UPGRADING PATHWAYS IN THE AUTOMOTIVE VALUE CHAIN

SESSION 3: Round Table on the Future of the Automotive Industry
BACKGROUND DOCUMENT

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UPGRADING PATHWAYS IN THE AUTOMOTIVE VALUE CHAIN

This paper is the revised and extended draft of the document shared for discussion at the first government-business round table hosted in the framework of the 2nd Plenary Meeting of the OECD Initiative for Policy Dialogue on GVCs, Production Transformation and Development. It summarises the results of the stocktaking exercise on “Policy Experiences in Upgrading in the Automotive Industry” carried out in the framework of the Initiative under the stream of work of sectoral trends and dynamics. It includes the preliminary results of business case analysis carried out in the framework of the OECD work on investment linkages. It includes an overview of stylised facts about the industry and its organisation within GVCs, an overview of industrial development pathways and policy approaches based on the experiences of Brazil, Chile, Colombia, Costa Rica, Czech Republic, Dominican Republic, Ethiopia, France, Ireland, Mexico, Morocco, Peru, Singapore, Turkey and Uruguay. The concluding session will be based on the outcomes of the Round Table on the Future of Automotive Industry, hosted in the framework of the 7th Plenary Meeting of the Initiative on November, 10-11, 2016.

Participants are invited to:
- Express interest in sharing their country experience in the industry and highlight lessons learned.
- Share views/provide information about scenarios for the industry and implications for their economies during the Government-Business Round Table.
- Provide suggestions regarding the next steps of this line of work, including identifying key priority areas for future work (e.g. scenarios for the industry, impact of new manufacturing techniques on the sector, typology of risks associated with participation in GVCs and tools for handling them, compendium of good practices for entry and upgrading in the industry, etc.).
- Provide comments to the drafts and volunteer for business and country case studies.

Suggestions and written comments are welcome by November 25th. The release of the report is foreseen by January 2017.

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OVERVIEW

[to be added]

INTRODUCTION

1. The automotive industry is highly concentrated, with few countries and companies leading world production. Its value chain is increasingly complex and characterised by a growing number of players operating in different sectors and located in different geographical areas.

2. The automotive industry has a high impact on growth and development. It is intensive in capital equipment, jobs and innovations. This industry is undergoing deep transformations. New players are emerging and new consumer demands are calling for safer and greener cars. New technologies are changing how vehicles are produced and used, and they are redefining the same concept of the vehicle.

3. This document builds on the Government-Business Roundtables hosted in the framework of the OECD Initiative for policy Dialogue on GVCs, Production Transformation and Development on the automotive industry and on direct interviews with companies. It also builds on the stocktaking on “Policies for upgrading in the automotive value chain” carried out in the framework of the Initiative. Fifteen countries replied to the questionnaire (Brazil, Chile, Colombia, Costa Rica, Czech Republic, Dominican Republic, Ethiopia, France, Ireland, Mexico, Morocco, Peru, Singapore, Turkey and Uruguay). Among them there are countries in which automotive has a high weight in the economy (such as, Brazil, France, and Mexico, for example), countries which are pointing to make the automotive industry a driver of transformative change (Colombia, Morocco and Turkey, for example) and countries which have capabilities in related industries and activities (such as Ireland and Singapore).

4. This document is structured in four sections: the first provides an overview of the industry; the second analyses the evolution of the automotive value chain and the experiences of different countries; the third presents business insights based on case studies of companies; the fourth section presents an overview of country’s policy approaches and tools; the fifth discusses scenarios for the future, from the perspective of government and business. The conclusions identify the lessons learned and the issues at stake for different countries.

INDUSTRY’S OVERVIEW

5. This section presents an overview of global trends in the automotive industry. It clarifies which countries and companies are leading in world’s production, export, employment, FDI and innovation.
6. The automotive industry is labour and capital intensive and its dynamics have deep impact on growth, employment and overall development. The industry is also facing deep transformations as new technologies and demands are pushing towards a radical transformation of vehicles (smaller, safer, greener, connected, driver-less) and their use (shared-cars and new, disruptive business models for mobility services), pointing to major changes for the future for automakers and suppliers alike, as well as for countries which have been relying on foreign direct investment as main industrial development driver.

 **China is the top world’s producer**

7. The world is producing more cars every year. Between 2010 and 2015 the number of produced vehicles has increased on average 5% per year; in 2015, 89.5 millions of vehicles where produced, of which 73% were passengers’ cars and the rest commercial vehicles (OICA, 2016). The industry is highly concentrated and the top 20 countries account for 90% of total world’s production.

8. Production has shifted from early industrial leaders (such as the United States, Japan and Germany, which continue to hold top world’s automakers brands) towards emerging economies (Figure 1). China today leads world’s vehicles production accounting alone for one fourth of it, while ten years ago it accounted for only 8% of it. The United States and Japan are today the second and third top world’s producers accounting, respectively, for almost 13% and 11% of total world’s vehicles production, but they have seen their share in global production dropping over the last decade. Among the top 20 world’s producers of vehicles, only China, India, Mexico, Thailand, Czech Republic and Slovakia have increased their share over total production. China, not surprisingly, also leads in terms of employment, accounting for 35% of the total number of world’s job in the industry (Figure 2).

**Figure 1. Top 20 countries in world’s vehicles production, 2004-14**

Source: Author’s elaboration based on data from International Organization of Motor Vehicles Manufacturers (OICA), 2016
Germany leads world’s exports

9. Germany is the world top automotive exporter. It accounts for 18% of total world gross exports in automotive, and it is followed by Japan and the United States. These three countries have been leading global automotive exports since the 1990s; however, emerging economies are gaining grounds as exporters. Among the top exporters, China is the one which increased the most is role in the global economy. Its share on total world exports increased from 1% to almost 4% in a decade (from 2004 to 2014). Other emerging economies, including Mexico, Korea and Thailand, are also increasing their role as global exporters (Figure 3).
Figure 3. Top 20 countries in world’s exports of vehicles, 2004-14

Share of countries’ exports over total world gross exports of vehicles

Note: The automotive includes the following activities according to the International Standard Industrial Classification of All Economic Activities (ISIC), rev.3, 2 digit level. 2: 34-Motor vehicles, trailers and semi-trailers and 35, other transport equipment.

