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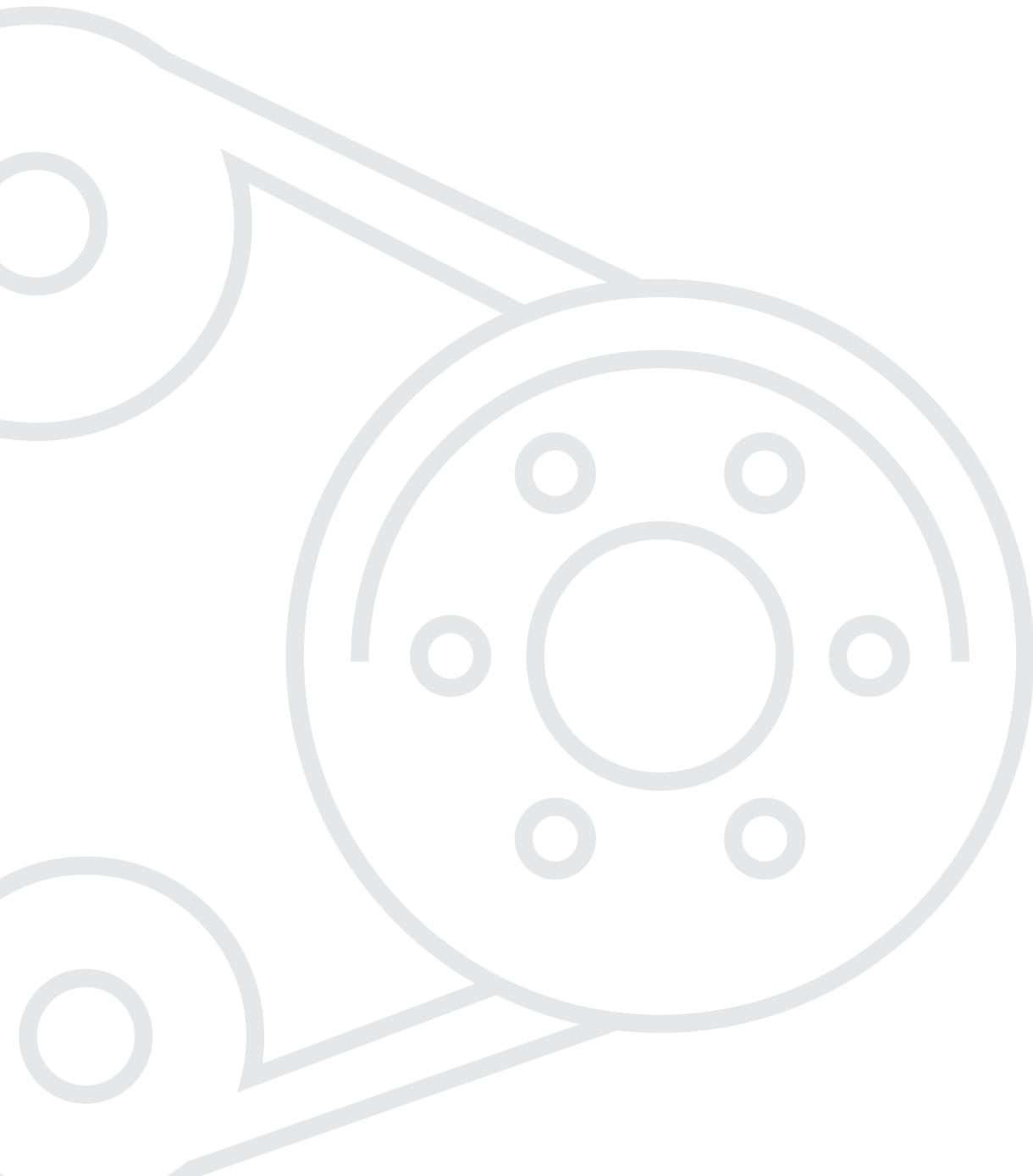
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# BACKGROUND ASSESSMENT



TOWARDS THE DEVELOPMENT OF A SUSTAINABLE AND INCLUSIVE AUTOMOTIVE  
SUPPLY CHAIN IN COLOMBIA THROUGH ENHANCED QUALITY AND PRODUCTIVITY



The present assessment report has been compiled by UNIDO for the specific purpose of developing a programme to support local automotive component suppliers in Colombia to become more competitive through the enhancement of quality and productivity along the supply chain.

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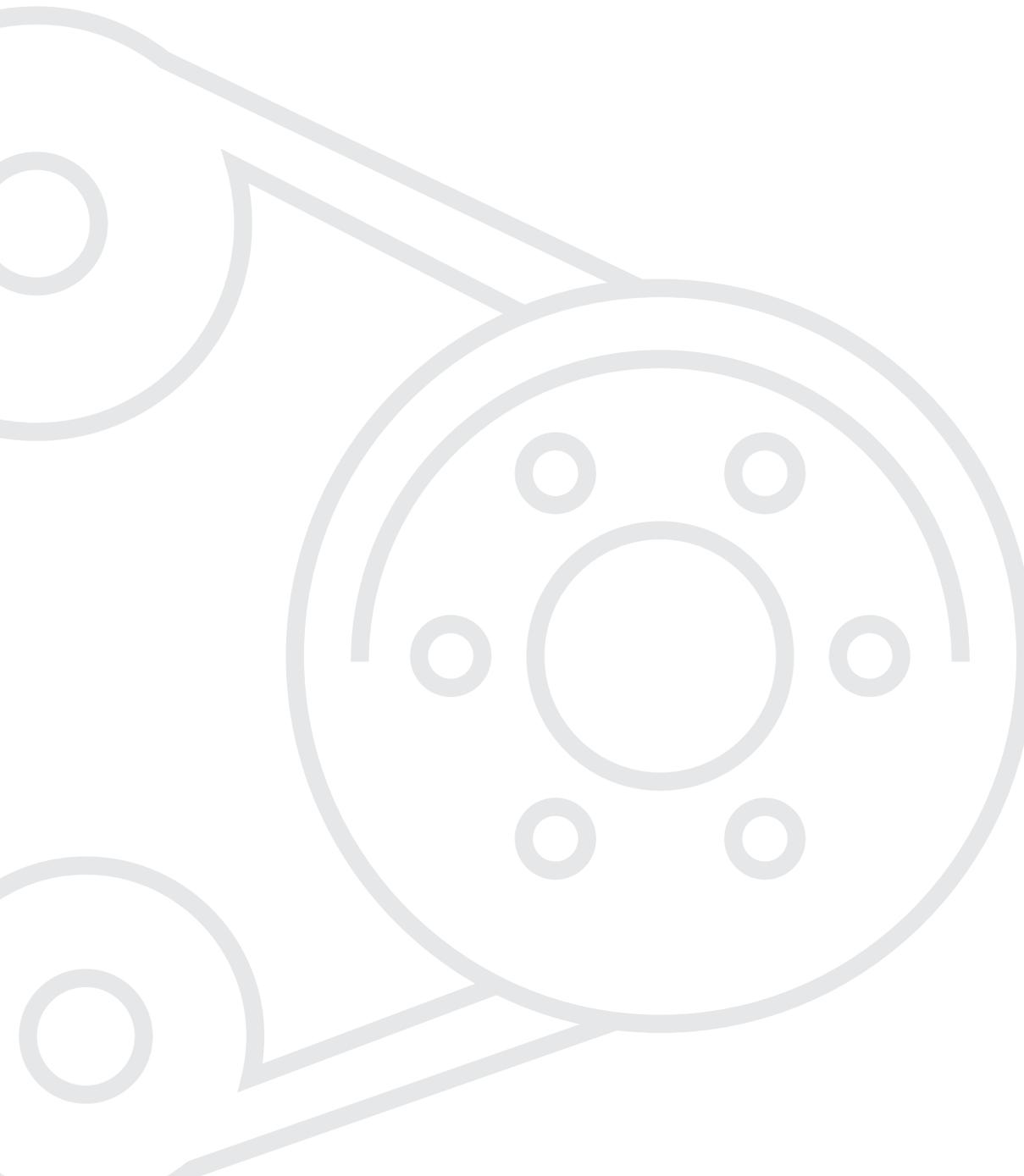
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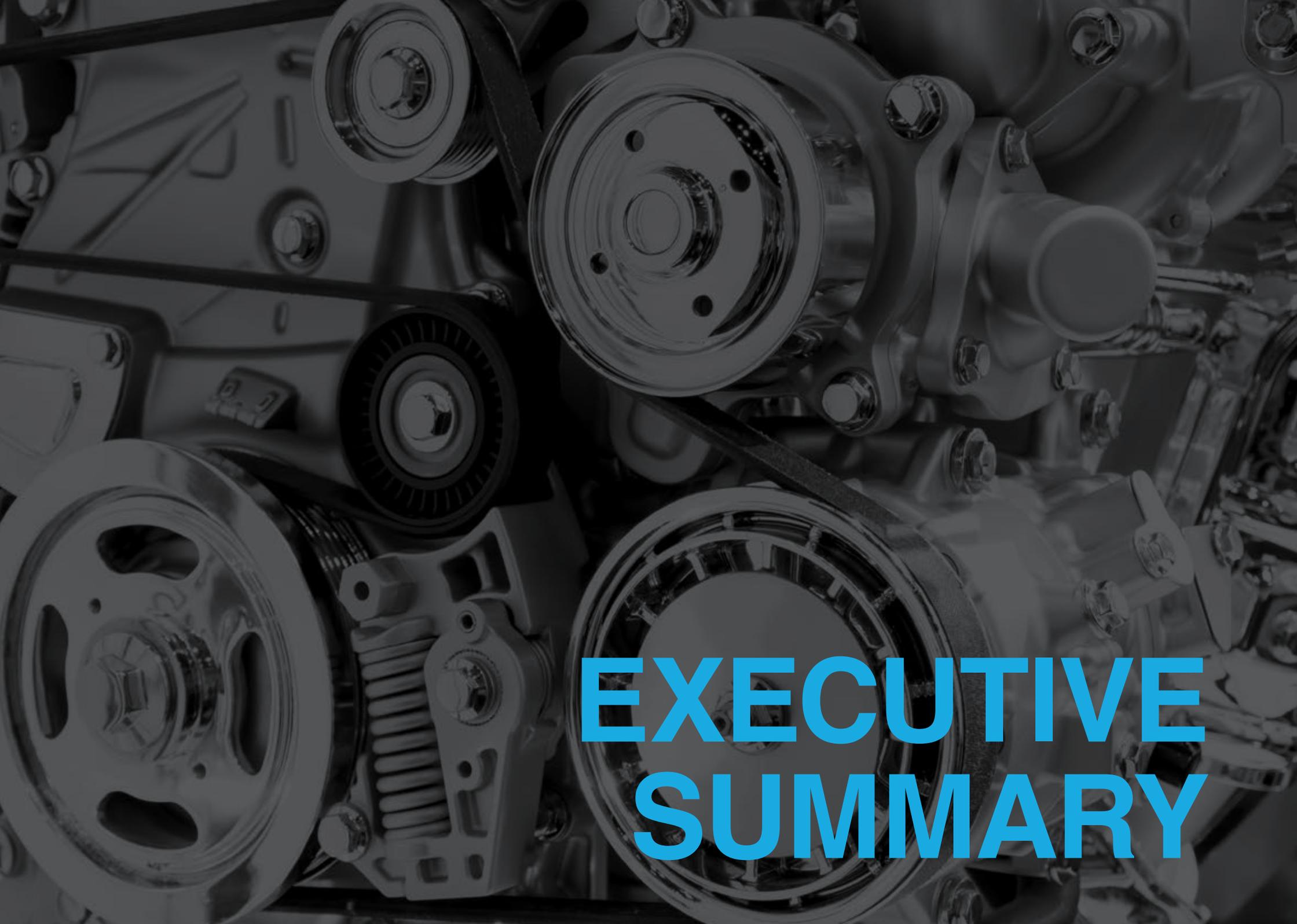
ACOLFA	Asociación Colombiana de Fabricantes de Autopartes	PTP	Productive Transformation Program
ANDI	Asociación Nacional de Empresarios de Colombia	R&D	Research and Development
ASTIN	Centro Nacional de Asistencia Técnica a la Industria	S.A.	Sociedad Anónima
BIT	Business, Investment and Technology	SENA	Servicio Nacional de Aprendizaje
CCA	Compañía Colombiana Automotriz	SOFASA	Sociedad de Fabricación de Automotores
CIP	Corporación Internacional de Productividad	SSDP	Sustainable Supplier Development Programme
CKD	Complete Knockdown	TBT	Technical Barriers to Trade
CNP	Centro Nacional de Productividad	TCB	Trade Capacity Building
CSR	Corporate Social Responsibility	UNIDO	United Nations Industrial Development Organization
EU	European Union	UNIST	Ulsan National Institute of Science and Technology
FTA	Free Trade Agreement	U.S.	United States
GDP	Gross Domestic Product	WTO	World Trade Organization
ICONTEC	National Standards Body	VAPCO	Value Addition Per Employee Cost
ISO	International Organization for Standardization	VC	Value Chain
IATF	International Automotive Task Force		
ITPO	Investment and Technology Promotion Office		
KOICA	Korea International Cooperation Agency		
KPI	Key Performance Indicator		
LAC	Latin America and Caribbean		
MNCIT	Ministry of Trade, Industry and Tourism		
MSMEs	Micro, Small and Medium-Sized Enterprises		
NMI	National Metrology Institute		
NQS	National Quality Subsystem		
OE	Original Equipment		
OEM	Original Equipment Manufacturer		
ONAC	National Accreditation Board		
PPM	Parts per Million		





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# EXECUTIVE SUMMARY

Colombia is the 5th largest producer of vehicles on the Latin American Continent. Its automotive industry represents approximately 4.2% of the industrial GDP and employs 2.5% of the country's working population (about 25,000 direct employees in OEMs and Tier-1 suppliers and about 100,000 indirect employees). The automotive manufacturing supply chain includes (-) manufacturing and assembly of light vehicles, buses, trucks and motorcycles (6 OEMs), (-) auto parts manufacturing (currently about 60 Tier-1 suppliers to OEMs and approximately 180 lower tier suppliers) – for OEM and aftermarket, and (-) imports and exports of thereof.

The following OEMs are currently operating in Colombia:

- General Motors Colmotores (Isuzu, Volvo y Chevrolet)
- Sofasa (Renault)
- Hino Motors Manufacturing S.A. (Hino – Toyota group)
- Carrocerías Non Plus Ultra (CKD Volkswagen)
- Daimler (Buses Mercedes Benz)
- Fotón (Trucks 4x4 Fotón)

Out of the above, the first three comprise 98% of the total production of vehicles in the country.

Colombia has a low motorization index (100 vehicles per 1,000 inhabitants compared to e.g. 270 in Brazil, 290 in Mexico, 310 in Argentina or 190 in Chile). The average age of the vehicle fleet is 15.6 years.<sup>1</sup> Another factor indicating good prospects for vehicle producers is Colombia's demographic growth; it is

<sup>1</sup> BBVA Colombia (2010): *Automobile Market Outlook*

expected that the working age population will rise from 64.9% in 2011 to 66.1% by 2020.

The passenger and freight transportation sectors also represent good potential markets. Industrial sectors are growing, thus requiring newer and bigger truck fleets. The average age of the fleet is 25 years and 90% of transport in Colombia is being handled by trucks. Also mass transportation systems require new vehicles with top of the line safety and environmental technologies: Bogota is currently implementing an integrated public transportation system that will demand the renewal of the entire bus fleet. This means 12,000 units over the next 10 years.

After Brazil, Colombia is the second largest motorcycle producer in the region with an approximate annual output of 515,000 units spread amongst nine assembly plants in the country (2012). Recently a leading international motorcycle producer, Hero MotoCorp, has chosen to set up its first major manufacturing plant outside of India and located in Villa Rica, southeast Colombia. With a reported investment of US\$70 million, this factory promises to generate over 300 jobs in the region to help develop local infrastructure and convert Colombia into a hub for motorcycle sales. Once operational towards the middle of financial year 2015-16, the plant will have an annual capacity of 78,000 units that will be scaled up to 150,000 units in the next 3-4 years.<sup>2</sup>

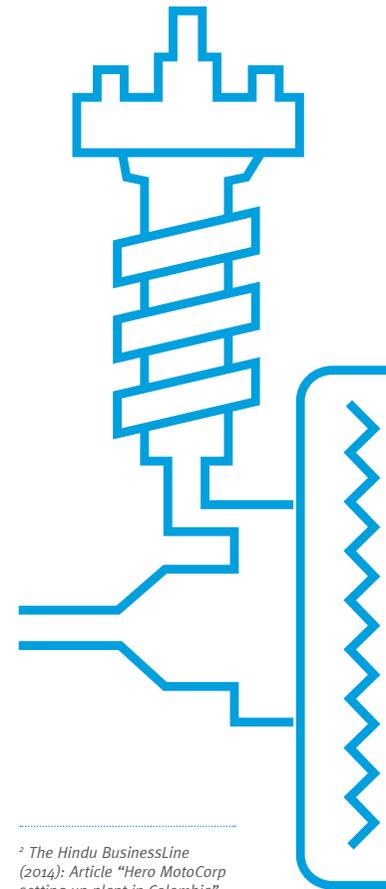
Given the dense urban population concentration and ambitious government plans, the country also has a good potential for the introduction of e-vehicles. The country's Transport Sector's Sectorial Mitigation Action Plan, which aims to reduce GHG emissions, foresees the introduction of electric buses in the massive transport systems of main cities. More specifically it aims

at substituting 50% of the urban public transport bus fleet by e-buses by the year 2040. Recently, Siemens as well as an e-bike manufacturer opened a plant in Colombia. However, due to the relatively low income per capita and limited awareness of these facts internationally, no assembler of electronic vehicles has yet considered this opportunity.

Based on factors mentioned above and taking into account that Colombia has economic and political stability and offers attractive investment incentives, over US\$ 450 million have been invested in the industry since 2011.<sup>3</sup>

But despite of the good prospects, Colombia's automotive industry is currently at a critical point. Local vehicle manufacturers are struggling to compete against cheaper imported cars that are constantly gaining market share due to the signed Free Trade Agreements (FTA). While imports grew from 2013 to 2014, the portion of domestic demand which is supplied with domestic production only increased from 32.1% in 2013 to 33.6% in 2014. However, these percentages are lower than those observed in 2010 and 2011 when they were above 40%<sup>4</sup>. Local automotive component manufacturers developed a strong dependence on the national OEMs as well as the Ecuadorian and Venezuelan markets for their exports, which granted them comfortable sales as long as OEM performance was stable and all three countries were still part of a free trade zone and represented a market of about 1 million vehicles. When Venezuela left this common market agreement in 2006<sup>5</sup>, local car assemblers as well as component manufacturers saw a drastic downturn in sales.

Whilst the promising factor conditions described earlier have attracted new companies to invest



<sup>2</sup> The Hindu BusinessLine (2014): Article "Hero MotoCorp setting up plant in Colombia" of July 7, 2014

<sup>3</sup> Based on data provided by ACOLFA and PTP.

<sup>4</sup> BBVA Colombia (2015): *Automotive Outlook*

<sup>5</sup> Also the economic relations with Ecuador are not at its best as regards trade in this sector – local vs. regional content - WTO case.

in the automotive industry (e.g. Foton), others have resigned and closed their operations recently due to shrinking market shares for the locally produced vehicles/parts and the growing cost pressures (e.g. Mazda and Michelin).

One reason for this negative development is that Colombian vehicle and automotive parts manufacturers have historically seen themselves somehow constrained to the national, Venezuelan and Ecuadoran markets as (a) logistics to reach other markets in Latin America are costly, (b) those other markets are already covered by suppliers in Brazil or Mexico, or (c) they require a scale, which Colombian suppliers cannot deliver with their installed capacity. And as the common market, when it still existed, guaranteed stable (and even growing) sales, local companies did not see a need to free themselves from their dependence on those markets and hence did not strongly pursue any diversification efforts.

Another factor that contributed to the crisis in the automotive industry is fact that Colombia signed Free Trade Agreements (FTAs) with 8 out of the 10 largest car manufacturers in the world (excluding only India and China), which had a negative impact on this sector due to the rise of cheap imports. Ten years ago, imported cars represented 50% of sales - in 2012 that number rose to 70%<sup>6</sup>, challenging local OEMs. About 68 automotive brands compete now for a 320,000-unit market. Also, imports of auto parts have increased, supported by a higher exchange rate. Exports of auto parts concentrate mainly in aftermarket products and are not very diversified; the first 4 products, (tires, batteries, armored glass and wheels) account for 88.1% of the total exports. Even though in 2014 auto parts exports reached more than 74 countries, sales to Mexico, Argentina, Ecuador,



Venezuela, USA and Peru account for 92% of total exports. As mentioned before, in 2013, Michelin – a major Tier-1 supplier in Colombia, closed its factory with 460 employees stating that the Colombian market is not competitive anymore due to the low volumes/scale and the inflow of cheaper (mainly Asian) tires.<sup>7</sup>

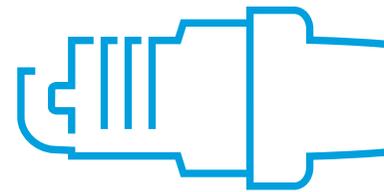
Apart from those market-related constraints, local automotive component suppliers face the challenge that the production of auto-parts in Colombia is relatively costly due to:

- high logistics costs (21% of total production costs corresponds to transport costs vs. 14% in Ecuador, Peru and Venezuela); and
- low production volumes /scale.

Logistics is a particular problem for most car assemblers as well as auto parts producers. Most of the auto parts suppliers are located in Bogota, where also most of the vehicle assemblers are placed, as it represents the biggest local market and has tended to be a pool for the best human capital (to 5 assembly plants and approximately 40 auto-parts suppliers, representing 67% of total component production). However, as the road infrastructure is not well developed in the country and its capital city is relatively far away from the main ports (i.e. Barranquilla, Buena Ventura), it is not the best location for an exporting model and also makes the import of raw materials fairly cumbersome and costly. The average distance (weighted by population) in a straight line from Bogota, Medellin and Cali to the nearest port is 271 km (which is 3.2 times more compared to Chile, 3.6 times than in Brazil, 5.3 times in Malaysia, 7.5 times in China and 18 times in Thailand). Also terrestrial transport costs are enormously high. President Santos' vision of "connecting the country and reducing travel time, thereby creating employment opportunities and improving the competitiveness of the production sector" therefore resonates well with the majority of the population.

