industry value chain promotes transfer of skills and firm capabilities in form of working practices and tacit knowledge embodied within firms (Page, 2019) through sub-contracting of parts and components to Micro, Small and Medium Enterprises (MSMEs). The MSMEs can specialize in manufacture of parts and components, which they can supply to motor vehicle assemblers through subcontracting arrangements as in the case of recently successful countries such as Thailand and Mexico (Kotturu and Mahanty, 2016; Saraf, 2016). Knowledge activities such as Research and Development (R&D) investments, development of prototypes and design of motor vehicles require close collaboration among the firms in the value chain. These collaborations facilitate skills transfer and building firm capabilities. Moreover, the motor vehicle industry forms an important avenue for manufacturing sector diversification into medium and high technology industries that are intensive in Research and Development (R&D) investments compared to low technology industries such as manufacture of foods, beverages, textiles, and leather that are dominant in low-income economies (UNIDO, 2019). Notwithstanding these potential benefits, the motor vehicle industry in Kenya has a weak value chain development, similar to other Sub-Saharan African countries (Black, Makundi and McLennan, 2017; Barnes et al., 2021) owing to dependence on imports of Fully Built Units (FBUs) and Completely Knocked Down (CKD) units as opposed to local manufacture of parts and components for supply to the assembly plants.

Considering potential opportunities provided by the motor vehicle industry, Kenyan policy documents place emphasis on its value chain development, particularly at the manufacturing level. These include the Kenya Vision 2030 (Government of Kenya, 2007), the Sessional Paper No. 9 of 2012 on the National Industrialization Policy Framework for Kenya 2012-2030 (Government of Kenya, 2012), the third Medium Term Plan (MTP) 2018-2022 that has also mainstreamed the "Big Four" agenda, and various Budget Policy Statements (Government of Kenya, 2021a). These policy documents seek to promote growth of the motor vehicle industry, leveraging on the iron and steel industry to manufacture parts and components. A detailed review of these policies is provided in Section 3.1 of this study. Further, the government has developed the National Automotive Policy, 2021 to promote competitiveness in manufacturing of motor vehicles and other automotive[2] products. This policy has been further approved by the National Assembly as Sessional Paper No. 1 of 2022 on National Automotive Policy, paving way for its implementation to commence. Among the key interventions of this policy will be establishment of the National Automotive Council.

2 Automotive industry, besides motor vehicles include motorcycles and three wheelers (*tuk tuk*).

Despite these policy aspirations, the contribution of Kenya's motor vehicle industry to manufacturing Gross Domestic Product (GDP) has stagnated at about 1.5 per cent over the last decade, with employment within this industry declining by 22.7 per cent over the same period (UNIDO, 2021). While the number of motor vehicles locally assembled averaged 7,022 units between 2010 and 2020 (KNBS, 2021a), imports have continued to surge - The value of motor vehicles imported have grown by 36.7 per cent (US$ 898.7 million to US$ 1.2 billion) while imports of motor vehicle parts, components and accessories alone have grown by 64.8 per cent (US$ 59.0 million to US$ 97.3 million) compared to the overall growth of total merchandise imports at 43.7 per cent over the same period (United Nations, 2020). The depressed growth of the domestic motor vehicle manufacturing industry is partly due to the industry remaining static in terms of a transition from Semi-Knocked Down (SKD) assembly to CKD assembly, and eventually a strong domestic value chain with large shares of parts and components manufactured locally.

Countries that have stronger domestic motor vehicle value chains reveal significant growth in employment and contributions to manufacturing GDP. Table 1.1 shows comparative contribution of motor vehicle industry to manufacturing employment and GDP for selected economies (Egypt, Morocco, South Africa, India, Thailand, North Macedonia, Brazil, Mexico, Indonesia, China, Japan and Germany). These economies comprise of those with well-established motor vehicle industries (e.g., Japan and Germany) as well as recently emerging ones such as Thailand, Mexico, Morocco, and South Africa. These countries have over time diversified from motor vehicle assembling to manufacture of parts and components to feed into the local assembly plants and also leverage on export markets (Humphrey & Memedovic, 2003; Zheng and Sheng, 2006; Black and McLennan, 2016; Markowitz and Black, 2019). For instance, the share of employment within manufacture of parts and components in overall motor vehicle manufacturing industry for Mexico and India are 87.5 per cent and 72.6 per cent, respectively. In contrast, among 5,188 employees engaged in the motor vehicle manufacturing industry in Kenya, only 22.0 per cent are involved in the manufacture of parts and components (KNBS, 2021b).

Table 1.1: Motor vehicle industry contributions to manufacturing

sector, 2019

Country	No. of employees (2019)		Employment growth: 2005 to 2019 (%)	Motor vehicle GDP (US$ million), 2019	Share in overall manufacturing employment (%), 2019	Share in overall manufacturing GDP (%), 2019
	2005	2019				
Egypt	18,154	22,756	25.35	594	2.32	2.42
Morocco	5,368	28,463	430.23	363	3.61	2.80
South Africa	108,464	93,936	-13.39	2,467	8.10	6.37
India	358,956	1,077,846	200.27	17,695	7.80	7.53
Thailand	157,417	344,736	119.00	13,101	8.46	13.72
North Macedonia	1,656	15,989	865.52	164	10.77	10.38
Brazil	366,038	435,380	18.94	15,561	6.24	7.27
Mexico	172,893	979,219	466.37	45,763	22.68	26.71
Indonesia	72,382	253,726	250.54	19,760	3.54	8.41
China	2,050,300	4,588,000	123.77	171,960	6.48	5.18
Japan	726,741	1,101,703	51.59	170,738	13.96	18.32
Germany	864,990	878,674	1.58	118,254	11.56	16.71

Data Source: UNIDO (2021)

This study aims to provide policy insights on ways of strengthening Kenya's motor vehicle industry value chain. There is limited research on motor vehicle manufacturing value chain development in Kenya to aid in evidence-based policy interventions. Closely related research on this industry's value chain, focusing on manufacture of automotive parts and components (Kiiru and Ngii, 1993) was undertaken when the economy was undergoing market liberalization. There have been emerging issues since then in terms of socio-economic transformations, national, regional and global policy developments. Other more recent studies (Tunje and Yogo, 2020) focus on other aspects of the automotive value chains - Two wheelers (motorcycles) and three wheelers (*tuk tuk*). Further, the Kenya Association of Manufacturers (KAM) Automotive Sector Profile report (KAM, 2020) provides a snapshot of motor vehicle industry and challenges, but there is need for further analysis along the value chain to facilitate tailored policy interventions. The Kenyan government has in the recent years reinvigorated the agenda to revive the motor vehicle manufacturing industry, thus warranting fresh research insights for evidence-based policy interventions.

1.2 Objectives of the Study

The overall objective of this study is to analyze motor vehicle industry value chain in Kenya, focusing on input, processing, and market levels. The specific objectives of the study are to:

(i) Assess key actors in the motor vehicle industry value chain in Kenya and analyse their roles;

(ii) Assess constraints related to motor vehicle industry value chain in Kenya; and

(iii) Review and draw lessons from policy strategies for development of motor vehicle industry value chain in selected countries.

2. The Evolution of Motor Vehicle Industry Policy Framework in Kenya

The policy measures targeted at development of the motor vehicle industry in Kenya have evolved through four policy phases, namely, promotion of indigenous entrepreneurship in 1960s-1970s; accelerated interventions towards local production of motor vehicles in the 1980s; navigating stiff competition in the wake of market liberalization in the 1990s; and business environment, access to markets and embracing emerging trends post-2000. These policy phases have had implications for development of the motor vehicle industry, relatively supporting growth of commercial vehicles and generally seeking to develop processing level of the value chain. These policy phases are elaborated below and implications for the motor vehicle industry summarized along the value chain towards the end of this section in Table 2.1.

2.1.1 Promotion of Indigenous Entrepreneurship for Manufacture of Motor Vehicle Parts and Components, 1960s-1970s

During the 1960s and 1970s, the main policy focus was on addressing low entrepreneurship, including for manufacture of motor vehicles, and motor vehicle parts and components. The motor vehicle industry during this period was wholly imports as Fully Built Units (FBUs) save for limited assembly by Volkswagen (which operated in the country in 1960s before exiting in 1977) until 1977 when the General Motors East Africa commenced assembly of commercial vehicles from imports of Completely Knocked Down (CKD) components (Kiiru and Ngii, 1993). The focus in favour of the commercial vehicles as opposed to passenger cars was due to relatively high technology involved for the latter; as revealed by key informant interviews (see Box 2.1). The importation of FBUs were subsequently prohibited as a way of protecting local assembly of commercial vehicles. It was also a requirement to use some locally manufactured parts and components in the assembly of the commercial vehicles. Priority parts for local production then included batteries, tyres, foam products, metal products, leather products, wooden articles and fan belts. To entrench entrepreneurial growth in industrial production, the Kenya Industrial Research and Development Institute (KIRDI) was established in 1979 to support research and development (R&D) and innovation in industrial and allied technologies, including those based on indigenous technical knowledge. Its key areas of focus include industrial research, mechanical engineering, industrial chemistry, and emerging technologies, among others, with the aim of knowledge and technology transfer especially among Micro, Small and Medium Enterprises (MSMEs) that form majority of enterprises in Kenya (KIRDI, 2021).

The policy interventions during this period were undertaken in line with the Sessional Paper No. 10 of 1965 on *African Socialism and its Application to Planning in Kenya* (Government of Kenya, 1965) that sought to promote indigenous entrepreneurship, skills development, and protection of local industries. The formation of an Industrial Protection Committee in the mid 1960s reflected the government's intent of preferential treatment accorded to local industries, the key goal being supporting local entrepreneurs to achieve viable scale of production. The second Development Plan for the period 1970 to 1974 (GoK, 1969) underscored establishment of motor vehicle assemblies, though a key limitation was that the domestic market alone was insufficient to viably support such projects. Thus, the government prioritized undertaking feasibility studies to assess its viability, though it was not clear whether this was eventually undertaken. The importance of quality and price competitiveness was also underscored, but weak entrepreneurial skills and technology were key hindrances. Subsequently, the third Development Plan for the Period 1974 to 1978 (Government of Kenya, 1974) explicitly prioritized development of the motor vehicle industry through a gradual shift from importation of FBUs to local manufacturing. A broad-based[3] incentive during this period was tax-deductible of expenses related to expenditure on scientific research, financial contributions to scientific and tertiary research institutions in support of scientific research as provided for through the Income Tax Act Cap 470 in 1973 (Government of Kenya, 1973). This measure was expected to spur R&D and innovation by private sector enterprises, though the progress remained stunted due to institutional weaknesses such as enabling skills and gaps in industry-research linkages.

The policy focus during this period was more on processing level of the motor vehicle industry value chain by discouraging importation of motor vehicles and instead supporting local production, and to some extent the market level, mainly focusing on meeting domestic demand. The advanced technology requirements of passenger vehicles in an environment of weak entrepreneurial skills favoured relatively more progress in the manufacture of heavy commercial vehicles, though it largely remained dependent on assembling of imported parts and components.

2.1.2 Accelerated Interventions Towards Local Production of Motor vehicles During 1980s

By the end of 1970s, domestic motor vehicle industry value chain was yet to advance, particularly in terms of manufacture of parts and components. The importation of FBUs and SKDs remained a key hindrance for development of the domestic motor vehicle industry value chain. Further, progress by the private sector in advancing manufacture of motor vehicles remained weak. The mitigation of these challenges was, however, to take place within the Structural Adjustment Programmes (SAPs) advocated by the World Bank and the International Monetary

3 The term 'broad-based' here implies that the legislation applies to various sectors or industries, and not specific to a particular industry or sector.

Fund that required developing countries to promote private sector development. The broader private sector development policy intents during this period was articulated through Sessional Paper No. 1 of 1986 on *Economic Management for Renewed Growth* (Government of Kenya, 1986) that sought to promote indigenous entrepreneurship, building on measures employed during the 1960s – 1970s. To accelerate development of local motor vehicle manufacturing enterprises the *Motor Vehicle Order 198 of 1980* prohibited imports of commercial vehicles in form of FBUs or Semi Knocked Down (SKD) components with the expectation that a further expansion of domestically manufactured components would serve the local assemblers (Kiiru and Ngii, 1993). This regulatory intervention further reduced carrying capacity of prohibited imports of FBUs and SKDs of commercial vehicles from 750kg to 250kg to support local assembly of passenger cars (Kiiru & Ngii, 1993). A key development during the 1980s was also the commissioning of the *Nyayo Pioneer Car Project* following a presidential directive, which was to be fully developed through local resources and capacities. The initiative that commenced in 1986 (inspired by Malaysia's launch of Proton car in 1985) brought together the University of Nairobi's Department of Engineering, Kenya Railways, Kenya Polytechnic (Currently Technical University of Kenya), National Council of Science and Technology, and the Department of Defense.

Similar to the 1960s-1970s, the policy focus during this period was more on processing level, particularly heavy commercial vehicles, with the market level focused more on satisfying the domestic demand that was insufficient to attract large-scale private sector investments. There was also a gap in the role of the private sector as witnessed from the *Nyayo Pioneer Car Project* that was largely public sector-led initiative.

2.1.3 Navigating Stiff Competition Resulting from Market Liberalization: 1990s

The 1990s was a period of market liberalization, opening the domestic market to external competition, including imports of new FBUs and second-hand motor vehicles. The surge in importation of FBUs threatened the development of the nascent motor vehicle manufacturing industry by eroding the gains achieved during the 1970s and 1980s, owing to weak local industries to face international competition within limited domestic market space. However, unlike the first two policy phases, this period commenced interventions to support the input level of the motor vehicle industry value chain, particularly development of the iron and steel industry. The focus on manufacture of light equipment, such as farm machinery, was intended to gradually support a shift to heavy manufacturing such as motor vehicle parts and components.

As part of the policy initiatives to achieve the above goals, the government transitioned the *Nyayo Car Project* into Numerical Machining Complex (NMC), a state-owned mechanical engineering-based company. The NMC was established in 1994 to oversee the production of the 'Kenyan made' motor vehicles. However, through NMC only one plant was actualised among the 11 envisaged to facilitate mass production of the *Nyayo* cars. The project only managed to produce five prototype cars (3 saloon cars and 2 pickups, all still present at the NMC workshop in Industrial Area, Nairobi)[4] before it stalled. As aforementioned, limited participation of the private sector together with budgetary constraints hampered expansion of the *Nyayo* car production on a commercially viable scale.

The realization of the policy goals during this period was also pursued through the National Development Plan for the Period 1989 to 1993 (Government of Kenya, 1988), which identified priority motor vehicle-related manufacturing activities including metallurgical industries anchored on iron and steel production to supply materials required by the engineering industry, such as machine tools and dies for shaping or cutting metallic materials to desired profile. These manufacturing activities are critical for development of motor vehicle parts and components. The strategy then was to leverage on public institutions such as the Kenya Industrial Estates (KIE), the Kenya Industrial Research and Development Institute (KIRDI), the ministries responsible for technical training and applied technology; and research, science and technology. The existing infrastructure particularly the forging and foundry[5] facilities located at the Kenya Railways Corporation was envisaged to support manufacture of parts, including gears and shafts among others. Further, the capacity of the Kenya Railways engineering and metallurgical testing facilities were planned to be strengthened and commercialized to support production of motor vehicle parts, accessories, and components.

Further, policy priorities during this period were articulated through the Sessional Paper No. 1 of *1994 on Recovery and Sustainable Development to the Year 2010* (Government of Kenya, 1994), which sought to support small scale industries to manufacture farm machinery, which was expected to serve as a seedbed for learning to manufacture heavy industrial products such as motor vehicle parts and components. Further, the *Sessional Paper No. 2 of 1996 on Industrial Transformation to the Year 2020* (Government of Kenya, 1996a) which underscored the importance of building manufacturing sector linkages through skills and technology transfer, and growth of small-scale sub-contractors including those in metallurgy, machinery, electronics and engineering. Moreover, the government through the *National Development Plan for the Period 1994*

4 Author's key informant interview with NMC.

5 Forging entails use of compressive or hammering force to shape metals while foundry entails casting of metals through melting and pouring the liquified metal into a mold and then cool to take the desired shape.

to 1996 (Government of Kenya, 1994) identified the challenge of importation of new and used motor vehicles, which in turn was viewed to stifle development of local manufacturing capacity for various parts and components to economically sustainable levels. The capacity utilization of the three motor vehicle assemblies in existence then was estimated to be only 18 per cent (Government of Kenya, 1994). Thus, to support development of the parts and components manufacture, the government prioritized to rationalize the number of motor vehicle models and makes so as to support production that was economically viable. Other interventions, besides motor vehicle assembly, was the intention to promote local value addition through sub-contracting of motor vehicle parts and components to local manufacturers. One strategy to support this intervention was revamping of the Kenya Railways workshop to serve as a nucleus for manufacturing parts, accessories, and components for supply to the private sector, including the small-scale industries. These initiatives were articulated within the broader goals of developing an iron and steel industry, with complementary activities including rehabilitation of steel plants, and discouraging exports of locally generated scrap metals to supplement imports of raw materials for the sector.

To further develop motor vehicle industry during this period, the government through the First Schedule of the Customs and Excise Act Cap. 472[6] waived import duty on unassembled motor vehicle parts and components (Government of Kenya, 1996b). This legislative provision was further operationalized through the *Customs and Excise (Unassembled Motor Vehicles) Regulations, 1993*. This Regulations detailed conditions to be met for parts and components of motor vehicles to be considered unassembled for purposes of importation – including chassis frame and panels, engine, axle, breaking and suspension systems, among others. This intervention was aimed at discouraging importation of FBUs to support local assembly of motor vehicles amid intensifying competition of market liberalization.

Overall, the policy regimes spanning through 1960s to 1990s aimed at promoting development of the motor vehicle industry were characterized by some shortcomings (Kiiru and Ngii, 1993; Black, Makundi and McLennan, 2017). First, given that the motor vehicle industry is scale intensive, low demand (market) constrained growth of parts and component manufacturers, thus eroding benefits that would have accrued from economies of scale (Barnes, Black, Markowitz, & Monaco, 2021). The importation of FBUs especially after market liberalization phase eroded growth of parts and component manufacturers. Second, limited flexibility of local parts and component manufacturers due to slow progress in technological advancement meant that there was a sustained mismatch between the make of new vehicles and models and local production of parts and

6 The Customs and Excise Act was repealed by the Excise Duty Act No. 23 of 2015.

components. Third, unpredictable policy environment dissuaded private sector investments given that heavy investments in the motor vehicle industry require long-term planning horizon (an issue corroborated by key informant interviews, see Box 2.1). Fourth, weak skills and limited opportunities for technology transfer remained a key hindrance. This partly explains why the Nyayo Pioneer Car project stalled owing to non-participation of private sector, besides shortage of local human resources to support the commercial production (Hornsby, 2012). Fifth, unreliable supply of CKD components eroded growth of the motor vehicle assembly industry, an indication of the importance of an efficient supply chain. Further, local content initiative imposed some limitations relating to price and quality of inputs, thus making the local motor vehicle industry less competitive. Sixth, weak linkages between parts and components manufacturers and motor vehicle assemblers meant that the former faced challenges in planning their production. Thus, component manufacturers faced growing implicit costs resulting from low-moving stock.

2.1.4 Business Environment, Access to Markets and Embracing Emerging Trends: Post-2000

This phase of the policy interventions has witnessed enhanced focus on business environment, aimed at lowering operating costs for enhanced competitiveness and market access. The key avenues targeted are broad infrastructure development, fiscal incentives favouring local production, and preferences for public procurement of locally manufactured motor vehicles and parts and components. These measures are aimed at attracting private sector investments for development of processing level of the motor vehicle industry value chain. More recently, there has been an increasing policy interest to embrace emerging trends related to environmentally friendly mobility owing to commitments to lower carbon emissions. This sub-section elaborates on these aspects.

a) Business environment and access to markets

The commitments to improve business environment were articulated through the Economic Recovery Strategy for Wealth and Employment Creation (ERSWEC) 2003-2007 (Government of Kenya, 2003), and subsequently the Kenya Vision 2030. The reforms articulated through these policies are, however, broad-based, seeking to support development of the private sector generally. The key areas of business environment reforms under ERSWEC 2003-2007 was access to quality infrastructure and energy, which was in turn expected to lower costs of production and enhance competitiveness. Other measures include recognition of Science, Technology, and Innovation (ST&I) as a driver of industrial development. While these measures are not explicitly focused on development of the motor vehicle

industry, some of the priority areas such as supporting R&D investments through incentives and zero-rating of research-related equipment were expected to be beneficial. This initiative was considering that the motor vehicle industry requires substantial R&D investment to meet the changing consumer tastes and safety and environmental standards through continuous research and development of prototypes to match such demands. Other priority areas identified in ERSWEC 2003-2007 included support for Micro and Small Enterprises (MSEs), development of industrial skills, enhanced efficiency in investment attraction and export promotion, including diversification of export markets. The Kenya Vision 2030, which was launched in 2008 as a successor to the ERSWEC 2003-2007, is geared towards achieving a diversified and competitive manufacturing anchored on improved business environment, value addition, R&D investments, technology, innovation, and productivity growth, particularly among the small and medium enterprises (Government of Kenya, 2007). While there are similarities in commitments in the ERSWEC 2003-2007 and the Kenya Vision 2030, the Kenyan manufacturing GDP is yet to sufficiently diversify to heavy industrial activities such as motor vehicle industry[7], with the share of medium and high technology activities at only 15 per cent (UNIDO, 2019). Detailed national industrialisation policy commitments towards improved business environment and access to markets are anchored in the Sessional Paper No 9 of 2012 on the National Industrialization Policy Framework for Kenya 2012-2030 (GoK, 2012). Besides seeking to promote industrial competitiveness, this policy emphasises development of iron and steel industry through motor vehicle, tools, and agro-machinery industries. Automotive and auto parts are identified as one of the 22 potential manufacturing activities, with one of the objectives of the policy being to increase by 25 per cent the share of locally produced industrial parts, components, and machine tools. The development of iron and steel industry is further prioritized through the Third MTP 2018-2022 as a flagship project to be implemented through NMC (Government of Kenya, 2018a), to supply input to the manufacture of automotive parts and components. The growth of the iron and steel industry is to be supported by formulation of an iron and steel policy during the period 2018-2022. The development of this policy is, however, still pending at the time of writing this study.

The growth of the motor vehicle industry during this period is also predicated on access to domestic and export markets. Through the Buy Kenya Build Kenya Strategy, 2017 (Government of Kenya, 2017a) the government seeks to increase use of locally produced goods and services. This policy is currently implemented under the provisions of the Public Procurement and Asset Disposal Act, 2015 (Government of Kenya, 2015a) and the Public Procurement and Asset Disposal

7 Kenya's manufacturing is mainly in low technology manufacturing activities characterized by low R&D content and include textile and apparel, leather, food and beverages, among others.