Source: Authors’ elaboration based on data from UN COMTRADE, 2016

10. The automotive value chain displays a strong regional component. Europe is the first exporting region for vehicles. It accounts for 54% of total world exports of vehicles and trade within the region accounts for 73% of total regional exports (Figure 4)
Figure 4. Regional automotive exports by regions of destination, 2014

USD Billions


Source: Authors’ elaboration on UN COMTRADE, 2016

Demand is growing in emerging economies

11. The United States, Japan and Germany lead in number of vehicles per 1000 habitants (Figure 5). However, the figures for these economies are stable, while emerging and developing economies have shown marked increases in vehicles’ demand. For example, China has increased vehicles’ consumption of almost four times in the last decade, Mexico of 1.5 times and Brazil of almost 50%. In these economies, the advancement of middle classes has been sustaining vehicles’ consumption (driving up imports or sustaining local production as in China and India. However, the slowing of growth in emerging economies is casting doubts about their capacity to drive world vehicle’s consumption at the same pace in the future.
Figure 5. Motor-vehicles in use, selected countries, 2004-14
Number of vehicles per 1000 habitants

Note: The figure includes world top 5 producers of automotive (highlighted in white), and selected countries which have been participating to the work stream on sectoral trends and dynamics in the OECD Initiative for Policy Dialogue on Global Value Chains, Production Transformation and Development.

Source: Authors’ elaboration on World Development Indicators and OICA data, 2016

Asia and Africa are attracting more FDI

12. Japan, Germany and the United States originate most of global FDI outflows in automotive, as measured by the number of jobs created by those investments. The three countries account together for more than 60% of total FDI in the industry as measured by the number of jobs created abroad between 2013 and 2015 (Figure 6). The other top investing countries are China, Korea, France, Italy, India, UK and Canada; these seven and the top three, all together account for almost 90% of total FDI. While most FDI outflows in automotive are linked to outsourcing of manufacturing activities, more recently some companies has started to outsource also knowledge intensive activities, including R&D, design and testing. At the city level, the source cities for knowledge intensive FDI outflows are the usual suspects, with Stuttgard, Seoul, Hannover activities abroad.

13. Mexico is the country which receives most of the FDIs in automotive. Automotive FDI inflows are increasingly targeting Asian economies and, more recently, Africa. The top ten countries for automotive FDI inflows include Mexico, China, the United States, India, Morocco, Russia, Romania, and the UK. Mexico accounts for 18% of total FDI, as measured by number of jobs created by FDI inflows between 2013 and 2015, China and the United States follow in attractiveness of automotive FDI inflows. Each accounts for 15% of total world automotive FDI inflows, in the same period. 96% of FDI inflows in Mexico are related to manufacturing; while China and the US also attract R&D and retail FDI. In China, Shanghai alone accounts for almost 40% of total knowledge intensive FDI inflows. While knowledge intensive FDI target mostly China and India, which host respectively 9 and 2 out of the top 20 recipient cities of knowledge intensive FDI inflows. Other hotspots are emerging as attractive for knowledge intensive activities including Casablanca in Morocco and Betim in Brazil which account respectively for almost 5% and 3% of total knowledge intensive FDI in automotive (Figure 8 and 9).
Figure 6. Top 10 World origin and destination countries in automotive FDI, 2013-15

Jobs created as percentage of total jobs created by world automotive FDI

Note: Data includes FDI Market’s “Automotive OEM” and “Automotive Components” groupings and display share above 1.5%. Note: Data includes FDI Market’s “Automotive OEM” and “Automotive Components” groupings. Based on the North American Industry Classification (NAICS, 2012 release), 3 to 7 digit levels. “Automotive Components” includes classes: 336211-Motor Vehicle Body and Trailer Manufacturing, 3363-Motorvehicles parts manufacturing, 441-Motor Vehicle and Parts Dealers; “Automotive OEM” includes classes: 3361-Motor vehicle manufacturing, 336999-All Other Transportation Equipment Manufacturing, 441-Motor Vehicle and Parts Dealers. “Manufacturing” refers to investments that involve the production or processing of any good (manufacturing plants, processing plants, smelter etc.)

Source: Authors’ elaboration based on data FDI Markets, a service from the Financial Times Ltd, 2016.
Figure 7. Top 10 cities for FDI inflows in automotive, 2013-15

Note: Data includes fDi Market’s “Automotive OEM” and “Automotive Components” groupings and display share above 1.5%. Data includes FDI Market’s "Automotive OEM" and "Automotive Components" groupings. Based on the North American Industry Classification (NAICS 2012 release), 3 to 7 digit levels, "Automotive Components" includes classes: 336211-Motor Vehicle Body and Trailer Manufacturing, 3363-Motor vehicles parts manufacturing, 441-Motor Vehicle and Parts Dealers; "Automotive OEM" includes classes: 3361-Motor vehicle manufacturing, 336999-All Other Transportation Equipment Manufacturing, 441-Motor Vehicle and Parts Dealers. "Manufacturing" refers to investments that involve the production or processing of any good (manufacturing plants, processing plants, smelter etc.).

Source: Authors’ elaboration based on data FDI Markets, a service from the Financial Times Ltd, 2016.
Figure 8. Top 20 source cities for automotive knowledge-intensive FDI outflows, 2013-15

Percentage of jobs created by city over total jobs created by FDI outflows in knowledge-intensive activities

Source: Authors’ elaboration based on data FDI Markets, a service from the Financial Times Ltd, 2016.
Figure 9. Top 20 source cities for automotive knowledge-intensive FDI outflows, 2013-15

Percentage of jobs created by city over total jobs created by FDI inflows in knowledge-intensive activities

Source: Authors’ elaboration based on data FDI Markets, a service from the Financial Times Ltd, 2016.

Germany, Japan and the United States drive innovation

14. The automotive industry is intensive in R&D and patenting. 7% of the top 2500 R&D investing companies in the world are from the automotive industry. These companies account for 20% of the total expenditure in R&D of these top R&D investing companies (Figure 10). Companies in the automotive industry are investing in developing the new, green, electric and safer car. Patenting activities in alternatives to the traditional combustion engines, as well as in safety have increased in the last decade (Figure 11). At the company level, Toyota is the world leader in total patent filings with 4500 patent applications in 2014. Toyota has been a pioneer in the development of green cars, with the introduction of Toyota Prius, in 2000, as the first and top selling hybrid car in the world, with almost 4 million units sold since its introduction till 2014 (McKinsey, 2015).
Figure 10. Top 20 R&D investing firms in automotive industry

Billions of EUR invested in R&D and share of R&D expenditure over sales


Figure 11. Top 10 technology areas in automotive patent activity, 2011

Share of sub-classes patent over total granted triadic patent in vehicles class B60

Note: 1- Patent classes are reported according with WIPO international Patent Classification (IPC). B60 class on transporting and vehicles takes into account subclasses from B60B up to B60W. For further information, refer to Guidelines for revision and use of the IPC (WIPO, 2015) http://www.wipo.int/classifications/ipc/en/general/.