With increasing cost pressures from local OEMs, historical markets closing doors, the constant rise in cheap imports enabled through the FTAs, and the relatively high production (and transport) costs, many local automotive component manufacturers are dangling on a thin string of survival.

As a response to all of those challenges, a large part of the local component suppliers have started to strongly move into the aftermarket segment, which they deem more profitable (and reachable) at this moment in time (an example of a short-term mitigation option turning into a strategic direction). This, however, is a risky



<sup>6</sup> The premium segment grew 18% (from 412 units in January 2012 to 486 in January 2013) with Audi leading the ranking with 192 units and a 40% share and growth of 149%. The Ingolstadt brand was followed by BMW (123 units, 25% share and 35% growth), Mercedes Benz (120, 25% and 3%), Volvo (23, 5% and 5%), Land Rover (18, 4%, and 80%), Porsche (9, 2% and 13%) and Jaguar (1%).

<sup>7</sup> Michelin (2013): Press communication of 12 June 2013

approach, as they might soon lose out against cheap imports and smuggled/counterfeited products, which are on the rise. The contraband of car parts has reached a figure of US\$ 2.700 million dollars and the trade in used parts accounted for US\$ 870 million. The cost pressure on the aftermarket is hence also very high. At the moment, local component suppliers have started to aggressively tackle this market, but at the same time keep supplying to OEMs. This implies that they need to maintain OEM expected quality management systems in production, which does not pay off on the aftermarket – on the contrary, it makes locally produced products even less cost competitive.

Apart from the different quality management systems and an evident change in production standards, the aftermarket brings along a set of new challenges. Component suppliers need to make strategic changes to cater for this segment, as it is less predictable, requires higher inventory levels, different quality standards, and greater flexibility. Once on this path, it might be difficult to move away from this strategy, once a new OEM opportunity arises in the country or abroad, or when local suppliers start to lose out more strongly also in the aftermarket segment due to cheaper imports. Some suppliers have already started to move away from production to just import parts to sell them locally – a strategy that does not support job creation/stability nor does it come with the important trickle down effects to local industry.

There are some good examples of local component suppliers that started tapping new markets and explore market niches abroad (e.g. supplying seats for Harley Davidson to the US or developing parts for golf carts or agricultural machinery). However, this development is still in its infancy stage. Product quality is there, but the required market intelligence and mechanisms are still widely lacking in the companies, due to the strong historic dependence on the local, Ecuadoran and Venezuelan markets.

The Productive Transformation Programme (PTP) business plan, which is the strategic planning document for the automotive industry, strongly fosters an export focus and promotes diversification of products and buyers for auto parts. The key challenge that many suppliers face in this respect is that for many potential alternative markets, local suppliers are also not able to deliver the requested volumes. Finding the right market niche is hence one of the key areas in which support is required.

In this regard, key stakeholders from public and private sectors have come together and in a series of many meetings, studies and workshops

identified promising market niches for all actors in the automotive supply chain. For component suppliers the newly identified niches for potential future business growth include, inter alia, parts for luxury and high end cars, agricultural machinery, railways, naval industry, aeronautics and mass transport vehicles.

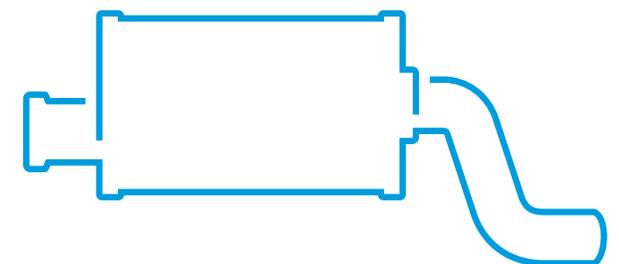
On the positive side, all the above-mentioned market related constraints as well as relatively high operating costs have made local component manufacturers “creative” in terms of seeking alternatives to reduce production costs through internal/shop-floor adjustments. On average, Colombian automotive component suppliers (at the Tier-1 level) are more advanced in the implementation of lean/kaizen methodologies than comparable firms in other emerging markets. Quality requirements are largely being met, the labour productivity in auto parts manufacturing is superior to the average of the industry in Colombia, and the potential for cost savings through lean/kaizen tools already fairly well exploited. This is however only true for the Tier-1 suppliers to OEMs. Further down the supply chain, the story is a completely different one. Most industry support programmes however do not reach out sufficiently to those mainly small and medium sized companies, which can be partly related to their inability or lacking willingness to provide co-funding and invest in improvement activities. In order to strengthen the automotive industry at large, targeted support at this level is required. Currently there is little information on lower tier suppliers and their needs, and a general mapping of those firms within the automotive supply chain is lacking.

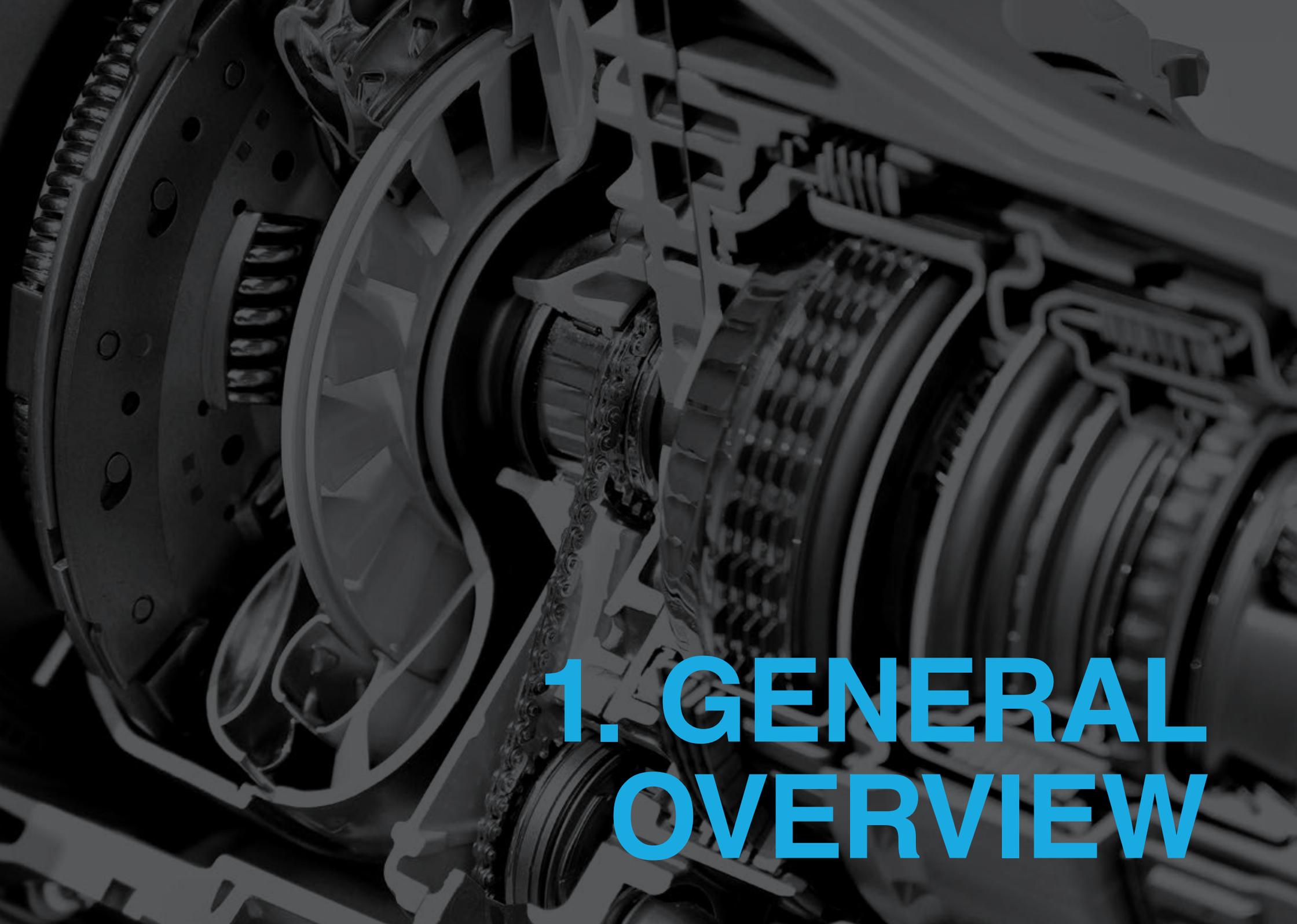
One factor that contributed to the downturn of the automotive industry is the lack of defined coordinated action plans to really support the

achievement of the strategic vision for this sector. The Colombian government has selected the auto parts industry as one of the target sector within its PTP. In this context, it aims at increasing auto parts and automotive industry exports to US\$ 3 billion by 2032 and to establish an Automotive R&D Center (amongst others). However, the strategy lacks concrete information in terms of how the envisaged export target can be reached, given the current situation within the sector. It is also not clear, whether the country intends to position itself as an upcoming hub for the production of specific types of passenger vehicles, of e-vehicles, motorcycles, trucks or buses or as an exporter of components thereof. Lacking a shared strategic vision/position on this, there is currently an insufficient coordination of efforts when it comes to export and investment promotion, whilst local producers are seeking salvation in the aftermarket segment. Hence, there is an immediate need to support Colombia’s public and private sector players in the process of evaluating the country’s realistic options (and niches) vis-à-vis current developments in its major competitor countries and to concretize its long term sectoral vision.

Furthermore, local component manufacturers require support in the fields of marketing and niche market exploration, and tapping potentials for cost savings through non-internal measures, such as through business linkages and horizontal cooperation (cluster development).<sup>8</sup>

<sup>8</sup> This last point has also been highlighted in the course of supplier conferences of General Motors-Colmotores, where participants pointed out the need for associative structures amongst suppliers.





# 1. GENERAL OVERVIEW

### 1.1 OVERALL CONTEXT

**H**istorically, Colombia is a country that has shown significant progress in economic terms more than social. The speed of transformation of the productive structure, employment, demand, trade, and distribution of goods among the population, has exceeded the performance of many countries under similar conditions of development.

In the first decade of the century, to overcome the economic growth issues and unemployment, caused by the economic crisis of the last five years, Colombia focused its internationalization model in the transformation of the productive structure and on improving the competitiveness level of productive sectors with export potential. In trying to achieve this goal it was necessary to promote technological upgrading programs, human capital training, foreign direct investment attraction, productive diversification towards high value added activities, financing programs for production, institutional strengthening for competitiveness policies and free trade agreements to increase the opportunities to position Colombian products in new markets. These policies have contributed to accomplish economic growth in Colombia, however, also generated great challenges that need to be addressed to improve the competitiveness level of potential sectors, since they have been highly exposed to international competition. In this regard, it is important that Colombia gives continuity to policies to increase labour productivity, encourage technological innovation, improve education levels, develop basic physical infrastructure, diversify its production and its exports towards higher value added products, develop the local market, build access to new markets, improve financial and labour market, and use resources efficiently.

### 1.2 NATIONAL DEVELOPMENT PLAN & POLICY FRAMEWORK

**W**ithin the above context, the National Development Plan for 2014-2018 (PND in Spanish) lays down the nation's long-term targets and objectives, medium-term goals and priorities and the framework for economic, social and environmental policy. It therefore constitutes the guideline that public entities, private sector and civil society must follow to address the most crucial needs of the population. The PND 2014-2018 is based on three pillars:

peace, fairness and education, and establishes five transversal strategies to mainstream these three policy pillars:

- Strategic infrastructure and competitiveness, which is seen as essential to boost economic growth.
- Social mobility, through increased quality and coverage of the educational and health systems.
- Transformation of the countryside and green growth, trying to reduce the gap between rural and urban environments.
- Consolidation of the welfare state in Colombia.
- Good governance, to consolidate a modern, more transparent, efficient and efficacious state.

The private sector plays a crucial role in the development model of the country. The state now facilitates and brings the incentives to encourage private sector to improve its productivity and become nationally and internationally competitive. Evidence of this is that in 2008 the country established the Productive Transformation Programme (PTP) which is a public-private partnership to promote world-class sectors of high export potential, including automotive.

### 1.3 THE PRODUCTIVE TRANSFORMATION PROGRAMME (PTP)

**T**he Productive Transformation Programme (PTP) is a public-private partnership signed between the Ministry of Commerce, Industry and Tourism (MINCIT) of the Government of Colombia and sixteen economic activities. The Program was created in 2008 in the framework of the current National

Development Plan 2010-2014, that has as one of the main pillars, sustainable growth and competitiveness improvement. At the same, the PTP constitutes one of the key elements of the sectoral component of the Industrial Policy also known as the Entrepreneurial Development Policy of 2011.

PTP was created to promote productivity and improve competitiveness of sectors with high export potential, through an efficient coordination between public-private sectors. It also helps industries and companies to benefit from free trade agreements (more exports) and promotes a better way of living for Colombians (more and better jobs), as a result of good performance of productive sectors.

The sixteen economic activities identified by PTP are divided in three subsectors: agro-industry, manufacturing (including the automotive industry) and services. They are detailed below:

- Aquaculture; beef and cattle; chocolates, candies and raw materials; horticulture; dairy; palm oil and bio-fuels.
- Cosmetics and personal care products; editorial and graphic communication industry; auto parts and vehicles; fashion system; steel, metal work and shipyards.
- BPO & O; software and information technologies; electric energy and services; medical tourism and wellness; nature tourism.

According to the strengths and weaknesses of the sixteen economic activities, the PTP has four working axes to intervene them. These are human capital; infrastructure and sustainability; legal affairs and fair trade; and industry development, promotion and innovation.



# **2. AUTOMOTIVE INDUSTRY OUTLOOK / SITUATION ANALYSIS**

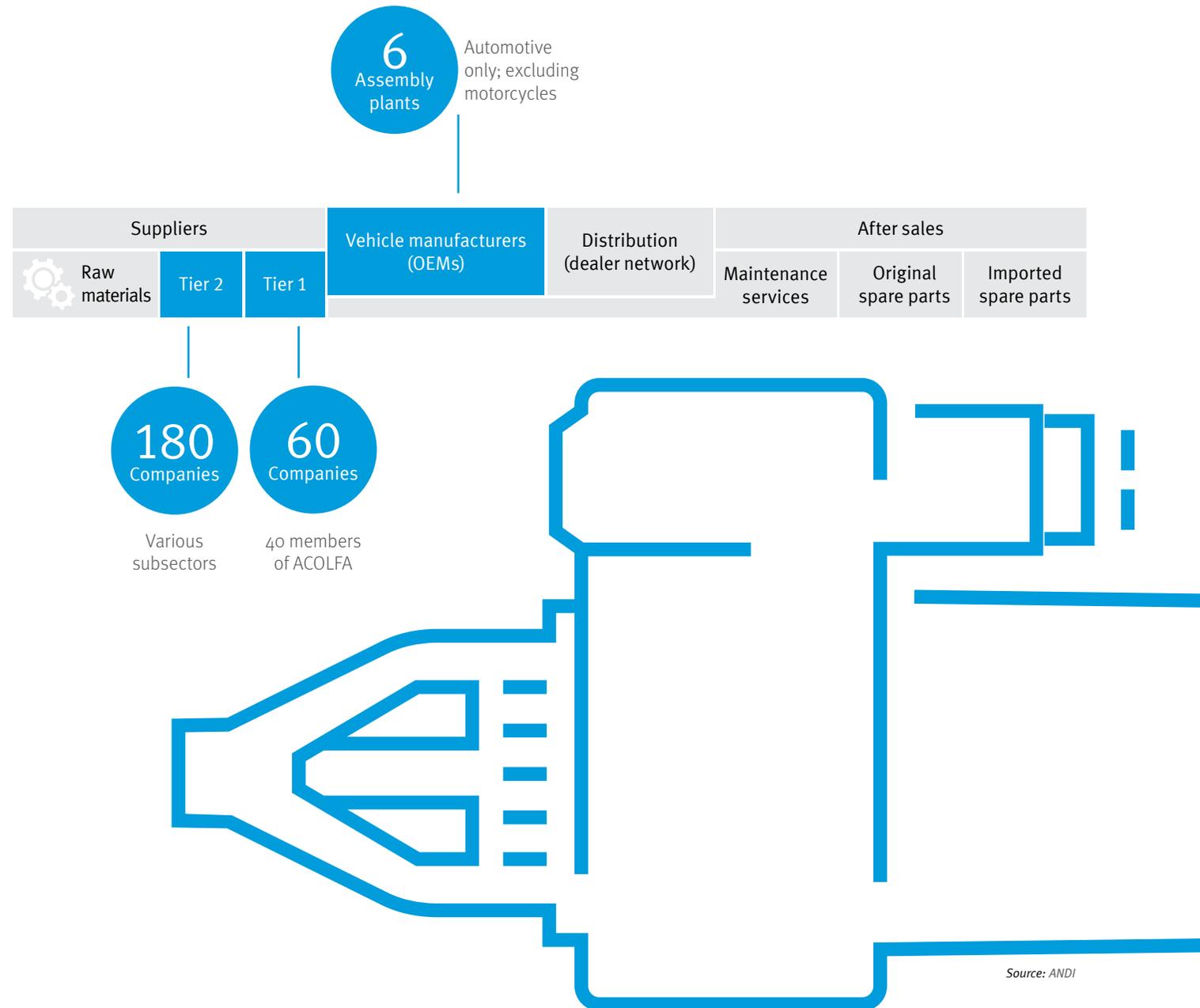
2.1. GENERAL OVERVIEW

Colombia is the second most populous country and one of the larger automotive markets in South America. Vehicle sales are projected to grow from currently approximately 300,000 to more than 400,000 units by 2019. On the subcontinent, Colombia ranks behind Brazil and Argentina in terms of vehicle production. Like much of the region, vehicle ownership levels are relatively low with roughly 53 passenger cars per 1,000 people. Thus, there is significant potential for growth.

The Colombian automotive sector is characterized by having high standards of quality, the level of formality in employment issues, highly skilled employees and very well paid and low rates of accidents at the factories. It is recognized as a “spearhead” sector of economic and social development for its multiple effects of drawing on a wide range industrial activities. Through its contribution to innovation and to the transfer of technology is can be seen as a locomotive for the country’s development.

In Colombia, the automotive industry represents 4% of the GDP (out of which 1.1% derives from the production of motorcycles) and makes up for 2.5% of employment in the manufacturing industry. More specifically, it generates approximately 38,000 direct jobs (vehicle and component manufacturing) and about 100,000 indirect jobs, including the dealer network, counting on formal, highly qualified employment and above-average wages compared to other sectors at national level. The automotive component manufacturing sector alone recorded sales of US\$ 3,817 million in 2014, out of which US\$ 1,527 million were locally produced.

Figure 1: Automotive value chain



2.2. AUTOMOTIVE VALUE CHAIN

The local automotive value chain includes vehicle assemblers, also referred to OEMs, Tier-1 suppliers and lower tier suppliers, referring to the commercial distance in the relationship between the manufacturer and supplier. For component suppliers there are two primary target markets: (1) the original equipment (OE) market for components produced for the domestic and/or export assembly industry; and (2) the aftermarket, also referred to as replacement equipment market for domestic and/or export maintenance and replacement parts. These key value chain actors are being supported by a network of public and private sector support institutions, which play an important role for the development of the sector. The chain also includes a network of dealers, finance institutions and after sales service units, which are however not being further described in this report given its focus on the productive links of the chain (vehicle and component manufacturers) and their support infrastructure.

2.2.1 Vehicle assemblers

Colombia currently hosts 13 vehicle assembly plants (including motorbike production).

The following OEMs currently produce cars, trucks and buses in the country:

1. General Motors Colmotores (Isuzu, Volvo y Chevrolet brands) – Bogotá
2. Sociedad de Fabricación de Automotores - Sofasa (Renault brand) – Envigado
3. Hino Motors Manufacturing S.A. (Hino brand – Toyota Group) – Cota
4. Carrocerías Non Plus Ultra (own brand - buses, CKD Volkswagen) – Bogotá
5. Daimler (Chassis for Buses - Mercedes Benz brand) – Cota
6. Fotón (Tunland Vans 4x4 - Fotón brand) – Funza

The first three account for about 98% of the national production (in units).