Regulations, 2020 (Government of Kenya, 2020a). Public procurement preferences are given to locally manufactured goods including motor vehicles. Further, preferences are given to products manufactured by Micro, Small and Medium Enterprises (MSMEs). Within these frameworks the Ministry of Industrialisation, Trade and Enterprise Development publishes a list of locally manufactured goods for preferential procurement (Government of Kenya, 2020b). Some of the preferential motor vehicle parts and components include air brakes and parts, engine air filters, exhaust pipes and silencers, leaf springs, wiring harness, seat upholstery, and U-bolts among others (Appendix 4 provides a complete list of products for preferential procurement). The preferential procurement is based on assessment of capacities of domestic enterprises to produce the specified products. The budget policy statement for 2019/2020 envisioned to provide preferences for purchase of locally assembled motor vehicles by Ministries, Departments and Agencies (MDAs). Further, the government allocated Ksh 600 million for procurement of locally assembled motor vehicles in line with the budget policy statement for 2020/2021 (Government of Kenya, 2020d).

The *Customs and Excise (Restricted Imports) (Commercial Trailers) Order, 2002* issued under the now repealed Customs and Excise Act Cap. 472[8] prohibited importation of commercial trailers in CKD form except by authorized assemblers in prescribed form comprising axles, suspensions, landing gears, rims, turntables, and air braking kits (Government of Kenya, 2002). As per the Excise Duty Act, 2015 motor vehicles are excisable goods (excise duty being rates 20%), excluding those that are locally assembled (GoK, 2015b). The Finance Act, 2017 amended the Income Tax Act Cap. 470 to reduce corporate rate of tax for new motor vehicle assemblers from 30 per cent to 15 per cent for the first five years, with possibilities of extending this lower tax rate for another five years for the assemblers that achieve local content of 15 per cent of the ex-factory value of motor vehicles (Government of Kenya, 2017b). Another regulatory instrument geared towards realization of the policy focus during this period is also the *Legal Notice No. 84, the Tax Procedures (Unassembled Motor Vehicles and Trailers) Regulations, 2019* (GoK, 2019b). These regulations outline the guidelines and conditions to be met by importers of CKDs of motor vehicles, which are exempted from import duty to promote local assembly. Approval of application for importation of CKDs for waiver of import duty is done by the Cabinet Secretary, National Treasury and Planning in consultation with the Cabinet Secretary responsible for matters of industrialization. Importantly, these regulations outline parts and components that belong to exclusion lists, considering capacity of domestic enterprises to supply and, as such, their importation attracts import duty. The exclusion lists of parts and sub-components are reviewed after every two years or as may be necessary

8 The Customs and Excise Act Cap. 472 was repealed by the Excise Duty Act No. 23 of 2015.

by the Cabinet Secretary in charge of National Treasury in consultation with the Cabinet Secretary responsible for matters of industrialization (Government of Kenya, 2019b).

b) Catching up with emerging trends

There is an increasing policy demand for lower carbon emission motor vehicles that are less dependent on fossil fuels. The government through the Kenya Bureau of Standards issues regulatory frameworks related to standards. These include the *Road Vehicles - Inspection of Road Vehicles - Code of Practice (KS 1515:2019)* that defines issues related to environmental standards (such as levels of exhaust and noise emissions), safety requirements and age limit of imported motor vehicles (KEBS, 2019). Other relevant standards include the *Kenya Standard, Road Vehicles – Passenger Vehicle Body Construction – Specification (KS 372: 2019)* for guiding passenger vehicle body construction.

A shift to electric mobility has been gaining traction in recent years owing to increasing demand for environmentally friendly motor vehicles and lower fossil fuel dependency. The Integrated National Transport Policy 2012 identifies electric mobility as an opportunity for clean air policy, including through incentives and standards for electric vehicles, among other interventions. Subsequently, the government has through budget policy statements and finance Acts implemented incentives to promote manufacture and demand for electric motor vehicles. For instance, the government through the Budget Policy Statement 2019 and subsequently Finance Act, 2019 reduced the Excise duty on motor vehicles that are fully electric from 20 per cent to 10 per cent effective 7th November 2019 (Government of Kenya, 2019a; Deloitte, 2019). Further, the National Climate Change Action Plan (NCCAP) 2018-2022 outlines seven priority climate action areas[9], the relevant one in the context of this study being energy and transport through initiatives including rolling out of pilot projects on electric vehicles and construction of the Bus Rapid Transit (BRT) system within the Nairobi Metropolitan Area, among other activities (GoK, 2018b). Other recent policy initiatives in supporting a shift towards electric motor vehicles are the plans by the Kenya Power and Lighting Company (KPLC) to roll out infrastructure for charging electric vehicles.

Development of policy and integrated infrastructure for supporting transition to electric motor vehicles requires synergy among key state entities, including the Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works; Ministry of Energy; State Department for Industrialization; the National Treasury; Kenya Bureau of Standards; Energy and Petroleum Regulatory Authority

9 Others include disaster risk management; food and nutrition security; water and the blue economy; forest and wildlife tourism; heath; sanitation and human settlements; and manufacturing.

(EPRA); county governments; and institutions involved in energy infrastructure and distribution including the Kenya Power and Lighting Company (KPLC) and the Kenya Electricity Generating Company (KenGen). This is considering a wholistic ecosystem in terms of incentives and infrastructure development, particularly electric vehicle charging facilities and supporting structures within residential, commercial and public facilities; and repair and maintenance. At the time of writing this study, the government through the State Department for Transport has been developing a National Electric Mobility Policy for Kenya[10]. However, the Kenya National Energy Efficiency and Conservation Strategy (NEECS), 2020 envisages enhanced adoption of e-mobility with a target of five per cent of annually imported motor vehicles being electric/hybrid by 2025 (GoK, 2020e). Further, this Strategy calls for measures to incentivize uptake of electric motor vehicles, including fiscal incentives such as lower import duties for electric cars, and revision of the Building Code to promote charging facilities in public buildings and new estates.

On the private sector front, in March 2022 BasiGo, an electric vehicle technology and financing startup partnered with Citi Hopper and Eastland Eagles buses for a pilot project. Other startups venturing into electric vehicles in the country include Opibus, which was founded in 2017, both for assembly of new and conversion of existing buses into electric capability.

Overall, the post-2000 policy phase has sought to be relatively more holistic in development of the motor vehicle industry value chain from input (such as iron and steel industry development) to processing (manufacture of parts and components and assembly) to the market level. Challenges, however, remain in budgetary allocations for implementation of the planned programmes. Moreover, a more regional focus would incentivize investments by OEMs owing to economies of scale. The National Automotive Policy was only recently approved by the Cabinet and Parliament and its implementation is at a nascent stage. Besides the shift to electric motor vehicles, another environmental related matter is disposal of motor vehicles at end of life (lessons from other countries are detailed in Section 4.3.2). Old motor vehicles that are no longer serviceable and older brands that are difficult to get spare parts, or those that are written off after accidents end up being discarded. Imports of second-hand vehicles by developing countries such as Kenya raises policy concerns on their eventual disposal. Lack of a clear policy on mechanisms of disposing such motor vehicles in Kenya has led to emergence of unofficial dumping grounds especially in areas such as downtown Nairobi, Kariobangi and Kangundo road. Similar scenarios can also be seen in other urban areas. These unofficial dumping sites emerge as a result of demand for spare parts (especially among *jua kali* mechanics) and scrap metals. While

10 At the time of writing this study, the progress of this policy development was at tendering stage for a consultant to lead the process.

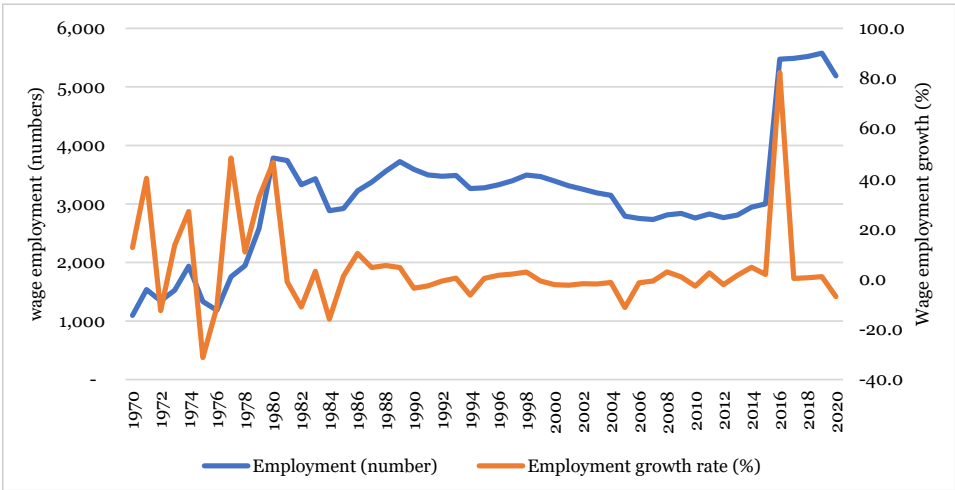
Kenya lacks a scrappage policy for end-of-life motor vehicles, the Scrap Metal Act No. 1 of 2015 seeks to promote circular economy of the metal industries, including through regulation of dealings in scrap metal. It defines scrap metal to include old metal goods; broken metal; and second-hand metal, whether partly or wholly manufactured.

2.1.5 A synthesis of historical policy focus, key trends and outcomes

The motor vehicle manufacturing industry in Kenya to date is characterized by assembling activities, mainly through importation of CKD parts and components. The industry recorded a sustained growth until the early 1990s when the economy was liberalized, and the market opened to external competition of new and used motor vehicles. For instance, the number of motor vehicles assembled locally increased from 8,459 units in 1985 to 14,056 units in 1990 before falling to 6,500 units in 1995 and a low of 2,551 units by 2000 (KNBS, 1986; 1991; 2001). The production has, however, been on an upward trend since the year 2000 with economic reforms under ERSWEC 2003-2007 and the Kenya Vision 2030 targeting improved business environment, with number of assembled motor vehicles increasing to 4,296 units in 2005 and 9,989 units as of 2021 (KNBS, 2006; KNBS, 2022).

Figure 2.1 shows the employment numbers and employment growth within the motor vehicle industry during 1970 to 2020, to reflect outcomes of various policy regimes. While the period 1970s saw some sustained growth in employment within the industry under the entrenchment of indigenous entrepreneurship for local production to substitute imports, the year-to-year employment growth was relatively volatile compared to the succeeding periods. The volatility during the mid-1970s is explained by balance of payment constraints that resulted from worsening of exports, and the 1973/74 oil crisis that severely affected the economy (World Bank, 1977). Nonetheless, the period 1976 to 1980 experienced sustained growth in employment in absolute numbers, coinciding with prohibition on importation of FBUs for commercial vehicles commencing 1977 (Kiiru and Ngii, 1993). The sustained decline from 1982 to 1984 reflects the foreign exchange crisis and a prolonged drought experienced during this period. The period from late 1980s through 1990s to mid-2000s have largely experienced decline in employment within the motor vehicle manufacturing industry, which reflects the period of Structural Adjustment Programmes (SAPs) of the 1980s, followed by market liberalization and influx of imports that saw sustained decline in employment. The late 2000s to present reflects some marginal recovery under implementation of the ERSWEC 2003-2007, and subsequently the Kenya Vision 2030 economic reforms, save for depressed performance during the 2007 to 2010 global financial crisis. The positive performance in 2016 coincides with increased import duties on FBUs in favour of locally assembled motor vehicles and an increased push for local content.

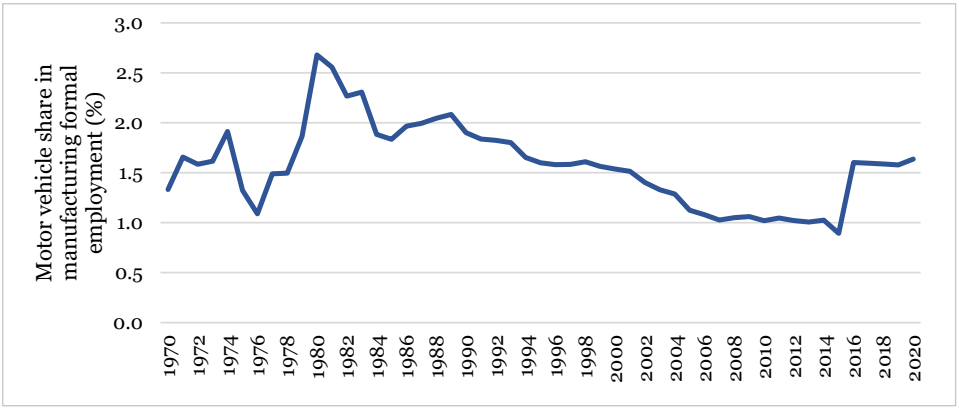
Figure 2.1: Employment and employment growth in formal motor vehicle industry, 1970-2020



Data source: KNBS (Various), Statistical Abstracts

Figure 2.2 illustrates the motor vehicle manufacturing industry formal employment as a share of total manufacturing sector formal employment. After recovering from the oil crisis of mid-1970s, the sector performance peaked in 1980, reflecting trends in Figure 2.1 and has since generally experienced declining share in manufacturing sector formal employment save for the marginal recovery in 2016 owing to policy reforms as outlined earlier. These findings reveal that the manufacture of motor vehicles has generally under-performed those in other manufacturing sub-sectors.

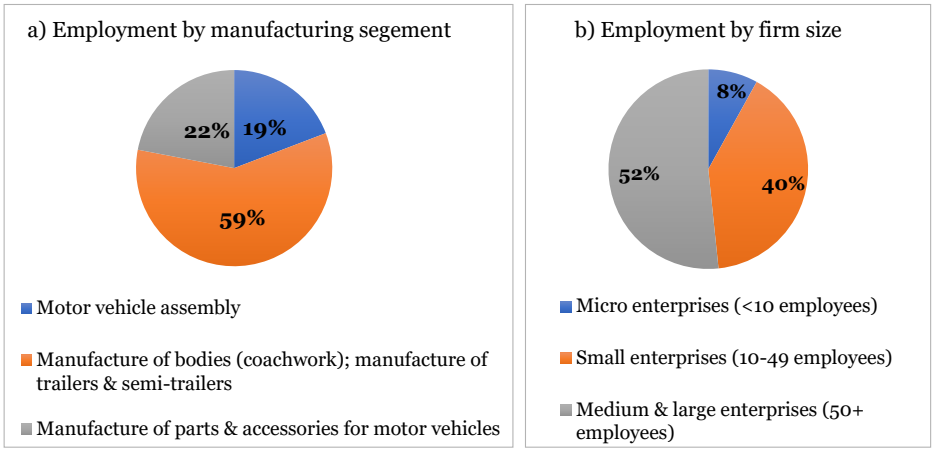
Figure 2.2: Share of motor vehicle manufacturing industry employment in total manufacturing formal employment (%), 1970-2020



Data source: KNBS (Various), Statistical Abstracts

As of 2020, the formal sector employment within the motor vehicle manufacturing industry was only 5,188 jobs (a reduction from 5,576 jobs in 2019), largely in manufacture of bodies (coachwork) at 59 per cent, followed by manufacture of parts and components/accessories at 22 per cent, with motor vehicle assembly at 19 per cent (Figure 2.3a). In contrast, as of 2019, there were 60,606 persons employed at the market level, in activities including sale of motor vehicles, motor vehicle parts and accessories, and repair and maintenance of motor vehicles with respective employment shares at 16.1 per cent, 62.7 per cent and 21.2 per cent (KNBS, 2021a). In 2020, this employment at the market level reduced to 54,894 due to adverse impacts of COVID-19 but the respective shares across key activities including sale of motor vehicles, motor vehicle parts and accessories, and repair and maintenance of motor vehicles remained largely unchanged. Thus, on average, 91.5 per cent of the formal sector employment within the motor vehicle industry is at the market level, mainly supported by importation of new and second-hand vehicle parts and components. Further, within the informal sector the 2016 Micro, Small and Medium Enterprises (MSMEs) survey reveals that there were about 39,000 informal sector enterprises dealing in repair of motor vehicles and sales of motor vehicle parts and accessories[11]. These statistics reflect the under-developed nature of the motor vehicle industry value chain, particularly from the viewpoint of parts and components manufacture, which are the key drivers of employment and contribution to GDP. Further, employment within the motor vehicle industry is mainly within medium and large enterprises (Figure 2.3b), suggesting constrained opportunities for value chain development through MSEs.

Figure 2.3: Employment structure by motor vehicle manufacturing segment and firm size



Data source: KNBS (2021b), Statistical Abstract 2021

11 Author's calculations based on 2016 MSME survey data.

The analysis by gender reveals that females account for 10.6 per cent of the employment within the motor vehicle industry in Kenya, which is low for the average of the whole manufacturing sector at 22.6 per cent (KNBS, 2019). These statistics reflect gender imbalance across different regions, for instance with only one quarter of employees in the motor vehicle industry being female within the European Union (International Labour Organization, 2021). The participation of women is still relatively low in Kenya. The key hindrances to participation of women in industrial activities such as motor vehicle manufacturing include unappealing work environment and skills gaps, particularly those relating to the Science, Technology, Engineering and Mathematics (STEM) courses (Lytle, Sharbek and Robinson, 2019).

A detailed summary of areas of policy focus over time and implications for development of the motor vehicle industry in Kenya is provided in Table 2.1. Three insights can be drawn from this section and the summary in Table 2.1:

(i) Much of the policy efforts have been focused on processing level compared to the input and market level for a comprehensive value chain development. This is a drawback given that the processing level of the value chain depends on input level manufacturing and economies of scale offered by larger markets that can go beyond the domestic market.

(ii) Actualization of policy aspirations through specific interventions such as R&D investments and FDI attraction particularly with regard to OEMs remains weak. This is reflected through growth of motor vehicle assemblers; who largely depend on imports of CKDs, with limited opportunities for value chain development through local sub-contracting of MSMEs.

(iii) A notable challenge is the difficulty in assessing the extent to which identified policy priorities were implemented, partly due to gaps in documenting the progress, for instance through mid-term policy reviews.

Table 2.1: Summary of policy regimes and implications for motor vehicle industry development

Time period	Policy focus areas	Motor vehicle industry value chain interventions			Industry developments
		Input level	Processing level	Market level	
1960s-1970s	Promotion of indigenous entrepreneurship for manufacture of motor vehicle parts and components: This policy regime focused on development of indigenous entrepreneurship and protection of local industries for import substitution, particularly for commercial vehicles as opposed to passenger vehicles, owing to advanced technology requirements of the later. This partly explains why the motor vehicle industry in Kenya is advanced in heavy commercial vehicles.	No explicit intervention at the input level, save for the general industrialization strategies for entrepreneurship and skills development.	• Prohibition of imports of FBUs for commercial vehicles commenced in 1977, with additional requirements for local content by motor vehicle assemblers. • KIRDI established in 1979 to support R&D, innovation, knowledge, and technology transfer especially among MSMEs in the industrial sector.	• Domestic market was the main target. • Requirements to use local materials were intended to provide market for parts' manufacturers.	• **1960s**: Volkswagen commenced assembling in Kenya but closed its operations in 1977. • **1975**: General Motors East Africa commenced operations in Kenya. • **1976**: Kenya Vehicle Manufacturers (KVM) Ltd commenced assembling. • **1977**: Association of Motor Assemblers (AVA) Ltd commenced assembling operations. • Apart from Volkswagen that exited the market, the other three players have since continued to operate. However, as seen below, Volkswagen commenced its operations in Kenya again in 2016.

Time period	Policy focus areas	Motor vehicle industry value chain interventions			Industry developments
		Input level	Processing level	Market level	
1980s	Accelerated interventions towards local production; mainly through prohibition of imported vehicles in form of FBUs and SKDs, and establishment of the *Nyayo* Car Project.	Similar to 1960s-1970s, this policy regime broadly sought to promote indigenous entrepreneurship within the domestic enterprises, and there were no explicit specific support for the motor vehicle industry at the input level.	• At the beginning of this era, the Motor Vehicle Order 198 of 1980 prohibited imports of commercial vehicles in form of FBUs or SKD components, with the expectation that a further expansion of domestically manufactured components would serve the local assemblers. • Introduction of SAPs in 1980s required less government involvement in the market, commencing exposure of weak industries to external market competition. • This policy era shifted attention to promoting private sector through incentives, a shift from direct government control in line with the SAPs, though a moderate control was recognized to facilitate local industries gradually adapt to competition from imports. • Initiative to produce Kenyan cars commenced in mid 1980s with establishment of the Nyayo Pioneer Car project.	Prohibition on imports of FBUs for commercial vehicles and the requirements for local content was intended to create market for parts and components manufacturers, and assemblers within the domestic economy.	**1986**: *Nyayo* Pioneer Car project commenced to make a 'Kenyan car', following a presidential directive. The project brought together the University of Nairobi's Department of Engineering, Kenya Railways, Kenya Polytechnic (Currently Technical University of Kenya), National Council of Science and Technology, and the Department of Defense.

Time period	Policy focus areas	Motor vehicle industry value chain interventions			Industry developments
		Input level	Processing level	Market level	
1990s	Navigating stiff competition resulting from market liberalization: This period focused on promoting industry viability amid market liberalization, opening the domestic market to external competition such as imports of new FBUs and second-hand motor vehicles. Importation of FBUs, SKDs and second-hand vehicles, together with weak value chain development and technology upgrading depressed growth of local motor vehicle industry.	There was policy recognition for development of supportive industries such as metallurgical industries anchored on iron and steel production to supply materials required by the engineering industry.	The transitioning of the *Nyayo* Car Project into the present NMC epitomised policy interests in growth of the motor vehicle industry. The government also prioritized skills and technology transfer, and growth of small-scale sub-contractors including those in metallurgy, machinery, electronics and engineering – partly intended to support motor vehicle industry in the country.	The opening up of the market to imports of FBUs, SKDs and second-hand vehicles imposed severe constraints on growth of the local motor vehicle industry.	• **1991-1993**: Local production slumps due to market liberalization and influx of imports. Number of imported passenger vehicles increased by 418% in 1994 (from 7,420 units in 1993 to 38,457 units in 1994)[12]. Similarly, imports of buses, trucks and lorries increased by 486 per cent (from 884 units in 1993 to 5,183 units in 1994). • **1994**: *Nyayo* Car Project was transitioned into the Numerical Machining Complex (NMC) to oversee commercial production of the Nyayo Car.