This section presents an overview of the structure and evolution of the automotive value chain. It starts with an analysis of interconnectedness as it can be measured by the OECD-WTO TiVA database; it then presents a preliminary analysis based on firm-level data that maps the types of firms and their investments in the global automobile supply chain, including equity and non-equity forms of participation.

Insights from the OECD-WTO TiVA database

The automotive industry is highly concentrated, with few countries and companies leading world production. However, its value chain is increasingly complex and characterised by a growing number of players and interconnected sectors and activities located in different geographical areas. Few countries (companies) lead world production. Its value chain however, is articulated in several locations across the globe, hosting not only assembly and production, but also design, testing, R&D and innovation activities in directly and indirectly linked activities. Many manufacturers from OECD countries already produce a large proportion of their cars in emerging markets (for example, in 2012, Volkswagen and GM produced around 40% of their cars in non-OECD countries), and they will likely need to further increase capacities in these countries going forward in order to maintain their market shares (Klein and Koske, 2013).

The automotive value chain has evolved over time from vertical integration to a complex and geographically dispersed production different network where different companies and clusters specialise and operate as first, second and third tier suppliers producing inputs that are then assembled in the final vehicle following the design of the original equipment manufacturers (OEM).

Figure 12. Automotive Global Value Chain

18. The automotive industry is particularly important not only for world leading exporters, but also for several economies which participate to its global value chain. Czech Republic, Korea and Germany show the highest share value added of exports as a share of GDP, 8.5% for the former and slightly above 7% for the other two. In most countries, with the exception of Czech Republic, Slovenia, Thailand, Malaysia and Vietnam, the share of the domestic value added of exports on GDP is higher that the share of foreign value added of exports on GDP (Figure 13).

19. Companies located in different countries participate to the automotive GVC in different ways. The foreign value added embodied in a country’s export as a share of its gross exports gives an indication of how much of the value that is exported is due to imports. Mexico, followed by Czech Republic is the country with the highest share of foreign value added on gross exports in the observed sample. This indicates a high integration in the international production network of automotive, as major assembly hubs. Another dimension of a country’s participation in GVCs is the domestic value added embodied in foreign exports as a share of domestic gross exports. This share indicates to what extent the value added of a country’s exports is included in another country’s export. This share varies less across countries that the share of foreign value added embodied in domestic exports, it tends to be higher for countries that are leaders in the industry (such Japan, Germany and the United States) but also for countries highly inserted in the value chain such as Poland and Czech Republic (Figure 14).

**Figure 13. Export’ specialisation in automotive, selected countries, 2011**

Domestic and foreign value added content of gross exports as share of GDP, by country

Note: The figure includes world top 5 producers of each industries (black and grey), and selected economies.

Source: Authors’ elaboration on OECD Trade in Value Added (TIVA) and OECD National Accounts Statistics, 2016
The figure includes world top 5 producers of each industries (dark bars), countries participating to the OECD Initiative for Policy Dialogue on Global Value Chains, Production Transformation and Development and countries replying to the questionnaire on “Targeted Programmes to Support the Automotive Industry” for which data were available.

Source: Authors’ elaboration on OECD Trade in Value Added (TIVA), 2016

Consumption patterns and the origin of the value added of the final demand for vehicles in each country offers additional insights into the dynamic of the value chain. To what extent the value added of what is consumed in a given country comes from the domestic economy or foreign sources depends on several factors, notably the size of the economy, the relevance of the industry in question for the country and the role played in the automotive value chain, as well as business strategies and consumers’ preferences. Japan, China, Brazil, India and Indonesia stands out for being the countries where the value added of final demands of vehicles bought in the economy comes from domestic companies. These are actually counties where the automotive industry has a strong domestic network of suppliers and where, as in the case of China and India the industry mostly targets the domestic market. In Europe the country with the highest share of domestic origin of value added of demand of vehicles is Germany, while for all European countries Europe is a major source of value added embodied in final demand, from 30% in Ireland to more than 50% in Slovenia, indicating a strong regional supply network in the region.
Figure 15. Origin of value added in final demand by regions, selected countries, 2011

Notes: The figure includes countries participating to the OECD/DEV GVCs initiative and top 5 producers, conditional to TiVA data availability

Source: Authors’ elaboration on OECD Trade in Value Added (TIVA), 2016

Insights from micro-level data: supply chain actors in the value chain

21. The section above based on TiVA data has provided a useful overview of the extent and type of participation of countries and their sectors at the aggregate level, by identifying, for instance, where value added is created. Going deeper into firm-level dynamics can provide additional insights to policy makers by capturing critical features arising from firm-level, offering a more detailed picture of the typology of actors that are participating in the supply network. It also provides for more timely data, given that the moment available TiVA data has a time lag (with the latest available data being 2011). Finally, micro-level analysis allows us to explore the different modes of investment, both involving equity and non-equity modes of investment which are becoming important building block in GVCs.

22. In this section we present preliminary evidence on firm-level dynamics in the automobile supply chain, based on a comprehensive and up-to-date dataset of material intercompany relationships. Figure 15 illustrates the geographic distribution of equity (i.e., FDI) and non-equity based (i.e., contractual relationships) investments in 85% of the world automobile industry. The size of the circles reflects the number of foreign subsidiaries operating in a given country, while diamonds represent contractual supply relationships in each country where national suppliers participate in the GVC (blue shaded area). The figures suggest that there are differences in the investment mode deployed by different lead firms in various production locations. Automobile companies from the United States appear to primarily deploy FDI in their production networks based in more developed and proximate markets, while relying on non-equity investment models in other economies. This pattern is consistent with the investment model of European lead firms, although there is greater market presence in selected emerging economies, notably Brazil, Mexico and South Africa. On the contrary, lead firms from Asia (Japan, South Korea, India) undertake significantly more equity investment in emerging economies. Overall, lead car manufacturers from Asia have a stronger presence in developing countries, particularly within the region, but to a great extent also in Latin America and Africa.
Figure 16. Equity and non-equity investment in Automotive Value Chains

Panel A: Lead firms from Europe and their investments

Panel B: Lead firms from USA and their investments

Panel C: Lead from Asia and their Investments

Source: Analysis compiled from FactSet, encompassing the 16 largest vehicle producers which account for 85% of world market share in the automobile industry.