The following companies produce motorbikes in the country:

1. Autotécnica Colombiana S.A. – AUTECO (Kawasaki, Bajaj, Kymco and KTM brands) – Itagüí
2. Honda – Fanalca S.A. (Honda brand) – Cali

3. Incolmos – Yamaha (Yamaha brand) – Medellín
4. Suzuki S.A. (Suzuki brand) – Pereira
5. AKT (AKT y TVS brand) – Envigado
6. AYCO (AYCO brand) – Pereira
7. Hero Motocorp (Hero brand) - Villarica

Table 1: Overview of vehicle assemblers - production & export markets (excluding Non Plus Ultra)

	GM	RENAULT	HINO	FOTON	DAIMLER
No. of vehicles produced 2014	56,004	69,472	5,717	-	0
No. of vehicles produced 2015 (projections)	49,873	76,470	4,470	144	300
Target markets for exports	Current: Ecuador Future target: Brazil	Current: México, Ecuador, Chile, Guatemala, Costa Rica, Dominican Republic Future target: Brazil	Current: Ecuador, Perú Future target: Bolivia, Argentina	100% Local	100% Local

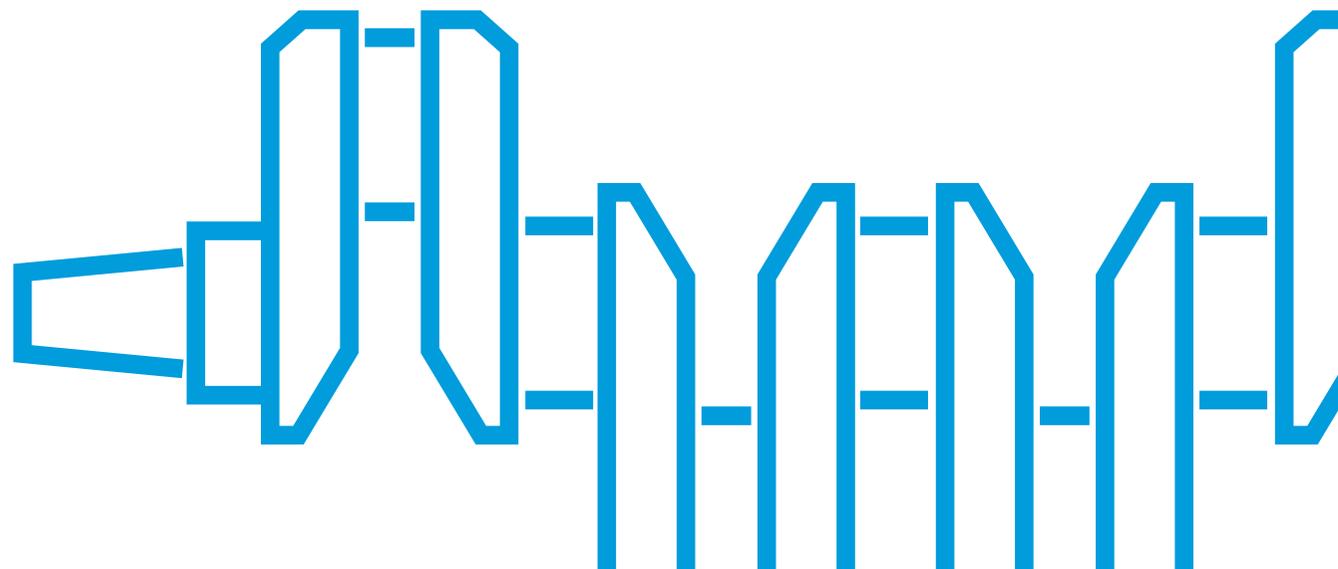


Figure 2: Key OEM data on vehicle production and target markets (excluding motorcycle production)

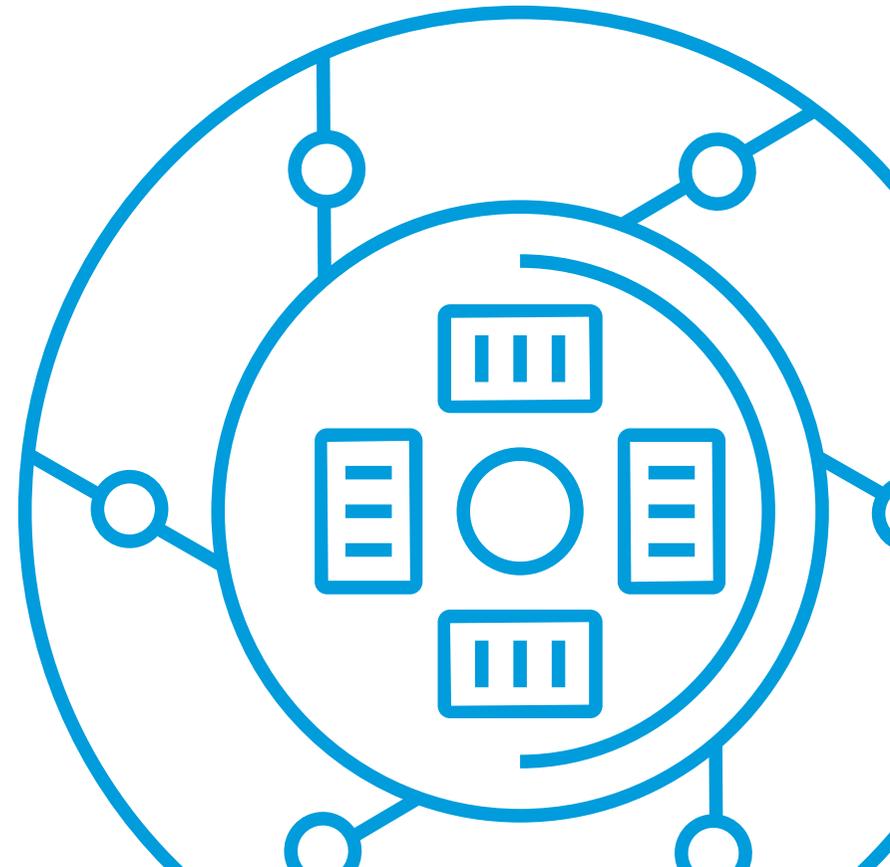
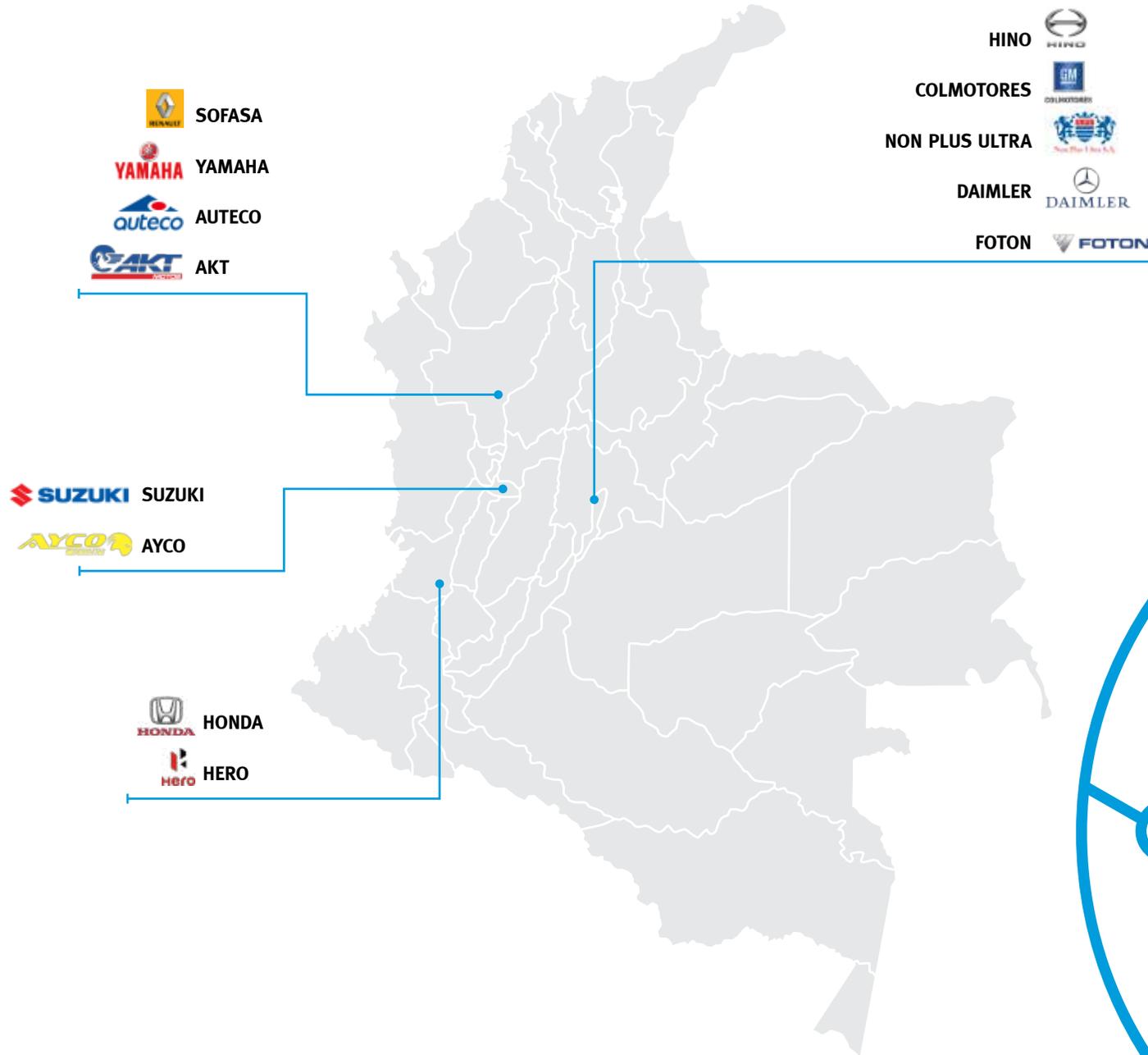
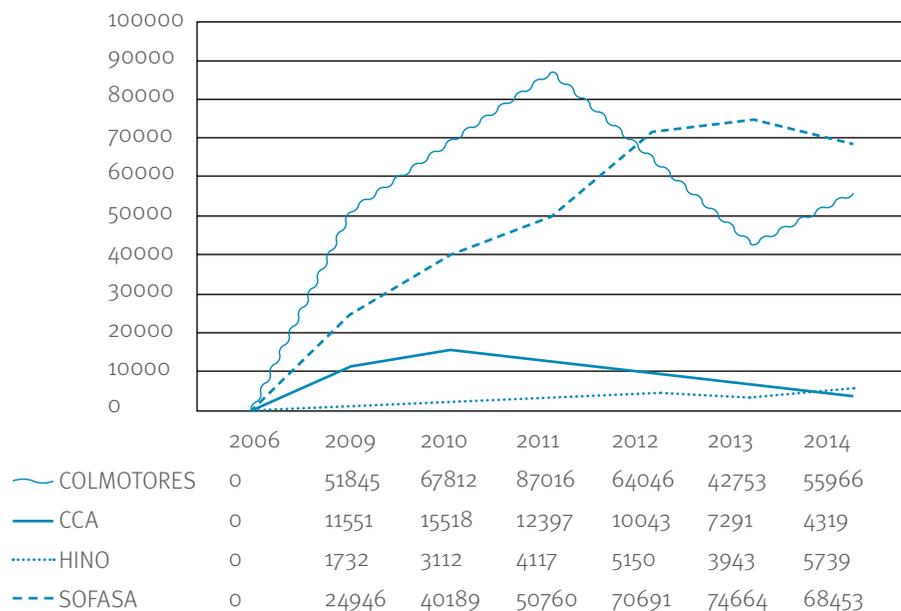


Figure 3: National production distribution of vehicles per assembly plant



Source: ACOLFA. Manual Estadístico 2015 (Statistics Manual 2015, ACOLFA)

The largest vehicle producers in the country are GM – Colmotores with 43% of the total production and Sofasa-Renault with 47%. The firm CCA-Mazda already closed its vehicle assembly operation in 2014.

The production of vehicles in 2014 in Colombia was at 134,477 units and represented a growth of 4.5% compared to the registered production in 2013. Figure 3 shows the distribution of the national production by assembly plant. Exports of vehicles in 2014 recorded a volume of 51,506 units, which represented a decline of 38% compared to exports recorded in 2013, which were at 75,192 vehicles.<sup>9</sup>

The trend over the past 5 years cannot be regarded as stable. Between 2009 and 2011, sales grew 97.2% to a record of 351,012 units, while production swelled 69.3% to 154,261 units, according to statistics compiled from government records by ANDI. In 2012, the wave broke, with a 7.3% fall in consumption and a 9.8% drop in production. In 2013, only 293,846 vehicles were sold, a further 7% decline compared to 2012. The proportion of Colombian produced cars was 32% of total sales. Mexico was confirmed as the main supplier of cars to Colombia, and KIA was the most successful brand in the country. Lower domestic momentum and the high penetration of imported vehicles resulted in the automotive

<sup>9</sup> ACOLFA (2015): Statistical Handbook

<sup>10</sup> BBVA Colombia (2013): Automotive Outlook

industry’s production index falling by 19.8% and spare part manufacturing going down by 22.8% in 2013, despite the sector’s improved performance abroad. Only the motorcycle assembly industry succeeded in consolidating growth in 2013, both in terms of sales and in production.<sup>10</sup>

Table 2: Evolution of vehicle production in Colombia – excluding exports (2000-2015)

Year	No of units produced	Year	No of units produced
2000	34789	2008	83770
2001	41111	2009	86144
2002	57993	2010	116246
2003	23233	2011	140796
2004	63606	2012	113074
2005	67262	2013	94181
2006	89951	2014	134477
2007	113128	2015 (estimate)	116000

Source: Statistics Handbook 2015, ACOLFA

A large part of Colombian production in this sector is complete knockdown (CKD) kit assembly and therefore reliant on component imports. GM, Renault, and Daimler are amongst the firms with local assembly operations.

### 2.2.2 Tier-1 and lower-tier component manufacturers

The local component manufacturing sector depends to a large extent on the performance of OEMs in the country. At present, the sector accounts for 0.7% of the industry’s gross production and comprises about 60 Tier-1 suppliers, out of which 40 are members of the Colombian

Automotive Component Manufacturers Association (ACOLFA). Before the closure of Michelin, multinational companies (including Yazaki, Goodyear, Dana, Saint Gobain, Vitro, AGB, etc.) used to represent more than 50% of the local Tier-1 production.

In addition it is estimated that there are approximately 180 Tier-2 suppliers (mainly SMEs), which are scattered in different industrial subsectors such as metalworking, plastics, chemicals, textiles, glass and rubber mainly. In terms of production, the largest segments include metal works (60%) and plastics (20%). However, a proper mapping of lower tier suppliers to the automotive industry is currently non-existent – hence the above figures are to be understood as estimations. Automotive component suppliers are spread all over the country: 50% in Bogota, 21% in Antioquia, 13% in the Coffee Valley (Caldas, Risaralda) and 16% in the Valle del Cauca.<sup>11</sup>

The production of automotive components can be split into two categories; original equipment and aftermarket parts. Original equipment parts are used in the assembly of a new vehicle or are purchased by the manufacturer for its service network, whilst for aftermarket parts (which comprise spare parts and accessories) there is no link with the assembler. Nevertheless many suppliers produce OE and aftermarket parts at the same time.

Based on data from ACOLFA most of their Tier-1 member firms currently do not operate at full capacity (50-70% capacity utilization only). Furthermore, a large majority confirmed that over past three years they faced a growing aftermarket and diminishing OE supply. In terms of linkages with lower tier suppliers, Tier-1 manufacturers count on less than 50%

of local sourcing (US\$) and about one fourth of ACOLFA's member firms source even less than 20% of the value of all parts/inputs from lower tier suppliers in the country.

In 2012<sup>12</sup>, the automotive parts sector has yielded a gross production of US\$1,886,557 million, which represented a real annual average rate of growth of 5.3% for the period between the years 2009-2012.

**2.2.3 Support institutions**

The sector is being supported by a series of public and private sector institutions, which are further described in section 2.5 of this document. Those include industry associations (ACOLFA, ANDI), technical institutions (TECNNA), universities (e.g. Universidad del Valle), training institutions (SENA), export and investment promotion agencies (ProColombia) and private consultancies.

**2.2.4 Value Chain Organization**

Based on an analysis undertaken by McKinsey<sup>13</sup>, it can be summarized the despite of the existence of high level institutions and a series of industry support measures and schemes in place (e.g. industry roundtables and discussion platforms), the Colombian automotive value chain is not well organized – a factor that needs to be improved through the following measures:

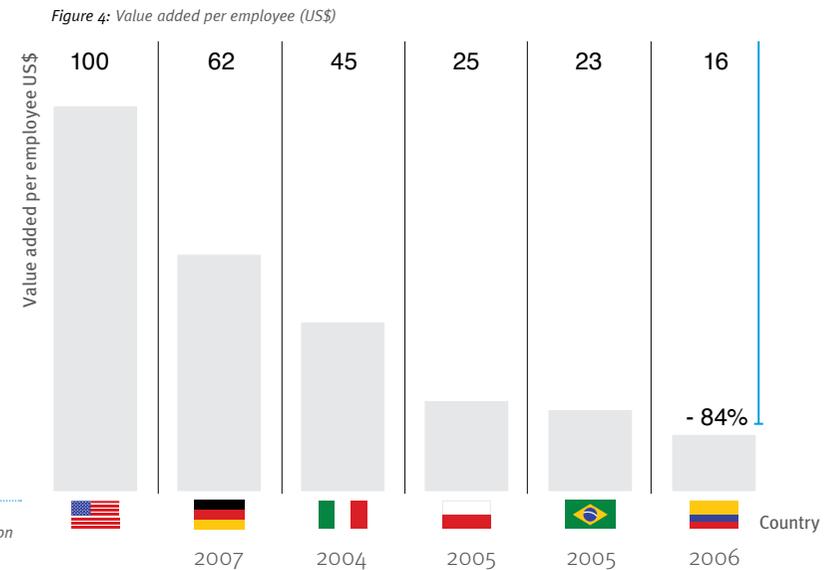
- Implementing performance measurement systems at the sectoral level (benchmarking)
- Implementing best practices in supplier development approaches (Supplier Development)
- Strengthening lean production systems and processes (lean)
- Optimizing internal sectoral and external

- relations (assemblers, government agencies, academia, etc.)
- Optimizing the use of free trade zones
- Developing clusters

**2.3. KEY CHALLENGES FACED**

**2.3.1 Overall constraints**

The Colombian automotive industry in general and the automotive component manufacturing sector in particular face a high productivity gap vis-a-vis other countries in the region. The below figure illustrates this by comparing the percentages of the value added per employee in US\$, taking the U.S. as the benchmark/baseline (100%).<sup>14</sup>



<sup>11</sup> ANDI (2013): Characterization of the automotive industry

<sup>12</sup> Most recent years of official data consolidated in the Annual Survey of Manufacturing of 2013.

<sup>13</sup> McKinsey (2009): Informe Final: Desarrollando sectores de clase mundial en Colombia (Sector Autopartes)

<sup>14</sup> McKinsey (2009): Informe Final: Desarrollando sectores de clase mundial en Colombia (Sector Autopartes)



The key causes for this situation were found to be the following (many of them being interlinked):

- Production of a broad range of products/components of relatively low added value
- Limited economies of scale (low installed capacity)
- Disadvantages with regard to the cost structure (expensive raw materials and logistics)
- Low capital and technological intensive production
- Insufficient supply chain / sectoral organization

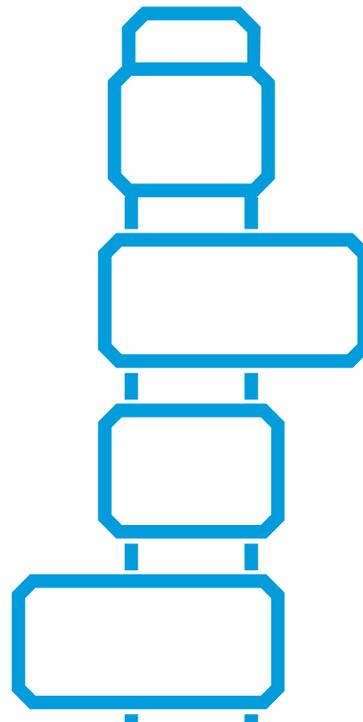
When Japan's Mazda announced in 2014 that it was stopping all production at Compañía Colombiana Automotriz (CCA), its Colombian subsidiary, it marked the end of an era for Colombia's auto industry. Though the company was a relatively small producer locally, it had been producing in the country for 30 years. This decision has therefore sparked fears other large producers may follow. That however, does not imply that Mazda intended to stop selling in Colombia but would rather focus on expanding its dealer network. The company seemed to have concluded that it has become much easier to import its models rather than producing them locally. The strength of the Colombian currency, combined with the lowering of Colombia's trade borders, paved the way for cheaper imports and changed the sums for manufacturers in terms of local production. Mazda will continue to produce in México and export to Colombia at zero tariff, which was made possible due to the FTA that is in place between the two countries.

In October 2014, also Nissan Autoassembly Company closed its assembly operations since the import of CKD from Brazil, Argentina and Italy was not deemed lucrative anymore due

to the high logistics costs and the inability to source the needed components locally.

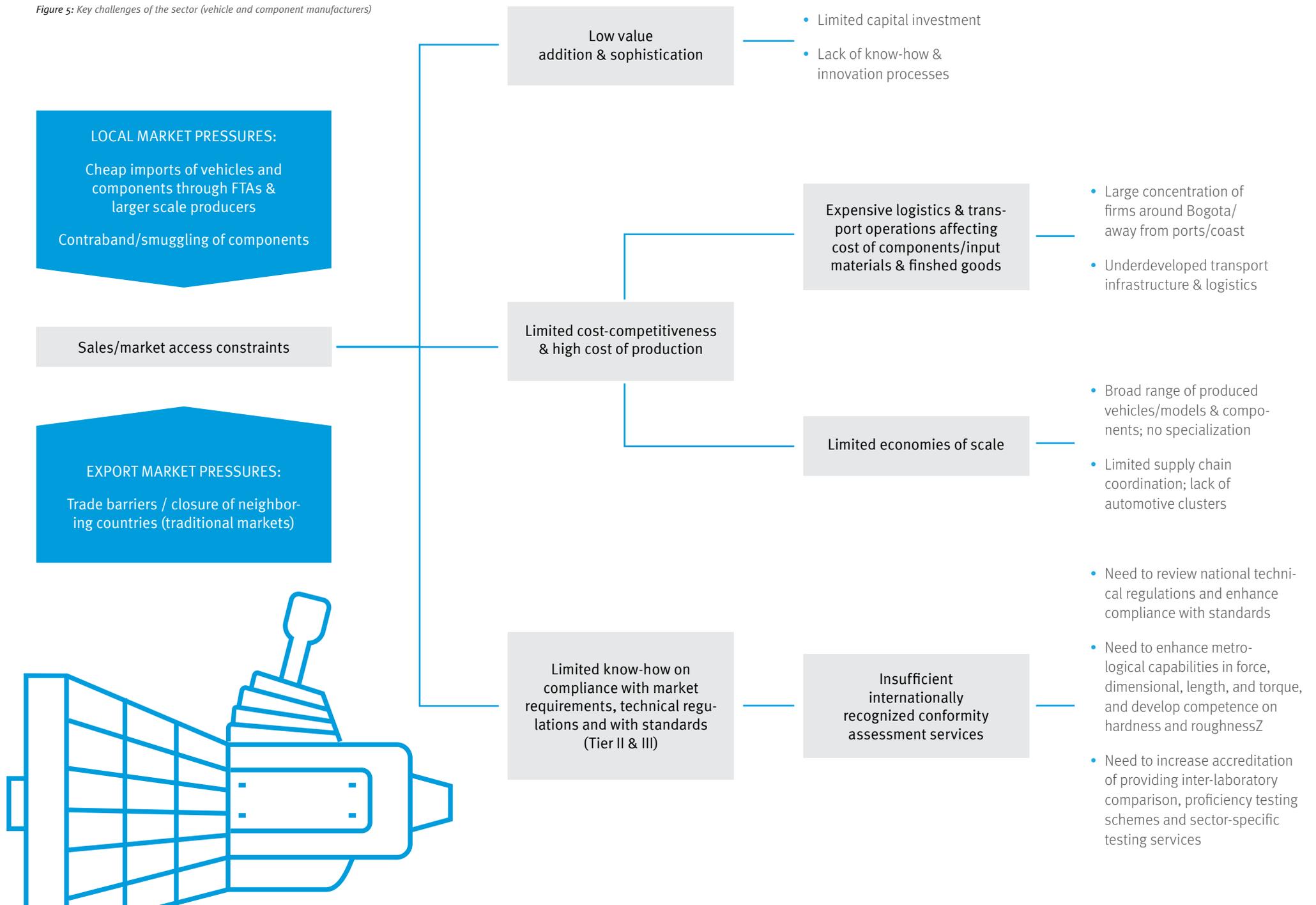
In 2013, also a major Tier-1 supplier in Colombia, Michelin, closed its factory with 460 employees stating that the Colombian market is not competitive anymore due to the low volumes/scale and the inflow of cheaper (mainly Asian) tires.<sup>15</sup>

This section describes in further detail some of the challenges being faced in the sector and provides an overview of current constraints with regard to market access from a viewpoint of vehicle manufacturers as well as component suppliers. The figure on the following page shows in a simplified form the key challenges, their causes and effects. Whilst some of those might be self-explanatory (e.g. limited economies of scale, low level of value added to products), others (such as logistics or competitiveness) warrant further explanations, which are provided in this chapter.