12 KNBS (1998), Statistical Abstract.

Time period	Policy focus areas	Motor vehicle industry value chain interventions			Industry developments
		Input level	Processing level	Market level	
2000s to present	Business environment, access to markets and embracing emerging trends: Key focus has been on improved business environment for private sector competitiveness and access to domestic and export markets.	Development of iron and steel industry is a flagship project under the Third MTP of the Kenya Vision 2030. The Scrap Metal Act No. 1 of 2015 seeks to promote circular economy of the metal industries including through regulation of dealings in scrap metal. It defines scrap metal to include old metal goods; broken metal; and second-hand metal, whether partly or wholly manufactured.	• Waiver of import duty on CKDs, save for exclusion of parts and components is aimed at localisation and development of the domestic motor vehicle industry value chain. • Reduction of corporate rate of tax for new motor vehicle assemblers from 30 per cent to 15 per cent for the first five years, with possibilities of extending this lower tax rate for another five years for the assemblers that achieve local content of 15 per cent of the ex-factory value of motor vehicles. • Reduction of excise duty on motor vehicles that are fully electric from 20 per cent to 10 per cent.	• Preferential access to public procurement promotes domestic market access for motor vehicles manufactured using locally sourced parts and components. • Preference to procure from MSMEs targets to promote domestic value chain development.	• 2009: Mobius Motors is established. • 2016: Volkswagen re-enters the market (after exit in 1977) to assemble polo vivo in collaboration with DT Dobie. • 2017: General Motors East Africa rebrands to Isuzu East Africa. • The local assembly of motor vehicles have averaged 7,200 units compared to imports of 93,000 units.

Source: Author's compilation from review of policy framework and literature

Complementary insights from key informant interviews are summarised in Box 2.1.

Box 2.1: Policy implementation challenges

1. Low budgetary allocations for industry development, including iron and steel industry. The challenge is compounded by gaps in mapping and establishing iron ore deposits for commercial/industrial exploitation.
2. Low technological capacity of local parts and component manufacturers particularly for passenger cars. This constrains implementation of exclusion items for importation under the *Buy Kenya Build Kenya* Policy and provisions of the Public Procurement and Asset Disposal Act, 2015.
3. High capital investments of the motor vehicle industry – High costs of finance against huge capital investments is a significant hindrance to expansion of the motor vehicle industry.
4. Limited market and incentives to attract private sector investments – Viability of motor vehicle industry is anchored on economies of scale, which is to be complemented by incentives, including tax and supply of relevant skills.
5. Competition from imports of parts and components and imports of second-hand motor vehicles depress development of local value chain.

Source: Author's compilations from key informant interviews - See Appendix 3

3. Methodology

This chapter outlines the analytical approach, based on value chain analysis and the theory of competitive advantage of industries. It further outlines a typical motor vehicle value chain and details of the approach and data sources to address the three research objectives along the value chain.

3.1 Value Chain Analysis and the Theory of Competitive Advantage of Industries

This study integrates two frameworks to provide insights on constraints in the motor vehicle industry: Value chain analysis (Porter, 1985) and the Porter's diamond model, also referred to as the theory of competitive advantage of industries (Porter, 1990) - see Appendix 1 for illustration of Porter's diamond model. Both frameworks assume that unlocking constraints within industries translate into competitiveness, improved innovation capacity and growth. The two frameworks further assert that firms operate in a globally competitive environment, which is a key feature of the motor vehicle industry.

Value chain involves a series of activities employed to transform a product from inception through intermediary phases of production up to delivery to the market (UNIDO, 2009a; 2009b). While the concept of value chain dates to 1960s and 1970s, it received traction with Michael Porter's (Porter, 1985) work that analyzed competitiveness of firms through sequential activities that transform and add value to products (UNIDO, 2009a). A Value Chain Analysis (VCA) is used to identify and address barriers to competitiveness at the firm, industry, country, or even regional levels with respect to a particular product. The framework is useful in situations that require identification of policy interventions with regard to interactions of actors, governance, constraints, and opportunities faced in product transformation at different stages and delivery to markets (UNIDO, 2009a).

The VCA framework has four paradigms (UNIDO, 2009a; 2011): Strategic management and business administration, industrial cluster development, global value chain, and innovation systems. The *strategic management and business administration approach* focuses on supply chain management at individual firm level considering actors such as suppliers of inputs and buyers of final products and the contractual relationships thereof, logistical support and competitiveness. The *industrial cluster development approach* focuses on systemic competitiveness realized through how value chain actors develop networks to exchange products and information; and building of industrial clusters through institutional frameworks such as inter-firm linkages. The *global value chain approach* (Gereffi, Humphrey,

and Sturgeon, 2005) focuses on governance structures and economic rents resulting from dominance of international actors such as bulk buyers and retailers, and constraints faced by producers and processors in developing countries. The *innovation systems approach* focuses on access to knowledge and technology, with opportunities for accessing them assumed to facilitate actors' participation in value chains. It focuses on enhancing competencies of value chain actors individually and collectively, through joint learning, technology development and institutional frameworks that provide an enabling environment for the value chain actors to create and utilize innovations. Enhanced competitiveness and growth of a local motor vehicle industry requires development of actors at various clusters such as suppliers of input, parts and component manufacturers and motor vehicle assemblers. Furthermore, continuous innovation and technology advancement is key considering evolving policy environment, customer taste and preferences, which requires stronger linkages among the actors within different clusters, with appropriate institutional support. Thus, this study seeks to integrate the four paradigms considering firm level features, firm interlinkages, innovation, and situational context within the global environment.

The Porter's diamond model (Porter, 1990), with its name derived from diamond-shaped nodes of the framework (Appendix 1), seeks to explain firm competitiveness within a particular industry. It attributes industry competitiveness and growth to a set of four interrelated elements: Firm strategy, structure, and rivalry; factor conditions such as skills and raw material inputs; demand conditions; and related/supporting industries. This study extends this framework to consider role of the government given that policy frameworks set the institutional contexts that shape the aspects articulated in Porter's traditional diamond model. The motor vehicle industry is complex, given different parts and components are usually manufactured by different industry players, and yet all are expected to meet the required standards and quality. Because the industry is also investments intensive, the role of support institutions and market demand to leverage on economies of scale are vital. The firm strategy, structure and rivalry situates this study within historical contexts, revealing weaknesses in the past industrial policies and lessons for the future. The factor conditions reflects set of natural resources, capital, and human resources; ranging from skills to scientific knowledge for continuous upgrading of the industry (Porter, 1990). The demand conditions reflect both sophistication of consumers to push firms to innovate, and opportunities presented by larger markets.

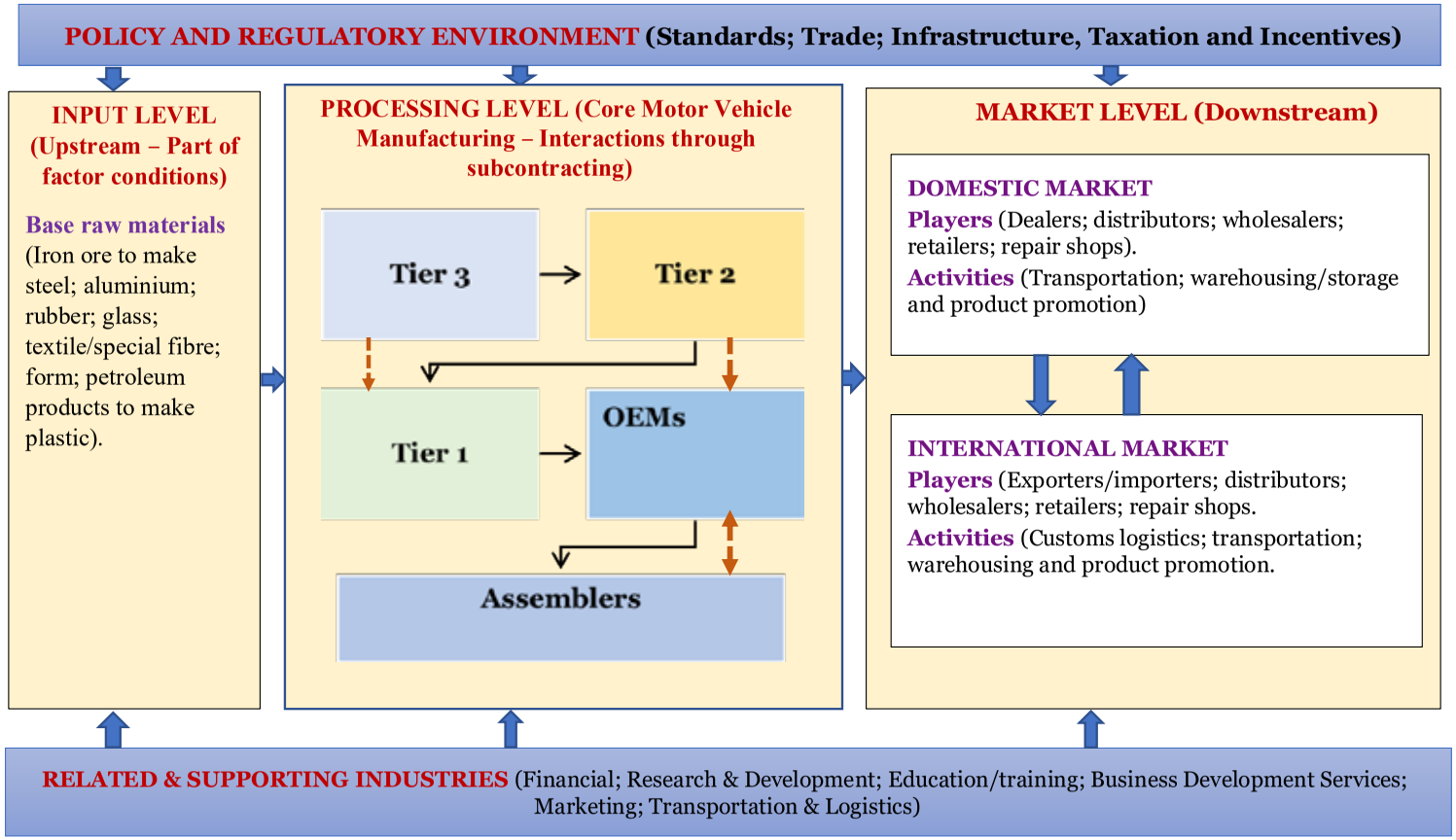
3.2 Motor Vehicle Value Chain

The motor vehicle value chain (Figure 3.1) as articulated in this study comprises of sourcing of raw materials, manufacture of parts and components, motor vehicle assembly, support services (policy institutions and private sector) and trade in parts, components and assembled motor vehicles. The manufacturers of input (base raw materials and semi-finished materials) make supplies to the core motor vehicle processing level industry actors. The roles and interactions among the processing level industry actors, which forms the critical section for motor vehicle industry development are as follows (UNCTAD, 2019):

- **Tier 3:** These are suppliers of raw materials, such as steel, other metals, glass, plastic, rubber, leather, and textile among others, tailored to the needs of motor vehicle industries. Tier 3 industry actors are therefore viewed as 'foundation of the motor vehicle industry supply chain'.
- **Tier 2:** The tier 2 suppliers do not directly sell parts to the Original Equipment Manufacturers (OEMs) and can have diversified production outside the motor vehicle industry. They can, however, be specialized in few parts or components, though usually not automotive grade.
- **Tier 1:** The tier 1 industry actors produce and supply parts and components/ systems directly to OEMs. They can have concentration in one or more OEMs through arms-length relationships, but generally work with multiple motor vehicle assembly companies. They generally have advanced technologies and more established quality credibility with OEMs.
- **OEM:** The OEMs manage project, design, brand and produce original parts and components for motor vehicles, usually under brand names. An OEM can be viewed as a 'manufacturer of final parts and/or components' when they assemble and sell parts manufactured by other companies, they sub-contract in the supply chain under a brand name and warranty. Some of the global examples are Bosch, ACDelco (producing parts for the General Motors), Motorcraft and BorgWarner.

There are two-way interactions among OEMs and motor vehicle assemblers because the motor vehicle manufacturing activities involve R&D investment, prototype development and designing of products that require close collaborations among the processing level actors. The motor vehicle assemblers aid in activities such as R&D investment, prototype development and designing of products depending on customer demands and policy developments locally, regionally, and internationally.

Figure 3.1: Motor vehicle value chain



Source: Author's illustration based on review of literature

Within the framework provided in Figure 3.1, demand is created at both the processing level (among different players) and at the general market level. The factor markets are reflected partly by the upstream (input level) and supporting industries, for instance, with regard to financing and training/skills supply. The policy and regulatory framework (role of government) and the supporting industries apply at the three levels of the value chain.

The motor vehicle manufacturing industry depends on upstream manufacturing activities. On average motor vehicles are comprised of steel (64%), plastic (21%), non-ferrous metals such as copper, lead, zinc, tin, and aluminium (7%), fluids (5%), glass (2%) and other materials such as magnesium, polymer/composite at 1 per cent (Blain, 2012). Steel is particularly a strategic input resource for the manufacture of chassis and other body structures of motor vehicles, with its distribution as follows: body structure, panels, trunk closures and doors (40%); drive train (engine block and wear-resistant gears) at 23 per cent; 12 per cent for suspension and the remaining 25 per cent utilized in parts such as steering, wheels, breaking systems and fuel tanks (Worldsteel Association, 2021a).

3.3 Study Approach and Data Sources

This study adopted mixed approaches, including review of literature and policy framework, quantitative and qualitative approaches within the VCA framework. The study assesses constraints at three broad levels of the value chain: Input (also called upstream), processing or the core motor vehicle manufacturing (comprising parts and components manufacturers and motor vehicle assemblers) and markets. The first and the third objectives are addressed through thematic analysis of policy actors and review of literature, corroborated by key informant interviews; the list of key informants is shown in Appendix 3. The second objective on constraints is addressed through a mix of review of literature and policy framework, analysis of secondary data and key informant interviews. Data source on constraints is the World Bank Enterprise Survey for Kenya 2018 (World Bank, 2020) that was conducted between May 2018 and January 2019. This survey targets formal private sector enterprises with five or more employees within the industrial, trade and service sectors. A total of 1,001 establishments were interviewed in 10 counties[13]: 455 in manufacturing, 198 in retail trade and 348 in services such as hotels and restaurants, transport and information technology. The relevant motor vehicle value chain sub-sample for analysis in this study comprised 223 enterprises: 169 enterprises at the input/upstream level, 12 enterprises at the

13 The 10 counties included Nairobi, Mombasa, Nakuru, Kisumu, Kilifi, Uasin Gishu, Machakos, Trans Nzoia, Kiambu and Kirinyaga.

core motor vehicle manufacturing (processing) level and 42 at the market level. The scope of the relevant economic activities constituting motor vehicle industry are provided in Appendix 2a and Appendix 2b. At the input level, sub-sample of enterprises included are those in the manufacture of iron and steel, fabricated metal products, basic metals, textiles, leather and leather products, chemical and chemical products, rubber and plastic products, and glass.

Additional data at the processing level of the value chain was from a survey of manufacturing firms undertaken by KIPPRA and the Kenya Association of Manufacturers (KAM) on '*Power Outages Study in Industries and its Impact on Production Costs*'. The sample for this survey was from firms that are members of KAM. Purposive sampling was first used to select the priority sectors across various regions based on KAM classification: Nairobi, Nakuru, Central, Machakos, Coast, Eastern, Eldoret, Nyanza and Western. This was followed by selecting industrial sub-sectors based on the intensity of energy use. Motor vehicle assemblers and manufacturers of parts, components and accessories constituted 18.7 per cent (17 firms) of the 91 successfully interviewed firms. The quantitative data in this study was complemented by key informant interviews (Appendix 3) from motor vehicle industry actors: Kenya Association of Manufacturers (KAM), and the Kenya Motor Industry (KMI) Association, the Ministry of Industrialization, Trade and Enterprise Development, and Numerical Machining Complex. Review of other country experiences further utilized national level competitive study reports: Global Competitiveness Index (World Economic Forum); and the Industrial Development reports from UNIDO.

4. Findings and Discussions

This section provides findings of the study in line with the three research objectives.

4.1 Key Policy Actors in the Motor Vehicle Industry

Policy actors include a diverse range of persons within the public and private sector such as individuals, organizations and groups who interact, and are concerned by collective problems sought to be addressed through a policy (Knoepfel et al., 2007). The actors in the motor vehicle industry are broadly categorised into policy development and implementing institutions, capacity development and support institutions, industry players and their respective associations, and development partners. The key actors, their roles in the motor vehicle industry value chain and some of the issues they face are elaborated according to this broad clustering. The mapping of the key actors is elaborated in Table 4.1.

4.1.1 Policy development and implementation institutions

The key actors at this level include the Ministry of Industrialization, Trade and Enterprise Development; the National Treasury and Planning; Ministry of Transport; the Ministry of Education and the Kenya Bureau of Standards (KEBS). The Executive Order No. 1 of 2020 (Government of Kenya, 2020c) provides for ministerial mandates, including functions related to the motor vehicle industry as part of the broader industrialization agenda.

The **National Treasury and Planning** ministry make legislative and fiscal proposals to Parliament on matters related to importation, trade and fiscal incentives. Such proposals are usually made through Budget Policy Statements, and subsequently Finance Bills. It also issues Regulations for implementation of the existing legislations relating to fiscal incentives. An example of such Regulations currently is the Tax Procedures (Unassembled Motor Vehicles and Trailers) Regulations, 2019. Under this Regulations, the Cabinet Secretary for the National Treasury and Planning ministry in consultation with the Cabinet Secretary for industrialization, approves applications for importers of CKDs for purposes of import duty waivers (GoK, 2019b). The consultation between the two ministries is envisaged to promote localization of the value chain, considering local capacities for manufacture of some parts and components. The **Kenya Revenue Authority (KRA)**, a state corporation under the National Treasury, administers and enforces laws on revenue, including assessments and collections of revenue on behalf of the national government. Under the Tax Procedures (Unassembled

Motor Vehicles and Trailers) Regulations, 2019 KRA licenses bonded warehouse facilities for authorized importers of CKDs (Government of Kenya, 2019b).

The **Ministry of Industrialization, Trade and Enterprise Development** formulates and coordinates implementation of industrialization and private sector development policies. These include policies related to development of Micro and Small Enterprises (MSEs), industrial policy and planning, development of special economic zones and industrial parks, domestic and foreign investments, Research and Development (R&D) investments, business innovation and incubation, intellectual property rights, standardization in the industry and quality control, industrial training, and capacity development. An important motor vehicle industry policy initiative by this Ministry is development of the National Automotive Policy, 2021 (Government of Kenya, 2021b) that has been approved by the Cabinet and further approved by Parliament as Sessional Paper No. 1 of 2022 on The National Automotive Policy will provide the framework for the motor vehicle industry's value chain development through incentives such as those related to innovation, R&D and technology acquisition. An important policy development and implementing agency under this Ministry is the **Kenya Bureau of Standards (KEBS)**, a government agency that provides standardization in the industry, standards infrastructure, and related services. In this regard, KEBS issues Kenya Standards (KS), a relevant one for the purposes of this study being the *"Road Vehicles – Inspection of Road Vehicles - Code of Practice (KS 1515:2019)"*. KEBS plays a role in development of the motor vehicle value chain through KS 1515:2019 by defining issues related to environmental standards (such as exhaust and noise emissions), safety requirements and age limit of imported motor vehicles (KEBS, 2019). Such standards are expected to facilitate convergence with international practices such as the European Union emission regulations (European Commission, 2019); that is, Euro Standards[14] that are being promoted since 1992.

Two additional ministries provide an enabling role through policy development on supply of industry-relevant skills. The **Ministry of Education** is mandated with matters of policy formulation and implementation related to management of education standards, quality assurance in education, curriculum development, post-training skills development, in science and technology. It plays an enabling role through development of policies for guiding the quality of education, including those relevant to the industrial sector, such as manufacturing. The **Ministry of Labour** is among other issues responsible for policy development and implementation regarding national labour and employment, national human resource planning and development, industrial training, national labour productivity and competitiveness. An important state agency operating under the

14 The Euro emission standards seek to lower harmful exhaust emissions including carbon monoxide (CO), nitrogen oxides (NOx), hydrocarbons (HC) and particulate matter (PM). Diesel and petrol engines generate different types of emissions and are therefore subject to different standards.

Ministry of Industrialization, Trade and Enterprise Development is the **National Industrial Training Authority (NITA**). A key mandate of NITA is to regulate and facilitate industrial training, to supply competitive workforce for industrial development (NITA, 2018). Part of the industrial training targeted by NITA include automotive engineering, mechanical engineering, electrical engineering, and Information and Communication Technology (ICT), all important for development of the motor vehicle industry.

The **Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works** is through the State Department for Transport responsible for policy formulation and implementation with regards to registration and insurance of motor vehicles, axle load control, national transport safety and transport policy management. A recent emerging trend within the motor vehicle industry globally (to be discussed in detail in Section 4.3 of this study) is the growing demand to shift from internal combustion engine vehicles to electric vehicles. Mass adoption of electric vehicles would, however, require supportive infrastructure within both public and private sector spaces. Such a shift would require support of this ministry through appropriate policy frameworks.

The review of the roles of policy development and implementation institutions reveal cross-sectoral activities required for effective development of the motor vehicle industry. The diverse nature of the actors involved therefore signals the importance of coordination among these institutions.

4.1.2 Support institutions

Support institutions include those directly involved in supporting the development of the motor vehicle industry through skills development, Research and Development (R&D), innovation, investment, financing, and marketing. At the input level, key skills development institutions include universities, Technical and Vocational Education and Training (TVET) institutions, and industrial training and capacity development institutions. The findings from review of other country experiences (Section 4.3 of this study) reveal that development of motor vehicle industry value chain is supported by availability of competent technical skills particularly in the areas of Science, Technology, Engineering and Mathematics (STEM) courses. Institutions involved in industrial training and capacity development operate under the Ministry of Industrialization, Trade and Enterprise Development; the key ones being the Kenya Institute of Business Training (KIBT) and the Kenya Industrial Training Institute (KITI). KITI provides hands-on technical training for technicians, craftsmen, artisans, and engineering with entrepreneurial orientation. Regarding investments, the Kenya Investment Authority (KenInvest) promotes domestic and foreign investments, facilitates

implementation of new investment projects, and offers investment after-care-services. Thus, KenInvest can play a critical role in the motor vehicle industry value chain development particularly at the input and processing levels. The Special Economic Zones Authority (SEZA) can support development of motor vehicle clusters through establishment of special economic zones facilitating investments. Collaborations involving institutions such as KenInvest, SEZA and the Public Investment Management Unit (PIMU) within the National Treasury can play a catalytic role in development of competitive industrial clusters through measures such as public private partnership investment arrangements. Recycling of end-of-the-market materials can serve an important input to the motor vehicle industry value chain. The Scrap Metal Council regulates trade in scrap metal and provide guidance on measures for attracting investors within the scrap metal industry.

At the processing level, NMC supports the motor vehicle industry through design work, foundry works, metallurgical laboratory, metal fabrication and machining. With regard to R&D investments, the Kenya Industrial Research and Development Institute (KIRDI) undertakes multidisciplinary research, development and innovation in industrial and allied technologies such as mechanical engineering, chemical engineering, electrical engineering, Information and Communication Technology (ICT), leather and textile technologies. It also supports MSMEs through technology transfer and incubation services. For instance, between 2016 and 2021, it facilitated transfer of 18 value addition technologies and supported 2,295 MSMEs through incubation, provision of common manufacturing facilities, product, and capacity development across the industrial sector (KIRDI, 2021).