23. This analysis allows seeing the participation of domestic firms in production activities in the value chains. Figure 16 captures both domestic suppliers in manufacturing (Panel A), suppliers of services (Panel B). It reflects that it is mostly developed or larger emerging economies that participate in the
manufacturing of automobile parts; however, the picture also shows the opportunities for smaller or less developed economies to participate in the GVC through the provision of services.

**Figure 17. Domestic suppliers in automotive global value chain**

![Map of domestic suppliers in automotive global value chain](image)

Source:

**Evolution of countries’ participation in the automotive value chain**

24. Participating to global value chains is not an end in itself. It can represent a means to create jobs, to enter into new industries and or to attract new investments and building new infrastructure. To what extent developing countries can transform their participation to global production networks into development outcomes for their citizens, depends on several factors, including the strategy of the multi-national companies, the domestic development strategy and the effectiveness of policies put in place to transform participation into a learning opportunity (**Box 1**).
The automotive industry in Turkey includes the production of passenger cars, minibuses, pick-ups, heavy/light trucks. This industry has linkages with domestic activities in basic industries such as iron and steel, petrochemical, tire and glass industries and electronics and it has been at the origin of innovations and technological improvements in these industries. The development of the industry started in the decade of the 1960s in the framework of import substitutions policies. A landmark has been the signing in 1996 of the custom union with the EU, which has allowed to increase exposure to competition and favoured productivity improvements in the domestic industry. Since the mid-1990s the policies focused on encouraging the development of original design and R&D capabilities in the domestic industry.

The approach of government support has evolved over time, and it currently focuses on technology and innovation. The Tenth Development Plan (2014-18) is embedded in the broader government vision for economic transformation with a view to 2023. The current government strategy aims at increasing domestic generated value added by increasing the supply chain activities developed in house and by increasing domestic innovation content. The strategy aims at developing new environment friendly technologies, supporting local design and refining the country branding strategy. Turkey is planning to strengthen its industrial capacities by leveraging on attracting more knowledge and innovation intensive FDI in automotives by promoting original design and innovation in local companies and by fostering joint-ventures between international and domestic players.

### Table 1. Policies for industrial development: the automotive industry in Turkey, 1960-2018

<table>
<thead>
<tr>
<th>Period</th>
<th>Development Model</th>
<th>Main Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960s</td>
<td>Import Substitution Strategy</td>
<td>Assembly of tractors and commercial vehicles production</td>
</tr>
<tr>
<td>1970s</td>
<td>Development of components for domestic production</td>
<td>Development of components for domestic production</td>
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<tr>
<td>1980s</td>
<td>Development of domestic capacities and technologies</td>
<td>Development of domestic capacities and technologies</td>
</tr>
<tr>
<td>1990s</td>
<td>Global Competition and EU linkages</td>
<td>Industry restructuring and integration into world market</td>
</tr>
<tr>
<td>2000s</td>
<td>Creating higher local value added</td>
<td></td>
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<tr>
<td>2007/2013</td>
<td>Ninth Development Plan</td>
<td>Government support to promote science, technology and innovation</td>
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<tr>
<td>2014/2018</td>
<td>Tenth Development Plan</td>
<td>Strengthening domestic chain and increasing innovation and design content for global markets.</td>
</tr>
</tbody>
</table>

Source: Table based on country responses to the questionnaire on "Targeted Programmes to Promote the Automotive Industry". Figure based on Turkish Automotive Manufacturers Association.
As a first approximation, the employment dynamics in a given industry and the change in ratio between foreign content embedded in domestic exports and domestic value added embodied in foreign exports, contributes to identify four different patterns of participation in the automotive value chain:

**Climbing the GVC ladder**: countries are defined as “climbing the GVC ladder” in a given industry when they are increasing the share of employment in that industry whilst also increasing their domestic value added content in foreign exports relative to the foreign content in their exports. This is the case of China and Slovenia.

**Deepening in assembly**: countries are defined as “deepening in assembly” in a given industry when they are increasing their share of employment in the industry whilst also increasing the foreign content of their exports relative to their domestic value added embodied in foreign exports. This is the case of Mexico and Turkey in automotive.

**Maturing and specialising**: countries are defined as “delocalising and specialising” in a given industry when they are reducing their relative share of employment whilst increasing their domestic value added content in foreign exports relative to the foreign content in their exports.

**Phasing out from the GVC**: countries are defined as “phasing out” or “scaling down” from a given value chain, if they are reducing the share of employment in the industry while increasing the foreign value added embodied in their exports relative to their domestic value added embodied in foreign exports.

These patterns are described by the four quadrants of Figure 18. Notice that the reasons why a country falls into a given quadrant can be affected by several factors including, for example, the fact that for natural resource intensive countries, an increase in the domestic value added embodied in foreign exports can results from an increase in the price of raw materials and not from a change in the country’s positioning in the value chain. A correct interpretation of the data therefore requires also a deep understanding of the specific situation of each country.
Figure 18. Patterns of participation in the automotive GVC, selected countries, 1995-2011

Box 2. What has shaped the entry and evolution in the automotive industry?

From the policy dialogues and the stocktaking exercise carried out in the framework of the OECD Initiative for Policy Dialogue on GVCs, Production Transformation and Development, four main factors have been identified as key in shaping the evolution of the industry in the countries and the patterns of their participation to the automotive value chain:

The quality and density of the production and innovation system

All countries agreed in affirming that for entering and moving up in the automotive chain a major determinant is that a whole ecosystem of capabilities needs to be in place, from technical skills and business capabilities, to technological, production and services' capabilities. Whether the participation to the automotive chain is done through major automotive producers which carry out production, assembly and research in situ or by developing specific competences in niches, the linkage to the global network is rarely the outcome of the operations of a single firm. The evolution and performance of single firms depends on the quality and density of interaction of different firms, business associations, technology centres and institutions which deal with the multiple aspects that influence the productivity and innovativeness of production agents in the sector.