<sup>15</sup> Michelin (2013): Press communication of 12 June 2013

Figure 5: Key challenges of the sector (vehicle and component manufacturers)



### 2.3.2 Market access

Colombian vehicle and automotive component manufacturers have historically seen themselves constrained to the national, Venezuelan and Ecuadoran markets as (a) logistics to reach other markets in the LAC are costly, (b) those other markets are already covered by suppliers in Brazil or Mexico at competitive prices, or (c) they require a scale, which Colombian firms cannot deliver with their installed capacity. With Venezuela having left the common market agreement in 2006<sup>16</sup>, trade relations with Ecuador not being at their best and FTAs having been signed with 8 out of the 10 largest car manufacturers in the world (missing only India and China), market access is at risk on the national level as well as in traditional export countries.

#### Vehicle Manufacturers

##### • Local market

Annual car sales in Colombia only reach about 300,000 new units a year (in Argentina for instance, which has about 8 million less inhabitants, this figure lies at about 900,000). Nevertheless, with a relatively low motorization index (100 vehicles per 1,000 inhabitants compared to e.g. 270 in Brazil, 290 in Mexico, 310 in Argentina or 190 in Chile) and an average age of the vehicle fleet of 15.6 years future prospects are good.<sup>17</sup> Another factor indicating good prospects for vehicle manufacturers is Colombia's demographic growth; it is expected that the working age population will rise from 64.9% in 2011 to 66.1% by 2020.

However, Colombian OEMs have to compete with a wide range of imported cars/models on the local market. Locally produced vehicles

make up only about 30%, whereas imported cars take the prime share of the remaining 70%. In 2014, imports reached US\$ 4,996.5 million, showing a growth rate of 17.7% compared to the previous year. The major importers come from Mexico, South Korea, U.S., Japan, China, Brazil, Argentina and Germany.<sup>18</sup>

The recently signed FTA with South Korea will add to the pressures. The biggest Korean vehicle manufacturers, Hyundai and Kia, have already made strong inroads in the Colombian market through imports. Some local OEMs, such as GM and Renault, have made substantial investments in the country in recent years and are now worried about how they are going to achieve the expected returns.

The president of the largest local car producer, GM-Colmotores, stated that if domestic assemblers fail to ensure the supply of local demand, and at the same time reach stable export sales of approximately 50% of production it will be difficult to maintain the viability of the assembly lines. In his view a plant can be profitable with a production level of 80,000 - 100,000 units annually, but focusing on one model and always having the local market as a solid basis.<sup>19</sup> This however does not reflect the current modus operandi of local vehicle producers.

In view of the eminent threats, the Colombian government granted local firms from the sector a zero tariff scheme called Profia or Decreto 2910 for the import of CKD kits and automotive components from any part of the world as long as they are not being produced within the country. At the same time, national content requirements for locally produced cars were set at about 33%. The objective of these measures was to increase the competitiveness of local vehicle

manufacturers vis-a-vis imported cars. However, industry insiders are warning the scheme will do little to tackle the internal and external issues affecting the sector's competitiveness.

##### • Current exports and opportunities

The export of cars assembled in Colombia achieved US\$ 441.1 million in 2014, representing a decline of -0.7% compared to 2013. The key export markets include Ecuador (60.9% of the total exports); México (18.9%); Chile (7.9%) and Peru (7.4%). Exports were driven mainly by Sofasa-Renault, which takes more than 90% of all foreign sales. The second biggest exporter is Hino.<sup>20</sup>

Whilst Mexico is one of Colombia's main export markets for cars, Colombia's auto industry also sells an increasing number of vehicles to Canada and the U.S., after bilateral trade agreements came into force in 2011 and 2012, respectively. The collapse of Venezuelan trade hit Colombia's auto industry particularly badly. So did the imposed trade hurdles with Ecuador. In this regard, it is also a worry that Argentina, with a slightly volatile economy known for having applied protectionist policies in the past, has also become an important export market for the sector.

In general, local OEMs are aggressively trying to identify new market opportunities abroad, because with the inability to compete against imported cars in the long run and having Venezuela closed down completely and Ecuador partially, they will not be left with many alternatives.

#### Component suppliers

Colombian automotive component suppliers are largely dependent on the performance of local OEMs, which are currently struggling and their

<sup>16</sup> Also the economic relations with Ecuador are not at its best as regards trade in this sector – local vs. regional content - WTO case.

<sup>17</sup> BBVA Colombia (2010): Automotive Sector Outlook

<sup>18</sup> BBVA Colombia (2015): Automotive Sector Outlook

<sup>19</sup> El Tiempo (2014): Hay crisis estructural en la industria automotriz, según la Andi

<sup>20</sup> BBVA Colombia (2015): Automotive Sector Outlook



future survival is uncertain (particularly in the passenger car segment). Nevertheless, most of the parts of a vehicle being assembled in Colombia are still imported since local suppliers generally do not manufacture highly complex components that require high technological sophistication.

Also on the export markets, local parts manufacturers do not have an easy stance – largely due to the same reasons as described above. The export of auto parts reached US\$ 327.7 million in 2014, representing a decline of 10.8% compared to 2013.<sup>21</sup> The key export markets include Ecuador, Venezuela, U.S., Peru and Mexico. There are some good examples of local component suppliers that started tapping new markets and explore market niches abroad (e.g. supplying seats for Harley Davidson to the U.S. or developing parts for golf carts or agricultural machinery). However, this development is still in its infancy. Product quality is largely there, but the required market intelligence and mechanisms are still widely lacking in the companies, due to their strong historic dependence on traditional markets.

A large part of the local component suppliers have started to strongly move into the aftermarket segment, which they deem more profitable (and reachable) at this point in time. This is however a risky approach, as they might soon lose out against cheap imports and smuggled/counterfeited products, which are on the rise. The contraband of car parts has reached a figure of US\$ 2,700 million dollars and the trade in used parts accounted for US\$ 870 million.<sup>22</sup> The cost pressure on the aftermarket is hence also very high. At the moment, local component suppliers have started to aggressively tackle this market, but at the same time keep supplying to OEMs. This implies that they need to maintain OEM

<sup>21</sup> Based on data by ACOLFA and DANE - Annual Manufacturing Survey

<sup>22</sup> El Heraldo (2014): Artículo "Contrabando de autopartes mueve USD2,700 millones al año", 17 de Mayo de 2014

<sup>23</sup> World Economic Forum (2015): Global Competitiveness Report 2015-2016



expected quality management systems in production, which does not pay off on the aftermarket – on the contrary, it makes locally produced products even less cost competitive.

Apart from the different quality management systems and an evident change in production standards, the aftermarket brings along a set of new challenges. Component suppliers need to make strategic changes to cater for this segment, as it is less predictable, requires higher inventory levels, different quality standards, and greater flexibility. Once on this road, it might be difficult to move away from this strategy again once new OEM opportunities arise in the country or abroad, or when local suppliers start to lose out more strongly also in the aftermarket segment due to cheaper imports. Some suppliers have already started to move away from production to just import parts and sell them locally – a strategy that does not support job creation/stability nor does it come with the important trickle down effects to local industry.

### 2.3.3 Productivity and competitiveness

According to the latest report from the World Economic Forum, Colombia is ranked 61 of 140 countries in the Global Competitiveness Ranking, behind Mexico, Panama and Peru, amongst others<sup>23</sup>. One of the main causes of

this gap that captured the attention in public policy debates, is the low level of productivity prevailing in the country.

Despite generally good and sustained winds of the Colombian economy and the labor market, productivity, which is the determinant of structural behavior of economic growth and wages, has been stagnating. According to the Inter-American Development Bank (IDB) one of the problems that Colombia still faces is that productivity has not seen any significant increase during the last 20 years. For the economy to reach a growth rate of 5% in the coming years, productivity needs to grow about 1.6% annually. But such figure has not been seen since the mid-1970s. It should be noted that although the term productivity contains a number of definitions, there is a general consensus to label it as the efficient use of factors of production, whether in labor, physical capital and / or human capital. Labor productivity in Colombia is extraordinarily

low. In fact, according to the indicator of labour productivity (which is defined as the average GDP per worker adjusted for purchasing power parity), Colombia is located in the lower end of the spectrum of countries of the region analyzed by the index.

According to the report of the Colombian Competitiveness Council 2013-2014, associated with low productivity is the low level of sophistication and diversification of the productive apparatus, which ends up being reflected in the loss of sophistication of Colombian exports. Fedesarrollo, nonprofit policy research center in Colombia, stresses that the situation is so extreme that 4.5 Colombian workers are needed to produce at the level of one American worker. As one of the first steps to optimize productivity according to the Colombian Competitiveness Council report is to increase the presence of clusters. Fedesarrollo estimates that only 4% of companies in Colombia form part of productive clusters, which reflects the lag in competitiveness and innovation.

The country's Development Plan (2014-2018) argues that business productivity must increase "from the sophistication and diversification of the productive apparatus."

Even though the productivity within the local automotive industry is higher than in other industrial sectors, there are still a series of competitiveness gaps to be addressed, which resulted from several analyses, studies and expert missions that have been undertaken since the launch of the PTP. In a nutshell all of them revealed low levels of productivity, particularly further down the supply chain. Most of the support programmes and initiatives in this respect were however, almost exclusively

targeted towards the OEMs and their Tier-1 suppliers, which have reached fairly good levels with regard to production and quality standards and workplace organization.

In total, 46 Tier-1 suppliers in the country have benefited the Renault–GM vendor programme called "Programa Mejoramiento de Gestión de la Competitividad (MGC)" which was executed between 2007 and 2009. With an investment of about US\$ 8 million (total cost of the initiative), the programme covered trainings and advisory services over a 36 months period on the following subjects: continuous improvement, cost based management, production system, quality, logistics, personnel development, strategic management and manufacturing excellence. Through programmes like this, many (primarily Tier-1 suppliers) have incorporated internationally recognized concepts of lean manufacturing/kaizen into their production lines. Nevertheless, their performance in the area of quality is still better than in the field of productivity. Currently, 32 out of the 40 Tier-1 suppliers that are members of ACOLFA have ISO TS 16949 certifications.

However, there is still a large group of SMEs further down the supply chain at the Tier-2 and Tier-3 levels left without assistance in this field.

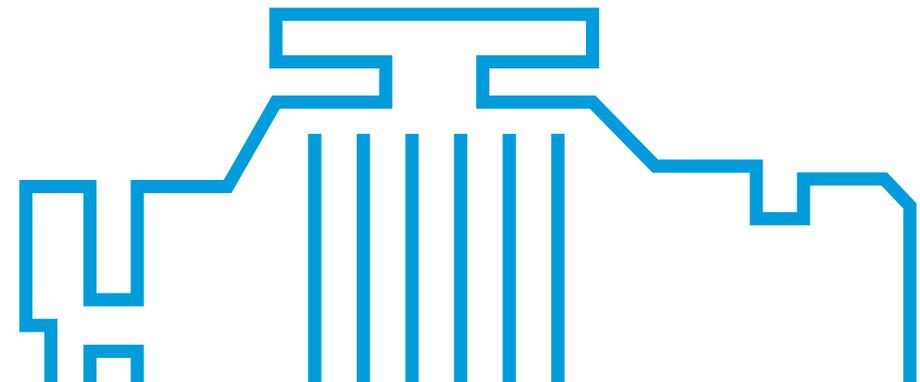
One of the few programmes that tried to address this target group was the "Programa de Extensionismo Tecnológico" developed under the auspices of the Departamento Nacional de Planeación (DNP) and SENA (with support from the World Bank) and implemented by the Centro Nacional de Productividad. In total the programme covered about 180 companies from various subsectors (not targeted specifically at the automotive supply chain).

### 2.3.4 Logistics and transport

The absence of adequate infrastructure is one of the major challenges for any production activity in Colombia. The poor condition of the road infrastructure, the lack of fluvial access to the major ports, the weak development of logistics areas, an extremely underdeveloped railway network and the absence of multimodal infrastructure make logistics costs in Colombia significantly higher than those of other countries in the region.

Colombia has dropped 33 places in the 2014 world rankings of logistics and infrastructure and is now ranked 97 out of the 160 countries assessed by the World Bank. A comparison of internal transport costs to international transport costs of goods can illustrate how expensive it can be to move goods between Colombian cities. It costs US\$ 94 to move one ton from Bogota to the Atlantic coast and US\$ 88 to move one ton to Barranquilla. This compares to US\$ 75 for ship goods from the coast to the United States or US\$ 60 from Buenaventura to Shanghai. In Colombia, logistics costs represent, on average, 18.6% of the total value of company sales. While this is lower than the 21% observed in Mexico, logistics costs in Colombia are larger than the average in the Andean Region, Central America and the U.S. (World Bank 2005). According to Doing Business, an export container handling supposed US\$2,255, which is almost triple the cost of this operation in Peru, at US\$ 890. In Mexico and Peru, the time needed to export goods from factory to port is 12 days and the average of the OECD is 10; in Colombia it is 14 days. These high internal costs undermine the competitiveness of goods produced in Colombia's largest cities.

Roads are a key problem, as they carry 70% of the country's exports, amounting to 170 million tons, but Colombia only has 900 kilometers of divided highways connecting to five ports. In contrast, Chile has more than 1,500 kilometers to connect with 32 ports on the Pacific. With mostly one lane intercity highways, it often means that accidents or potholes cause long delays and increased





They also have to make an extra payment to be able to register them. All of this makes logistical transport in Colombia very expensive.<sup>26</sup>

Within that context, local vehicle manufacturers already stated that, in order to reduce costs and remain competitive, the national automotive industry should relocate from the major cities of Bogota and Medellin to the port cities of Cartagena, Barranquilla, Santa Marta or Buenaventura. On the other hand, the automotive industry in particular is calling on the government to improve transport and logistics so that the sector can remain competitive. Without significant improvements in logistical transport, the future for the Colombian automotive sector looks gloomy.

Currently, the government is working on the implementation of the National Logistics Policy and Transportation Master Plan 2010-2032 which includes priority infrastructure projects, financing and strategies for attracting private capital, quality of services and regulatory policies, institutional framework and conditions for spreading good logistics practices.

The PTP Business Plan for the Automotive Industry also includes one concrete action pillar related to the optimization of the logistical network with a view to decrease costs. It proposes, amongst others, an analysis of the current situation of the logistics chain for the sector and optimization gaps, which has not been undertaken so far. The Plan also foresees the development of agreements with key actors in the logistics sector (e.g. from Germany).

Taking into account the severity of the problem and its current impacts on the sector, there is a need to (apart from the execution of planned

investments in infrastructure improvements):

**a.** Consider options for at least a partial relocation of the industry: This requires a thorough cost-benefit analysis and a detailed study of experiences from other parts of the world in such processes, comparing various tested government incentive schemes and the results obtained from the implementation thereof.

**b.** Define an investment attraction strategy that incentivizes potential new OEMs and suppliers ready to start operations in Colombia to settle in close proximity to major ports: To date it seems that the government (through ProColombia) has not applied a strategic approach for the attraction of new firms from the sector but rather followed the dogma “everyone’s welcome in any place of the country”. There is a need to not only pursue more aggressively companies that could directly contribute to the sector’s long term vision (particular OEMs, as well as logistics firms, foundries, etc.), but also develop schemes and incentives for these firms to locate in key coastal towns, thereby stimulating also the emergence of competitive export-oriented automotive clusters.

## 2.4. SECTORAL POLICY FRAMEWORK

### 2.4.1 Vision for the Automotive Industry / Automotive Sector Strategy

The government has commissioned a thorough analysis of the status quo of the sector, and future success scenarios, and on this basis initiated the elaboration of the current PTP Business Plan for the sector (which is currently being evaluated, reviewed and validated) that is oriented towards the following vision:

“By 2032 Colombia will be known as a leading exporting country for automotive components, generating incomes of US\$ 3 billion and being a regional champion in specific segments of auto parts”.

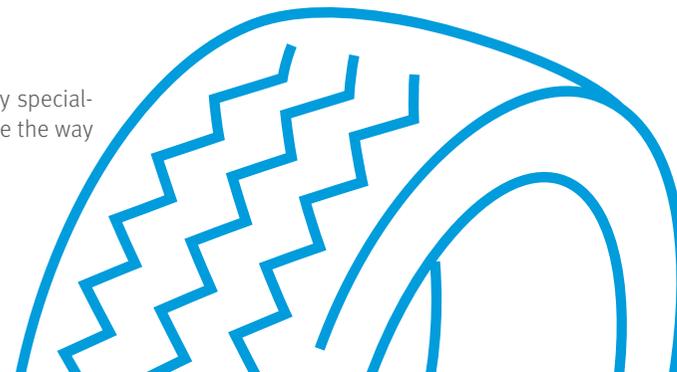
#### In order to achieve this, Colombia:

- Will have developed solid assembly alternatives with a highly specialized and competitive offer at the regional level, which will pave the way for setting a strong export focus.

- Will have strengthened its presence in export niches for automotive components and will be known for the production of specialized parts for certain emerging technologies

#### The plan envisages a phased approach to achieve this vision which covers the following stages:

- In the short term (2009 - 2012), Colombia aims to increase its presence in market niches for auto parts in other countries in the region, developing skills from a specialization in competitive components, particularly for the aftermarket.
- In the medium term (2013 - 2019), Colombia will focus its range of auto parts on a competitive manufacturing offer for achieving growth on the local and export markets. The plan states that for this purpose companies can leverage a logistical advantage in the markets of the Pacific, particularly in segments of low-cost vehicles.
- Finally, in the long term (2020 - 2032), once local firms will begin to harvest the fruits of R & D, Colombia will be able to stand out in the regional market through the assembly of automotive components for specialized vehicles such as electric cars. The offer of Colombian automotive components will be focused on the local market as well as on countries in the Americas, covering OEMs located within Colombia as well as other OEMs in the region.



Whilst the PTP Business Plan indicates in broad terms which direction Colombia's automotive industry might go, the outlined goals are still formulated in a very vague manner and the possible success scenarios to achieve the envisaged "export presence through highly specialized products targeting market niches" have not been elaborated at a level of detail that would allow local actors to coordinate their initiatives towards the most promising strategies.

In fact, the above framework leaves the door wide open for many possible avenues to pursue, which could be very different and also require a more focused, coordinated and strategic approach from the side of all public and private sector actors. To illustrate this, the below shows in a very simplified manner some extreme ideas (not to be interpreted or understood as recommendations!) to demonstrate the broad spectrum of possible alternatives and provide an indication of how much more could be done in terms of this thinking process for the operationalization of the upcoming revised planning framework.<sup>27</sup>

- "Colombia will be known globally as a leader for the manufacturing of electric buses and/or trains and components thereof, through (a) the attraction of one OEM in that segment on the basis of a specialized incentive package for such assembler to settle, (b) the establishment of a targeted R&D center in cooperation with a leading international institution in that field, and (c) the commitment to integrate e-trains/buses into urban planning and transport strategies over time; thereby becoming a leading example in the Americas, tapping its potential to develop the country's still underdeveloped public transport and railway network as a point of attraction to future investors (serving as testing ground)."



<sup>27</sup> The following shows a different set of options that are NOT to be interpreted or understood as recommendations. They solely serve to instill the thinking process towards more focused visions/ideas.

- "Colombia's automotive industry will be driven by a range of highly specialized automotive component manufacturers that focus on the supply of components to (lower volume) luxury brands/models of various OEMs assembling in Brazil, Mexico and the U.S., by (a) developing manufacturing know-how and highest quality standards, and (b) the attraction of one OEM assembling a luxury car model or a higher end brand (e.g. Range Rover) and/or key Tier-1 suppliers thereof, through a specific incentive package to manufacture in Colombia."
- "Colombia will become THE destination for the production of racing cars and for off-road racing events in Latin America through (a) becoming a member of the international series of events entitled "The Rainforest Challenge (RFC)", enabling the testing of vehicles/engines in difficult terrain and climatic conditions, and (b) developing a testing infrastructure for this purpose (within TECNNA), and (c) attracting a manufacturer of racing cars to Colombia with a specific incentive package for such type of OEM, thereby enhancing the image of Colombia as an "automotive country" globally, creating income opportunities in less advanced regions of the country and attracting heavily needed investment into infrastructure."
- "Colombia will be known for its capacities to produce specialized components for the aeronautic and aerospace industry through (a) attracting a manufacturer of small passenger planes or helicopters with a specific incentive package to manufacture in Colombia, (b) assisting automotive component suppliers in developing parts and components also for this industry, and (c) developing respective capacities within TECNNA to also serve this niche market, thereby overcoming logistical

hurdles/costs related to export, benefiting from a big regional market with high demand for such products (small aircrafts as the only means to connect smaller cities within the Amazon basin). ” – Similar visions for naval and railway industry or agriculture machinery or special purpose vehicles (mining, forestry, etc.) thinkable.

At present the government is in the process evaluating and revising the PTP Business Plan and to validate the long term strategic vision for the sector. A proposal for the new long term strategic plan should be drafted by March 2016. Hopefully this new strategic planning framework will be more focused and explicit or will at the minimum leave room to undertake more thorough analyses of possible/specific success scenarios for the survival and thriving of the local automotive industry in the future.

#### 2.4.2 Productive Transformation Programme (PTP)

The Colombian government is implementing the above mentioned strategic plan primarily through the Productive Transformation Programme (PTP) which targets:

- Increasing auto parts and automotive industry exports to US\$ 3 billion in 2032.
- To create the Colombian Automotive R&D Center.