At the market level, the Kenya Export Promotion and Branding Agency (KEPROBA) implements branding of the country and export promotion initiatives to promote export of Kenyan goods and services. KEPROBA was established in 2019 as a merger of the Export Promotion Council (established in 1992) and the Brand Kenya Board that was established in 2008. Its key mandates are envisaged to be achieved through coordinating, harmonizing, and implementing export promotion and branding initiatives and policies to promote Kenyan products in export markets; to monitor international standards and specifications; and advise Kenyan exporters on aspects such as quality and design improvement, innovation, technology upgrading, standards and product development (Government of Kenya, 2019c).

Financing is also an important input to operations of enterprises, including those within the motor vehicle industry across the three levels of the value chain. The Kenya Industrial Estate (KIE) is a development finance institution with key mandates of promoting industrialization in the country by supporting

MSMEs through measures such as financing, infrastructure/worksites, business development services and market access by entrenching sub-contracting arrangements with large-scale enterprises. Other relevant development finance institutions include the Industrial and Commercial Development Corporation (ICDC) for advancing industrial credit to medium and large enterprises; and the Industrial Development Bank (IDB) for financing industrial activities ranging from diversification or expansion.

The various policy and support institutions are summarized in Table 4.1.

Table 4.1: Policy and support institutions along the value chain

<table>
<tr><th></th><th>Input level</th><th>Processing level</th><th>Market level</th></tr>
<tr><td rowspan="3">Policy formulation and implementation institutions</td><td rowspan="2">• Ministry of Education
• Ministry of Petroleum and Mining – State Department for Mining</td><td>Ministry of Industrialization, Trade and Enterprise Development - State Department for Industrialization</td><td>Ministry of Industrialization, Trade and Enterprise Development - State Department for Industrialization</td></tr>
<tr><td colspan="2">Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works</td></tr>
<tr><td colspan="3">• Ministry of Labour
• KEBS (for implementation of standards and capacity development on related matters)
• KRA (for implementation of tax administration)</td></tr>
<tr><td rowspan="2">Support institutions</td><td>• Universities and TVET institutions
• Scrap Metal Council</td><td>• KIRDI
• KITI
• NMC
• NITA</td><td>KEPROBA</td></tr>
<tr><td colspan="2">• KenInvest
• Special Economic Zones Authority (SEZA)</td><td></td></tr>
<tr><td>Support institutions (cross-cutting)</td><td colspan="3">• Development financing institutions e.g., KIE, ICDC, IDB
• Private sector financial institutions – banks, microfinance institutions
• KIBT (For entrepreneurial skills development and business development services for MSMEs)</td></tr>
<tr><td>Member business associations (For business linkages and lobbying for supportive policies)</td><td colspan="3">• KAM
• KEPSA
• Kenya Motor Industry Association (KMI)
• Kenya Association of Bus Manufacturers (KABM)
• Kenya Association of Motor Repairers (KEMRA)
• Kenya Auto Bazaar Association (KABA)</td></tr>
</table>

Source: Author's compilations

4.1.3 Private sector industry actors

At the core of the motor vehicle industry manufacturing are the three tiers as aforementioned, together with OEMs and motor vehicle assemblers. The motor vehicle dealers can buy from local supply chain, but for Kenya this segment is dominated by imports of new FBUs and second-hand vehicles. There are also after-market dealers of new and second-hand parts and components. The motor vehicle assemblers procure parts and components, mostly from Tier-1 and OEM players in the value chain. There are six motor vehicle assemblers in Kenya (Figure 4.1). At the tier-2 and tier-1, there are about 40-45 parts and components manufacturers (Key informant interview with KAM – Appendix 3), but they are not of OEM standards. Nonetheless, they supply the motor vehicle assemblers. Tier-3 players are quite diverse and do not necessarily specialize in manufacture related to motor vehicle industry.

Another category of private sector actors are the business associations for lobbying policies and market access opportunities among other industry development initiatives. The major private sector associations include KAM, Kenya Motor Industry Association (KMI), Kenya Private Sector Alliance (KEPSA), Kenya Association of Bus Manufacturers (KABM), and the Kenya Association of Motor Repairers (KEMRA). At the dealers' level, the Kenya Auto Bazaar Association (KABA) is a key private sector association. Further, there is an increasing policy interest in the end-of-life vehicles for purposes of both environmental management and promoting circular economy. While not focused solely on the scrap metal generated from the motor vehicle industry, there are two key private sector associations at this level: the Scrap Metal Dealers Association, and the Metal Cottage Industry of Kenya.

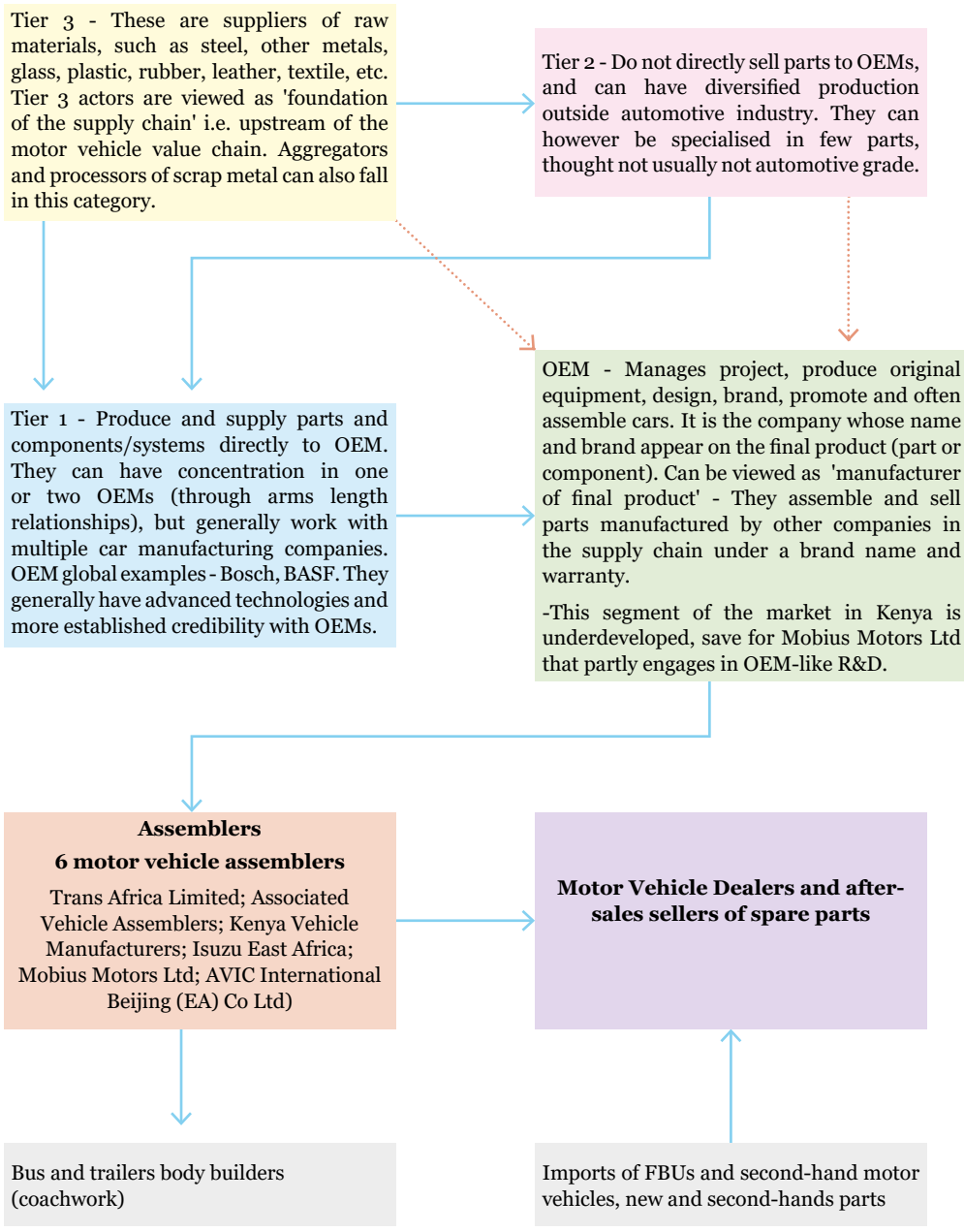
4.2 Motor Vehicle Industry Value Chain Constraints

The constraints are aligned along the value chain, with analysis considering the key issues articulated in Porter's diamond model (Porter, 1990): Factor conditions; related and supporting industries; demand conditions; and enterprise strategy, structure, and rivalry; with additional consideration of role of the government through policy support.

4.2.1 Input level constraints

The ratings of various categories of constraints by input level enterprises are summarized in Table 4.2 and discussed together with other relevant issues in subsequent paragraphs. The issues considered include skills, transport

Figure 4.1: Mapping actors in the core motor vehicle industry value chain



Source: Based on KIIs (see Annex 2) and author's review of literature (doted arrows means the supply chain varies with the industry actor, may or may not be there)

infrastructure, customs logistics, access to finance, access and cost of electricity, taxation, access to industrial land and threats of competition from the informal sector enterprises. The first column in Table 4.2 captures these issues and their relevance to Porter's diamond model.

Table 4.2: Constraints at upstream/input level of the motor vehicle industry

Issue/ Porter's diamond model relevance	Firm size	Not obstacle	Minor obstacle	Moderate obstacle	Major obstacle	Very severe obstacle
Skills – general (Factor market/ supportive industries)	MSEs	45.5	29.0	16.6	7.8	1.1
	Medium & large enterprises	32.9	34.2	20.2	8.9	3.8
	All enterprises	**39.6**	**31.4**	**18.3**	**8.3**	**2.4**
Skills for technology upgrading (Factor market/ supportive industries)	MSEs	28.4	31.8	19.3	17.1	3.4
	Medium & large enterprises	39.7	23.1	16.7	15.4	5.1
	All enterprises	**33.7**	**27.7**	**18.1**	**16.3**	**4.2**
Transport (Factor market)	MSEs	23.3	34.4	33.3	6.7	2.2
	Medium & large enterprises	29.1	32.9	17.7	15.2	5.1
	All enterprises	**26.0**	**33.7**	**26.0**	**10.7**	**3.6**
Customs/trade regulations (Government)	MSEs	35.3	24.7	27.1	10.6	2.3
	Medium & large enterprises	20.8	28.6	24.7	23.4	2.6
	All enterprises	**28.4**	**26.5**	**25.9**	**16.7**	**2.5**
Access to finance (Factor market/ supportive industries)	MSEs	20.2	27.0	18.0	30.3	4.5
	Medium & large enterprises	19.5	29.9	26.0	18.2	6.5
	All enterprises	**19.9**	**28.3**	**21.7**	**24.7**	**5.4**

Issue/ Porter's diamond model relevance	Firm size	Not obstacle	Minor obstacle	Moderate obstacle	Major obstacle	Very severe obstacle
Electricity (Factor market/ Government)	MSEs	11.1	35.6	27.8	15.6	10.0
	Medium & large enterprises	17.7	26.6	27.9	17.7	10.1
	All enterprises	**14.2**	**31.4**	**27.8**	**16.6**	**10.1**
Tax rates (Government)	MSEs	10.2	21.6	38.6	26.1	3.4
	Medium & large enterprises	18.2	20.8	19.5	29.9	11.7
	All enterprises	**13.9**	**21.2**	**29.7**	**27.9**	**7.3**
Access to industrial land (Factor market/ Government)	MSEs	54.0	21.1	9.2	11.8	4.0
	Medium & large enterprises	63.6	16.9	11.7	6.5	1.3
	All enterprises	**58.8**	**19.0**	**10.5**	**9.2**	**2.6**
Practices of competitors in the informal sector (Demand conditions/ firm strategy/ Government)	MSEs	15.7	15.7	23.6	36.0	9.0
	Medium & large enterprises	29.0	23.7	22.4	19.7	5.3
	All enterprises	**21.8**	**19.4**	**23.0**	**28.5**	**7.3**

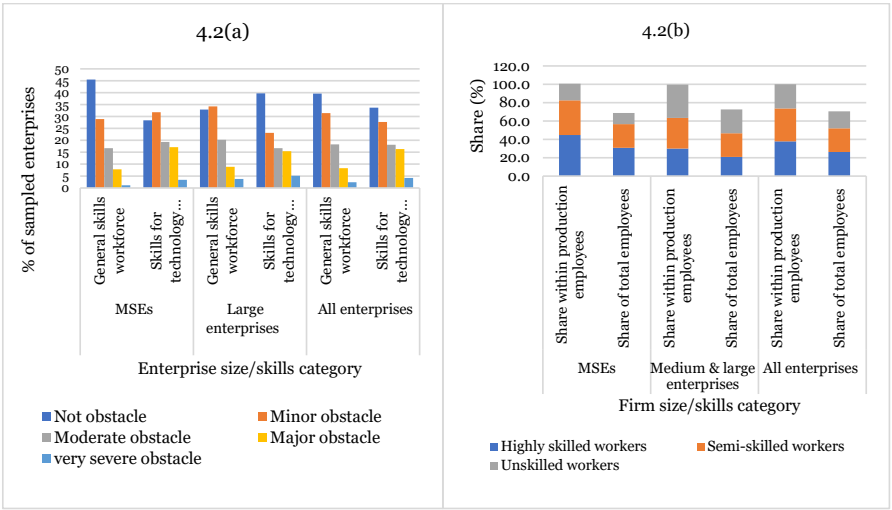
Data source: World Bank (2020), Enterprise Survey for Kenya 2018

a) Factor conditions

The factor conditions considered for analysis include skills, access to raw materials, access to finance and access to industrial land. Considering the diversity in constraints faced across firm sizes, and the Kenyan government interests to develop the MSEs sector, the analyses are provided by firm size. The findings in Table 4.2 and Figure 4.2 reveal that skills for technological upgrading is a more severe constraint than the general skills required by enterprises at the input level of the motor vehicle industry, and this is particularly the case among MSEs. The technological upgrading skills are basically a combination of technical, Research

and Development (R&D) and innovation skills. As illustrated in Figure 4.2b, the MSEs have relatively a higher proportion (not in absolute terms) of highly skilled and semi-skilled employees compared to medium and large enterprises. This is the case both in terms of composition within the production employees and a share of total employees. A possible explanation for this is that MSEs within the industrial sector are more specialized in providing supplies to medium and large enterprises, implying relatively higher demand for more technical and specialized skills. This perhaps explains why the MSEs cite skills for technological upgrading to be more severe compared to medium and large enterprises.

Figure 4.2: Skills constraints among input level industry players



Data source: World Bank Enterprise Survey for Kenya 2018. The statistics used in Figure 4.2(b) relate to production workers, including relative to total employees. Note that the share of total employees does not add to 100 per cent since it is 'production workers relative to total employees.

With regard to finance, a larger share of MSEs (52.8%) reported it to be a moderate to severe constraint compared to medium and large enterprises at 50.6 per cent. The MSEs that reported it to be a major obstacle are 30.3 per cent, compared to medium and large enterprises at 18.2 per cent. Access to finance can affect productivity of enterprises as it constrains plant expansion and technology upgrading to remain competitive.

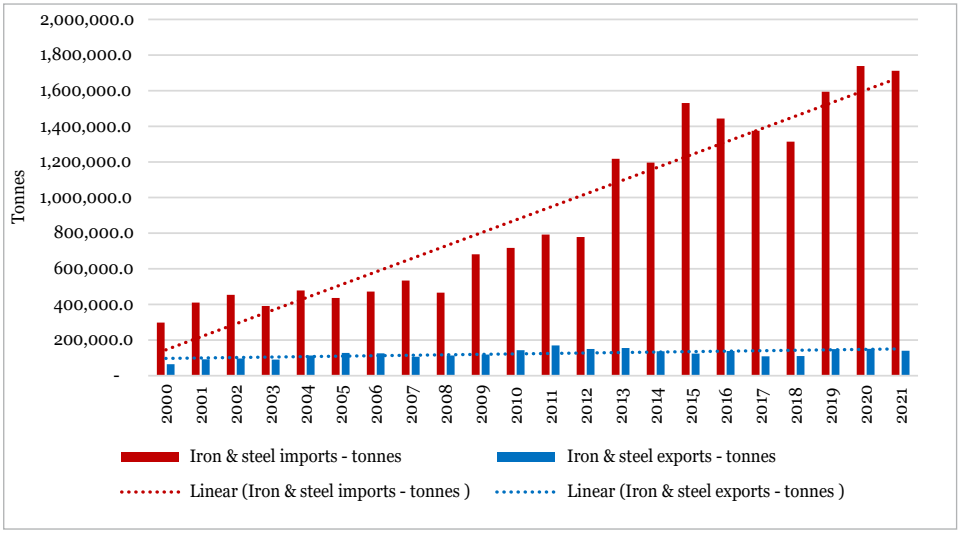
The sources of inputs for enterprises have implications in terms of supply chain constraints and opportunities created within the domestic economy. The MSEs have a higher share of domestic inputs (72.3%) compared to medium and large enterprises at 46.8 per cent. In congruence with these statistics the medium and

large enterprises report that they face higher logistical constraints (transport, customs, and trade regulations) because of higher dependence on imported intermediate inputs.

The findings further reveal that MSEs within this segment of the value chain own 42.8 per cent of the land they occupy for business, compared to 82.3 per cent for medium and large enterprises. This is further reflected in the ratings of constraints faced in access to industrial land; 46.0 per cent of MSEs cite it as a constraint compared to 36.4 per cent for medium and large enterprises.

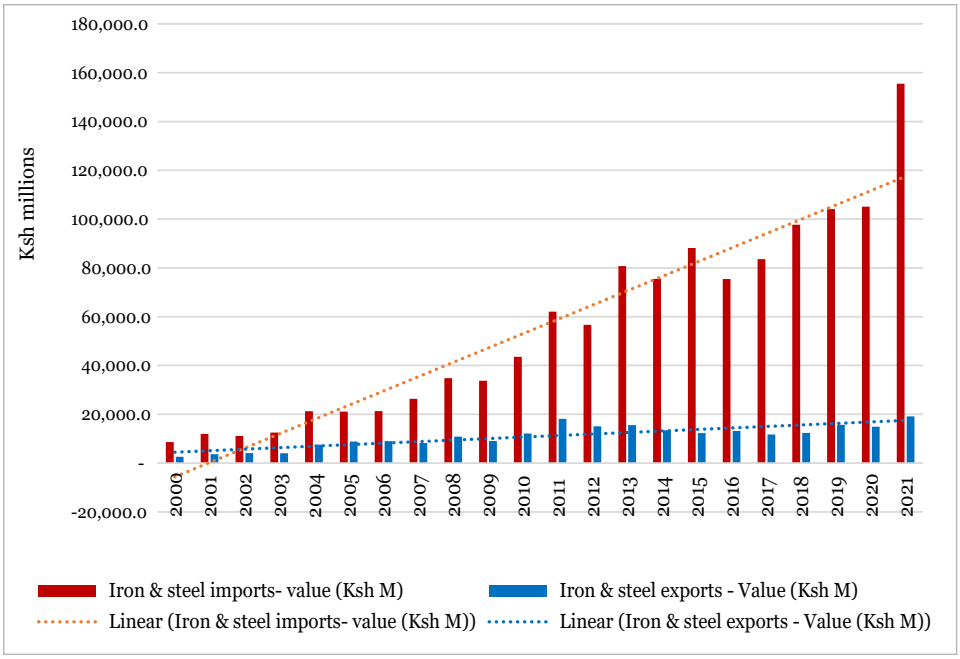
At the input level, steel serves as a strategic engineering material for the motor vehicle industry. Thus, trends in imports and exports of iron and steel are analysed (Figure 4.3a and Figure 4.3b). The findings reveal that the demand for iron and steel has been growing particularly from 2013 onwards. While not all the use of iron and steel is within the motor vehicle industry, it presents opportunities to develop local supply and capacity.

Figure 4.3a: Imports and exports of iron and steel (tonnes), 2000-2021



Data source: KNBS (Various), Economic Surveys

Figure 4.3b: Imports and exports of iron and steel (value – Ksh million), 2000-2021



Data source: KNBS (Various), Economic Surveys

b) Demand conditions

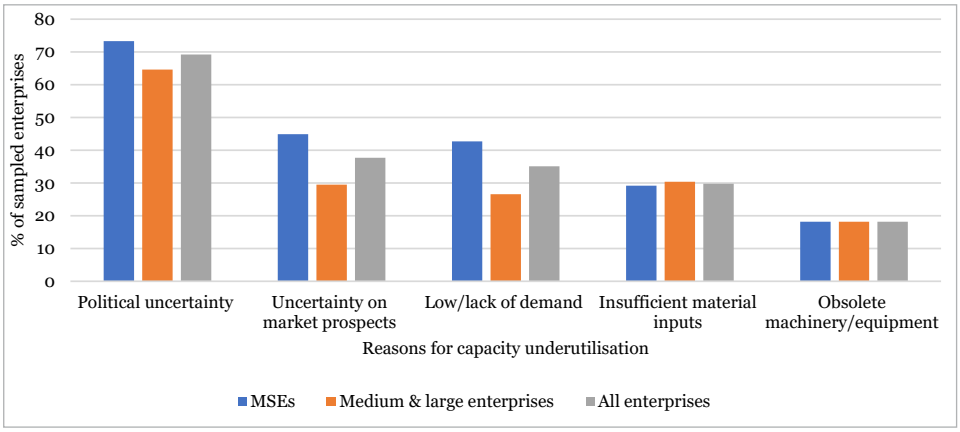
The demand conditions relate to both expanded access to domestic and export markets, which yields the benefits of economies of scope, and the domestic market sophistication that incentivize firms to innovate and embrace efficiency-enhancing strategies (Porter, 1990). Kenya's buyer sophistication according to the Global Competitiveness Index 2019 is ranked at position 92 out of 141 economies (score of 38.1 out of 100) compared to the best performing economy, South Korea at position 1 with a score of 73.8 (World Economic Forum, 2019). The rankings are based on executive survey with reference to considerations buyers make in purchasing decisions, with Likert scale rankings of 1 to 7: with 1- solely based on lowest price, and 7 - decision based on multiple product performance attributes.

The World Bank Enterprise Survey for Kenya 2018 further reveals that a moderate 35.1 per cent of the input level enterprises reported depressed demand as a key reason for low-capacity utilization (World Bank, 2020). Further, learning through exporting (Grossman, 1991; Yeoh, 2004) is minimal as a large share of the sales are within the domestic economy (85.9%), with MSEs at 89.6 per cent and medium

and large enterprises at 81.7 per cent. Firms' participation in the export markets facilitates learning from international customer demands and competition that create incentives for the firms to engage in innovation and efficiency-enhancing strategies to remain competitive (Love and Ganotakis, 2013).