Effective and integrated government support

Respondents include a varied sets of countries, at different stages of development and with different roles in the automotive value chain, however a common aspect from all the countries' experiences is the role of governments in favoring the creation of the conditions for effective value chain development. Governments are reported to play a role in offering financial and real services and incentives in a broad range of areas, from access to finance, matchmaking and business support services, to information sharing and training of professionals and local suppliers, as well as in standard settings and regulations. Free trade agreements and access to international markets are also important tools to promote the development of the industry and its increasing global outreach. The capacity to manage
rents and government support over time, in alignment with the evolution of domestic industrial capabilities has been highlighted as a major success factor in public policy management.

**An environment favorable to learning and experimentation**

Many countries have highlighted the importance of having in place conditions and institutions that allow accumulating knowledge and capabilities over time. Entering and being successful in a global value chain, as well as increasing the value added of domestic activities is not done overnight. Companies and production systems learn how to produce and trade over time and the conditions that shape learning patterns influence the evolution of industrial and services capabilities over time. Private and public institutions play a determinant role in fostering learning and allowing building systems that are not only responsive to change, but also capable of anticipating change.

**Effective logistics, infrastructure, easiness of connectivity**

Whether the participation to the automotive chain is done through major first tier producers localised in the country, through domestic suppliers sourcing MNCs globally or through a mix of the two, the quality and easiness of connectivity are key in shaping the evolution and productivity of the industry in the country. Effective logistics, access to ICTs and infrastructure for transport are key to favour the development of activities linked to the automotive industry. The connectivity needs are strongly correlated with the existing trade agreements, including the regional ones, such as EU and MERCOSUR and the bilateral ones.

In many countries, the origins of the development of technological and production capacities related to the automotive sector go back to the import substitution period (Brazil, Korea, Mexico and Peru are some examples). Peru, for example, which today is a net importer of vehicles with a marginal participation in the automotive value chain, hosted in the early 1960s several automobile assembly plants (General Motors, Chrysler, American Motors, Nissan, Toyota, Ford and Volkswagen, among others). During the 1980s, only three major assembly plants remained active (Nissan, Toyota and Volkswagen). The liberalisation policies of the 1990s led to a dismantling of these capabilities, leading the country to specialise in vehicle imports.

**Becoming specialised suppliers by linking to the value chain**

Even countries in which the automotive sector is pretty small have some horizontal programmes that benefit the suppliers linked to the automotive chain. In Ireland, for example, the automotive industry is small, it employees around 4 500 people in niches of subcomponents employed in the automotive and aviation industries. These companies operate in engineering, tool-making, plastics, and metal fabrication and they supply mostly EU companies. These companies can benefit from the support offered by Enterprise Ireland (EI), the government agency responsible for the development of Irish enterprises in world markets, and by its network of overseas offices, which provide market information, matchmaking services, support for trade missions and company visits, and in certain locations also incubation services.

**Box 3. Supplying the global automotive chain: options through specialisation**

Many countries have highlighted that they have capabilities in industrial and services activities that provide, or could provide a good base for linkages with the automotive chain. These include traditional supply sectors such as textile (indicated as subject to further expansion by Dominican Republic, Mexico, Peru) and new areas such as electronics (indicated as subject to potential further expansion by Dominican Republic, Ireland, Mexico and Singapore). Singapore hosts world suppliers of electronics and automotive applications. The country has identified potential linkages between its energy and chemical industrial hub and the automotive chain, highlighting the role of the current national strategy of shifting from fast implementers of technologies to a place where innovations and technological developments are actually generated. Ireland has highlighted software and electronics as areas of potential linkages with the automotive and aeronautics chain.

Peru has indicated that their policy is aiming at developing capacities in areas such as tires (rubber products) and textiles to increase linkages with the automotive chain. Peru exports rubber tires for airplanes, motorcycles and bicycles to Mexico, Colombia and Brazil. Chile reported that they have an incipient industry in vehicle parts and that the copper industry provides unexploited opportunities for linkages with the automotive chain, especially in the
Other areas that Chile has reported as potential for further development are related to electronics and innovative design solutions for auto-parts. Dominican Republic has highlighted footwear and leather goods clusters, as well as electronic goods components as areas of potential linkages with the automotive chain.

Since the 1970s, Costa Rica hosts some companies which operate as sub-contractors for lead-firms in the automotive sector. From the 1970s to the 1990s the country specialized in tire manufacturing for the automotive sector. Since 2005, Costa Rica has diversified its exports towards more sophisticated components. According to COMEX (Costa Rica Ministry of Foreign Trade), in 2012, the automotive sector accounted for 4.6% of free trade zones exports in Costa Rica and the share of domestic value added was 51.3% (versus 42.3% in 2009). The table below lists the companies which have operation in Costa Rica and the figure shows which parts they manufacture for the global automotive value chain.

**Table 2. Companies linked to the automotive chain, Costa Rica, 2014**

<table>
<thead>
<tr>
<th>Company</th>
<th>Country of Origin</th>
<th>Year of Establishment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridgestone</td>
<td>Japan</td>
<td>1967</td>
</tr>
<tr>
<td>CML</td>
<td>USA</td>
<td>1995</td>
</tr>
<tr>
<td>Daewoo Bus</td>
<td>South Korea</td>
<td>1995</td>
</tr>
<tr>
<td>Deshler Automotive Products</td>
<td>USA</td>
<td>2008</td>
</tr>
<tr>
<td>Firestone Industrial Products</td>
<td>Japan</td>
<td>2009</td>
</tr>
<tr>
<td>Hutchings Automotive Products (HAP)</td>
<td>USA</td>
<td>2004</td>
</tr>
<tr>
<td>Innovative Components</td>
<td>USA</td>
<td>2005</td>
</tr>
<tr>
<td>Proquinal</td>
<td>Colombia</td>
<td>2004</td>
</tr>
<tr>
<td>Zollner</td>
<td>Germany</td>
<td>2013</td>
</tr>
<tr>
<td>Micro Technologies</td>
<td>USA</td>
<td>1999</td>
</tr>
</tbody>
</table>

Source: CINDE (Costa Rican Investment Promotion Agency), 2014
BUSINESS INSIGHTS

28. [This session provides information based on companies’ and clusters experience in the automotive value chain. It will include up to 5 “case studies.”]. As a preliminary example of the information from case studies, the following paragraphs contain a preliminary overview of findings from two lead automobile industries in the sector, focusing on their production operations in Southern Africa (Table 3).