The key areas of intervention as per the PTP Business Plan for the automotive sector include:

##### 1. Human Capital:

- Improving educational pertinence to align academic offer with the private sector's needs
- Strengthen academic formation focused on R&D + innovation

- Bilingualism
- Training of staff abroad

##### 2. Regulation:

- Update regulation to follow international standards and trends
- Improve knowledge and awareness of intellectual property
- Develop schemes to promote assembly of vehicles

##### 3. Development Promotion and Innovation

- Attract and promote FDI inflows
- Strengthen R&D capabilities
- Promote exports
- Increase aggregated value in supply chain

##### 4. Infrastructure and Sustainability

- Cluster promotion
- Sustainable development

##### The key activities undertaken to date by the PTP for this sector include:

- Programme “Profia”: The primary objective of the scheme called Profia (Development Program for the Automotive Industry), is to help the sector recover market share from inexpensive imports, by reducing tariffs on parts and materials imported for vehicle assembly. The programme enables local vehicle assemblers and manufacturers of auto parts to import of components and raw materials duty free, as long as they are not being produced within Colombia. The scheme can be utilized regardless of the country of origin of imported goods.
- Study on Electric Vehicles: PTP elaborated a proposal for a regulatory framework to pave the way for electric vehicles in Colombia. This proposal has been further discussed by relevant

stakeholders in the course of 2015.

- Establishment of the Centro de Desarrollo Tecnológico de la Industria Automotriz – TECNNA.
- Establishment of the National Sectoral Roundtable for the Automotive Industry / Mesa Nacional Sectorial de la Industria Automotriz, led by ANDI and SENA to develop human capital in this sector. To date efforts have been undertaken by this group to update the classifications and standards for sectoral occupational skills. At present they are also working on a plan to ensure that training programmes fully match the needs in terms of human capital required by the industry.
- Development of a credit line to support firms in this sector in cooperation with Bancóldex.
- Cooperation agreement with South Korea.
- Creation of a mechanism to allow firms from the sector to better benefit public procurement processes: To date, this initiative generated orders for more than 118 billion Colombian pesos, of which 54% represented orders assigned GM-Colmotores and Renault Sofasa.

Another key initiative to be mentioned here is the Programa Piloto de Productividad, which was executed by the Corporación Internacional de Productividad (CIP) between 2013 and 2015, and covered 50 companies from 10 cities and various sectors (including 2 firms from the automotive and 11 from the metal-mechanical sectors). The programme focused on lean manufacturing techniques, TPM, innovation and R&D strategies. Over a period of 9 months each company received 3 counselling days for a diagnostic, 1 counselling day for the development of an

improvement plan and 7 counselling days for implementation support. The cost per company was approximately US\$6,400, out of which the PTP covered US\$3,700 and each company had to pay US\$2,700 in four tranches directly to CIP. The key observations and lessons learned to take into consideration for the development of future upgrading programmes are the following:

- It has been observed that companies in general do many things to improve productivity and quality but in many cases the costs of doing so were higher than the benefits realized.
- The gap between companies with high levels of productivity and the rest has been growing over time.
- Although companies know of many internationally renowned improvement tools, the level of sophistication in the use thereof is still sub-optimal.
- In those companies, where high level management delegates leadership for productivity improvement to the second level management the result is generally a further delegation of the task to even lower levels of the hierarchy, which reduces priority given to this issue.
- ISO 9001 is largely being used as a management system for documentation only and not as a tool for continuous improvement.
- Productivity improvement is a step by step process which takes time – skipping one building block or changing the sequence which is required to build the capacity to standardize, improve and innovate is one of the key reasons for failure.

- 80 hours of intervention that were foreseen in the programme were not enough.
- There is a need to differentiate the programmes to fit the size of the firm.
- There is a need for more programmes of this kind in the future that cover more firms but at the same time increase the intervention time in each company.

## 2.5 SUPPORT INSTITUTIONS AND INITIATIVES OF RELEVANCE

### 2.5.1 Centro de Desarrollo Tecnológico de la Industria Automotriz (TECNNA)

The Technological Development Center of the Automotive Industry / Centro de Desarrollo Tecnológico de la Industria Automotriz (TECNNA) is a long-term transformation project, which will require a total investment of approx. US\$ 65 million within the first 10 years of its operation. The centre was established as a non-profit private association in November 2012 by 18 companies located in Bogotá, Cali, Manizales and Medellín (including auto parts manufacturers and 2 OEMs - GM Colmotores and Renault SOFASA) as well as support institutions such as ACOLFA and the Automotive Chamber of ANDI, Colciencias and the Universidad del Valle. It was established following a PPP model, in cooperation with the PTP. The basic aim of the Centre is to support the productive transformation of the industry, by contributing to the development of supply of and demand for technological upgrading services in the productive chain of the local automotive industry. It will offer testing laboratories, soft- and hardware for the development of technological and scientific capacities, R&D facilities, human capital development cells and support structures to facilitate value addition and competitiveness enhancement of the automotive supply chain in the country.

More specifically, the Center will feature a testing unit for auto-parts, where safety, reliability and environmental tests are being conducted. Furthermore it will include a training cell, where specialized training services will be offered to the industry as well as a research and innovation group, which will be responsible for leading the processes of basic and applied R&D for the development new designs and prototypes. Last but not least

the Center will provide strategic foresight inputs of relevance to the sector. In order to strengthen the capacities of TECNNA a cooperation agreement was signed with relevant Korean entities via the PTP for know-how transfer.

TECNNA was involved in the structuring and formulation of the following projects to be pursued in the near future (subject to approval of funding):

- Development of an automotive cluster managed by TECNNA based on international best practice
- Design of suspension systems and components to better fit local road conditions
- Reverse engineering to develop a new product or improve an existing one
- Development of a design and simulation unit
- Development of a prototype to showcase the capacities of the local industry

### 2.5.2 Asociación Colombiana de Fabricantes de Autopartes (ACOLFA)

The national auto-parts manufacturers association was founded in 1974, counts with 40 members, which are suppliers to OEMs (importers are not granted membership; OEMs are members of ANDI). The association represents the interests of auto-parts suppliers vis-à-vis the government, produces statistical yearbooks (figures only – no analysis), and has cooperation agreements with peer organizations in the Americas as well as with the Spanish Chamber for data exchange and support for

fare participation. It is headed by a president and counts with 1 technical staff member. It is governed by a 24-member board of directors, which is being supported by several technical committees. The key activities of the association include:

- Lobbying and support to members in interaction with government
- Statistical data collection and publication of statistical manual
- Seminar and conference organization
- Exchange with relevant institutions in other countries
- Inputs for establishing new quality standards of quality assurance for the sector

### 2.5.3 Asociación Nacional de Empresarios de Colombia (ANDI)

The national business association of Colombia counts with 1,300 members and is organized in sectoral chambers. The automotive chamber represents OEMs, automotive component manufacturers and motorcycle producers (4 companies only). It represents the interests of its members (heavily dominated by OEMs), provides information about national and international policies that impact the industry, supports FTA negotiation processes, and provides recommendations regarding the relevant legislative frameworks (e.g. environmental laws, consumer rights, transportation regulation). The automotive chamber consists of 3 staff members. ANDI regularly circulates a questionnaire to its

automotive chamber members on the current state of the industry, production levels, etc.).

### 2.5.4 ProColombia

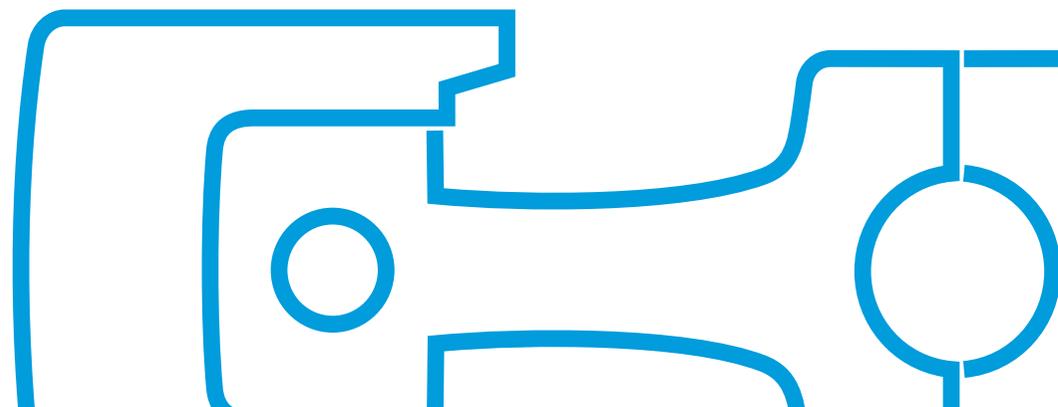
ProColombia is the Government's Tourism, Foreign Investment and Exports Promotion agency responsible of the effective insertion of Colombian companies into international markets as well as providing specialized services to foreign companies interested in acquiring Colombian goods and services. The organization operated as an entity associated to MCIT and disposes of a network of 28 liaison offices around the globe (including India, Russia, Turkey and China) that have helped to identify export opportunities also for automotive companies in Colombia. At a general level, ProColombia's support services include the following:

- Identification of market opportunities
- Designing strategies for market penetration
- Internationalization of business
- Support for the development of action plans
- Promotion of business contacts through trade promotion, investment and international tourism
- Advisory services for foreign companies interested in purchasing Colombian goods and services or to invest in Colombia
- Partnerships with national and international, private and public entities that

ProColombia has a unit dedicated to serve specifically the automotive industry, which is linked

to the Directorate of Manufacturing. In terms of concrete activities to attract additional OEMs or automotive suppliers to Colombia or to secure business for local firms in the sector, the organization coordinates the participation of firms in business roundtables and relevant events within Colombia and abroad, and also facilitates direct business contacts. Within this context, e.g. the company Kubota approached ProColombia in 2010 to explore the capabilities of the local auto parts sector to supply OE components to its plant in the U.S. This resulted in the successful conclusion of a supply contract for OE parts with two Colombian companies. By 2014 the number of local firms supplying components to this plant has increased to seven. The parts exported to Kubota include fluid tubes, control cables, exhaust pipes, and suspension parts, amongst others.

Furthermore, ProColombia promotes the application of state of the art economic and market intelligence tools/instruments such as general information from Business Monitor, identification of companies on the Orbis platform, Trade Map and Euromonitor, among others. ProColombia also produced a booklet on the local automotive industry in order to better promote the sector globally. This however dates back to 2012 and has not been updated since then (only the information on the website include updated information and statistics).



### 2.5.5 Instituto de Prospectiva, Gestión del Conocimiento e Innovación

The institute was formally established in 2009 by the University of el Valle and now comprises 25 fixed-term staff and 150 associated experts working in two offices in the country. The main objective of the entity is to become a benchmark for the development of national capabilities in foresight, innovation and knowledge management, which contributes to the advanced training of a critical mass of people capable of effectively managing knowledge-based organizations. The Institute represents an evolution of the National Program for Prospective Technological and Industrial (PNP), which operates successfully since 2003, and responds to the joint interest of Colciencias, Universidad del Valle, SENA and other entities, with the support of agreements and legal provisions as well as networks of national and international organizations linked to the government, universities, the private sector and the academic community. Its research agenda is being defined through interaction between academia, the private sector and the public sector at local, regional and national level. The entities that have received advice from the Institute include SENA, the municipalities of Cali, Palmira, Yumbo and Buenaventura; the Government of Valle del Cauca, the National Department of Science, Technology and Innovation - COLCIENCIAS, as well as the National Ministries of Health, Education and Commerce, Industry and Tourism.

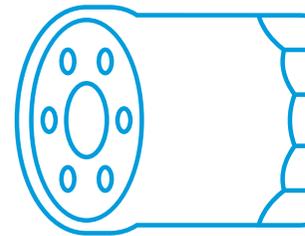
The Institute has developed linkages with the auto industry since the beginning. Amongst others, they contributed to the first study of technology foresight, which led to the definition of the technological development strategy of the automotive industry in Colombia and ultimately to the creation and establishment of TECNNA. Between 2013 and 2014 the institute assisted TECNNA in the structuring and formulation of the project: “Development of the Strategic Unit for Standardization, Certification and Testing for the Colombian Automotive Industry”.

### 2.5.6 Servicio Nacional de Aprendizaje (SENA)

SENA was established in 1957 to provide technical training to employees, complementary training for adults, and help employers and workers to establish a national learning system. For this, SENA establishes mechanisms of direct and permanent interaction with the unions, the companies, the governmental and non-governmental institutions, and the educational

institutions of the country, for the ongoing update and adjustment of the curriculum designs of the existing training programmes and the creation of new ones. SENA’s key interface with the automotive industry is a coordination mechanism called “Mesa Sectorial Nacional de la Industria-Automotriz”, which brings together all key actors of the sector to discuss any issues of relevance – in particular related to the creation of human talent. Its main purpose is the qualification of human talent through standardization and certification of on the job skills, updating and creating training programs that generate a continuous knowledge in the specific technical skills of the production of auto parts, motorcycle parts, car bodies, motorcycles, vehicles and related industries, thus helping to meet the needs of human

talent in the industry. The Executive Council of this body comprises the following actors: ANDI, SENA, ACOLFA, Fanalca, TECNNA, Incolmos -Yamaha, Sofasa, GM Colmotores, ChaidNeme, YazakyCiemel, Technological University of Pereira, BUSCCAR, SAS Alliance CarroceraCesvi Colombia. The Ministries of Environment and Transport also participate in this initiative. In addition to this, SENA is running 71 technical training programmes of relevance to the automotive industry.





**3. NATIONAL  
QUALITY  
INFRASTRUCTURE**

The current worldwide trade context is notably characterized by an increasing interdependence among national economies and the formalization of international trade in accordance with the agreements of the World Trade Organisation (WTO). In parallel, the global market is subject to increasingly strong competition resulting in a growing demand for quality while policies toward the protection of environment and the consumer become more and more stringent.

In fact, increasing supply capacity is essential to, but not sufficient for, gaining entry into world markets or achieving regional harmonisation and integration. Once the critical quantity is achieved the problem of reaching a certain quality requested by international and regional markets arise and the associated challenge of proving conformity with international standards and technical regulations.

Countries that rely on import for satisfying a good part of the needs of their populations in food and consumer products should establish effective systems for controlling the quality and safety of imported products. This implies establishing an effective technical regulatory regime with the necessary conformity assessment capabilities in line with the accepted rules of international trade.

This requires establishing efficient standards, testing, certification and accreditation mechanisms that conform to the requirements of the WTO SPS and TBT agreements and enjoy international recognition. Conformity assessment means evaluating and confirming features such as quality, reliability, safety, economy, efficiency and effectiveness as

defined in standards and regulations. To prove compliance with quality standards and adequate quality infrastructure (QI) it is essential to face the challenges of and benefit from a changing global landscape. Standardization, for example, contributes not only to international trade but also to the basic infrastructure promoting sustainability and good regulatory practice. An adequate QI has the potential to improve the quality of products, processes and services.

The typical buildings blocks of a Quality Infrastructure are listed in the Table 3 below. Also listed in the table are the typical institutions that provide the services, as well as whether they are to be found in the public or private domain.

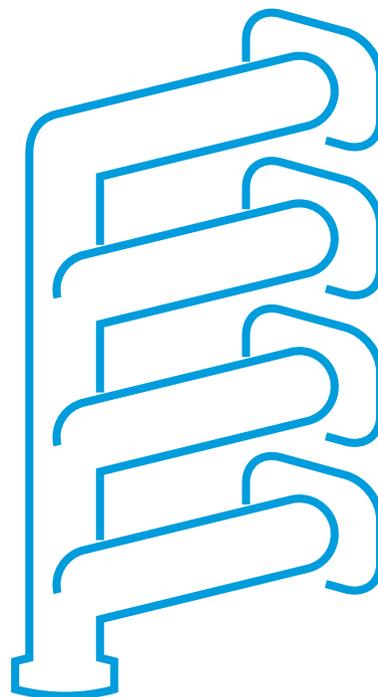


Table 3: Quality infrastructure, services and institutions

Domain	Description of service	Institution(s)
<b>Standards</b>	Publication of a formal document (standard), generally developed by consensus, containing the requirements that a product, process or service should comply with. Standards are considered essentially voluntary in themselves. Suppliers can therefore choose whether to use standards or not. It is only once they are called up in a contract, for example or referenced in technical regulation, that compliance with standards becomes a legally binding obligation.	<ul style="list-style-type: none"> <li>• National Standards Body (NSB)</li> <li>• Sectoral Standards Development Organizations (SDO)</li> <li>• Industry based standards organizations</li> </ul>
<b>Technical Regulations</b>	Technical specification relates to product(s), process(es) or industrial premises, which establishes the mandatory nature through a legal disposition for their manufacturing, commercialization or use.	<ul style="list-style-type: none"> <li>• Government Ministries</li> <li>• National Authorities</li> <li>• Regulatory Commissions</li> <li>• Institutions in charge of monitoring TR</li> </ul>
<b>Metrology</b>	The technology or science of measurement. Metrology can be subdivided into scientific metrology (the development and organization of the highest level of measurement standards), legal metrology (the assurance of correctness of measurements where these have an influence on the transparency of trade, law enforcement, health and safety) and industrial metrology (the satisfactory functioning of measurement instruments used in industry, production and testing).	<ul style="list-style-type: none"> <li>• National Metrology Institute (NMI)</li> <li>• National Calibration Service</li> <li>• Calibration Laboratories (public or private)</li> <li>• Legal Metrology Department (LMD)</li> </ul>

Domain	Description of service	Institution(s)
<b>Accreditation</b>	The activity providing independent attestation as to the competency of an individual or an organization to offer specified conformity assessment services (e.g. testing, inspection or certification).	<ul style="list-style-type: none"> <li>National Accreditation Organization/Body</li> </ul>
<b>Inspection</b>	The examination of a product design, product, process or installation and determination of its conformity with specific requirements or, on the basis of professional judgement, with general requirements. Inspection is often conducted on consignments such as import inspection, to ensure that the whole consignment is equivalent to the product sample tested.	<ul style="list-style-type: none"> <li>Import inspection agencies</li> <li>General inspection agencies</li> </ul>
<b>Testing</b>	The determination of a product's characteristics against the requirements of the standard. Testing can vary from a non-destructive evaluation (e.g. X-ray, ultra sound, pressure testing, electrical, etc. where after the product is still fit for use) to a total destructive analysis (e.g. chemical, mechanical, physical, microbiological, etc. where after the product is no longer fit for use), or any combination thereof.	<ul style="list-style-type: none"> <li>Test laboratories</li> <li>Pathology laboratories</li> <li>Environmental laboratories</li> </ul>
<b>Certification</b>	The formal substantiation by a certification body after an evaluation, testing, inspection or assessment, that a product, service, organization or individual meets the requirements of a standard.	<ul style="list-style-type: none"> <li>Product certification organizations</li> <li>System certification organizations</li> </ul>

<sup>28</sup> This decree has been revoked by Decree 3523/2009, Art. 19 with the exception of articles 1, number 1, 4 (# 1 and 6), 11 (#5 and 6), 24, 44 to 54. Article 24 was revoked by Decree 4886/2011.

### 3.1. SITUATION IN COLOMBIA

#### 3.2.1 Legal framework

Decree 2152/1992, Art. 22

- Rearranges the Ministry of Economic Development, establishes the National Council for Standards and Quality, and proposes the adoption of new standards, certification and metrology systems.

Decree 2153/1992<sup>28</sup>

- Restructures the Superintendence of Industry and Commerce (SIC)

Decree 2269/1993

- Organizes the National System for Standardization, Certification and Metrology (sets objectives, definitions)

Andean Community Resolution 502 of 1993

- Approves the regulations of the Andean standardization, national accreditation body, testing, certification and metrology networks

Decree 300/1995

- Establishes the procedures to verify compliance with compulsory Colombian technical regulations and technical regulations of imported products

Andean Community Decision 543 of 2003

- Andean System of Standardization, Accreditation, Assays, Certification, Technical Regulations and Metrology

Decree 1112/1996

- Creates the information system for standardization measures and conformity assessment procedures, it dictates standards to harmonize the drafting of technical regulations and complies with some international commitments agreed by Colombia

Andean Community Decision 506 of 2001

- Recognition and acceptance of certificates of products sold within the Andean Community

Andean Community Decision 543 of 2003

- Programa de Acciones de Convergencia (PAC)

CONPES<sup>29</sup> 3446 of 2006: Guidelines for the establishment of a National Quality Policy

- Assessed the NQS and proposes the reorganization of the institutional framework.

Decree 2828/2006

- Rearranges the National Administration System for Competitiveness
- Establishes the National Commission for Competitiveness

Andean Community Decision 462 of 2007

- Provisions Regulating the Integration and Liberalization of the Trade in Telecommunications Services in the Andean Community

Decree 3257/2008

- Partially modifies Decree 2269/1993 and establishes the National Quality Subsystem (chapter 1)
- Establishes the Inter-sectoral Commission for Quality (chapter 2)

Law 1480 of 2011: Consumer Statute

Title IX: "Issues related to the National Quality Subsystem"

- Chapter I: Metrology (Art. 68-71)
- Chapter II: Technical Regulations and Conformity Assessment (Art. 72-74)

Decree 4738/2008

- Dictates norms for the accreditation functions of conformity assessment bodies which are part of the National Quality Subsystem and amends the structure of the Superintendence of Industry and Commerce

Decree 3523/2009

- Amends the structure of the Superintendence of Industry and Commerce and dictates the functions of its departments

Decree 323/2010

- Amends and adds article No. 4 to Decree 4738 from 15 December 2008

Decree 1867/2010

- Modifies decree 3523/2009

Decree 2124/2012

- Designates the National Accreditation Board (ONAC) and dictates other provisions

Decree 0865/2013

- Designates the National Accreditation Board (ONAC) as the only accreditation board and dictates other provisions

Decree 1844/2013

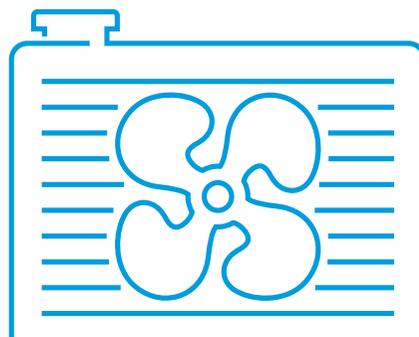
- Regulates the Ministry of Commerce, Industry and Tourism's competence to elaborate and report technical regulations and conformity assessment procedures

Decree 1471/2014

- Reorganizes the National Quality Subsystem and modifies Decree 2269/1993

Decree 1595/2015

- Dictates norms related to the National Quality Subsystem and modifies chapter 7, and section 1 of chapter 8, title 1, second part of book 2 related to the Unique Regulatory Decree of the Ministry of Commerce, Industry and Tourism, Decree 1074/2015 and dictates other provisions



### 3.2 INSTITUTIONAL ORGANIZATION

The Colombian National Quality Subsystem (NQS) is aligned with other international quality systems (see figure 6). In the particular case of Colombia, both the National Accreditation Board (ONAC) and the National Standards Body (ICONTEC), provide public functions although the institutions are not governmental.