The capacity utilization among the enterprises at this level of the value chain is estimated at 73.0 per cent (World Bank, 2020): 69.6 per cent for MSEs and 76.8 per cent for medium and large enterprises. The MSEs therefore face more severe constraints in capacity utilisation. Uncertainty on market prospects and low demand are cited as the second and third major reasons for capacity under-utilization, respectively (Figure 4.4). It is also revealed that policy uncertainty (e.g., change in government policy or regime) plays a central role because such uncertainties commands risk premium in investment decisions (Pástor and Veronesi, 2013).

Figure 4.4: Reasons for capacity under-utilization by input level enterprises



Data source: World Bank (2020), Enterprise Survey for Kenya 2018

c) Related and support industries

The related and support industries span a range of activities such as alliances and networks, competitive suppliers, skills development, and innovation upgrading (Porter, 1990). Learning through inter-firm networks is low among the input level enterprises: The World Bank Enterprise Survey for Kenya 2018 reveals that among enterprises at this level, only 10.7 per cent and 13.0 per cent reported interaction with suppliers and business associations, respectively, as important sources of information/ideas for technological upgrading. In contrast, 32.0 per cent reported interactions with customers as the most important source for

technological upgrading though, as aforementioned, Kenyan consumers are less sophisticated (World Economic Forum, 2019). Further, only 14.2 per cent of the sampled enterprises at this level of the value chain suggested that they benefit from incubation labs established by the government, universities, and private sector. Thus, knowledge spillover and transfer of capabilities through interfirm interactions and collaborations (Newman et al., 2016) is limited.

d) Firm strategy, structure, and rivalry

The key aspects under this theme relate to strategies employed by enterprises given the competitive structure of the market. The World Bank Enterprise Survey for Kenya 2018 reveals that majority of the enterprises at this level of the value chain report they operate in a competitive industry structure, characterized by many industry players, with no market concentration. About 58.8 per cent of the enterprises at this level of the value chain, however, reported that competition from enterprises in the informal sector pose moderate to severe constraints. As established in other studies, informal sector enterprises largely operate outside taxation and regulatory costs and, therefore, pose disincentives for investments by formal sector enterprises including decisions on R&D investments (Shibia, 2021; la Porta & Shleifer, 2014; Mendi & Costamagna, 2017).

4.2.2 Processing Level Constraints

This level of the value chain comprises of motor vehicle parts and components' manufacturers, manufacturers of bodies (coachwork) for motor vehicles, and the motor vehicle assemblers. The information from key informants reveals that there are six motor vehicle assemblers and 40-45 parts and components manufacturers. As in the previous sub-section, the relevant issues are analysed following Porter's diamond model (Porter, 1990): Factor conditions; related and supporting industries; demand conditions; and enterprise strategy, structure, and rivalry; with additional consideration of role of the government. Given fewer observations within the dataset used at this level of the value chain, analyses are not disaggregated by firm size and are reported in aggregated form. The ratings of various categories of constraints are summarized in Table 4.3 and discussed together with other relevant issues in subsequent paragraphs, including the cost structure illustrated in Figure 4.5. The first column in Table 4.3 captures these issues and their relevance to Porter's diamond model.

Table 4.3: Constraints - core motor vehicle manufacturing

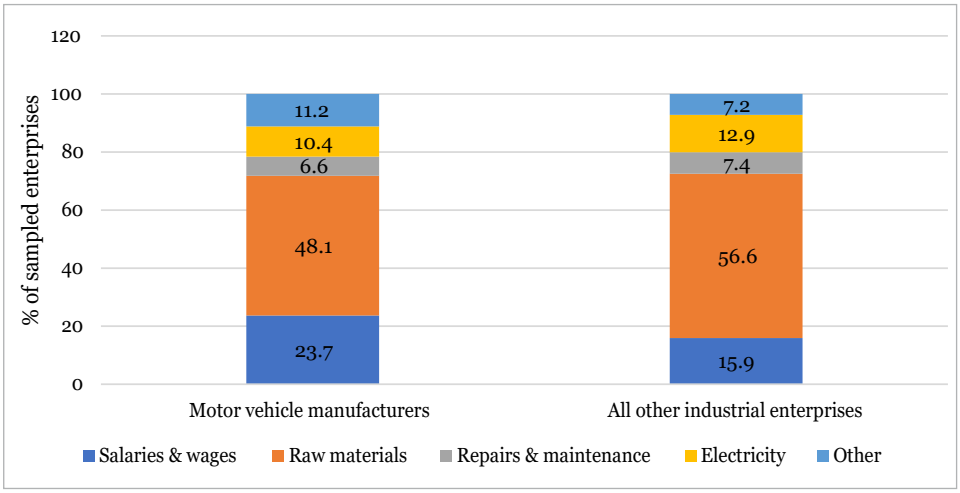
Issue/Porter's diamond model relevance	Not obstacle	Minor obstacle	Moderate obstacle	Major/ severe obstacle
Skills - general (Factor market/ supportive industries)	50.0	16.7	25.0	8.3
Skills for technology upgrading (Factor market/ supportive industries)	25.0	41.7	16.7	16.7
Transport (Factor market)	63.6	0.0	27.3	9.1
Customs/trade regulations (Government)	54.5	9.1	9.1	27.3
Access to finance (Factor market/ supportive industries)	25.0	16.7	25.0	33.3
Electricity (Factor market/ Government)	16.7	25.0	41.7	16.6
Tax rates (Government)	33.3	16.7	8.3	41.6
Access to industrial land (Factor market/ Government)	63.6	27.3	9.1	0.0
Practices of competitors in the informal sector (Demand conditions/ firm strategy/ Government)	16.7	8.3	16.7	58.3

Data source: World Bank (2020) Enterprise Survey for Kenya 2018

The cost structure reflects drivers of competitiveness within an industry. Figure 4.5 illustrates operating cost structure of core motor vehicle manufacturing industries in comparison with other industrial sector enterprises. Expenditures on raw materials and labour account for a large share (over 70%) of operating costs for motor vehicle manufacturing enterprises. The share of labour costs

for motor vehicle manufacturers is higher than those for other industrial sector enterprises, which reflects its skills-intensive nature that demand higher returns on labour supply.

Figure 4.5: Comparative cost structure of motor vehicle manufacturers compared with other industries

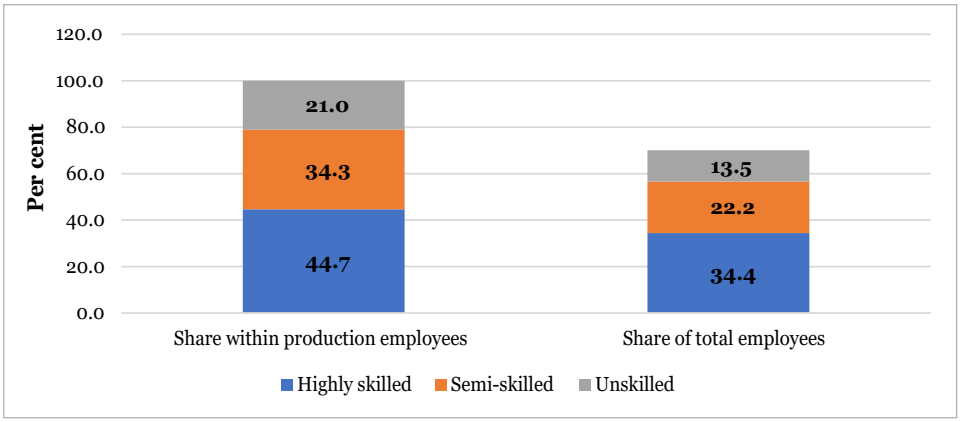


Data Source: KAM/KIPPRA (2021) survey

a) Factor conditions

Similar to the input level, skills for technological upgrading are cited to be of more severe constraint compared to the general skills level - Table 4.3 above. Figure 4.6 provides more details on skills composition within enterprises at this level of the value chain. The share of highly skilled production employees in total employment at this level of the value chain is 34.4 per cent, which is higher than the input level enterprises at 26.3 per cent. The share of highly skilled workers among production employees is also relatively high at this level of the value chain; 44.7 per cent, compared to 37.9 per cent for input level enterprises discussed in Section 4.2.1 of this study. The higher proportion of highly skilled employees suggests skills-intense nature of this level of the value chain compared to enterprises at the input level of the value chain. As discussed in Section 4.3 on review of other countries' experiences, the skills requirements largely relate to Science, Technology, Engineering and Mathematics (STEM) disciplines such as engineering (industrial, electrical, metallurgical, chemical, computer engineering), technology (computer systems and software), drafting and design, industrial production, and manufacturing (Swiecki and Menk, 2016).

Figure 4.6: Production employee's skills compositions within core manufacturing industry



Data source: World Bank (2020) Enterprise Survey for Kenya 2018. Note that share of total employees does not add to 100 per cent since it is 'production workers relative to total employees

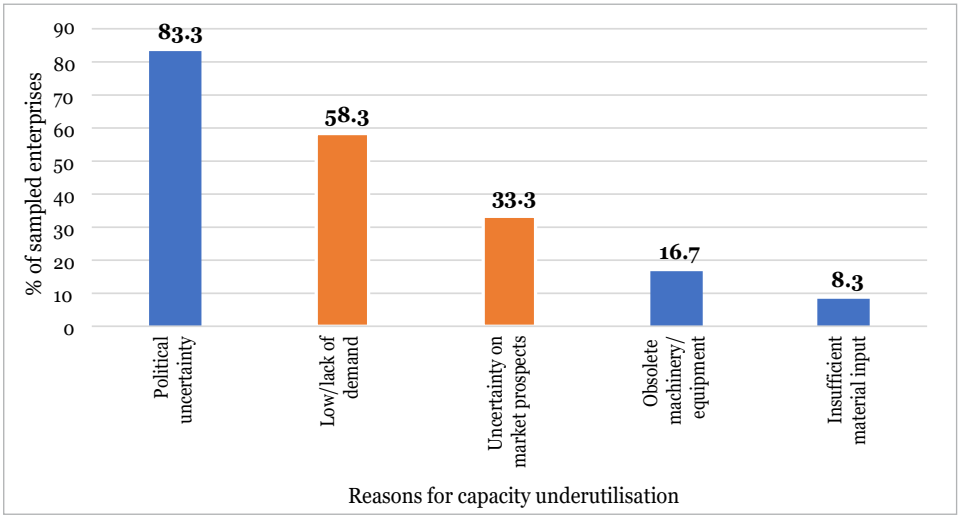
Besides skills, other key constraints at this level of the value chain relate to costs of electricity and access to affordable finance. Both of these constraints were rated by 58.8 per cent of the enterprises at this level of the value chain as moderate to very severe.

b) Demand conditions

Across all the enterprises at this level of the value chain, including parts and component manufacturers, body builders and assemblers; the World Bank Enterprise Survey reveals that capacity utilization averages 67.1 per cent with demand-related factors (low/lack of demand and uncertainty on market prospects, as illustrated in Figure 4.7a reported by 58.3 per cent and 33.3 per cent of the enterprises as the reasons for capacity under-utilization. Complementary analysis in Figure 4.7b reveals the role of cost of raw materials, labour costs, constraints related to machinery/equipment and costs of electricity as factors constraining capacity utilization. Further, the analysis in Table 4.3 reveals that competition from informal sector enterprises is reported by 75.0 per cent of the sampled firms at this level of the value chain as a constraint to their operations. The key channels of informal sector competition relate to imports of cheap and sometimes counterfeits or sub-standard parts and components (KAM, 2020). The challenge of low capacity utilization is more severe among the motor vehicle assemblers as a sub-category of enterprises within this segment of the value chain, estimated at 20.0 per cent as of 2020 (KAM, 2020): Trans Africa Ltd (40.0%); Isuzu East

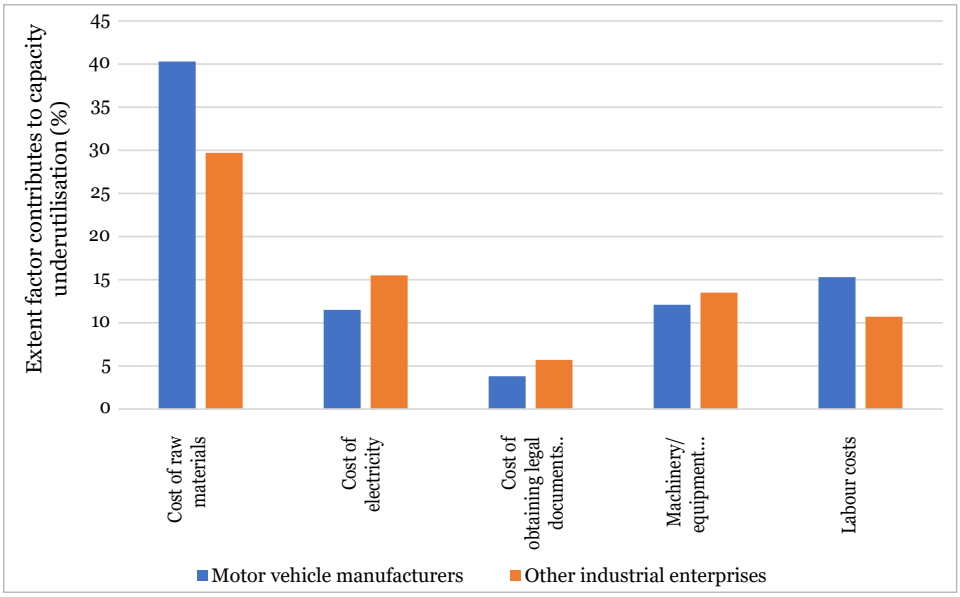
Africa (31.0%); Associated Motor Vehicle Assemblers (29.0%); Kenya Vehicle Manufacturers (6.0%) and Mobius Motors Ltd (0.0%).

Figure 4.7a: Reasons for capacity under-utilization by motor vehicle manufacturers



Data source: World Bank (2020) Enterprise Survey for Kenya 2018

Figure 4.7b: Extent different elements contribute to capacity under-utilization



Data Source: KAM/KIPPRA (2021) survey

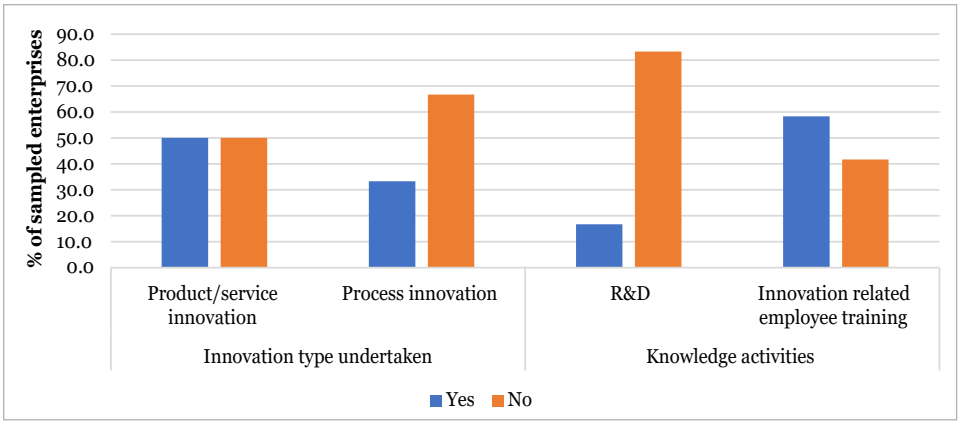
Insights from key informants (Box 4.1) suggest a number of factors for low demand on newly manufactured motor vehicles, parts, and components: Taxation of intermediate inputs at different levels of production; and imports of second-hand parts, components and motor vehicles. The high costs of raw materials in Figure 4.7b can therefore be partly linked to taxation reported by key informants.

A key opportunity related to demand conditions for development of the motor vehicle manufacturing can be viewed from the economies of scale. Africa, Kenya included, is experiencing a growing middle class (Kharas, 2010; AfDB, 2011; 2014; UNCTAD, 2019). The share of middle class in the continent's population has increased from 27 per cent (126 million people) in 1980 to 34 per cent (350 million people) in 2010 and is projected to increase to 42 per cent (1.1 billion people) by 2060 (AfDB, 2014). Leveraging on the growing middle class, Kenya can tap into the regional markets such as the East African Community (EAC), Common Market for Eastern and Southern Africa (COMESA) and more recently the African Continental Free Trade Area (AfCFTA). As a result of the growing middle class and narrowing of infrastructure deficits, the African continent is increasingly becoming an attractive destination for motor vehicle manufacturing multinational companies, including OEMs (UNCTAD, 2019). These emerging interests are also reflected in policy initiatives by different countries in the continent, including South Africa's Automotive Masterplan 2021-2035, and Morocco's Industrial Acceleration Plan 2014-2020. Exploiting these opportunities, however, requires competitive manufacturing capability and supportive business environment (Markowitz and Black, 2019).

c) Related and support industries

The most important source of knowledge/ideas for innovation and technology upgrading at this level of the value chain are cited to be interactions with customers (25.0%), consultancies (25.0%) and R&D at 16.7 per cent (World Bank, 2020). Thus, knowledge transfer through strategic alliance, inter-firm networks and collaborative projects with private/government entities remain deficient. Even so, investments in R&D is only undertaken by few enterprises (16.7%) compared to employee training (58.3%) as part of innovation strategies. About 50.0 per cent of the sampled enterprises reported to have undertaken product/service innovation, compared to process innovation at 33.3 per cent.

Figure 4.8: Knowledge activities and innovation by motor vehicle *manufacturers*



Data source: World Bank (2020) Enterprise Survey for Kenya 2018

d) Firm strategy, structure, and rivalry

A moderate proportion of the sampled enterprises at this level of the value chain reported that the industry is competitive: 50.0 per cent reported they compete against 'many competitors' compared to input level enterprises at about 40.0 per cent (World Bank, 2020). The relatively higher competition at this level of the value chain can be attributed to the liberalized market facing importation of second hand and new motor vehicles and parts and component imports. The enterprises at this level of the value chain also face competition from informal sector enterprises. A larger share of motor vehicle manufacturing enterprises (75%) at this level of the value chain reported they face moderate to very severe competition from informal sector enterprises (Table 4.3) compared to 58.8 per of the enterprises at the input level of the value chain.

Box 4.1: Summary of processing level constraints reported by key informants

- Weak/lack of incentives for R&D investments: Given changing customer tastes and preferences, international competitive pressure, and environmental concerns/regulations for controlling greenhouse gas emissions, the motor vehicle industry is under pressure to continuously innovate. This requires continuous R&D investments and development of prototypes, which are costly. This is contrasted with countries such as Germany that provide attractive R&D incentives for innovation within the industry.

- High costs of finance: Motor vehicle manufacturing equipment are capital intensive and high costs of financing in Kenya is a key hindrance to capacity expansion.
- High taxation: The taxes on intermediate inputs and final products (value added tax) increases costs of production.
- Imports of second-hand parts, components, and motor vehicles: The second-hand parts and components originate from countries such as China, India and to some extent Japan.

Source: Author's analysis from key informant interviews

This study is cognizant of the need for a more disaggregated data at processing level of the motor vehicle industry value chain to analyze the issues covered at broader level in this section. This is including disaggregation by different tiers (tier 1, tier 2 and tier 3), OEMs (or those having OEM features), and assemblers. Other aspects requiring further insights include technology requirements for different categories of motor vehicles such as passenger vehicles and heavy commercial vehicles (buses, lorries) that can be studied in detail. Future studies need to therefore extend this research, including aspects such as cost structure, skills and technology requirements from these perspectives.

4.2.3 Market level constraints

The market level of the value chain comprises enterprises engaged in sale of motor vehicles, sale of motor vehicle parts and accessories, and maintenance and repair of motor vehicles. The analysis in this section first provides the results at this broader level and then narrows to the constraints faced by sellers of parts and accessories, given the policy interest to develop local value chain. The ratings of various categories of constraints are summarized in Table 4.4 and Table 4.5, which are discussed together with other relevant issues in subsequent paragraphs. The first column in Table 4.4 captures these issues and their relevance to Porter's diamond model.