29. Investment and trade decisions of multinational enterprises are two aspects of the same economic activity in any industry, including the automobile industry. These decisions are embedded in MNEs’ strategies to optimise the fragmentation of production and to provide access to key markets across the world. However, international and national policies on trade and investment are often not determined in conjunction and without a whole-of-supply lens that would respond to the needs of global lead MNEs and their local partners in countries and regions of production.

30. The OECD is currently collecting insights from lead firms in the automobile (and other) sectors to derive policy options for the SADC region supporting their efforts to leverage investment into regional and global value chains for inclusive and sustainable industrialisation. This box provides a snapshot of first insights from interviews with two lead automobile companies, henceforth the ‘Companies’, which are among the 6 largest automakers globally and both have established production plants in South Africa. Company 1 is headquartered in the United States with a global market share in revenues of around 8% (and 10% in South Africa). Company 2 is headquartered in Japan with a global revenue share of approximately 5% (and 8% in South Africa). The information reported in this box corresponds to perspectives of OECD’s interview partners in the Companies and does not reflect OECD’s or the Companies’ opinion.

Internationalisation of production: a highly globalised production model

31. The Companies engage significantly in final assembly of vehicles as well as the manufacturing of key first-tier components (such as engines, gearboxes and transmissions) in their countries of origin. Both Companies report net exports of vehicles out of their countries of origin. Company 1 has about half of its automobile or automobile component plants within the United States (see Figure). This share is lower (at around 8%) for Company 2, but broadly reflects the smaller market for automobiles in Japan (domicile of Company 2) as compared to the United States (domicile of Company 1).

32. Besides the countries of origin, the Companies engage heavily in vehicle assembly in Mexico, the UK, China and the Republic of Korea as well as in emerging markets like Argentina, Brazil, India, and Thailand. For both companies, the assembly plants in South Africa are very small compared to plants in larger markets. Company 2, for example, manufactures only about 30-40’000 vehicles in South Africa as compared to more than 800’000 in Japan, the domicile of the country and most important location of production. Brand-specific first-tier components are not produced in all countries with established assembly activities of the Companies. These components are predominantly produced in countries with large and developed automobile industries (such as the United States, Japan and several countries in Europe).

33. In smaller production locations like South Africa, only less complex components or no components at all are produced locally: Company 1 is not producing any components in South Africa and applies the so-called 'complete-knocked-down' (CKD) model of assembly. CKD assembly means that all or almost all components are imported from the Company’s production plants in other countries. This model is often applied in countries trying to develop an automobile industry and applying higher import tariffs for already assembled vehicles as compared to tariffs for automobile components. Company 2 is producing
some brand-specific but less complex components in South Africa, including for example the chassis and car bodies. Both companies complement their range of vehicles with imports from other plants abroad to supply the Southern Africa market.

Table 3. Subsidiaries and suppliers of two global car manufacturers, 2016

<table>
<thead>
<tr>
<th></th>
<th>Company 1 (United States)</th>
<th>Company 2 (Japan)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Subsidiaries</td>
<td>Suppliers (direct)</td>
</tr>
<tr>
<td>Total (#)</td>
<td>471</td>
<td>357</td>
</tr>
<tr>
<td>Domicile in Company’s home country (% of total)</td>
<td>80%</td>
<td>29%</td>
</tr>
<tr>
<td>Operating in automobile or automobile component production (% of total)</td>
<td>5%</td>
<td>33%</td>
</tr>
<tr>
<td>Domicile in Company’s home country (% of total operating in automobile or automobile component production)</td>
<td>50%</td>
<td>19%</td>
</tr>
</tbody>
</table>

Source: Authors’ calculations based on FactSet (2016)

Drivers of production internationalisation: proximity to final markets is key

34. The Companies reported that their decision to invest into production plants domestically and abroad is largely driven by the size of the market for selling. The transportation of vehicles is expensive and the Companies therefore try to minimise shipping of vehicles over long distances and across certain borders: on the one hand, shipping takes more space and involves more security concerns when cars are already assembled; on the other hand, most countries that have an automobile industry, particularly in emerging markets, still apply higher import duties for finished automobiles as compared to automobile components.

35. Additionally, the local presence of global suppliers of important components (such as seats and axels) is essential for the decision to establish in a country. These global suppliers have often the intellectual property of the components’ design and cannot be easily replaced by other suppliers. As the market for selling in a country is growing, it becomes typically financially more feasible for global component suppliers to establish in a country (also see section below). Finally, and importantly, the decision to set up a production plant is determined by the extent to which public policies are supporting the automobile sector. Related to that the clarity and reliability of policies are often more important than the policies or incentives themselves. Capital investment is a long-term decision and therefore it is of utmost importance to ensure that the investment is safe from expropriation.

36. In South Africa, despite relatively low overall volumes and distance from large markets, conditions for production are relatively good, particularly due to existing capabilities and skills, a supportive, stable and very clear long-term policy framework (now in its 3rd generation), good infrastructure, access to a global shipping route to major export markets (i.e. weekly shipping), a strong private sector (transport, telecom, finance and business services) and existing over-capacities allow for expected expansions. Nonetheless, the Companies are exposed to important challenges in the South African market of production. For example, the BBBEE policy is constraining the Companies as there is limited qualified labour available and labour costs are relatively high including due to labour uncertainty related to strikes, for example.
Mode of investment: Significant diversification in equity and non-equity modes of investment

37. The Companies typically fully own assembly plants as well as plants producing certain key components that are specific to the brand. Besides equity investments, the Companies also apply non-equity modes of investment. For example, Company 2 is often investing into specific tools/components, for which it keeps the intellectual property. These components are however produced by contracted suppliers that may also produce components for other automobile manufacturers. This model is applied if the suppliers have more expertise to manufacture a specific component, but owning the design and technology is critical for the Company's comparative advantage. Company 1 engages in similar technical agreements, i.e. non-equity modes of investment (see next section for a description of weaker and more arm's length linkages between the Companies and their suppliers).