The national Decree 1595/2015 establishes the following fundamental objectives for the NQS:

- Promotes on the markets the security, quality, trust, innovation, productivity, competitiveness of the productive sectors and import of goods.
- Protects the interests of the consumers.
- Facilitates the access to markets and trade.
- Protects the life and health of people, also of animals and the preservation of vegetables.
- Protects the environment and the national security.
- Prevents the practices that could be harmful to the consumer.

Achieving these objectives is not a simple task and requires the articulation of various components: standardization, the drafting and setting up of technical regulations, the evaluation of conformity, metrology, accreditation, etc. The area of security and protection has the following characteristics:

<sup>29</sup> A CONPES (Consejo Nacional de Política Económica y Social) is a document prepared by the DNP defining, recommending and promoting public and economic policy.

- Legitimate interest: it aims at protecting life, health and the environment.

- Mandatory nature: those that produces goods and services that carry a risk or threat to the legitimate interest are oblige to comply with state regulations for their production.

**Instruments:**

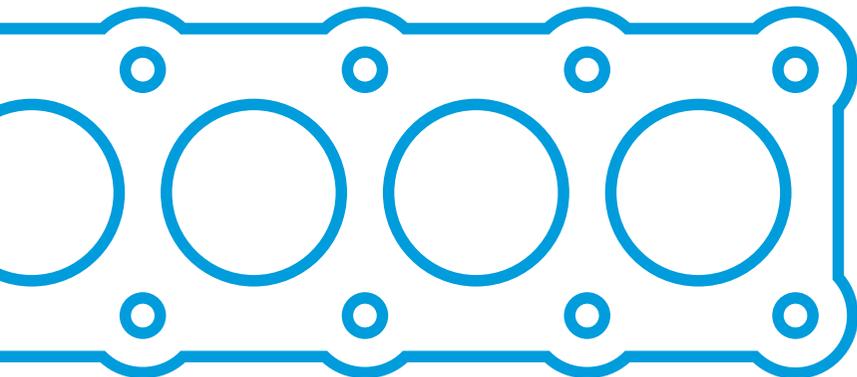
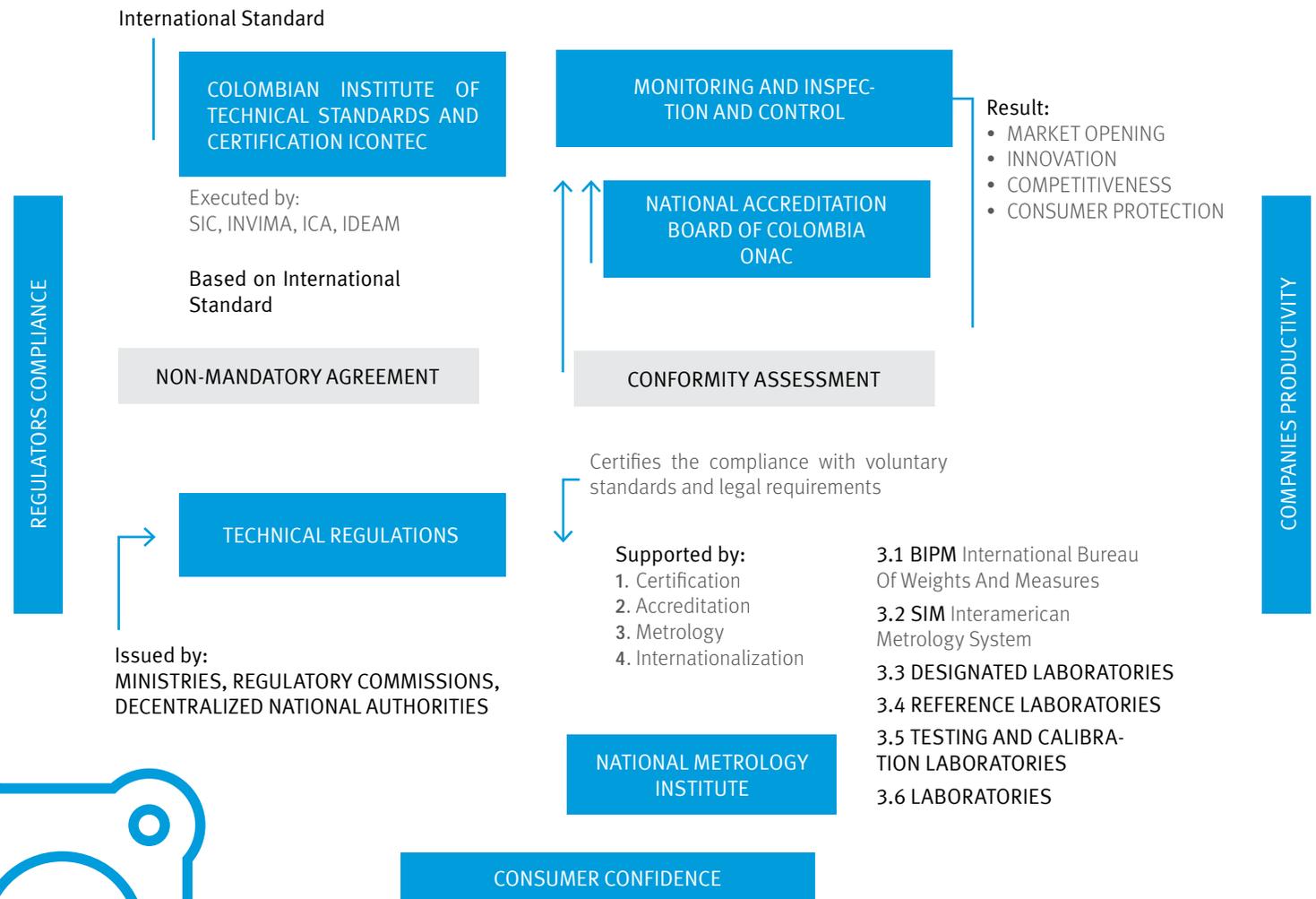
The obligatory realm has the following instruments:

- The technical regulation
- The conformity assessment and designation
- The reasonability regime and administrative control

In the area of competitiveness and productivity the following characteristics exist:

- Support the productive processes and the scope of competitive standards – their aim is the productive development and the facilitation of trade
- Voluntary nature – those interested in competing in better conditions and with better products

Figure 6. Colombia's National Quality Subsystem in line with Decree 1595/2015<sup>30</sup>



<sup>30</sup> [http://legal.legis.com.co/document?obra=legcol&document=legcol\\_f0b35694078c40509e5c67f5297fba05](http://legal.legis.com.co/document?obra=legcol&document=legcol_f0b35694078c40509e5c67f5297fba05)

### 3.2.1 La Superintendencia de Industria y Comercio (SIC)

The Superintendency for Industry and Commerce (SIC) has the responsibility within the NQS for the control and verification of technical regulations and legal metrology ([www.sic.gov.co](http://www.sic.gov.co)). It is also in charge of regulating fair business practices, promoting competitiveness and acting as the Colombian patent and registration office.

The SIC safeguards consumer rights, protects free and fair competition, acts as the national authority for industrial property and defends the fundamental rights relating to the proper management of personal data. In the field of consumer protection, the Superintendency is responsible for monitoring compliance with the provisions of the statute of the consumer, Act 1480/2011.

Regarding Technical Regulations and Legal Metrology, the SIC sets the permissible tolerances for metrological control, establishes the requirements for models or prototype measuring instruments and patterns that are to be marketed, and approves their use. It is in charge of making administrative inquiries about manufacturers, importers, producers and marketers of goods and services subject to compliance with technical regulations and may impose measures and penalties in case of violations of the provisions related to legal metrology. In accordance with Decree 3144/2008, the SIC may suspend the marketing of a product or service when it has serious indications that it may compromise the corresponding technical regulation.

Furthermore, in order to strengthen the efficiency of national production, and to ensure that consumers have freedom of choice and access to the supply of goods and services,

the Superintendency investigates and take due action on unfair competition.

#### The National Metrology Institute (INM)

INM is the National Metrology Institute in Colombia (<http://www.inm.gov.co/es/>) and has the responsibility of being the custodian of the national physical measurement standards. Moreover, it offers calibration services on measurement equipment in industrial and scientific context. It further ensures traceability of primary measurement standards used by the legal sector. The full description of the tasks covered by INM is listed in the Decree 3527/2008 that has established the Institute:

- Implement, and preserve the national standards required in physical metrology, according to internationally established guidelines.
- Provide traceability in physical metrology, according to internationally established guidelines.
- Coordinate and direct the actions necessary for ensuring the traceability of national measurement standards to the International System of Units.
- Represent the Institute, when delegated by the Director, facing national and international groups working in physical metrology and product development tasks such as memberships, as well as coordinating the participation of designated reference laboratories.
- Provide calibration services, training and technical assistance in physical metrology.
- Propose the appointment of laboratories to

perform specific tasks when necessary.

- Coordinate participation in inter-laboratory comparisons and collaborative studies in physical metrology, and develop and evaluate plans of inter-comparisons.
- Propose as national measurement standards for physical metrology, those presented by laboratories under his tutelage that meet the technical and legal requirements for the purpose and participate in approval and recognition.
- Perform research, development and innovation in physical metrology.



- Participate and collaborate in the definition of fees and charges for physical metrology services.
- Organize and supervise the system of quality management in physical metrology laboratories and propose the necessary measures to address the technical and administrative improvement thereof.
- Promote the transfer of knowledge in the field of Physical Metrology.
- Facilitate the communication among members of the network and other related institutions in the area of metrology at national and international level.
- Identify the competencies of potential laboratories to be part of the network in diverse metrology segments.
- Establishing metrological subnets in different topics to meet the breadth of demands in areas of environment, health and industry.

#### National Metrology Network (RCM)

The National Metrology Network – Red Nacional de Metrología (RCM) – (<http://www.rcm.gov.co>) is a public – private institution, established and coordinated by the National Metrology Institute (NMI), in accordance with paragraph nine (9), article 6 of Decree 4175/2011 from the Colombia Presidency. Its role is to govern and articulate the metrological assurance system in the country, providing the necessary tools to ensure the realization of exact, accurate, comparable, and traceable measurements. Additionally, it should seek international recognition for these measurements. The RCM is meant to play a key role in Colombia's competitiveness, the development of the domestic market, foreign trade, health and environmental, disseminating traceability in the country through its various stakeholders.

The RCM aims to develop a set of actions for the creation, consolidation and continuous upgrading of metrology. It ensures the traceability of measurements in Colombia through the use of laboratory technical capabilities to seek national and international recognition. In coordination with the INM, it is task to reach the following objectives<sup>31</sup>:

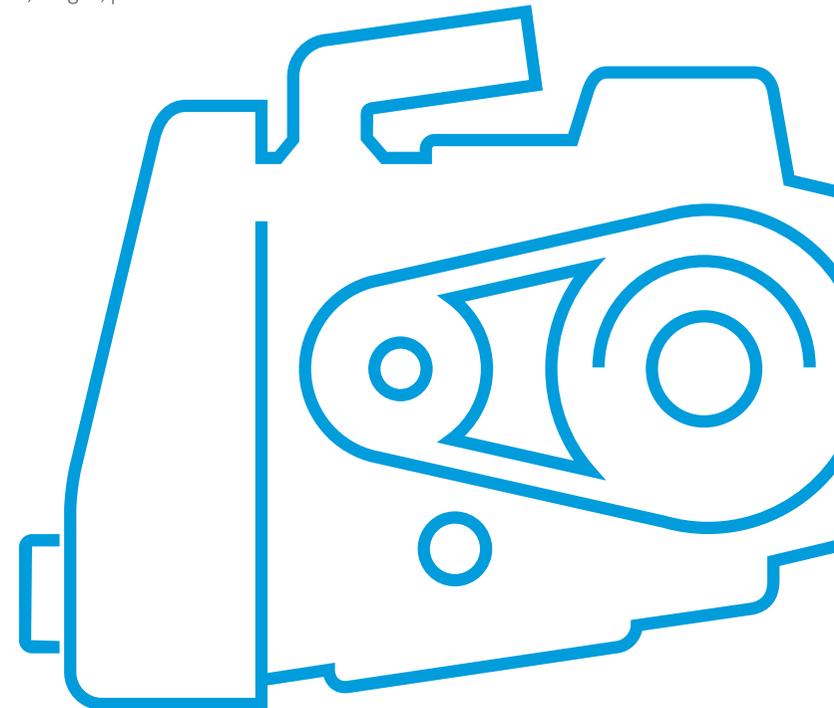
- Synergy and updating of knowledge through shared network performance of the institutions which have the knowledge and infrastructure needed for its operation.
- Improved control of imported and exported products.
- Support for improving the country's competitiveness and prevention of rejection of domestic for breach of quality requirements in international markets.
- Govern and articulate the metrological assurance system in the country and ensure traceability of measurements made in Colombia and these to the International System of Units.
- Assist in the dissemination of national traceability.
- Provide an environment and tools to enable constant updating of knowledge in metrological area in order to ensure the quality of the results issued by the laboratory, i.e. its accuracy, precision and reliability.

<sup>31</sup> [http://www.rcm.gov.co/index.php?option=com\\_content&view=article&id=9&Itemid=111](http://www.rcm.gov.co/index.php?option=com_content&view=article&id=9&Itemid=111)

- Promote technical cooperation between institutions involved in management of science, technology and innovation in the metrology area through joint actions.
- Assist in the continuous improvement of the measurements and the implementation of collaborative actions.

#### Instituto Colombiano de Normas Técnicas y Certificación (ICONTEC)

The national standard body ([www.icontec.org](http://www.icontec.org)) is a private company established by Decree 2269/1993 that covers not only the preparation, distribution and selling of standards, but also acts as a Certification and Inspection Body. It offers various services to the industries like courses, assistance in implementing internal QMS and calibration services. It has four laboratories covering measurements on temperature, mass, length, pressure and volume.



For the certification and inspection activities ICONTEC is accredited not only by ONAC but also by other international accreditation bodies in order to gain international recognition.

#### The National Accreditation Board (ONAC)

Is the national accreditation body of Colombia (<http://www.onac.org.co/default.asp>), its main objective is to provide independent attestation of the technical capabilities of the conformity assessment service providers; if functions as Colombia's National Accreditation Board, in accordance with designation under article 3, Decree 4738/2008, subsequently modified under Decree 323/2010, and ratified by Decree 2121/2012; it enforces and coordinates the functions related with accreditation described under Decree 2269/1993, as well as norms which amend, substitute and/or modify these; is also in charge of keeping record of the accredited conformity assessment bodies.

Its main functions are:

- Accredite the competence of conformity assessment bodies, in accordance with the terms and legal conditions established.
- Coordinate the functions related to accreditation, described under Decree 2269/193, as well as norms which amend, substitute and/or modify these.
- Represent the National Government to the Andean Community and multilateral recognition fora related to accreditation, in accordance with Andean Decision 376/1995.
- Establish and maintain a public registry up-to-date of conformity assessment bodies accredited.

- Issue rules, guidelines and general recommendations about the accreditation process and the compliance requirements for conformity assessment bodies.

- Elaborate, publish and distribute scientific material, technical or informative, about accreditation and conformity assessment.

- Participate in committees and activities at national and international level related to accreditation and conformity assessment.

- Support the legislation processes, regulation, and issuance of technical regulation, and present to the competent authorities initiatives aimed at promoting best practices and conditions in accreditation, and activities related to conformity assessment, surveillance and monitoring.

- Promote activities aimed at enhancing technical capacity on accreditation and conformity assessment, as long as this does not affect its impartiality vs the conformity assessment bodies subject to accreditation, in accordance with the criteria established by the Board.

- Ensure international recognition through association, participation, evaluation and other planned activities by institutions and international/regional fora related with accreditation activities.

ONAC is member of International Laboratory Accreditation Cooperation (ILAC). At the same time is full member of the Inter American Accreditation Cooperation organization (IAAC) – through being signatory of the IAAC MLA (Multilateral Recognition Arrangement), ONAC is signatory of the ILAC MRA (Mutual Recognition Arrangement) for testing and calibration. It is also member of



the International Accreditation Forum (IAF) – ONAC is signatory of the IAF MLA for management system certification and product certification.

### 3.4 KEY CHALLENGES FACED

**T**he Colombian NQS was recently realigned and institutionalized following international best practices. Although this programme and the efforts of the Colombian Government have achieved a variety of positive results, the NQS finds itself at an early stage, presenting still overall challenges and weaknesses:

- a. Policy level: outdated, weak or non-existent regulatory/legal, institutional quality frameworks;
- b. Institutional level: insufficient internationally recognized quality infrastructure and conformity assessment services (e.g. calibration, testing, inspection, accreditation, certification);
- c. Supply side: potential for value addition of export products is by far not realized. Lack of appropriate technology and skills for compliance with international quality, private and sustainability standards.

More specifically, the following challenges were identified with regard to the NQS and the automotive sector:

**Technical Regulations:** Decree 1595/2015 requires that the Government must carry out an impact assessment before establishing Technical Regulations, therefore, regulatory authorities have until 1 January 2018 to develop the required capacities to conduct these, and take due action where deemed necessary. This poses a challenge because in a limited time, the following TRs must be revised: safety glazing for vehicles, safety glazing for bullet proof vehicles, brakes parts, wheels, seat belts, labelling, gas vehicle conversion, and retroreflective tapes for use in motor vehicles and trailers.

**Standardization:** Insufficient know-how and lack of full understanding along the value chain, in particular Tier 2 and Tier 3 suppliers, of sector requirements for standardization, including regulatory and market requirements. This also includes more sector specific requirements like those set for example by SAE International<sup>32</sup> or the US National Highway Traffic Safety Administration, through its Federal Motor Vehicle

<sup>32</sup> SAE International is a global association of more than 138,000 engineers and related technical experts in the aerospace, automotive and commercial-vehicle industries. SAE International's core competencies are life-long learning and voluntary consensus standards development. <http://www.sae.org/about/>

Safety Standards and Regulations (FMVSS). It is therefore, important to identify the country needs in terms of standardization, based on targeted markets, in order to develop and/adopt those considered imperative for the production and export of auto parts. Also to be kept in mind are the requirements set by OEMs, which also establish their own standards for product testing and validation plans, setting up the technical requirements for homologation purposes.

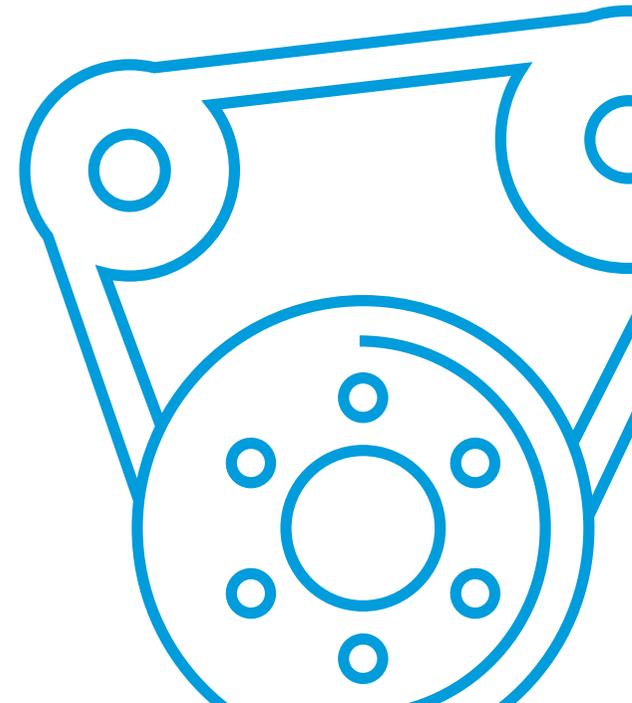
**Metrology:** In order for industry to produce auto parts in full adherence with international requirements, Colombian manufacturers of auto parts are required to use machinery and equipment calibrated in the magnitudes of force, dimensional, length, and torque. It is therefore very important to enhance the NMI service provision and technical know-how to perform these measurements. Additionally, the industry requires also the development of the technical competence in magnitude of hardness and roughness, currently not available in the country.

**Accreditation:** The country is taking bold steps towards the consolidation of ONAC's international recognition, it is important however, that support is given towards the accreditation of those providing inter-laboratory comparison services and proficiency testing schemes, this considering the difficult and high-edge technology required for the sector-specific testing

**Testing:** The homologation processes set a number of technical requirements for which compliance must be proven. Among these processes there are different methodologies, for example, the Advanced Product Quality Planning (APQP) and the Production Part Approval Process (PPAP) – these set the validation plans, which set the various tests that must be carried

out. It is therefore, imperative that Colombia increases the internationally-recognized and accredited service offer of testing laboratories to local producers and exporters, which are able to provide the specific tests, with required technical competence, and at a competitive pricing.

**Certification:** It has been observed that the majority of Tier 1 suppliers are ISO/TS 16949 certified, however, this is not the case for Tier 2 suppliers. It is therefore very important that lower Tier suppliers also enhance their management quality systems. Additionally, it was noted that based on the rules set by the International Automotive Task Force (IATF), Colombia is yet to have a recognized Certification Body (CB) – ongoing certification activities are being commissioned to CBs with international operations – with the required operational and technical capacity.





# 4. UNIDO'S RESPONSE

#### 4.1 UNIDO'S TECHNICAL & SECTORAL EXPERTISE

**A**s national and international car manufacturers are demanding increasingly higher standards with regard to cost, quality, delivery, and, to a certain extent, engineering know-how, UNIDO seeks to support suppliers in their endeavour to respond to this demand. UNIDO offers a wide variety of specific technical cooperation services targeted at the automotive supply chain, which can be delivered at the institutional and enterprise level as appropriate.

Due to its long-standing involvement in the automotive sector through technical cooperation projects as well as research initiatives and global forum events in the fields of supplier upgrading and development, sustainability issues, cleaner production, technology foresight, establishing effective technical regulatory regimes with the necessary conformity assessment capabilities in line with the accepted rules of international trade, private standards, policy advisory matchmaking and investment promotion related to the automotive industry, and in particular component manufacturers, UNIDO has acquired an in-depth understanding of the sector and established a relevant network of technical experts and collaborating institutions.

On this basis, UNIDO is in a position to directly assist developing countries and economies in transition, particularly through advising policy makers develop and implement support schemes for the industry and to promote green growth. Moreover, UNIDO is currently implementing very similar programmes to

the one proposed for Colombia in India, Russia, Belarus, Ukraine and South Africa, thereby generating synergies for local stakeholders by using well-tested approaches and services for continuous improvement processes and well as business linkages development in the automotive industry.