Table 4.4: Motor vehicle sellers/parts sellers and maintenance/repair

Issue/Porter's diamond model relevance	Not obstacle	Minor obstacle	Moderate obstacle	Major obstacle	Very severe obstacle
Skills – general (Factor market/ supportive industries)	43.9	24.4	17.1	9.7	4.9
Skills for technology upgrading (Factor market/ supportive industries)	19.0	35.7	16.7	23.8	4.8
Transport (Factor market)	35.7	33.3	23.8	7.1	0.0
Customs/trade regulations (Government)	32.5	32.5	12.5	20.0	2.5
Access to finance (Factor market/ supportive industries)	16.7	23.8	28.6	23.8	7.1
Electricity (Factor market/ Government)	9.8	46.3	17.1	19.5	7.3
Tax rates (Government)	17.1	19.5	34.2	24.4	4.9
Access to land (Factor market/ Government)	53.9	7.7	12.8	20.5	5.1
Practices of competitors in the informal sector (Demand conditions/ firm strategy/ Government)	4.9	17.1	36.6	36.6	4.9

Data source: World Bank (2020) Enterprise Survey for Kenya 2018

Table 4.5: Constraints – Parts and accessories sellers

Issue/Porter's diamond model relevance	Not obstacle	Minor obstacle	Moderate obstacle	Major obstacle	Very severe obstacle
Skills – general (Factor market/ supportive industries)	46.7	26.7	6.7	13.3	6.7
Skills for technology upgrading (Factor market/ supportive industries)	12.5	50.0	6.3	31.3	0.0
Transport (Factor market)	25.0	43.8	25.0	6.3	0.0
Customs/trade regulations (Government)	25.0	18.8	12.5	37.5	6.2
Access to finance (Factor market/ supportive industries)	18.7	31.3	12.5	31.3	6.3
Electricity (Factor market/ Government)	6.3	75.0	0.0	12.5	6.3
Tax rates (Government)	13.3	20.0	40.0	26.7	0.0
Access to land (Factor market/ Government)	40.0	6.7	13.3	26.7	13.3
Practices of competitors in the informal sector (Demand conditions/ firm strategy/ Government)	0.0	25.0	37.5	25.0	12.5

Data source: World Bank (2020) Enterprise Survey for Kenya 2018

a) Factor conditions

Similar to the input and processing levels of the value chain, skills for technological upgrading are of a more severe constraint than the general skills' requirements. Some factor conditions are, however, of a lesser constraint than the input and core manufacturing levels; notably access to finance and electricity. This can be attributed to heavy investments and electricity-intensive nature of activities at the input and processing levels of the value chain.

b) Demand conditions

The key demand constraints related to market level enterprises relate to competition from informal sector enterprises, and high tax rates that constrain affordability, particularly among the enterprises engaged in the business of parts, components, and accessories. The market level enterprises are also more inward focused, with 98.4 per cent of the sales within the national economy compared to, for instance, the processing level enterprises whose share of national sales are reported at 74.2 per cent. The heavy focus on the domestic economy signals opportunities available locally, though it also suggests constrained economies of scale that can be realized through expansion of markets. The local demand for motor vehicles as evidenced by new registration (Table 4.6) reveals that station wagons, followed by saloon cars account for a large share of the new registrations, averaging 55.5 per cent and 13.6 per cent over the last decade. A large share of this local demand is, however, met through imports of new and second-hand motor vehicles.

c) Related and support industries

The most important source of knowledge/ideas for innovation and technology upgrading at this level of the value chain are cited to be interactions with customers (37.5%), interaction with suppliers (31.3%) and professional journals/ publications at 12.5 per cent (World Bank, 2020). This contrasts with processing level of the value chain, for which use of consultants and R&D investments ranked second and third most important source of information/ideas for technological upgrading. This is also reflected by the fact that none of the sampled enterprises reported to have undertaken R&D investments among those dealing in parts, components, and accessories, although among all enterprises at this level only 9.5 per cent reported to have undertaken it (Figure 4.9). Further, a lower proportion of the enterprises at this level of the value chain reported to have undertaken innovation related employee training (42.9%) compared to 58.3 per cent at the

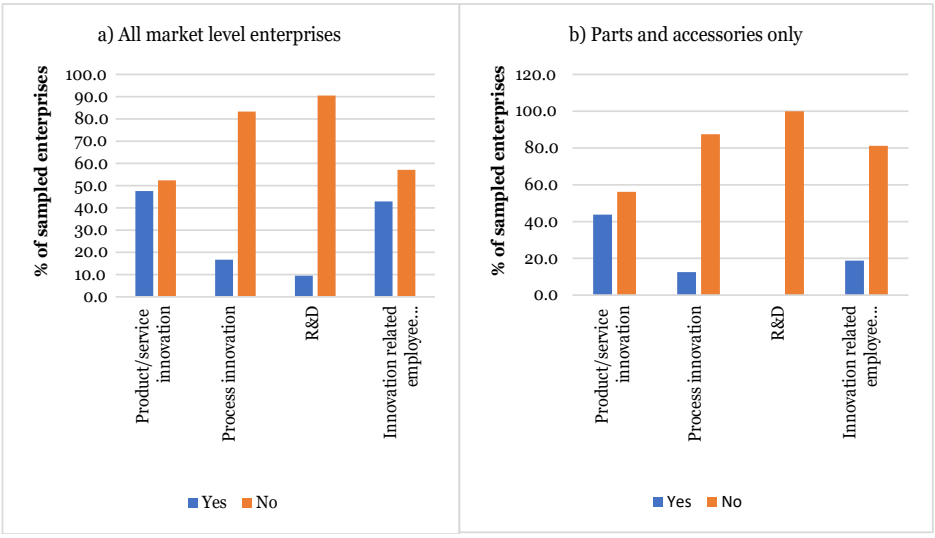
core manufacturing level. These statistics reflect that enterprises at the market level of the motor vehicle industry value chain are less knowledge intensive than input level and core manufacturing level enterprises.

Table 4.6: New registration of motor vehicles, 2010-2021 (shares, %)

	Per cent share (%)									
	Saloon cars	Station wagons	Panel vans, pickups	Lorries/trucks	Buses	Minibuses/ matatu	Trailers	Wheeled tractors	other vehicles	Total Number of Vehicles registered
2010	20.8	48.4	9.0	6.3	1.6	4.6	3.1	1.5	4.7	77,669.0
2011	17.4	49.1	11.7	8.3	2.6	0.7	4.0	1.9	4.3	63,486.0
2012	16.8	51.6	10.3	10.1	2.1	0.1	4.9	1.8	2.3	77,229.0
2013	17.4	51.8	10.4	10.2	2.2	0.2	4.2	2.0	1.5	94,017.0
2014	15.5	52.2	12.2	10.4	2.2	0.2	2.9	2.0	2.5	102,606.0
2015	13.3	50.2	12.9	12.8	2.2	0.5	3.6	2.1	2.3	107,761.0
2016	13.9	51.1	14.1	10.7	2.0	0.6	3.1	2.7	1.8	90,176.0
2017	12.6	61.3	10.9	8.3	1.2	0.5	2.2	3.0	1.0	90,211.0
2018	10.3	62.9	11.0	6.4	1.0	0.8	2.0	4.0	1.6	102,036.0
2019	9.1	66.1	9.3	5.9	1.2	1.8	1.5	1.7	3.5	109,751.0
2020	8.2	61.6	6.4	6.9	1.0	1.2	2.5	2.7	9.5	94,128.0
2021	7.6	59.9	5.6	6.6	0.8	0.8	3.0	2.6	13.2	107,499.0

Source: KNBS (Various), Economic Surveys

Figure 4.9: Knowledge activities and innovation by motor vehicle manufacturers



Data source: World Bank (2020) Enterprise Survey for Kenya 2018

d) Firm strategy, structure, and rivalry

The enterprises at this level of the value chain also face competition from informal sector operators; 78.1 per cent for all enterprises at this level, and 75.0 per cent for those trading in parts, components, and accessories (Table 4.4 and Table 4.5). This is comparable to the processing level of the value chain (75.0%), who reported they face moderate to very severe competition from informal sector enterprises, but lower that of the input level enterprises at 58.8 per cent.

Box 4.2: Key informant interview information

- Imports of second-hand parts and components limits opportunities for expanding the scope of the market.
- Technological lags: Imported second-hand motor vehicles always lag technological advancements in developed countries with regards to fuel efficiency and emission standards. While developed countries increasingly produce more eco-friendly vehicles, vehicles with older technologies end up being exported to developing countries.

Source: Author's analysis from key informant interviews

Due to data limitations, this study has not distinguished constraints faced by firms trading in locally manufactured parts and components versus those trading in imported parts and components. Future studies and can consider extending this research depending on availability of more disaggregated data and analyses on this aspect of the motor vehicle industry value chain.

4.3 Review of Lessons from Other Countries

The first part of this sub-section provides review of experiences from other countries in terms of policy framework for supporting development of motor vehicle industry value chain at the input, processing, and market levels. As revealed in Table 1.1 of the Introduction section of this study, and further elaborated in the methodology section, the country selections are based on growth of motor vehicle industry, considering established countries such as Japan and Germany and those who have recently emerged successful such as Mexico, Thailand, North Macedonia, Morocco, and India. While South Africa has experienced slow growth of the motor vehicle industry over the last decade, it is still advanced compared to other countries in Africa, and this point was also emphasized by the key informants. Thus, it was included as part of the countries for review. The second part of this sub-section provides review of countries with regards to emerging trends in the motor vehicle industry, notably market expansion strategies, transition to electric vehicles, digitization, and motor vehicle circular economy. In addition to highlighting examples from lead countries in this thematic area, including the United States (US), China and Japan, this sub-section also highlights experiences from countries advancing in this area within the East African Community, notably Rwanda and Uganda.

4.3.1 Policy support for development of the value chain

Insights from the country reviews (Japan, Germany, Thailand, Mexico, North Macedonia, India, Morocco, South Africa) in this sub-section and further summarized in Table 4.6 culminate into the following takeaways:

(i) Motor vehicle industry is scale-intensive, meaning a larger market base is essential in light of heavy capital investments. The experiences of the reviewed countries shows that access to large markets through trade agreements and leveraging on proximity advantages helps motor vehicle industry benefit from economies of scale.

(ii) Changing customer preferences and demand for more safety and environmental standards requires continuous innovations. Thus, incentives

embedded within policy frameworks particularly for R&D investments is essential. Incentives can include financing and fiscal aspects. Other key avenues for innovation technology upgrading include attraction of FDI, particularly by OEMs that through local content policies create synergy with domestic MSMEs.

(iii) Integrated infrastructure development through industrial clusters and transport logistics is required to lower costs of production. The essential infrastructure includes utilities (especially access to affordable energy), R&D centres of excellence to promote innovation, and transport infrastructure such as roads, railways, and ports, among others, for ease of trade logistics.

(iv) Specialized industry-relevant skills related to STEM courses provide a supportive input. Some of these courses include mechanical engineering, metallurgy, electronics, and mechatronics, among others.

(v) Various countries embrace futuristic policies considering increasing demand for safety and environmental standards. Some of the key measures relate to embracing eco-friendly technologies of zero emissions, including production of EVs. Other countries have also developed motor vehicle end-of-life (scrappage) policies to serve both as a policy tool for boosting demand for newer vehicles and discourage use of older vehicles that are more hazardous to the environment through carbon emissions. The scrappage policies also provide for orderly and safe disposal of motor vehicles upon reaching end-of-life.

a) Japan

Japan is one of the countries with a well-established motor vehicle industry and still demonstrating rapid growth. Employment in the motor vehicle industry grew by over 50 per cent between 2005 and 2019 (UNIDO, 2021). The development of motor vehicle industry in Japan dates to the world war and the Japanese culture of just-in-time manufacturing, continuous improvements (*kaizen*), automation with a human touch (*jidoka*) and focus on low-cost and lean (small body) motor vehicles (Putra et al., 2016):

At the input level, Japan has well developed clusters for upstream industries, such as steel, electrical and electronics, heavy machinery, chemical products, metal and plastic manufacturing. Deeply integrated industries (*keiretsu*) enhance efficiency in parts and components manufacture for the motor vehicle industry.

At the processing level, Japan militarization after the world war II incentivized development of transport and heavy machinery. At the beginning high domestic

population boosted demand for motor vehicles - with low-cost lean manufacturing, access to public funds for businesses, restrictions on car imports and strong anti-monopoly measures for domestic rivalry playing significant roles. Japan has a highly developed motor vehicle clusters with supportive infrastructure and supply of skilled labour – though an aging workforce remains a key concern. Japan is well known for attracting development of OEMs that are well integrated with parts and component manufacturers through industrial clusters quality culture of just-in-time, *kaizen* and *jidoka*. The OEMs play vital roles in Research and Development (R&D) investments that help venture into new technologies for motor vehicle industry.

At the market level, a highly sophisticated and demanding customer base push firms to innovate, which together with *kaizen* help meet international competition. Further, Japanese stringent safety and environmental standards push firms to adopt higher value advanced technologies that appeal to customers within the domestic and international markets.

b) Germany

At the input level, Germany has well developed clusters of upstream industries such as electronics, software, steel, glass, and Information and Communication Technology (ICT) (Germany Trade and Invest, 2021).

At the processing level, Germany boasts 43 OEMs (55% of OEMs in the EU) who are strong in R&D investments, accounting over a third of the global automotive R&D spending and over 60 per cent growth in Europe's R&D investments within the automotive sector (Germany Trade and Invest, 2021). The well-developed R&D infrastructure (e.g. academia-government-private sector collaborations, and centres of excellence such as the Open Hybrid LabFactory) and human capital serve as a driving force for design, innovation, safety, and reliability. The R&D infrastructure is corroborated by attractive incentives – e.g. cash grants and special credit programmes, some of which target Small and Medium Enterprises (SMEs) and high technology industries such as nanotechnology, ICT, and microsystems technology. Both the public and private sectors have committed to annually invest 3 per cent of GDP in R&D-related activities, with a target to increase it to 3.5 per cent by 2025. About 85 per cent of the value chain industry players are medium sized enterprises, supplying large-sized enterprises with parts and components, thus creating 70 per cent of the value addition within the domestic economy (Germany Trade & Invest, 2021). Further, there is strong academia-industry linkages (classroom-based teaching and on the job training over a 2–3-year period) with strong growth levels of automotive and mechatronics engineering disciplines (Germany Trade and Invest, 2017).

At the market level, Germany leverages on proximity to the expansive European market, accounting for 25 per cent of the passenger cars within the bloc (Germany Trade and Invest, 2021). It leverages on international markets with 75 per cent of the cars manufactured in 2019 destined for exports (Germany Trade & Invest, 2021).

c) Thailand

While the production of motor vehicles in Thailand dates to 1960s, its remarkable growth began only in the 1990s with exports growth commencing in 2000s (Warr & Kohpaiboon, 2017). The motor vehicle industry in Thailand has a strong value chain comprising over 1,700 Tier-2 and Tier-3 local Small and Medium Enterprises (SMEs), about 710 Tier-1 parts manufacturers cutting across local and foreign owned SMEs as well as large scale enterprises (54 per cent foreign majority and 46 per cent local majority), and 18 car assembling large scale multinational foreign-owned companies (Thailand Board of Investment, 2017; ASEAN UP, 2018). Insights at the three levels of value chain are as follows (Warr & Kohpaiboon, 2017):

At the input level, Thailand provides five-year exemption from import tariffs with regard to raw materials and other goods used for manufacture of exported products. To support motor vehicle industry value chain development at the input level, steel production is among the priority manufacturing activities that qualify for fiscal incentives (Thailand Board of Investment, 2020).

The country pursued import substitution strategy from 1960s to 1997, after which it has shifted to export-push strategy. The import-substitution strategy was pursued through a blend of fiscal incentives to local assemblers and high import tariffs and quantitative restrictions on CBUs and CKDs. The country explored complementary strategies (Warr and Kohpaiboon, 2017): First, Thailand remained a low-cost economy for heavy manufacturing in terms of labour supply. This advantage catapulted its attractiveness to FDI, particularly following appreciation of the Japanese Yen commencing in 1985[15] that increased the cost of production in Japan. Second, the Thai government pursued an aggressive strategy of infrastructure expansion to support heavy manufacturing. This included the Eastern Seaboard Corridor anchored on high-capacity deep water ports integrated with significant investments in roads, electricity, telecommunications, and water. Development of privately-owned industrial estates across the main transport corridor further enhanced logistical efficiencies. Third, favourable social ties with Japan facilitated motor vehicle industry FDI and therefore the associated technology transfer.

15 This was as a result of Plaza Accord of 1985 in which governments from key European countries, the US and Japan pursued a steady strategy of appreciation of the Japanese Yen and Euro to induce cost pressure in Japan for relocation of manufacturers to the US.

Fourth, FDI inflows for major assemblers, with many smaller Thai firms serving as parts and component suppliers, supported growth of local value chains. Fifth, there were also macroeconomic factors at play; for instance, the inflow of FDI surged following removal of restrictions on ownership of parts and component manufacturers and final assemblers after the 1997-1999 Asian financial crisis. In earlier years, local content requirements for motor vehicle assembly encouraged growth of parts and component manufacturers. The removal of local content requirements in the 1990s, however, led to a transient decline of domestic parts and component manufacturers due to opening of the economy to international competitors – only efficient Thai parts and component manufacturers survived. The country has however experienced positive value chain development owing to supply of domestic parts and component manufacturers to large assemblers. Despite the progress, a key challenge faced by the Thai motor vehicle industry is insufficient skilled labour supply for parts and components manufacturers as well as assemblers, which calls for accelerated investments for training engineers and technicians (Warr and Kohpaiboon, 2017). Thailand policies are futuristic, seeking to tap into eco-friendly production of motor vehicles. These are promoted both through lower tax rates, infrastructure development and tax incentives for R&D investment and efficiency-enhancing parts and components for motor vehicles (Thailand Board of Investment, 2017; 2020).

At the market level, Thailand's motor vehicle industry is currently export-oriented, a shift from inward-oriented import substitution strategy of 1960s to 1997 (Warr and Kohpaiboon, 2017). Manufacturers of motor vehicle parts and components benefit from free trade agreements with the Association of South East Asian Nations (ASEAN) bloc, New Zealand, China, India and Australia. The free trade agreements benefit the motor vehicle industry through expanded markets, harmonized product standards and customs, and access to raw materials at reduced prices or exemptions from import duties.

d) Mexico

Ranked as the 5th largest auto part manufacturer with US$ 99 billion annual revenue (International Trade Administration, 2020), Mexico is viewed as the 'new capital of the automotive industry' owing to its attractiveness to foreign direct investments. Between 2005 and 2019, employment in the Mexican motor vehicle industry grew by 466 per cent (UNIDO, 2021). The industry product market is diversified with key segments such as original equipment, electric and hybrid vehicles, aftermarket parts, speciality equipment, remanufactured products, and heavy vehicles. A number of factors are attributed to this attractiveness and motor vehicle industry growth (Swiecki and Menk, 2016):

At the input level, key raw materials such as iron and steel are imported from the United States, Japan, Korea and Europe (Swiecki and Menk, 2016; Wirjo, Pasadilla and Bassig, 2016) – as much as 90 per cent. To offset imported costs of raw materials, Mexico charges lower tariffs that make it more attractive for investments than the United States.

The key features at the processing level include skills availability, innovation, incentives, and attraction of Foreign Direct Investments (FDIs). The attractiveness to capital is anchored on availability of skilled and relatively low-cost labour (graduating over 90,000 engineers and technicians). The strategic areas for skills development include engineering (industrial, electrical, metallurgical, chemical, computer engineering), technology (computer systems and software), drafting and design, industrial production, and manufacturing (Swiecki and Menk, 2016). Additionally, availability of high-tech labs and Research and Development (R&D) centres corroborate availability of skilled and low-cost labour. Companies such as General Motors, Volkswagen and Nissan have research and engineering facilities specialized in motor vehicles industry needs. Further, there are attractive government investment incentives targeting large manufacturers including those in motor vehicle industry, and small-scale parts' manufacturers supplying the large-scale assemblers. Some examples of the incentives include capital equipment grants, training programmes including a government-sponsored training, attractive business services, establishment of a fund for technological development and innovation and promotion of use of ICT to increase productivity, which are seen to encourage SMEs to become suppliers of OEMs (Swiecki and Menk, 2016; Lejarraga et al., 2016). There are strong automotive clusters with well-developed supply chains and infrastructural support to lower logistical costs to neighbouring markets such the United States. For instance, its 30 automotive OEMs assembly plants are anchored on several tier 1, 2 and 3 suppliers located within various clusters across different regions of the country centre. Moreover, Mexico may have also benefited from foreign direct investments by OEMs seeking to relocate to jurisdictions that are less costly in terms of policy requirements for fuel efficiency and higher emission standards, yet remain closer to the target market base. The country is, however, experiencing challenges related to low domestic content, locally generated value added and promoting itself through the 'made in Mexico' concept though technological deepening is expected to mitigate part of these challenges (Lejarraga et al., 2016).

At the market level, Mexico's strategy is outward looking, unlike for instance Brazil that is inward-looking. The outward-looking strategy for export-push leverages on proximity to export markets that leverage on several free trade agreements[16]. Further, Mexico is looking towards diversifying export markets to developing

16 These include the European Free Trade Association (EFTA); the North American Free Trade Agreement (NAFTA); the Transpacific Partnership (TPP); the Northern Triangle; and a host of other country-level trade agreements.

and other emerging markets, driven by growing middle class and consumer preferences for light vehicles.

e) North Macedonia

Macedonia presents a case of successful growth of motor vehicle parts and components' manufacture, with employment in the industry growing ten-fold between 2005 and 2019 (UNIDO, 2021). Macedonia's policy support focuses on parts and components manufacture for exports (Invest North Macedonia, 2021), as opposed to motor vehicle assembly, thus spurring employment opportunities. The major parts and components manufactured in Macedonia include electrical and electronic parts, interiors, exhausts, transmissions (clutch boxes), telematics (software), exterior parts and roof rails, etc. Macedonia's exports of motor vehicle parts and components increased more than two-fold between 2005 and 2020, and it represents over 40 per cent of its annual exports value. The success of Macedonia is attributed to a number of factors (Invest Macedonia, 2018; Invest North Macedonia, 2021):

At the input level, there is a strong supplier base through sub-contracting arrangements. Strong science-based and engineering education system also supports value chain development, starting from the input level.

At the processing level, the key strengths include stable government policies for attracting Foreign Direct Investment (FDI), competitive and low-cost skills base with strong work ethic, and industrial clusters – technological industrial development zones, with well-developed industrial sites, infrastructure, support services and tax incentives. The population is largely youthful, with supportive skills base in specialized areas such as mechanical engineering, electrical engineering, computer sciences, metallurgy/technological engineering, transport engineering, chemical engineering and technology, leather, and textile processing. Further, strong academia-industry collaboration through joint scientific research projects promotes innovation and competent skills development. The Business Start-Up Centre scouts and nurtures innovation by university students and graduates - up to commercialization level. The innovation and skills development is further deepened by centres of excellence such as Centre of Excellence CIRCO, and the Johnson Controls Training Centre established in 2005. There is also a high level of specialization, supported by well-developed supply chain linkages. The entry of OEM such as VanHool from Belgium has further strengthened the local value chain.

At the market level, Macedonia benefits from access to a wide duty-free European market of over 650 million customers, which can be reached by road within 2

to 3 days. This is supported by a pool of competitive logistic companies. Ease of access to motor vehicle manufacturing base in Europe and Turkey facilitates low distribution costs and timely delivery ("just-in-time") of orders. Manufacturing firms in Macedonia also benefit from low production costs attributed to low income and value added taxes and low costs of utilities compared to majority of the European countries, as low as three to four times in comparative terms.

f) India

India has recorded an impressive growth of employment within the manufacturing value chain of the motor vehicle industry, accounting for 7.5 per cent of manufacturing GDP and employment growth of about 200 per cent between 2005 and 2019 (UNIDO, 2021). It has a diversified motor vehicle industry – 19 manufacturers of passenger vehicles, 14 manufacturers of commercial vehicles, 12 manufacturers of tractors and majority of the global OEMs.

At the input level, India has a vibrant steel industry. The country is ranked the second largest producer of steel (after China) at 111.2 metric tonnes in 2019, leveraging on abundance of iron ore and low-cost skilled labour (India Brand Equity Foundation, 2021). The National Steel Policy 2017 seeks to develop a technologically advanced and competitive steel industry. This policy, together with steel recycling policy are aimed at meeting the steel demand locally, thus mitigating costs of imported raw materials that can erode competitiveness of industries such as motor vehicle. Other strategies include energy efficient steel technologies among the Micro, Small and Medium Enterprises (MSMEs) and R&D support through the Steel Research and Technology Mission of India (SRTMI).

At the processing level, a number of factors and interventions supported innovation and development in the motor vehicle component manufacturing (Miglani, 2019), including: low costs and skilled labour within engineering discipline, technical collaborations, inflow of Foreign Direct Investments (FDI) particularly from Japan, and firm-level strategies to make an 'Indian or the people's car' in terms of design and affordability appeal. The technical collaborations and inflow of FDI served as conduits for learning (e.g., just-in-time and total quality management), knowledge and technology transfer. Further, the government supported R&D investments in the motor vehicle industry through tax cuts of related expenditures. Commencing in 2005, the government established a state-of-the-art R&D centre, the National Automotive Testing and R&D Infrastructure Project (NATRIP) to upgrade competencies through automotive testing (safety and emissions), approvals and R&D infrastructure (Government of India , 2012). There are, however, broader challenges related to infrastructure deficits (roads, railway) and R&D investments.