38. While the Companies are sometimes contracting external suppliers to produce brand-specific components and -- more often -- generic components directly related to the manufacturing of vehicles, they engage heavily in equity investment in firms less directly related to the automobile industry. These investments include to some extent strategic investment to acquire new technologies that may become relevant for the Companies' core business model in the future or relate simply to the diversification model of the company. Out of the almost 500 subsidiaries of Company 1, only 5% of these subsidiaries are directly related to the automobile industry. This share is slightly higher at 15% (38 out of approximately 250) for Company 2.

Linkages with arm's length suppliers: Substantial sourcing from global suppliers in production markets

39. In each production plant, the Companies typically make the so-called make-or-buy assessment for its components. That is, they will decide whether or not a component is produced within the plant, imported from another plant of the Company, outsourced to a locally established supplier (MNE or purely local supplier), or imported from an international supplier not established locally. This implies that the way the supply chains of the Companies are organised varies significantly across plants and time. Company 1 has approximately 350 arm's length suppliers of which 33% are directly involved in automobile manufacturing (assembly or components); Company 2 has around 270 suppliers of which 38% are closely related to the production of automobiles (see Figure).

40. As highlighted above, proximity to first-tier suppliers is essential for both Companies. The majority of first-tier components are sourced from international component suppliers (MNEs) that themselves have production plants close to the Companies' assembly plants. In South Africa, the Companies are sourcing around 50% of their components domestically, predominantly from large international component suppliers (first-tier suppliers). As mentioned in the previous section, the Companies engage in non-equity modes of investments with suppliers in South Africa to guarantee exclusive buying rights of a specific component or to uphold intellectual property over a specific technology. In many cases, however, the Companies are sourcing from global first-tier supplier at a purely arm's length basis.

41. While it is an objective for the Companies to increase domestic sourcing of parts and components (including from locally-owned SMEs) in each production plant, the company faces the challenge to ensure that local producers, particular in emerging countries, have the technical capabilities and meet global quality standards. Even if they may have the technical capability, it is often too costly and a somewhat burdensome process to support local firms, particularly SMEs, in getting the needed quality certificates. Despite these challenges, the Companies see a significant potential to increase sourcing from local SMEs in South Africa, not least due to the incentives provided by the South African automobile policy. While Company 1 is very sceptical about future sourcing from other SADC countries, Company 2 is much more
positive about this idea and is soon sourcing its wiring components from an international supplier moving production to Botswana. More generally, the potential for local sourcing in emerging markets is predominately embedded further up the value chain (second-tier and third-tier) due to lower requirements for technical knowhow of the workers.

**Foresight: Shifting modes of production and potential for Southern Africa**

42. The *Companies* continue working towards a business model based on more customised vehicles and shorter lead times. The latter implies to produce/assemble yet closer to the markets and ensure that key global component manufacturers are also close to these markets (see sections above).

43. Both *Companies* also increase the focus on environmental concerns in the area of production of vehicles as well as carbon emissions of vehicles themselves. *Company 2* sees investment in this area increasingly as an opportunity, which can also help to reduce costs (e.g. less consumption of energy in production will result in lower costs). Besides the commercial reason for environmental improvements, the *Companies* aspire to have and improve their image of environmental-friendly car producers.

44. With respect to technology, R&D and innovation, the *Companies* have been spending increasing shares on R&D and innovation over recent years. These efforts are targeted to improve production and supply chain processes (automation, robotics) as well as to enhance technologies integrated in the *Companies*’ vehicles. This is resulting in new partnerships with technology companies like Apple, Google, Microsoft and alike. Just like for other components, the *Companies* are not investing in developing capabilities in the area of new, digital technologies but through partnerships with leading digital firms/platforms, the *Companies* are integrating new technologies in their production processes and vehicles.

45. As to prospects for production in South Africa, both *Companies* see potential for expansion due to the expected increase in demand in Africa and the low potential for other, smaller economies in Africa to start producing automobiles. At the same time, as mentioned above, at least *Company 2* sees a lot of potential for smaller SADC countries to become important and relevant component suppliers, particularly at the second- and third-tier level. However, for this to happen, SADC trade and investment integration needs to become stronger (see next section). *Company 1* is rather concerned about the more near term growth potential in Africa: low availability of foreign currencies of buyers in their African markets for selling as well as high exchange rate volatility has made business operations and production out of South Africa difficult.

### Box 4. Business perspectives on reforms

The *Companies* highlighted that without industry support in the form of a very predictable, clear and supportive South African automobile policy the sector would not have emerged and would no longer exist in South Africa. Specific policies include, for example, reduced import duties on components as well as savings on import duties per unit of export of locally assembled vehicles.

The *Companies* provided policy perspectives that would support expansion of their own and of other automobile companies’ operations in South Africa and enable increased linkages with local suppliers in South Africa as well as with suppliers in other SADC countries:

**Banning used vehicle imports in all SADC countries**: The *Companies* suggested that there should be a very high import duty on used vehicles or a complete ban. The local automobile industry only grows with higher volumes/sales in the region. Used vehicle imports lower the volumes for new vehicles. The new automobile policy in South Africa stopped imports of used vehicles, which resulted in increased investment of car manufacturers in the country. Expanding this policy to the SADC level and possibly beyond would be welcomed by the *Companies*.
**Tax breaks and duty reduction:** The Companies proposed to make use of more tax breaks and import duties of new cars should be significantly reduced. Car producers spend too much on import duties for cars produced elsewhere. Avoiding these costs would all for more investments in the region.

**Clear and possibly regional automobile policy:** Long-term investments require clear, predictable and supportive policies. The South African automobile policy could be used for inspiration for a SADC-wide automobile policy.

**More support for fixed capital investment:** It was argued that more support for investment would help attracting more global suppliers to invest in the region. Currently, the automobile policy includes a 30% rebate for fixed capital investment (tax free cash grant), which is very useful but should be extended. The Companies also suggested that support could come in the form of rebates to buy land or of low-cost provision of firm-specific infrastructure needs (e.g. factory space, water supply, energy, etc.).

**Engaging in large plurilateral trade deals:** The Companies highlighted the important role of international trade and investment agreements. The recent trade deal with the EU (SADC-EU EPA) involving duty free access to the European market allows boosting and retaining growth of vehicle sales out of South Africa. Similarly the AGOA agreement with the US has helped to boost exports. The Companies would welcome similar deals with countries in Asia. It is important to note that it is still duty preference what Companies are seeking mostly in international agreements. The Companies are less aware of other provisions and liberalization (including on investment and services) that may be covered in newer generation trade and investment deals.