In order to stay up to date with recent trends and respond to shifting needs, UNIDO regularly organizes international expert group meetings to discuss and validate UNIDO's service portfolio for the automotive industry. The last meeting of this kind took place in 2011 and hosted a group of about 20 renowned industry professionals including representatives from OEMs, leading automotive cluster organizations, consulting firms, key associations, donors, government representatives and global Tier-I firms.

##### How we work:

**Know-how transfer to local staff top priority:** For project execution UNIDO does not work in isolation but always uses a blend of national and very renowned international experts in the various fields (sustainable supply chain development, auto-cluster development, supplier upgrading, investment promotion, etc.). These international experts are either recent retirees who worked for long in the sector (including in well-known OEMs and automotive institutions) and are still eager to transfer their knowledge. These people are expensive but experience has shown that the knowhow and confidence that they bring to locals is invaluable. Through the blending with local experts this knowhow is being transferred right from the start and local institutions also get a chance to be closely involved in all steps and learn from the process.

International experience exchange is key: through UNIDO's international network of companies, experts and institutions, the organization always strives to allow for experience exchanges that are most relevant to the beneficiary country. This is done through study tours or by hiring experts who could also foster broader collaboration with their respective institutions following their engagements.

**Holistic approach to upgrading including sustainability aspects:** When working with firms directly, UNIDO applies a holistic approach which does not only focus on upgrading based on cost, quality and delivery parameters but also includes sustainability considerations, including resource efficiency and cleaner production, working conditions, employee motivation and satisfaction and operational health and safety, amongst others. One of the key methodologies used in this regard is UNIDO's Responsible Entrepreneur Achievement Programme (REAP) which provides a structured capacity-building approach and supports the implementation of so called Corporate Social Responsibility (CSR) principles in identified priority areas for SMEs.

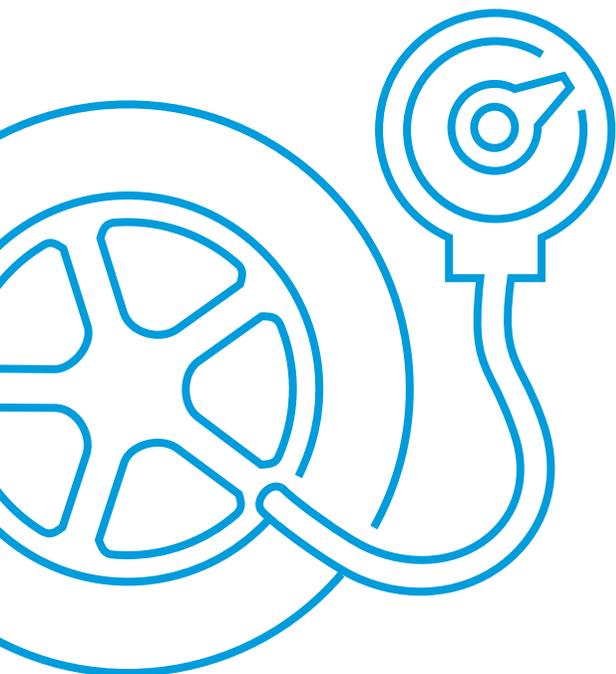
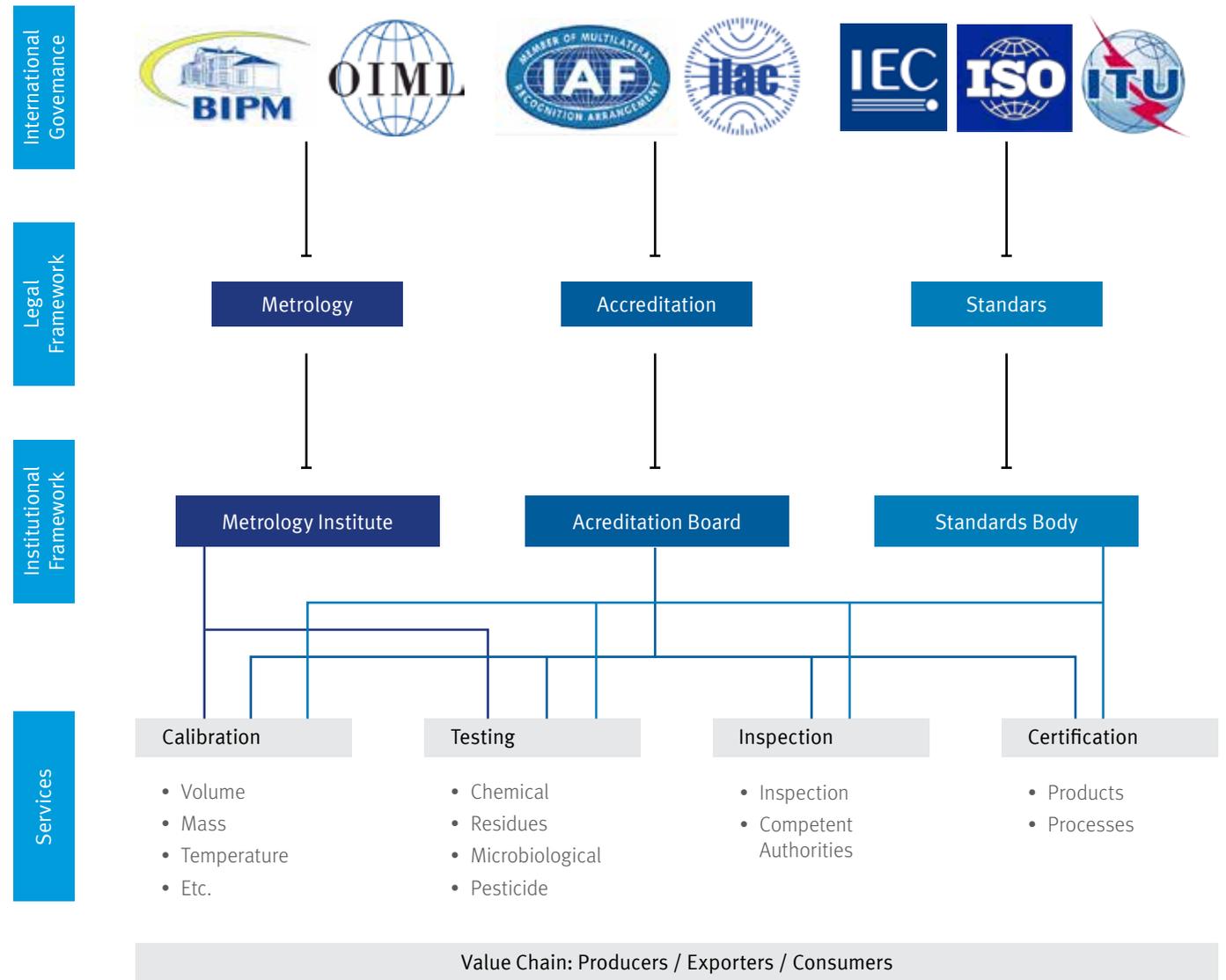
**Building capacity for effective quality policy making:** the National Quality Policy (NQP) is the basic government instrument to modernize/consolidate the national quality infrastructure (QI). It lays down how the various functions at country level in order to have an effective QI to serve national as well as international needs. UNIDO supports the setting and implementation of NQPs.

**Setting and implementing a technical regulatory framework:** Because of their mandatory nature, technical regulations have the potential to

become technical barriers to trade (TBT) which are barriers other than those of a financial nature that prevent or hinder the flow of goods and services between nations. Standards are voluntary but when referenced in technical regulations, they become mandatory. The main barrier in the area concerning QI is the inappropriate use of technical regulations, standards and conformity assessment procedures. Since technical regulations may be introduced by different ministries (e.g. Ministry of Transport for seat belts, Ministry of Health on labelling of foods, Ministry of environment on packaging materials, etc.), there is a need at the country level to have a technical regulatory framework that each regulator can abide by.

Enhance and support obtaining international recognition for standardization, quality, accreditation, metrology, and conformity assessment services – also known as the National Quality Infrastructure (see figure 7):

Figure 7: National Quality Infrastructure



**Standardization:** The activity consists of the processes of formulating, issuing and implementing standards. Standards are developed and approved by a recognized body which is known as the national standards body (NSB), normally established by law. Standards are produced by a process of consensus-building between stakeholders (consumers, regulators, industry, etc.), academia and research organizations, and technical experts, who collectively have the necessary knowledge to determine the market relevance, the coherence and effectiveness of the standard under consideration and its suitability as a technical solution.

**Conformity assessment:** It demonstrates that specified requirements relating to a product, process, system, person or body are fulfilled – these requirements may be included in a standard or a technical regulation. Conformity assessment is carried out by conformity assessment bodies (CAB), i.e. laboratories, inspection and certification bodies. The field of conformity assessment includes activities such as testing, inspection and certification. It is the conformity assessment result (e.g. a test report or inspection certificate) which provides acceptable evidence that specified quality requirements are fulfilled and is, therefore, the main outcome of the QIS.

**Accreditation:** A third-party attestation formally recognizing the technical competence of conformity assessment bodies (CAB), i.e. laboratories, inspection and certification bodies, to carry out conformity assessment activities so that certificates issued by these bodies are recognized as being reliable and trustworthy, both at national as well as international levels. Accreditation services are provided by a national accreditation body (NAB). To obtain international recognition,

the NAB itself has to successfully pass a peer-review process and becomes signatory to the mutual recognition arrangement of the International Laboratory Accreditation Cooperation (ILAC MRA) and/or the multilateral recognition arrangement of the International Accreditation Forum (IAF MLA).

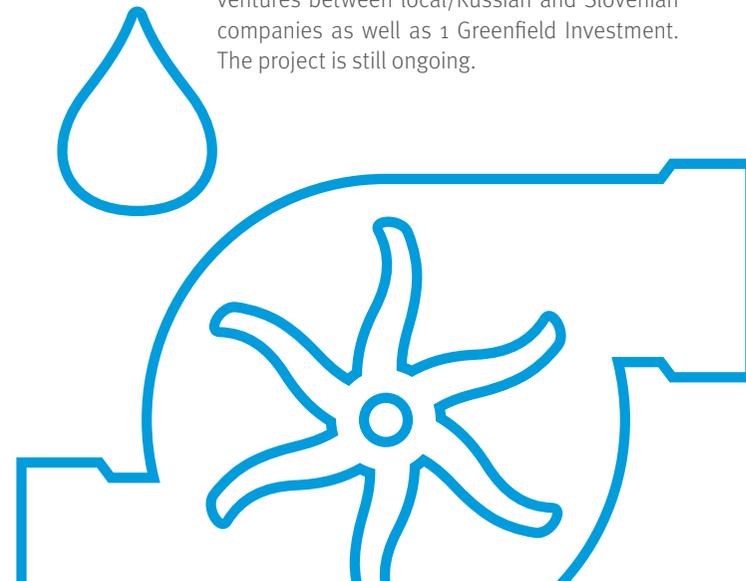
**Metrology:** It is the science of measurement. Metrology is divided into three subfields, namely scientific or fundamental metrology (concerns the establishment of measurement units, realization of measurement standards and the transfer of traceability from these standards to users in society), applied or industrial metrology (concerns the application of measurement science to manufacturing and other processes and their use in society) and legal metrology (concerns regulatory requirements of measurements and measuring instruments for the protection of health, public safety, the environment, protection of consumers and fair trade).

#### Where we work:

**South Africa:** UNIDO started to support the development of a local auto component supplier industry in South Africa back in 2003. Since then it upgraded 65 local component suppliers through direct shop floor counseling by trained experts. This resulted in enhanced productivity leading to cost savings of approx. 62 million South African Rand (or approx. US\$ 6,700,000); 49% derived from lean manufacturing initiatives and 45% from Cleaner Production related initiatives. The total Return on Investment (ROI) from the perspective of the national government that funded this project (the Department for Trade and Industry) was 1:3.88. This means for every rand the dti invested on this programme savings of R3.88 could be achieved.

Furthermore UNIDO supported the foundation and operationalization of the Automotive Supply Chain Competitiveness Initiative which was established in December 2013 to coordinate and align supply chain development activities in the South African Automotive Industry. The collaboration is still ongoing and UNIDO is currently developing a support programme at the Tier-II level which also embraces labour and environmental issues in addition to cost, quality and delivery components.

**Russia/Samara:** In this project has been initiated in 2008 and is still ongoing. UNIDO supported the local industry in setting up a network of automotive component suppliers and improving their competitiveness. On this basis, the Automotive Cluster of the Samara Region has been formed and was registered in June 2014 as a non-profit partnership (<http://np-acsr.ru/en/>). For this project UNIDO worked closely with the Automotive Cluster of Slovenia that forms part of UNIDO's expert network, which resulted in a number of business partnerships and enhanced the exchanges between the two clusters. UNIDO thereby also brokered two joint ventures between local/Russian and Slovenian companies as well as 1 Greenfield Investment. The project is still ongoing.



**India:** In India, the Automotive Component Manufacturers Association (ACMA) initiated a cooperation with UNIDO back in 1999, which is still ongoing. Since then the Indian government made available more than US\$ 3 million, which in addition to an almost equal industry contribution allowed us to upgrade 133 local auto component manufacturers. These companies all improved their operational efficiency by decreasing PPM (parts per million/defect rate), customer returns and machine downtime amongst others. In the same time frame, more than 50 national counsellors, company experts and quality staff were trained on the UNIDO-ACMA methodology for productivity upgrading and now deliver related services and facilitate upgrading within the companies (<http://www.youtube.com/watch?v=nJqwdRDx1hg>). The currently ongoing phase targets another 120 companies and is also self-funded by the Government of India.

**Colombia:** UNIDO is supporting Colombia's efforts to integrate into the regional and multilateral trading system by enhancing its trade capacities and performance. This would be carried out through a quality programme (<http://safeplus.com.co/>) aimed at the cosmetics sector's productive chain, which is expected to strengthen the National Quality Subsystem (NQS), enhance the technical capacity of key players (e.g. growers, producers/processors, exporters) and improve their compliance with international quality, private and sustainability standards, technical regulations and market requirements along the value chain. The project is developing local expertise with the adequate technical knowledge to provide quality-related advisory services to the sector during and after the project duration. Furthermore, it is contributing to improving the quality of production and the competitiveness of exported natural ingredients-based cosmetics.

**Indonesia:** UNIDO has been working towards strengthening the trade capacity of selected value chains of the Indonesian fisheries export sector, while at the same time ensuring the preservation of biodiversity through promoting the sustainable use of maritime resources. This is being accomplished through increasing value-added to exports by providing advice to the Government on enacting enabling policies for exports, strengthening the supply side (e.g. improving competitiveness of products in terms of price and quality, branding, enhancing compliance with international market requirements, including certification for sustainability standards, etc.), and facilitating entry into the respective global value chains.

**Ghana:** UNIDO has been supporting Ghana's integration into world markets by developing a competitive and sustainable export economy compliant with trade-related standards; the programme aims at enhancing the export of targeted sustainable value chains (fruits, cocoa, fish and wood products) through a vertical integrated quality value-chain approach. The expected results are: (i) to ensure that the selected value-chains improve their sustainability, quality and export competitiveness by complying with international standards and (ii) to improve the national quality system through the provision of world class conformity assessment services (i.e. testing, certification and inspection). Apart from international quality and safety standards, the project also supports the uptake and implementation of private voluntary standards by local producers.

UNIDO was furthermore instrumental to the establishment of the Serbian Automotive Cluster and is currently developing projects to support the automotive supplier industries in Egypt,

Ukraine (approved already), Belarus (initiated recently), Nigeria (concept approved), and South East Asia.

#### 4.2 TOWARDS A SUPPORT PROGRAMME FOR THE COLOMBIAN AUTO INDUSTRY

**B**ased on the identified key challenges of the sector, local institutional capacities, already ongoing and planned initiatives, as well as taking into considerations UNIDO's technical expertise, it is recommended to structure a support programme for the local automotive industry around the following pillars and activities:

**Inputs to strategic planning processes and policy advisory:** Whilst it is recognized that an overall planning framework for the automotive sector already exists in form of the PTP Business Plan, which is currently being revised and updated, there are still specific pieces of information missing that are however required as a basis to develop detailed action plans for the operationalization of the various components the PTP Business Plan. Those include, amongst others:

- Benchmarking of Tier 1 suppliers and their performance (including innovation capacities) and comparison with other countries of relevance
- Analysis of the current logistics and transport costs/situation, drawing comparisons between OEMs and suppliers of different product/component groups and locations (e.g. Cali vs. Bogota), including projections on possible competitiveness impacts of relevant policy initiatives such as e.g.

completion of planned infrastructure projects or firm relocation

- Raising the international perception of Colombia as a competitive and high quality automotive production hub
- Exposure to successful policy initiatives and institutional support schemes in other countries of relevance, with a particular focus on supply chain coordination, training /capacity building and automotive cluster development

Enhancing the productivity of lower-tier component suppliers:

- Mapping of existing and potential local lower tier suppliers to the automotive and related industries in Colombia.
- Development of a trainin/upgrading programme for lower tier suppliers incorporating productivity, social and environmental parameters
- Development of an apprenticeship scheme to systematically transfer know-how to juniors

Strengthening the national quality infrastructure:

The technical capacity of the National Metrology Institute (NMI) / the Colombian Laboratory Network (RCM), the National Accreditation Board (ONAC), the Superintendence for Industry and Commerce (SIC) and Colombian Institute of Technical Standards and Certification (ICONTEC) should be strengthened.

- Enhancing the NMI technical capacity and services provision as national metrology reference in the magnitudes of force, dimensional, length, torque. Development of technical competence in magnitude of hardness and roughness



- Reviewing and developing adequate technical regulations for the automotive sector following international best practices
- Strengthening RCM capacity to articulate testing and metrology best practices and services
- Revision and adoption by SIC of international best practices for inspection, surveillance, and control activities (ISC). This includes also increasing the technical knowhow of its personnel knowhow in this field
- Design and introduce an ERP system to facilitate market surveillance
- Enhancing ONAC's technical capacity to provide internationally recognized accreditation services for calibration and testing laboratories (ISO 17025), certification of products, processes and services (ISO 17065), inspection bodies (ISO 17020) and proficiency testing (ISO 17043). This includes also increasing the technical knowhow of its personnel knowhow in this field
- The identification, jointly with ICONTEC, of relevant international quality, private, sustainability standards and mandatory regulations applicable. This includes in coordination with the automotive sector, actively participation at standards-related regional and international fora and the development of guidelines for identified relevant standards

Enhancing the provision of internationally recognized conformity assessment services to the auto parts sector: The following services will be enhanced in order to demonstrate the quality of products and services from the targeted value chain, independently from the manufacturer or the supplier.

- Testing and calibration services will have the technical competence to test export products according to best international practices. It is expected that testing/calibration laboratories use proficient testing methods. The objective is to increase the internationally-recognized service offer of testing/calibration laboratories to local producers and exporters
- Establishing a technical support programme based on the Advanced Process Quality Products (APQP) methodology
- Strengthening of inspection services to ensure that staff is competent and knowledgeable on current legislation and inspection practices;
- Certification services for relevant international standards (key for market access), will be available for products and management systems, through improved methodologies.
- Training of technical staff resources (e.g. auditors, assessors, technical experts) by the International Automotive Task Force (IATF) following internationally-recognized curricula and best practices
- In cooperation with SENA, establish a personnel certification programme aimed at inspectors servicing the automotive sector
- Identification of strategic quality management system requirements for export destination countries
- Provision of a technical support programme to a number of key VC members (mainly Tier 2) to enhance their technical knowhow/competence and compliance capacity with standards and technical regulations
- Support the harmonization of the Colombian approval system and/or homologation activities with global technical regulations for wheeled vehicles, equipment and parts which can be fitted and/or be used on wheeled vehicles (EU Directives, UNECE Regulations)
- Training of local resources for the provision of business advisory services (e.g. conformity assessment, homologation, quality management system, marketing, cleaner Production, etc.)
- Training of local resources for the provision of sustainable advisory services, in particular, for the implementation of the International Material Data System (IMDS)<sup>33</sup>

Enhance compliance with international quality, private and sustainability standards, technical regulations and market requirements along the supply chain: Key players, in particular Tier 2, along the value chain (e.g. producers, exporters) will be encouraged to adopt relevant international standards based on demonstrated needs/requirements, in order to improve productivity and enhance efficiency of products.

Creation of market linkages and tapping of identified niche markets locally and abroad: Key stakeholders from public and private sectors have come together and in a series of many meetings, studies and workshops identified promising market niches for all actors in the automotive supply chain. For component suppliers the identified niches for potential future business growth include: parts for luxury and high end cars, agricultural machinery, railways, naval industry, aeronautics and mass transport vehicles. However, more research is required in order to identify a concrete action plan as to how to tap those niches in the medium and long

<sup>33</sup> The IMDS (International Material Data System) is the automobile industry's material data system. Initially, it was a joint development of Audi, BMW, Daimler, HPE, Ford, Opel, Porsche, VW and Volvo. Further manufacturers have meanwhile joined the community and IMDS has become a global standard used by almost all of the global OEMs. In IMDS, all materials used for automobile manufacturing are collected, maintained, analysed and archived. Using the IMDS, it is possible to meet the obligations placed on automobile manufacturers, and thus on their suppliers, by national and international standards, laws and regulations. <http://www.mdsystem.com/imsnt/startpage/index.jsp>



term and which are the most promising target buyers/markets in those fields. Those include, amongst others:

- Market survey and a demand assessment in relevant countries (primarily of the Americas) of identified promising market niches (naval, railway, aerospace, special purpose and luxury car industries) that fit Colombian production capacities, and development of a marketing access strategy/plan for local suppliers.
- Market survey and a demand assessment to identify the needs of (primarily) Tier-1 suppliers and key producers from other industries within Colombia (e.g. construction, white goods) to identify, which parts they would be willing to source locally in the short or medium term, as well as parts and components that they are already sourcing locally but not necessarily meeting their quality, cost, delivery (QCD) requirements (and the impact thereof).
- Further building the capacity of ProColombia based on the findings of the market studies and the new strategic framework of the revised PTP Business Plan

#### 4.3 OPPORTUNITIES FOR LINKAGES WITH KOREA

“Through the recently signed Free Trade Agreement (FTA) with Colombia Korea hopes to increase its exports of automobiles, automotive components, textiles, plastics, and steel, while Colombia expects a growth of exports of agricultural products such as coffee, bananas, and natural resources including crude oil.”<sup>34</sup>

Notices like the above published by a Korean internet portal have not been well received by industrial players within Colombia – a country that aspires to become one of the three most competitive countries in Latin America by 2032 through an economy that is characterized by exports of products and services of high value added and a great degree of innovation.