At the market level, growing middle class and a large population base provide opportunities within the domestic market (Miglani, 2019).

g) Morocco

The motor vehicle industry in Morocco dates to 1959 with establishment of *Société Marocaine de Constructions Automobiles* (SOMACA) by the Moroccan government, with technical assistance from Fiat Company subsidiary, Simca (Maturana et al., 2015). The privatization of SOMCA started in 2003, and by 2019 the French company, Renault, had gained 100 per cent ownership with a key breakthrough plant expansion investment of US$ 1.5 billion in 2012 (Maturana et al., 2015). Morocco has the fastest growing motor vehicle industry in Africa, which is reflected in employment growth in the industry of 430 per cent between 2005 and 2019 (UNIDO, 2021). Morocco designed and implemented a number of interventions along the value chain (Maturana et al., 2015):

At the input level, local content initiatives were aimed at supporting industries such as electronics, steel, glass and textiles. For instance, an agreement was made with SOMACA to start at 35 per cent local content with a target of increasing up to 70 per cent (Vidican-Auktor and Hahn, 2017).

At the processing level, in 2012 Morocco launched the Automotive Industry Training Institute to enhance industry skills. Further, the government made investments in strategic infrastructure such as special economic zones, transport infrastructure such as ports and road networks, and specialized training centres. The infrastructure development has been corroborated by attractive incentives for motor vehicle parts' manufacturers and assemblers – key among these being lower tax rates (0% for the first five years and 8.75% thereafter until the 25th year), human resource training (technicians, operators, managers) subsidies within the motor vehicle industrial clusters. The key industrial zones include Casablanca Industrial Zone, Tangier Med Zone, and Kenitra Free Zone with about 200 parts and component manufacturers supplying strategic motor vehicle assemblers such as Renault Nissan (Maturana et al., 2015). Over 43 per cent of the parts and components are sourced locally.

At the market level, Morocco has a strategic location in access to the European market. A world class port with access to European markets through the Atlantic Ocean and the Mediterranean Sea offers opportunities in ease of logistics. It also benefits from emerging economies in North Africa and Middle East.

h) South Africa

The motor vehicle industry in South Africa dates to 1920s (Black, 1995) with

establishment of the first assembly plant, the General Motors. Similar to Kenya, South Africa initially adopted tariff-based protectionist policies up to the 1980s, which created weak industries with further challenges resulting from high costs of production owing to high input costs of steel, aluminium, and rubber. It managed to attract component manufacturers much earlier. Commencing in the 1980s the government policy shifted to trade liberalization and exports promotion. As of 1995, there were up to 180 motor vehicles parts and components manufacturers (Black, 1995). A key strength over the years is, however, transfer of technology (through licensing and direct investment) between the component manufacturers and assemblers with other companies in Japan, Europe, and the US, resulting into enhanced firm capabilities, innovation, skills development and process engineering (Black, 1995).

At the input level, requirements for local content have been the principal policy instrument for motor vehicle industry value chain development in South Africa. This dates to the 1970s and 1980s, with a decreased emphasis with market liberalization in the 1990s but renewed efforts in recent days. The 2035 South African Automotive Masterplan (SAAM) has set a target of 60 per cent local content from the existing level of about 38 per cent (Black, Barnes and Monaco, 2018).

At the processing level, as aforementioned, South Africa benefited from technology transfer through licensing and direct investments. There has also been growth of parts and components' manufacturers through joint ventures and buyouts by the US and European firms (Black, 1995). The investments within the motor vehicle industry also leveraged on relatively efficient financial system and infrastructure development that lowered costs of production (Black, 1995). Commencing in 1994, the South African government developed the Motor Industry Development Programme that phased out local content requirements and tariffs, but volume-based exports incentives encouraged increased production and development of the industry (Black, Barnes and Monaco, 2018). The Automotive Production and Development Programme (ADPD) introduced in 2013, replacing the Motor Industry Development Programme of 1995 which placed heavy emphasis on parts and components manufacture (particularly at tier-1 and tier-2 suppliers).

At the market level, motor vehicle assemblers support growth of parts and component manufacturers by serving as channels/networks for access to global markets (Black, Barnes, & Monaco, 2018). Improved firm capabilities and reputation, resulting from increased foreign ownership coupled with volume-based export incentives has also been a key driver for expanding markets.

Table 4.6: Summary of country experiences

Country	Input	Processing/'Core' Motor Vehicle Manufacturing	Market
Japan	Clusters of upstream industries such as steel, electrical and electronics, heavy machinery, chemical products, metal, plastic manufacturing	• Home to major OEMs, with strong R&D orientation and linkages to parts and component manufacturers. • Culture of continuous improvements (just-in-time, kaizen and jidoka).	• Highly sophisticated and demanding customer base push firms to innovate, which together with kaizen help meet international competition. • Stringent safety and environmental standards push firms to adopt higher value advanced technologies that appeal to customers within the domestic and international markets.
Germany	Well-developed clusters of electronics, software, steel, glass, and ICT	• World class R&D facilities, incentives, and infrastructure (academia-government-private sector collaborations, and centres of excellence). • Boasts 43 OEMs (55% of OEMs in the EU), who are strong in R&D investments - Accounting over a third of the global automotive R&D spending and over 60 per cent growth in Europe's R&D investments within the automotive sector. • Incentives for Small and Medium Enterprises (SMEs) and high technology industries such as nanotechnology, ICT and microsystems technology. • 85% of the value chain industry players are medium sized enterprises, supplying large-sized enterprises with parts and components, creating 70% of the value addition within the domestic economy. • Strong academia-industry linkages (classroom-based teaching and on the job training over a 2–3-year period), with strong growth levels of automotive and mechatronics engineering disciplines.	• Proximity to the expansive European market, accounting for 25% of the passenger cars within the bloc. • It leverages on international markets with 75% of the cars manufactured in 2019 destined for exports.

Country	Input	Processing/'Core' Motor Vehicle Manufacturing	Market
Thailand	• Exemptions of strategic raw materials such as steel from import tariffs. • Promote steel production through tax incentives.	• Strong value chain comprising over 1,700 Tier-2 and Tier-3 local Small and Medium Enterprises (SMEs), about 710 Tier-1 parts manufacturers cutting across local and foreign owned SMEs and large scale enterprises (54% foreign majority and 46% local majority), and 18 car assembling large scale multinational foreign-owned companies.	• Leverages on export markets anchored on free trade agreements.
Mexico	Up to 90% of raw materials such as iron and steel are imported from the United States, Japan, Korea, and Europe - to offset imported costs of raw materials, Mexico charges lower tariffs that make it more attractive for investments than the United States.	• The industry product market is diversified with key segments such as original equipment, electric and hybrid vehicles, aftermarket parts, specialty equipment, remanufactured products, and heavy vehicles. • Availability of skills and low-cost labour (Engineers and technicians), particularly industrial, electrical, metallurgical, chemical, computer engineering), technology (computer systems and software), drafting and design, industrial production, and manufacturing. • Availability of high-tech labs and Research and Development (R&D) centres. Companies such as General Motors, Volkswagen and Nissan have research and engineering facilities specialized in motor vehicles industry needs. • Attractive government investment incentives (capital equipment grants, training, innovation funds, etc) targeting large manufacturers including those in motor vehicle industry, and small-scale parts' manufacturers supplying the large-scale assemblers. • Strong automotive clusters with well-developed supply chains and infrastructural support to lower logistical costs to neighbouring markets such the United States. • Foreign direct investments by OEMs seeking to relocate to jurisdictions that are less costly in terms of policy requirements for fuel efficiency and higher emission standards yet remain closer to the target market base.	• Outward-looking strategy for export-push leverages on proximity to export markets that leverage on several free trade agreements. • Diversification of export markets to developing and other emerging markets driven by growing middle class and consumer preferences for light vehicles.

Country	Input	Processing/'Core' Motor Vehicle Manufacturing	Market
North Macedonia	• Strong supplier base through sub-contracting arrangements. • Strong science-based and engineering education system.	• Well-developed low-cost skills with strong engineering backing. • Predictable policy environment, well developed (technological industrial development zones) attract FDI, including OEM.	• Access to expansive duty-free European market (location advantage) that leverage on free trade agreements. • Low cost of production (skills, logistics, utilities) enhances competitiveness.
India	• Steel production through a dedicated policy, R&D centres of excellence and a dedicated ministry.	• Low cost and competitive skills in engineering disciplines. • R&D support through tax incentives and centres of excellence. • Technical collaborations and FDI attraction for technology transfer.	• Products with an appeal of 'made in India/people's car' to appeal to the large population base and a growing middle class. • Leverages on both domestic and export markets
Morocco	• Support for upstream industries such a steel, electronics, textiles, and glass; with explicit agreement with the major assembler to promote local content in such industries.	• Skills development through specialized training centres. • Competitive industrial clusters with well-developed infrastructure support, tax incentives and linkages to ports. • Clustering of parts and components manufacturers around OEMs.	• Strategic location for accessing the European and Middle East markets through the Atlantic Ocean and the Mediterranean Sea. • Highly leverages on export markets.
South Africa	• Local content regulations for upstream value chain development.	• Technology transfer through investments and technology licensing to domestically owned parts and components manufacturers and assemblers. • Volume-based incentives encouraged increased production and industry development.	• Enhanced technological capabilities through foreign ownership improved reputation. • Parts and components manufacturers leverage on networks of international assemblers in accessing global markets.

Source: Author' compilations base on review of literature in Section 4.3

4.3.2 Emerging trends in motor vehicle industry

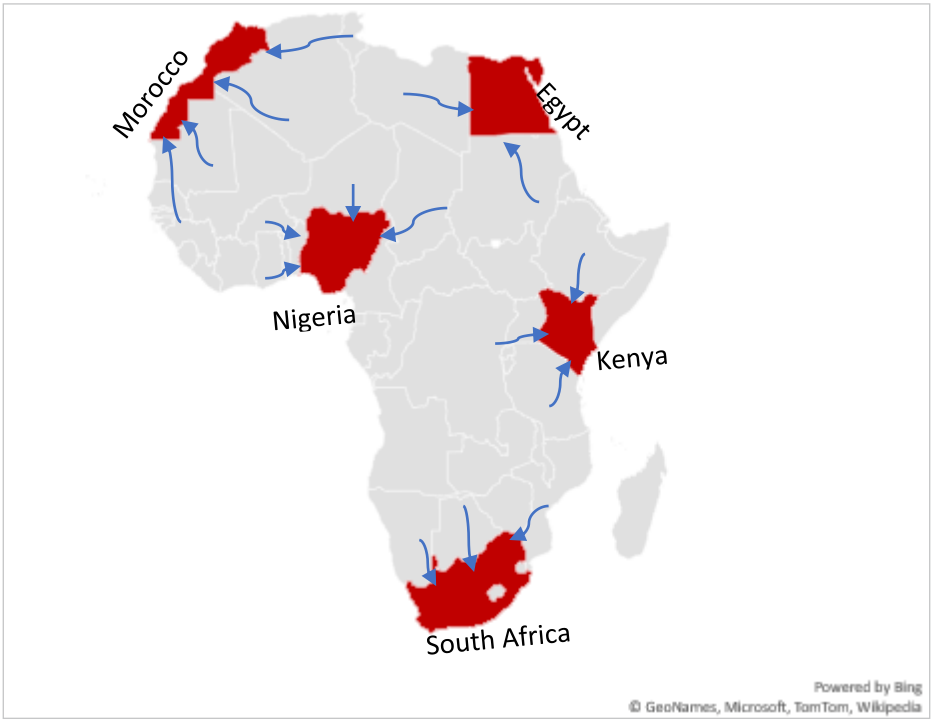
There are a number of emerging issues within the motor vehicle industry that have implications for policies aimed at strengthening the industry's value chain. These include regional approaches for economies of scale; transition to electric vehicles; digitization; and vehicle circular economy. The analysis reveals that countries are seeking to leverage on expanded markets through regional proximity or trade blocs and agreements. There is an increasing policy interest in adoption and production of electric vehicles, though developing countries face barriers related to supportive infrastructure such as those for recharging batteries. Digitization of the motor vehicle value chain, including quality control, digital identity and safety, and collaboration among industry actors in the supply chain is still at a nascent stage. Vehicle circular economy in form of recycling at end-of-life is also being increasingly embraced by governments in different regions, but this requires supportive policy, including incentives for the private sector.

a) Expanding market opportunities

The concept of '*automotive space*' is gaining policy attention (Barnes, Black, Markowitz and Monaco, 2021), and it can take three forms: A single large market such as India or China; large neighbouring markets such as opportunities presented to Mexico by the US market or that offered to Morocco by the European market; and expanded markets through regional trade agreements as in the case of the Association of South East Asian Nations (ASEAN). Thus, to overcome the challenge of limited market opportunities within a single economy, there are policy efforts towards promoting regional development of the motor vehicle value chain. The African Association of Automobile Manufacturers (AAAM) founded in 2015 as a pan-African approach seeks to leverage on existing opportunities within the African continent. Information from key informant interviews (Appendix 3) reveals that the initiative seeks to develop regional value chains for motor vehicles and other automotive industries, with South Africa, North Africa (Morocco and Egypt), West Africa (Ghana and Nigeria) and East Africa (Kenya) economies identified as strategic levers for the value chain development. The AAAM was formed by OEMs and global car manufacturers such as Toyota, General Motors, Nissan, Ford, BMW, and Volkswagen. By leveraging on AfCFTA, the Association seeks to tap into opportunities for economies of scale, partnerships for skills transfer and financing, and harmonization of automotive standards across the continent. Recent examples related to these strategies include memorandum of understanding between AAAM and the African Export-Import Bank (Afreximbank) for financing of the industry (Afreximbank, 2021), and a cooperative arrangement

with the German Association of the Automobile Industry for training and skills transfer. Developing and emerging economies such as those within the African continent are attractive to motor vehicle industry investments owing to rising middle class and lower labour costs. The realization of these opportunities is, however, dependent on the extent to which constraints such as infrastructure, policy certainty and harmonization, and skills deficit are addressed (Black & McLennan, 2016). Figure 4.10 illustrates mapping of the envisaged location for motor vehicle manufacturing hubs in the African continent.

Figure 4.10: Pan African auto pact vision supply chain



Source: Author's illustrations based on literature review and discussions with key informants

b) Shift from Internal Combustion Engine Vehicles (ICEVs) to Electric Vehicles (EVs)

There is an increasing policy interest to embrace eco-friendly technologies for environmental sustainability, including through fuel efficiency, lower greenhouse gas emissions and shift to EV production and preferences. The key emissions of concerns include carbon dioxide, carbon monoxide, nitrogen oxides, hydrocarbons, and particulate matter (Nesbit et al., 2016). The European Commission has since

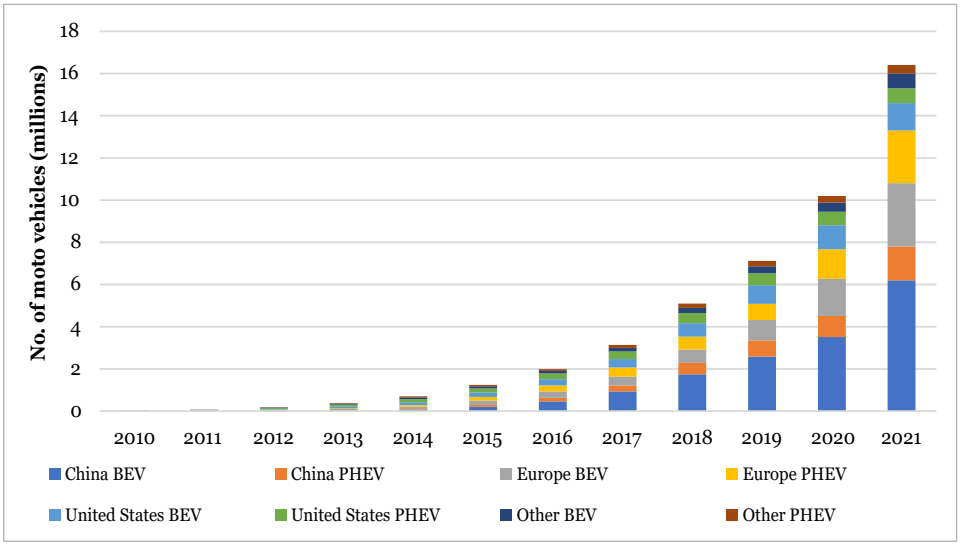
1992 introduced motor vehicle emission standards, making the standards stricter over time; the latest issue being Euro VI issued in 2014. These standards (Euro Standards) are currently in place for light duty vehicles including cars and vans, and heavy duty vehicles including buses and lorries with more stringent measures for diesel vehicles compared to petrol/gasoline vehicles (Nesbit et al., 2016). Locally, the Kenya Standards (KS) 1515:2019 issued by KEBS requires petrol-powered vehicles to comply with requirements of Euro IV/4 (KEBS, 2019).

Closing gaps on emissions such as through a shift to EV production would expand opportunities for domestic and export markets as consumers become more sustainability-conscious (International Energy Agency, 2021). The EVs can be Battery Electric Vehicles (BEVs), Hybrid Electric Vehicles (HEVs), or Plug-in Hybrid Electric Vehicles (PHEVs). The BEVs operate exclusively on high-capacity rechargeable batteries while PHEVs use both gasoline-powered engine and an electric motor with capability to recharge through regenerative braking and plug into the electric grid. The HEVs are similar to PHEVs, only that recharging of the battery is done through regenerative braking as it has no option for a plug into electric grid for recharging. As of 2021, there was 16.5 million stock of EVs, of which passenger vehicles accounted for 90 per cent, with light commercial vehicles, buses, and tracks accounting for the remaining proportion (International Energy Agency, 2021; International Energy Agency, 2022a). Further, in 2021, 10 per cent of motor vehicle sales globally was accounted for by electric vehicles (International Energy Agency, 2022a). Figure 4.11 shows trends in the stock of passenger EV cars during 2010 to 2021, revealing exponential growth. China, Europe, and the United States are the major players in the expansion of EVs, particularly BEVs.

Within the East African countries, Rwanda has prioritized transition to electric vehicles as part of its commitments to be carbon-neutral by the year 2050. The strategies to transition to electric vehicles is anchored within its Vision 2050; the National Strategy for Transformation 2017-2024; and more recently the Strategic Paper on Electric Mobility and Adaptation in Rwanda (Government of Rwanda, 2021). This strategic paper, which was approved in April 2021, seeks to promote local production and adoption of electric vehicles through a range of fiscal incentives and infrastructure support. Prior to adopting the strategic paper, the government undertook a study that among other issues established constraints to adoption of electric vehicles, notably high initial purchase costs of new EVs, limited availability and inadequacy of charging infrastructure, and knowledge gaps on operations and requirements of electric vehicles (Government of Rwanda, 2021). The incentives it employs include exemption of import and excise duties on batteries, spare parts and charging station equipment for electric vehicles. Further, building codes are planned to mainstream requirements for electric vehicle charging facilities. Companies engaging in the manufacture of electric

vehicle parts and components and those engaging in the assembly of electric vehicles enjoy a lower corporate income tax of 15 per cent and a tax holiday for specified period of time. The policy support by the Rwandan government has incentivized establishment of an electrical vehicle assembly plant by Volkswagen in 2019, with Siemens in the process of setting up charging stations in Kigali.

Figure 4.11: Trends in electric passenger car stocks, 2010-2021



Data source: International Energy Agency (2022b). Countries in 'other' category includes India, Japan, Korea, Mexico, South Africa, Thailand, Chile, Brazil, Canada, New Zealand and Malaysia.

Uganda, another economy within the EAC region, has also shown keen interest in development of electric vehicles through Kiira Motors Corporation that was formed as a partnership between the Government of Uganda and Makerere University. Kiira Motors is 96 per cent owned by the Ugandan government through the Ministry of Science, Technology, and Innovation while the remaining four per cent is owned by Makerere University (Kiira Motors Corporation, 2021). The development of motor vehicle industry is articulated in Uganda's Third Development Plan (NDPIII) 2020/21 - 2024/25 for implementation of the Uganda Vision 2040 (Government of Uganda, 2020). Under this policy framework, the Ugandan government seeks to promote local manufacturing, including activities related to iron and steel manufacture, metallic parts manufacture, and motor vehicle assembly. Moreover, it seeks to promote environmentally friendly transport solutions. Policy efforts towards manufacture of electric motor vehicles is therefore intended to promote local manufacturing and support environmentally friendly transport systems,

with a long-term orientation of tapping into export markets particularly within the Sub-Saharan Africa. Unlike Rwanda that has clearly articulated incentives for involvement of the private sector in manufacture of electric vehicles, Uganda seems to drive the agenda through a government-owned enterprise.

Despite the positive trends in the growth of EVs, there are some key policy areas of concern that can hinder the transition; for instance, battery life and access to affordable and reliable charging infrastructure, and renewable energy charging grids. Part of a slower growth rate in uptake of EVs within the category of heavy-duty vehicles such as buses, lorries and tracks is the requirement of large battery capacities and high energy demands (International Energy Agency, 2021). Public policies have roles in these contexts (International Energy Agency, 2021); for instance, there is need to encourage roll-out of zero-emission EVs, planning and development of fast-charging infrastructure for EVs, including integration of charging demand in green power systems, and sustainable battery manufacturing and disposal/recycling.

Box 4.3: Policy measures driving growth of EVs

- Development of supportive infrastructure, particularly with regards to charging points, interoperability, and integration of the demand in electricity grid. In some instances, there are direct investments in charging infrastructure and requirements for building codes for private sector to provide for charging points such as within apartments – Examples of these interventions are in Japan, India, and Canada.
- Fiscal incentives in form of purchase subsidies and tax rebates. Phased subsidies were extended during COVID-19 pandemic (in China and other countries), with sales of EVs growing by 40 per cent globally, against a decline of 16 per cent for all motor vehicles.
- Formulation of policies to aid in a shift towards EVs – In China the New Energy Automobile Industry Plan 2021-2035 has a target of increasing zero emission vehicles in total vehicle sales to be at least 20 per cent by 2025. Japan, through its Green Growth Strategy launched in 2020 seeks to promote increased electrification of motor vehicles through production of 'next generation' batteries, capital and R&D investment incentives, infrastructure for charging EVs and regulator reforms for hydrogen refuelling. Canada has a phased policy targets in shifting towards zero emissions for light duty vehicles, 10 per cent by 2025, 30 per cent by 2030, and 100 per cent by 2040.

Source: International Energy Agency (2021)

Over 20 countries (including China, Japan, Sri Lanka, the United Kingdom, Denmark, Norway) have already announced interests to completely phase out internal combustion engine vehicles within 10 to 20 years (International Energy Agency, 2021). Box 4.3 shows highlights of some policy measures used to support a shift towards EVs, and zero emission vehicles generally.

a) Digitization

Digitization in the motor vehicle industry applies to the entire value chain from product design and quality control, supply chain management and marketing (Confederation of Indian Industry, 2019). Other aspects relate to digital identity to support safety, tracking, insurance, and fleet management. Moreover, there is emergence of autonomous vehicles that minimizes the need for human drivers and enhances safety through use of advanced recognition technologies. Digital transformation can also facilitate collaboration among the industry actors in the supply chain, such as input suppliers, OEMs, and customers (Confederation of Indian Industry, 2019). While these technologies can transform the transport sector, they are still under development and can take some years before widespread adoption (Seamans, 2021).

b) Motor vehicle circular economy

Countries are increasingly paying attention to developing policies for vehicle-end-of life. Such policies are aimed at pursuing at least five objectives (Deloitte, 2021): first, to promote safe disposal of vehicles and second, to encourage recycling of materials for re-use. The third reason is to promote stock of environmentally friendly motor vehicles given that older vehicles tend to generate more pollutants. The fourth reason is to promote market opportunities for domestically manufactured vehicles by discouraging ownership of older vehicles, including through imports. Fifth, it enhances availability of low-cost raw materials for steel and automotive industries. Some of the countries with vehicle end-of-life policies are presented in Table 4.7. Kenya has no scrappage policy at the time of writing this study, but only has the Scrap Metal Act, 2015 for regulation of dealings in scrap metal by the Scrap Metal Council. This legislation is not specific to scrap metal for motor vehicles and therefore does not provide for details summarized in Table 4.7 with regard to other country experiences.

Table 4.7: Countries with policy incentives for motor vehicle scrapping

Country/ year policy developed	Programme name	Type of vehicles covered	Age criteria of vehicles	Incentives per vehicle
India (2021)	Vehicle Scrapping Policy	Commercial vehicles and passenger vehicles	15 years for commercial vehicles and 20 years for passenger vehicles	Zero registration fee for a new vehicle replacement; owners to receive 4-6% scrap value of ex-show room price of similar vehicles.
Japan (2009)	Accelerated Vehicle Replacement Programme (EcoCar)	Light duty vehicles	Greater than 10 years	US$ 2,500
Germany (2009)	Car Scrappage Programme	Light duty vehicles	Greater than 9 years	US$ 3,500
China (2009)	National Vehicle Scrappage Programme	Heavy and light duty vehicles	Age limit varies across categories	US$ 1,000 to US$ 3,000
US (2009)	Consumer Assistance to Recycle and Save (CARS)	Light duty vehicles	Greater than 25 years	US$ 3,500 to US$ 4,500
UK (2009)	Car Scrappage Scheme	Light duty vehicles	Greater than 10 years	US$ 3,500, which is shared with OEM

Source: Deloitte (2021), with extension by the author based on literature review.

The review of progress of other countries as summarized in Table 4.7 reveals this as an important emerging policy area. Further detailed research is needed on motor vehicle end-of-life activities, including disposal mechanisms and operations of this segment of the value chain. Insights from such research could guide development of motor vehicle scrappage policy for Kenya.

5. Conclusion and Recommendations

5.1 Conclusions

This study sought to analyze constraints along the motor vehicle industry value chain. This is in recognition of the potential contribution of this industry owing to its linkages with other manufacturing industries through the input channels. The government has over the years placed emphasis on the development of this industry as articulated in Sessional Paper No. 9 of 2012 on National Industrialization Policy Framework for Kenya 2012-2030; the Third Medium-Term Plan of the Kenya Vision 2030; and various budget policy statements. Prior to this, the government has sought to support the industry through regulatory instruments since 1977. The growth and contribution of the motor vehicle industry has, however, remained marginal in terms of both employment and share in GDP, with the contributions slumping since market liberalization in early 1990s. It is in these contexts that this study sought to assess constraints along the value chain at three broad levels: input level; processing ('motor vehicle parts and components' manufacturing and the assembly'); and market level. The study employs value chain and Porter's diamond model frameworks to provide insights along the value chain using the World Bank Enterprise Survey for Kenya 2018, complemented by other secondary data sources. It also leverages on review of literature and policy framework. A number of conclusions are derived from the findings of this study:

a) Policy framework

The policy approach of 1960s-1970s was intended to support indigenous entrepreneurs as a measure towards import substitution, and this was followed by accelerated measures towards local production, including through establishment of the *Nyayo* car project and prohibition of imports of commercial vehicles in form of FBUs or SKDs components, though this happened in the face of structural reforms of the 1980s. Weak entrepreneurial skills and relatively technological sophistication required for passenger vehicles favoured progress in manufacture of heavy commercial vehicles such as lorries and trailers, although again there was a heavy dependence on imported parts and components for local assembling.

The market liberalization of the early 1990s, however, exposed local enterprises to competition in international markets and cheap imports in form of new and second-hand motor vehicles and motor vehicle parts and components, substantially constraining access to markets. During the period 2000 onwards much of the policy focus has been on improved business environment, access

to markets and more recently embracing emerging developments in the motor vehicle industry, particularly a shift towards environmental-friendly production.

The analysis reveals that much of the policy focus has been on processing level compared to the input and market level for a comprehensive value chain development. A comprehensive approach to value chain development is imperative, given that access to large market can attract private investments to leverage on economies of scale considering that the motor vehicle industry is capital-intensive. Moreover, the focus on the processing level has supported growth of motor vehicle assembly as opposed to manufacture of parts and components, which are the key drivers of employment and contribution to GDP.

b) The value chain

The input level of the value chain is constrained by under-developed iron and steel industry owing to limited resource allocations. The situation implies constraints in access to inputs given that, on average, steel accounts for about 65 per cent of motor vehicle parts and components. The skills, particularly those for technological upgrading are a key obstacle especially among the MSEs. This is despite availability of well-developed universities and TVET institutions for supply of the needed skills, particularly those relating to STEM courses.

At the processing level, in addition to skills for technological upgrading, there are challenges related to capacity under-utilization, knowledge transfer, low R&D investments and innovation. Capacity under-utilization largely emanates from scope of the market and policy uncertainties and to some extent equipment/ technology obsolescence. Competition from the practices of informal sector enterprises is also observed to be a severe constraint through imports of and trade in second-hand parts and components that limit opportunities for more production to benefit from economies of scale. A key opportunity observed at this level of the value chain relates to the scope of the regional markets for attracting investments.

At the market level taxation, competition from informal sector enterprises and access to land are reported by the motor vehicle enterprises (mainly motor vehicle dealers and parts/components' traders) to impose substantial constraints.

c) Experience from other countries

Review of other country experiences reveals at least five important policy insights. First, the motor vehicle industry is scale-intensive, meaning a larger market base is essential, considering the heavy capital investments involved. The experiences

of the reviewed countries reveal that access to large markets through economic blocs and trade agreements, and ability to leverage on proximity advantages helps the motor vehicle industry benefit from economies of scale.

Second, changing customer preferences and demand for more safety and environmental standards require continuous innovations. Thus, incentives embedded within policy frameworks particularly for R&D investments and other elements of the innovation ecosystem such as supportive skills are essential. Incentives can include financing and fiscal (taxation) aspects. Other key avenues for innovation and technology upgrading include attraction of FDI, particularly OEMs that through local content policies create synergy with domestic MSMEs.

Third, integrated infrastructure development through industrial clusters and transport logistics is required to lower the costs of production. The essential infrastructure includes utilities, R&D centres of excellence, and transport infrastructure such as roads, railways, and ports, among others.

Fourth, specialized industry-relevant skills related to STEM courses provide a supportive input, particularly at the processing level. Some of these courses relate to mechanical engineering, metallurgy, electronics, and mechatronics among others.

Fifth, considering the emerging trends such as environmental sustainability, various countries embrace futuristic policies considering increasing demand for safety and environmental standards. Some of the key measures relate to embracing eco-friendly technologies of zero emissions, including incentives for production of EVs through subsidies and tax incentives, and policies to encourage charging infrastructure development. There are also increasing interests in circular economy through vehicle-end-of-life recycling (scrappage) policies. The scrappage and recycling policies are eco-friendly and should provide incentives to expand markets for new vehicles.

5.2 Policy Recommendations

The following policy recommendations are suggested to promote development of the motor vehicle industry value chain in Kenya:

i. **Input level interventions:** These interventions are geared towards a sustainable supply of strategic raw materials for the motor vehicle industry value chain.

   - Support development of the upstream industry, particularly iron and steel due to its strategic role in development of the motor vehicle industry. The specific interventions include mapping existing deposits

of iron ore and attracting private sector investors and making adequate budgetary allocation for exploitation. At policy level, there is need to finalize the iron and steel policy as envisaged in the Third MTP of the Kenya Vision 2030, and develop a vehicle-end-of-life policy to promote a coordinated approach towards recycling of steel. Existing legal and regulatory framework, including the Scrap Metal Act, 2015 and any Regulations developed thereunder can then be aligned to a vehicle-end-of-life (scrappage) policy. The MDAs to drive this include the State Department for Mining, the National Treasury and Planning (for budgetary allocation); State Department for Industrialization, NMC, and KenInvest.

- Strengthen linkages between complementary input level industries and the processing level industries. Growth of the processing level industries such as parts and component manufacturers and motor vehicle assembling requires input from other industries such as those manufacturing glass, rubber, leather, and textiles. The key issues for consideration include quality and standards. The linkages can be promoted through sub-contracting arrangements; establishing centres of excellence for MSMEs and holding regular forums for resolving challenges and exchange information and experiences. The actors to support implementation include the State Department for Industrialization, State Department for Mining; KIRDI; KIE; the Micro and Small Enterprises Authority (MSEA); KIE; KenInvest; Kenya Leather Development Council (KLDC); KEBS; and Agriculture and Food Authority (AFA) through the Fibre Crops Directorate. Private sector associations such as KAM, KEPSA, KMI and the Scrap Metal Dealers Association are also important actors in creating the linkages. Partnerships with universities, TVET institutions (for capacity building) and development partners such as the World Bank, and UNIDO are important in capacity development and funding opportunities.

ii. **Processing level (Core motor vehicle manufacturing) interventions.** These interventions are geared towards core motor vehicle manufacturing activities, such as parts and components manufacturing and motor vehicle assembling.

- Promote technology transfer and innovation: This could be achieved through incentives for R&D investments and integration of institutions of higher learning and the industry. Fiscal incentives could promote R&D investments, innovation, and knowledge transfer towards

lowering costs of prototypes and continuous technology upgrading. The Income Tax Act Cap 470 already provides for some incentives in form of tax-deductible expenses for promoting R&D investments, including expenditure on scientific research and contributions to scientific research institutions. Promoting these measures through awareness creation among the private sector enterprises and tertiary institutions within the education sector is imperative. If there are implementation challenges of these incentives, then there is a need to develop regulations for administrative feasibility. Besides the motor vehicle industry, these measures are also of benefit to the wider industrial sector. An important aspect is to expand opportunities in tapping value chain development for passenger motor vehicles. Kenya's policies have over time favoured manufacture of heavy commercial vehicles considering relatively higher technology requirements of passenger vehicles. A large share of the imports is, however, accounted for by passenger vehicles especially saloon cars and station wagons. This could be actualized through developing a conducive technology and innovation ecosystem such as through R&D incentives, innovation centres of excellence and knowledge transfer that can leverage on enhanced industry-policy-research/academia linkages. The key actors include the National Treasury and Planning; Ministry of Industrialization, Trade and Enterprise Development; Ministry of Education; State Department for Labour, KRA, SEZA, KenInvest and KIRDI.

- Enhance avenues for domestic value chain development through incentives for OEMs, including infrastructure within industrial zones, fiscal incentives and access to regional markets for economies of scale. The incentives could be aligned to the criteria outlined in the Kenya Investment Policy 2019, including potential for sustainable development, technology transfer to domestic enterprises, skills development, productivity growth, and opportunities for employment creation. Thus, the incentives could be linked to the extent of integration of OEMs and other large enterprises with local enterprises, such as technology transfer and sub-contracting arrangements with MSMEs. Opportunities to develop infrastructure for industrial development such as motor vehicle clusters could consider leveraging on PPPs. The key actors include the National Treasury; Ministry of Industrialization, Trade and Enterprise Development; KenInvest; the Export Processing Zones Authority; and the Special Economic Zones Authority.

- Deepen training in courses related to motor vehicle industry, such as mechatronics, mechanical engineering, metallurgy, electrical and electronics engineering. Further, there is need to create awareness on opportunities for internship programmes for university students, partnership with the industry/private sector and scholarship opportunities in collaboration with development partners. An example of the partnership between the government and the industry that needs to be scaled up is the establishment of the Hyundai Dream Centre, an automotive training and educational facility espoused within NITA in Athi River in June 2021 to offer automotive vocational training. This was the seventh such global institutes established by Hyundai Motors, the other six being Ghana, Vietnam, Indonesia, Philippines, Cambodia and Peru (Hyundai Motor Company, 2021). The actors include the Ministry of Education, Ministry of Labour, universities, and TVET institutions.
- Development of the motor vehicle value chain needs to be cognizant of the emerging issues such as targets to shift towards zero emissions and production of EVs. Such goals could be realized through implementation of appropriate fiscal incentives in line with the Kenya Investment Policy, 2019; the Kenya National Energy Efficiency and Conservation Strategy (NEECS) 2020 and other policy measures that encourage private sector investments as demonstrated by experiences of other countries such as China and Rwanda – for example, R&D incentives, building codes to encourage EVs charging infrastructure and tax incentives for manufacturers of EVs. The key actors include the National Treasury; Ministry of Industrialisation, Trade and Enterprise Development; Ministry of Energy; and the Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works.

iii. **Market level interventions.** These interventions are intended to expand access to markets for local manufacturer of motor vehicle parts and components, and motor vehicle assemblers.

- Leverage on access to regional markets to attract investors. As aforementioned, the motor vehicle industry is scale-intensive and there is therefore need to expand the market to provide the advantage of economies of scale. While the EAC market is an immediate opportunity, AfCFTA provides an expansive opportunity for motor vehicle parts and components and assembled motor vehicles. Continued engagements and partnerships with pan-African entities such as the African Association of Automobile Manufacturers (AAAM)

for actualizing Kenya as a regional hub for the automotive industry within the EAC market is imperative. Attracting OEMs and promoting sub-contracting of MSMEs could expand the market at different layers of the industry. Other measures include gradual increase of taxes on imports of old and new vehicles, parts and components imports; a gradual phasing out of second-hand vehicles through age limit of imported motor vehicles; and a vehicle-end-of-life (scrappage) policy. Further, the implementation of *Buy Kenya Build Kenya* strategy is imperative in sustaining access to the local market through the preferential procurement for motor vehicle industry (Appendix 4 lists the motor vehicle parts and components receiving the preferential procurement). The key actors include the National Treasury; Ministry of East African Community and Regional Development, Ministry of Industrialisation, Trade and Enterprise Development; KEBS; and KEPROBA. Further, private sector associations such as KAM, KEPSA, KMI and KABM have roles in supporting development of market opportunities through coordination of members, including tapping into market niches and upgrading of standards.

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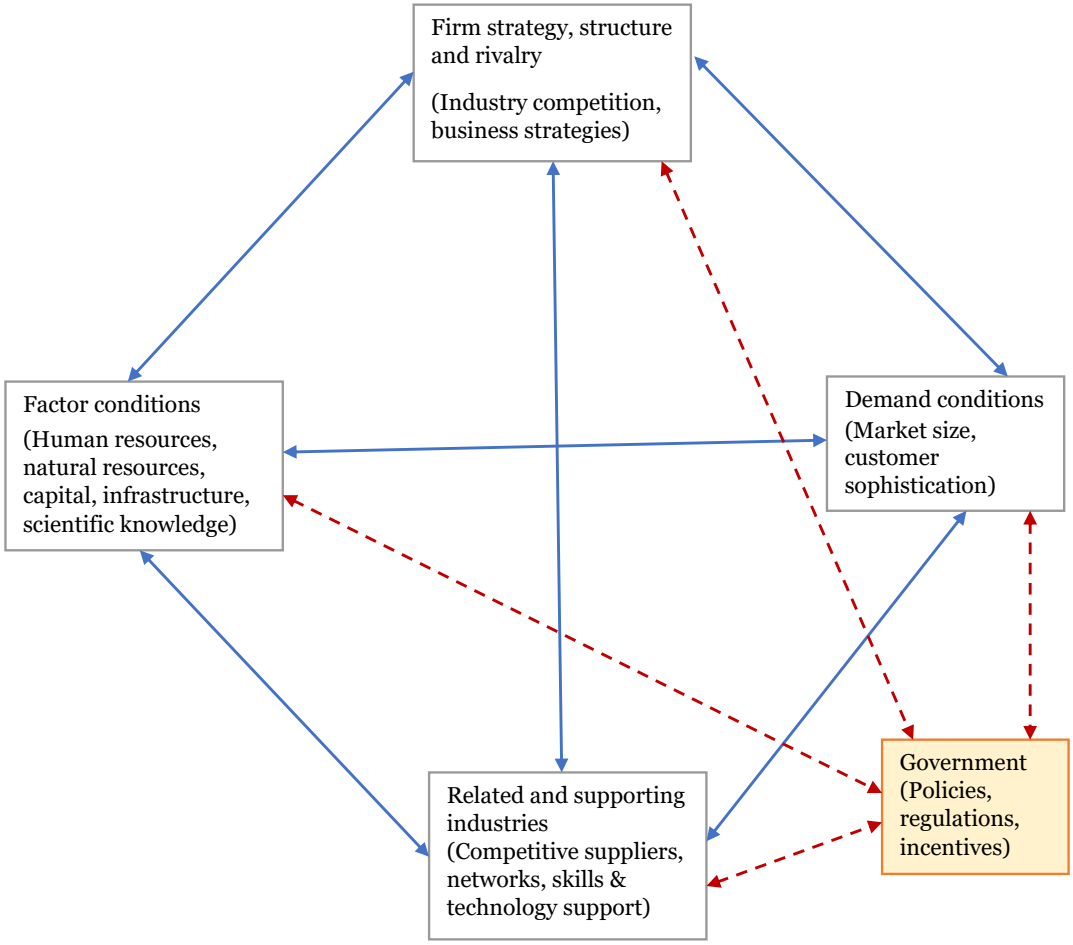
Appendices

Appendix 1: Porter's diamond model



Source: Porter (1990), with author's extension on roles of the government.

Appendix 2a: Motor vehicles manufacturing activities (ISIC 29)

Manufacture of motor vehicles include vehicles for passenger transport or freight; manufacture of parts and accessories; and manufacture of trailers and semi-trailers. The sub-components of motor vehicle manufacture include:

i. Manufacture of motor vehicles (ISIC 2910):
   - Manufacture of passenger cars
   - Manufacture of commercial vehicles (vans, lorries, tractors, etc)
   - Manufacture of buses and coaches
   - Manufacture of motor vehicle engines

ii. Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers (ISIC 2920):
   - Manufacture of bodies
   - Outfitting of all types of motor vehicles, trailers and semi-trailers
   - Manufacture of trailers and semi-trailers
   - Manufacture of containers for carriage

iii. Manufacture of parts and accessories for motor vehicles (ISIC 2930): -
   - Manufacture of parts and accessories (brakes, gearboxes, wheels, suspension shock absorbers, radiators, silencers, exhaust pipes, catalytic converters, clutches, steering wheels, steering columns and steering boxes
   - Manufacture of parts and accessories for motor vehicle bodies (safety belts, airbags, doors, bumpers)
   - Manufacture of car seats
   - Manufacture of motor vehicle electrical equipment (Generators, alternators, spark plugs, ignition wiring harnesses, power window and door systems, assembly of purchased gauges into instrument panels, voltage regulators, etc)

Source: United Nations (2008)

Appendix 2b: Wholesale and retail trade and repair of motor vehicles (ISIC 45)

The activities in ISIC 45 include wholesale and retail sale of new and second-hand vehicles, the repair and maintenance of vehicles, and the wholesale and retail sale of parts and accessories for motor vehicles. Other activities included relate to washing and polishing of motor vehicles. The sub-components of ISIC 45 are as follows:

- Sale of motor vehicles (ISIC 4510), including wholesale and retail sale of new and used motor vehicles
- Maintenance and repair of motor vehicles (ISIC 4520), such as mechanical and electrical repairs; bodywork repair; spraying and painting; tyre and tube repair; anti-rust treatment; installation of parts and accessories (not as part of manufacturing process), etc
- Sale of parts and accessories for motor vehicles (ISIC 4530), which includes wholesale and retail sale of all kinds of parts, components, supplies, tools and accessories for motor vehicles

Source: United Nations (2008)

Appendix 3: List of key informants

S/N	Name	Organization	Designation	Date of Interview
1.	Jackson Wambua	Kenya Association of Manufacturers (KAM)	Manager, KAM Sectors	04.08.2021
2.	Zipporah Samoei	Numerical Machining Complex (NMC)	Ag. Head of Sales & Marketing	04.08.2021
3.	Gideon Oele	State Department for Industrialisation	Deputy Director, Industries	09.08.2021
4.	Gladys Oudu	Scrap Metal Council		15.12.2021

5.	Kenneth Guantai	Auto Truck E.A., and NYS	Founder & CEO, Auto Truck E.A. Ltd.; and Director of Innovation at the National Youth Service (NYS)	24.05.2022

Appendix 4: Preferential procurement for motor vehicle industry

1. Air brakes and parts
2. Canvas
3. Covered and closed (railway or tramway goods vans and wagons, not self-propelled)
4. Hooks and other coupling devices, buffers, and parts
5. Industrial filtering or purifying machinery and apparatus for gases
6. Locomotives (parts of railway or tramway locomotives or rolling stock)
7. Lubricants in liquid form gear oil, engine oil, brake fluid, grease
8. Oil or petrol-filters for internal combustion engines
9. Open, with non-removable sides of a height exceeding 60 cm (railway or tramway goods vans and wagons, not self-propelled)
10. Other (railway or tramway goods vans and wagons, not self-propelled)
11. Other (centrifuges, including centrifugal dryers; filtering or purifying machinery and apparatus, for liquids or gases)
12. Seats of a kind used for motor vehicles
13. Self-discharging vans and wagons, other than those of subheading 8606.10.
14. Greases
15. Coolants, brake fluid, cutting oils
16. Motor vehicles for the transport of ten or more persons, including the driver
17. Buses: Motor cars and other motor vehicles principally designed for the transport of persons (other than those of heading 87.02), cylinder capacity exceeding 3,000.
18. Other auto accessories: Batteries, battery cables, engine air filters, exhaust pipes and silencer, leaf spring assembly and leaf springs, U-bolts, U-bolt nuts and centre bolts, wiring harness, in vehicle literature, vehicle vin plates & decals, speed governors and accessories, seat frames, seat foam pad, (polyurethane foam), seat upholstery, interior trim.

Source: Government of Kenya (2020b), Preferential Procurement Master Role No. 1 of 2020

ISBN 978 9966 817 82 2

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