Korea and Colombia signed a bilateral FTA, which was ratified in 2014. Korea is therefore the first country in Northeast Asia to sign a FTA with Colombia, whilst Colombia is the third South American country to sign a FTA with Korea, following Chile and Peru.

<sup>34</sup> *Koreanet (2013): Korea, Colombia officially sign FTA* <http://www.koreanet/NewsFocus/Business/view?articleId=105874>

The industrial segments covered by the FTA include automobiles, tires, and synthetic resin. The 35% tariffs on cars and trucks, which account for 28% of Korea's exports to Colombia, are to be eliminated in steps (over 10 years), along with those on synthetic resins and tires, amounting to 10%.

The Korean automotive industry is the 5th largest in the world in terms of production. Only Hyundai Motor Company is the 4th largest producer of cars globally, assembling one car every 12 seconds in the largest automotive assembly facility in the world located in Ulsan, South Korea. In the Americas, Hyundai Motor Company has manufacturing plants in the U.S., Brazil and Mexico. Korean cars already account for more than 20% of the imported vehicles to Colombia – a figure that is expected to grow in the future due to the FTA. Since Colombian automotive component manufacturers still depend heavily on the local productive chain, industry experts do not see significant opportunities to contribute to cars that enter the market as imports, but where assembled elsewhere.

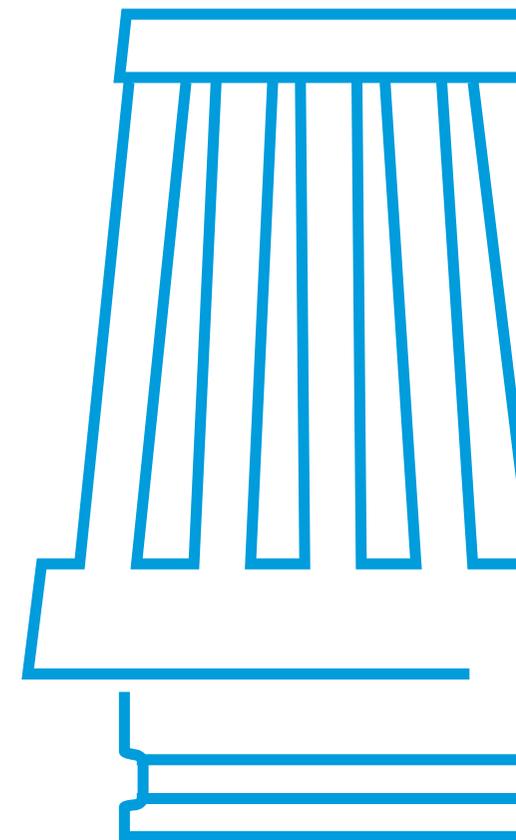
Whilst imported Korean vehicles can be seen as a threat to local assemblers and their suppliers, there are still vast opportunities to benefit from Korean industry know-how – a process that could be facilitated with the support of KOICA. In particular, the below described options for cooperation could be further explored in this regard.

##### 4.3.1. Exploring linkages with Korean Tier-1 suppliers and/or OEMs

Taking into account already existing supply chain relations and the limited production capacities/economies of scale of Colombian component manufacturers, creating linkages with Korean

OEMs and/or Tier-1 suppliers will be a challenging endeavor. Any efforts in this regard should focus on exploring opportunities for Colombian firms within the supply chains of car models of limited quantities (e.g. the luxury car segment - such as Hyundai Equus or Kia K900 – both currently assembled in Korea and introduced to the U.S. market).

Another alternative would be to explore opportunities within the identified promising niche markets, primarily the railway and naval supply chains in which Korean firms are strongly present.



- Hyundai-Rotem Hyundai Rotem forms part of the Hyundai Motor Group and is a South Korean company manufacturing trains, defense products and plant equipment. At the end of 2014 it agreed to establish a train assembly plant in Brazil under an agreement with the government of the state of São Paulo. The plant at Araraquara will be built on land owned by Hyundai-Rotem's Brazilian partner lesa and will assemble light rail vehicles, commuter trains and metro trains. Hyundai-Rotem decided to build the plant after securing a contract to supply 30 units to a São Paulo commuter rail operator. The Korean company is also supplying 55 trains for the Salvador metro through concessionaire CCR and has also supplied the train fleet for São Paulo's metro Line 4.
- Korea is also the world's largest shipbuilder; its industry accounts for more than 30% of global vessel production and forms an integral part of a wider maritime cluster, with marine equipment and steel comprising the key inputs. Shipbuilding in Korea is dominated by nine major companies, with the largest being Hyundai Heavy Industries, Daewoo Shipbuilding and Marine Engineering and Samsung Heavy Industries.

#### 4.3.2 Participation in key automotive events in Korea

Korean events to be visited by Colombian component suppliers and support institutions for networking and business linkages:

**Automotive Testing Expo:** This expo shows the very latest test technologies and services that are being used in the full automotive production process. From the initial prototype analysis through to end-of-line inspection and quality

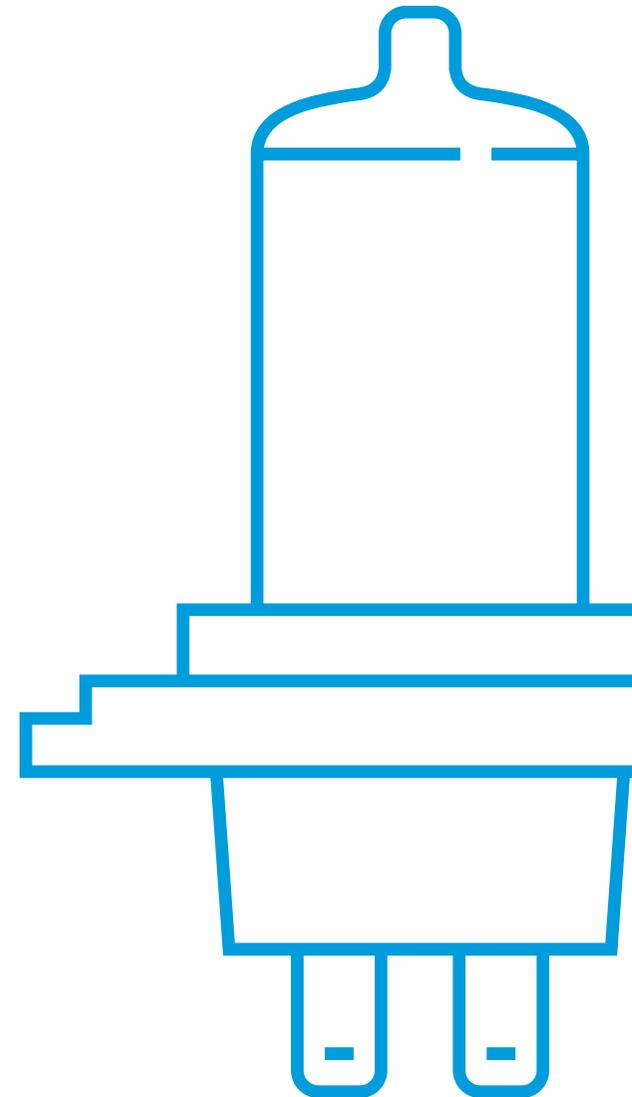
assurance, and every procedure in between, over 120 exhibitors will display their very latest products that are all improving vehicle reliability, durability, safety and quality. It mirrors the concept of its sister exhibitions in Stuttgart, Detroit, Shanghai and Chennai, and brings together the world's leading manufacturers of test and evaluation equipment and test service providers.

**Seoul Motorshow:** The Seoul Motor Show offers an excellent platform for the market entry. The leading event for the automotive industry in South Korea takes place every two years and is supported by KAMA (Korea Automobile Manufacturers Association) and by the importers association KAIDA (Korea Automobile Importers and Distributors Association) as well as by KAICA (Korea Auto Industries Coop. Association). In 2013 the event gathered 384 exhibitors from 14 countries on a 102,431 sqm exhibition space, attracting 1,048,000 visitors and buying delegations and 2,200 journalists.

#### 4.3.3 Exploring linkages with Korean support institutions for know-how transfer

There is a variety of successful Korean initiatives and support institutions which could serve as a benchmark and best practice example for Colombia, including amongst others:

**Ulsan Heavy Industry Cluster:** Around 260 auto-related companies located in Ulsan produce more than US\$ 36 billion a year along with the world's largest automobile plant of Hyundai Motors, which produces 1.55 million cars a year, and leading bus maker, Daewoo Bus Corp. Ulsan accounts for more than 21% of the nation's car production and exports USD 20.5 billion yearly, becoming the world's 5th largest automobile city. In addition, it plans to complete the construction of the Green Car Technology Center and is in full swing in the development of eco-friendly cars such as EV cars, hybrid cars, hydrogen fuel cell cars, and fuel cell cars to reinvent itself as a core base for the electric car industry. It became the first city in Korea that produced hybrid cars in 2009 and again became the first city in the world to commercialize a hydrogen fuel cell vehicle in 2013, exporting them to European nations such as Denmark and making Ulsan a leading city in the production of technology-intensive cars. The Ulsan Autovalley Project aims to develop a regional cluster for small and medium-sized companies supplying automobile parts and modules for Hyundai Motor Company. For this purpose it is currently establishing infrastructure, such as the construction of a modulization complex and of an automotive



parts innovation center, for the fortification of R&D capabilities. The shipbuilding and marine industry in Ulsan is also strong, recording USD 980 billion of orders in 2013. The industry also accounts for 33% of Korea's total production, making Ulsan the largest shipbuilding and marine city in the world. Hyundai Heavy Industry, the world's largest shipbuilder, and Hyundai Mipo Dockyard, the world's 5th largest shipbuilder, are located in Ulsan. Ulsan strives to become the most powerful shipbuilding country in the world by developing FPSO, LNG, and shale gas carriers in the future. On this basis, the cluster serves as a good model in terms of automotive clusters but also to discover linkages between the automotive and shipbuilding industry for the purpose of spurring diversification of business amongst component suppliers.

**Ulsan National Institute of Science and Technology (UNIST):** UNIST is the first independent national university established as a national research university in Ulsan founded in 2007. UNIST aims to rank in the top 10 of globally competitive universities emphasizing science and technology by the year 2030. The strategies for reaching this goal include creative, interdisciplinary and global education and research. Being located in the capital of Korean industry, UNIST is realizing its potential and is emerging as a hub of industry-academic cooperation in advanced technologies. Seven interdisciplinary schools offer dual major programs; Electrical and Computer Engineering, Green Energy Engineering, Mechanical and Advanced Material Engineering, Nano-Bioscience and Chemical Engineering, Urban and Environmental Engineering, Design and Human Engineering and Technology Management. A world-class library, dormitory and laboratories are provided in research and education. In particular, UNIST Central Research Facilities, UCRF, boasts its state-of-the-art equipment for promoting interactions between researchers. UNIST is also executing campus-wide English-only classes and adopting various criteria to recruit distinctive and creative students from around the world.

**Namyang R&D Center:** Located approximately 40 kilometres southwest of Seoul, the center was constructed in 1993 on a lot of 3.47 million square meters reclaimed from the sea. The center started to play a key role in 2003 as Hyundai Motor's Ulsan R&D center and Kia Motors' Sohari R&D center were combined and moved into Namyang. It consists of various districts, mainly for design and engineering, performance and drive-testing facilities and center for future automotive technologies, which have about 10,000 employees from engineers to designers. The center is very strict with security, as it develops designs for new models and

new technologies. The center has devoted a large portion of its resources to develop next-generation materials and future cars. Hyundai Motor Group has unveiled much-anticipated new models such as the all-new Genesis luxury sedan, the Sonata family sedan and the Soul EV to news media at the center ahead of their official launch, instead of simply holding a launch event at a luxury hotel.

**Hyundai America Technical Center (HATCI):** This facility is the design, technology and engineering arm for all North American models of the Korean-based Hyundai-KIA Automotive Group. Its test programmes maximize and accelerate exposure to all North American climate conditions.

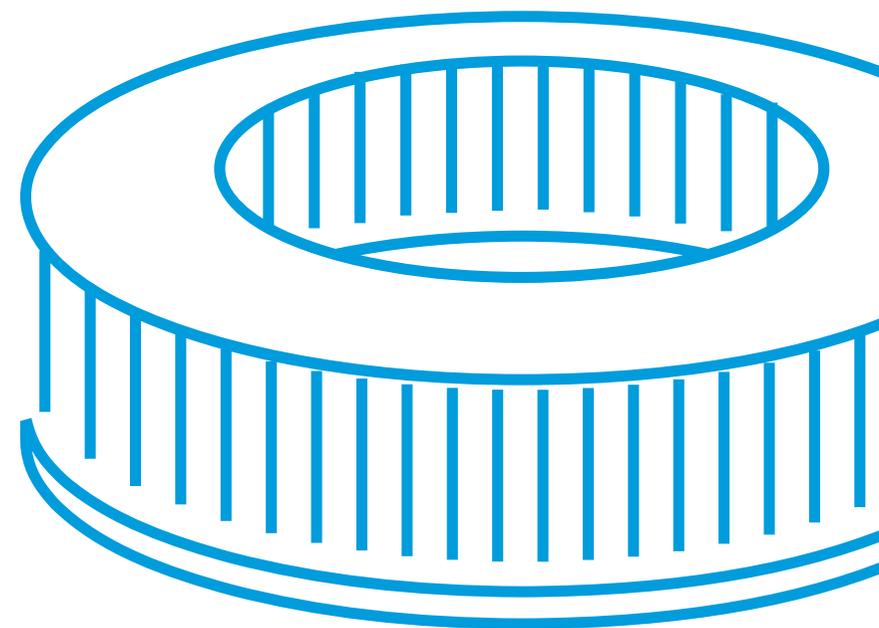
**Korea Research Institute of Standards and Science (KRISS):** Upgrading member countries' human resource capacities is a feature of many areas of UNIDO's work but is especially so in the case of Standards, Metrology, Testing and Quality (SMTQ). As producers in developing countries move up value chains and integrate further into global markets, they encounter requirements from suppliers and consumers for compliance with an ever expanding range of standards, including private standards. All this means a need for continuous training and upgrading of their human resource skills and increasing calls for technical assistance from UNIDO in this area. UNIDO has partnered with KRISS, to organise training programmes for the technical staff of national metrology institutions - and their calibration laboratories in particular - in developing countries. The programme is designed to upgrade, theoretical knowledge and technical capacities in the areas of dimension, volume, mass, thermometry, pressure, force, electricity, laboratory accreditation and laboratory management knowledge.

Through the proposed project, Colombian counterparts and beneficiaries could benefit from the above mentioned know-how through:

- Study visits
- Placements / apprenticeships / exchange programmes
- Advisory services
- Formal partnership/cooperation agreements between support institutions (including joint event organization)

Initiatives of this kind can be facilitated through:

- UNIDO's Investment and Technology Promotion Office (ITPO) Korea
- ProColombia commercial office Seoul
- KOICA





# 5. FUTURE OUTLOOK

**T**he survival of Colombian's automotive industry – as it stands at the moment – depends on the readiness of OEMs to start up new and/or continue existing assembly operations there.

There are several driving forces for a vehicle manufacturer to start assembling in a country, which can in a nutshell be summarized as follows:

- a.** A large existing local market that justifies the assembly of certain models in a country
- b.** A large existing regional market (not already fully absorbed by key competitors) with good export opportunities and in easy reach logistically to be serviced from the assembly plant
- c.** Promising future market: There are cases in which OEMs have decided to settle despite of low volumes and sales and limited export options, because they make a strong bet on the future development of a market or region (e.g. South Africa)
- d.** Conducive incentive and regulatory environment: OEMs may decide to settle in a location against all possible odds, because of lucrative incentive schemes (e.g. Manaus: Every 11.5 minutes, a Harley-Davidson motorcycle is built in the middle of the Amazon. The factory, which opened there in 1998 because of lucrative tax breaks (including an 88% reduction on import taxes and a 75% reduction on federal income tax until 2023) which the government granted in order to lure investors to this sleepy jungle port. Since the free trade zone was created in Manaus in 1967, some 600 national and international

manufacturing outfits from Samsung to Coca-Cola to Siemens have moved in. This created 150,000 local jobs, which employ nearly a quarter of the city's residents.)

There may have been a mix of several of the above driving forces kicking in when vehicle manufacturers decided to settle in Colombia. For them to stay it will come down to an "opportunity cost analysis" being continuously repeated. In terms of future outlook there seem to be different bets (e.g. Mazda moved out whilst Foton just invested).

Whether OEMs will keep their commitment to produce in Colombia or new assembly operations will start in the future will depend on their views regarding market development as well as government action, which only the future will show. Should the pressure on local OEMs become too strong and more firms decide to close their doors, the survival of the local automotive industry will be linked to the level of dependence of local component suppliers on the local vehicle manufacturers and their capacity to diversify. Local OEMs agree that if the vehicle production industry cannot adjust and compete it will be "killed off" and Colombia's automotive trade will simply rely on buying and selling imported vehicles. Whilst this may be true, it does not automatically imply that Colombia will be left without an auto industry. It has been proven that a country's automotive sector can also flourish with no or just one OEM present, like in the case of Slovenia, for instance. Slovenia's automotive industry accounts for 21% of the country's entire exports and, notably, 80% of what is produced by the industry is exported. And this despite of the fact that the automotive workforce there still costs significantly more than in many other Eastern and Southern European countries.

The vision outlined in the PTP Business Plan seems to prepare Colombian component manufacturers for such a scenario in order not to risk the loss of an entire industry in case the big enterprises struggle. There is still a long road to go in terms of helping local component suppliers to achieve the above-mentioned diversification of markets and clients. This is however key to ensure that the industry will survive in the long run, regardless of future vehicle assembly dynamics.

Colombia's automotive sector is still to find its position in the Americas where it faces strong competition from mass producer markets such as Brazil, Mexico and the U.S., covering already a wide range of several types of vehicles (including non-passenger vehicles) and components, and have a large array of qualified technical institutions. For Colombia's relatively small automotive industry to survive within this environment and given the constraints faced in terms of high production costs due to limited economies of scale and expensive logistics, it needs to become more competitive in the future.

One of the most common definitions for competitiveness refers to the "ability to produce goods sufficiently low in price or high in quality to be successful (maintain or grow market share) against commercial rivals". Based on this definition there are two main strategies for the Colombian automotive industry to achieve being competitive:

- By selling products (vehicles and/or components) at lower prices than rivals. This is possible when firms are market leaders, and benefit from economies of scale or operate in an environment that makes production significantly cheaper compared to competitors in other countries.

- By differentiating your product from those of rivals.

For Colombia – being amongst the rather smaller automotive producers in the Americas – it is rather difficult to pursue the first strategy. Given the small volumes, the comparatively high production costs and fairly open trade policies it is almost impossible to compete even on the local market based on price. Hence the second strategy is the viable option to boost the competitiveness of the local industry in general and local automotive component manufacturers in particular (within the spirit “if you cannot be cheaper or outperform, be different”). This was also largely confirmed by the vision outlined in the PTP business plan with is oriented towards “export presence through highly specialized products targeting market niches”. However, for this strategy to be pursued successfully there is a need to (a) identify the right market niches, characterized by lower volumes and higher margins, and (b) on this basis, identify concrete strategies on how to tackle those markets in the medium to long term.

#### Diversification options for local suppliers:

- Supply of parts to other sectors, primarily within the country (e.g. construction industry, white goods, etc.). This might work at the lower tier levels but for an automotive Tier-1 supplier to continue producing OE components that require strong quality standards and at the same parts for the construction industry where the maintenance of the same high standards does not necessarily pay off, is not an easy task. Another risk is that companies may lose their innovative and high-tech edge the more they start catering to less demanding markets.

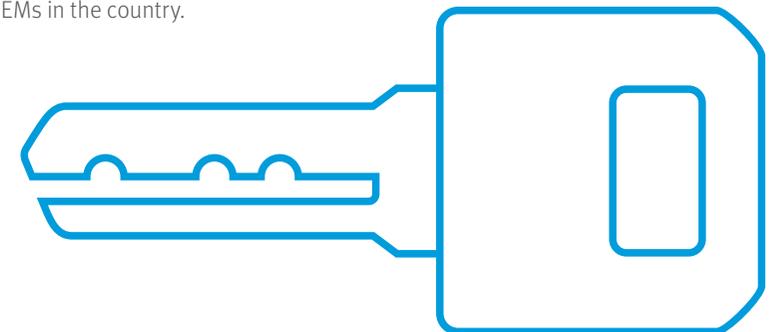
- Stronger focus on the aftermarket: In the aftermarket they face a huge competition from cheap imports as well as smuggled goods, which could put at risk the viability of local suppliers focusing strongly on this segment. According to ACOLFA the trade in contraband auto parts alone costs the Colombian automotive sector an estimated US\$2.3 billion a year, representing over one-third of 2013 sales.

- Exports of currently produced automotive components (primarily OE): In order to achieve this, local companies need to develop a competitive edge despite of their limitations regarding production volumes/scale and high cost factors related to the production in Colombia. Value addition to currently produced components is key in this context.

- Production/exports of components for automotive related strategic niches (aerospace, naval industry, railways, agricultural machinery, special purpose vehicles, etc.): These are generally lower volume markets that offer slightly higher margins, which could offset some of the competitive disadvantages Colombian suppliers face in other segments. However, in order to be able to target this, local companies need to upgrade their technical and design capacities considerably, which requires a network of local support institutions ready and capable to support such a strategy. In any case this could be tackled only over a medium to longer term time horizon. The attraction of an OEM from one of those niche markets to assemble in Colombia with a clear agreement/commitment to increase local content over time would be essential in this regard, as well as the orientation of TECNNA to service such niches.

The fact that the automotive industry locally is currently characterized by a low level of sophistication and limited value addition in automotive parts does not imply that Colombian firms do not have innovation potential or the required R&D capacity. For instance, Medellín - Colombia's second largest city - is currently in the process of positioning itself as a hub for Latin America's space industry – an effort spearheaded by a public-private corporation known as “Ruta N” that is planning to launch its first aerostatic balloons. As part of that initiative, new technology companies have sprung up that are developing low-cost satellites and place them in orbit.

For Colombia it will be key to build on these capacities and provide adequate framework conditions for the expansion thereof. It is hence crucial that the new sectoral framework will be sufficiently focused and provide a clear direction towards a success scenario for all actors involved in the future development of the industry. This will enable the government as well as industry support institutions to strategically allocate their resources and achieve a maximum impact at the target group level. In the long run, the result of this should be a flourishing and regionally/internationally competitive local automotive component industry that is being nurtured but not dependent on the operations of OEMs in the country.



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