The Companies also suggested policy action that would ensure that they retain their investments in the country. In this context, a particular emphasis was given to the need to lower logistics costs. Policy suggestions included:

**Avoid inefficiencies in the use of rail:** Among others, the reason for high rail costs in South Africa is not a lack of investments but an inefficient use of assets. In particular, it is unfortunate that certain hours of the day are blocked off for passenger rail even if the rail is not used during those hours. Hence, the Companies argued that there should be a policy better regulating user slots for passenger and cargo transport, avoiding these inefficiencies. It was also argued that the fact that the rail costs are shared among those using it, less frequent use due to inefficiency unnecessarily increases costs.

**Increase competition particularly in rail cargo:** It is important not to carve out the private sector in the transport industry. For example, in many cases it is cheaper to move cargo on roads rather than rail. Low costs on roads are due to a very competitive private sector in the trucking industry. The Companies argued that it would be good to increase competition in the rail industry to lower costs.

**Support the development of the steel industry:** The Companies argued that policies to support the development of a steel industry in South Africa would be highly welcomed. Currently, the South African car industry imports most steel products from outside Africa/SADC while South Africa itself (and SADC more broadly) has a lot of potential to develop a steel product industry. This would help to lower costs for steel products.

Notes: *The business insights have been collected through primary semi-structured interviews to lead firms in the sector. The two lead vehicle manufacturers from which the data is taken have a market share at above 5% globally and at above 10% in South Africa. The firm names cannot be disclosed for the purpose of this paper. The reported findings are preliminary.*

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**COUNTRIES STRATEGIES**

46. This section provides information about countries’ strategy to promote participation and upgrading in the automotive value chain. It provides an overview of countries’ strategies; a summary of
main characteristics of targeted programmes in selected countries, an overview of incentives schemes for FDI attraction. It concludes highlighting some success stories and lessons learned.

Overview of countries’ strategies

47. Many countries are taking steps to strengthen their positioning in the automotive value chain. The “Questionnaire on Programmes to Support the Automotive Industry” aimed at identifying what type of initiatives countries are implementing to promote the development of the automotive industry and the participation and upgrading in global and regional value chains with a view to promoting peer-learning and identifying principles to improve the effectiveness of policies in different contexts. **Fifteen countries replied to the questionnaire.** Five are implementing targeted programmes (Brazil, Colombia, France, Morocco and Uruguay). Four follow a horizontal approach (Costa Rica, Czech Republic, Mexico and Turkey). The rest declared having a fairly small automotive industry, but have identified opportunities of linkages through other activities (Chile, Dominican Republic, Ethiopia, Ireland, Peru and Singapore). Korea has provided information about the evolution and current challenges for the automotive industry.

48. France and Korea have strong domestic industries with world leading large domestic companies. Brazil hosts most world leading automotive producers and has a network of suppliers which mostly operate for the MERCOSUR market. Mexico and Turkey have developed strong assembly capacities and are moving up the chain to add value and local content to the domestic production. Morocco is taking advantage of FDI from OECD countries to set up a domestic automotive industry linked to global markets, while Colombia is looking at developing domestic technological capabilities to strengthen the domestic production. Costa Rica and Czech Republic mostly operate as platforms for exports thanks to settlements of specific production processes related to the industry. Uruguay’s participation to the industry is mostly determined by its cooperation with Brazil and the linkage with MERCOSUR. Ireland is looking to become a technology hub providing high tech manufacturing and knowledge intensive services to the global industry, including in automotive and aerospace. Singapore is linked to the automotive chain through its electronics and components specialised producers. Dominican Republic and Ethiopia have identified the sector as a potential area of future industrial development based on some accumulated capacities, while Chile and Peru, which are net importers of vehicles, have identified opportunities to linking with the automotive value chain through developing suppliers’ capacities in related production and technological area, including copper, design and textiles.

49. Countries are following different approaches in promoting the automotive industry and the participation in its value chain (Table 4):

i) **Five countries are implementing targeted programmes (Brazil, Colombia, France, Morocco and Uruguay).** These programmes prioritise the strengthening of the domestic supply chain. Three of them include incentives for innovation (Brazil, Colombia and France) and two (Brazil and France) green targets. Of the five countries, Morocco is the one that prioritises FDI attraction as a lever for transformative change, the others point to the strengthening of the domestic base and its export orientation. **Targeted programmes are implemented through multi-institution settings and a broad policy mix.** Countries use different combinations of tools, including fiscal incentives, programmes for skills development, business services, demand-side support and standards setting. In addition to the Ministries of Trade, Industry and Economy, development banks and institutions in charge of science, technology and innovation are involved as responsible institutions.

ii) **Four countries (Costa Rica, Czech Republic, Mexico and Turkey) affirmed that they rely on horizontal programmes** to promote industrial development. Despite the differences, most of
these programmes include a broad policy mix, including incentives for FDI attraction, but also for innovation, job creation, training and strengthening of the local supply chain.

iii) Some countries use Special Economic Zones (SEZs) as main tools for setting up capabilities linked to the automotive value chain. Colombia, Costa Rica, Dominican Republic and Morocco rely on these schemes as main drivers of support for industrial development. Despite the differences in approach, all respondents highlighted the importance of setting up schemes for local-supply and human capital development.

iv) Some countries implement programmes to promote linkages between domestic companies and the global automotive value chain. Strengthening domestic suppliers’ capabilities and reducing information gaps are the main objectives of programmes to support the creation of linkages between clients and suppliers.

Table 4. Comparative overview of policy priorities for the automotive value chain, 2015

<table>
<thead>
<tr>
<th>Policy Priorities</th>
<th>High specialisation</th>
<th>Medium specialisation</th>
<th>Low specialisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEX</td>
<td>FRA</td>
<td>CZE</td>
<td>TUR</td>
</tr>
<tr>
<td>Strengthening the domestic supply chain</td>
<td></td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Creating/maintaining jobs</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Attracting FDI</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Promoting exports</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Fostering innovation</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Greening the industry</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

Notes: This visualisation is not meant to be exhaustive, it summarises the policy priorities (*) as reported by the countries.

* indicates that the country has a targeted program for the automotive industry in relation to the priority. High specialisation means a share of automotive manufacturing value added over total MVA of ≥15%, Medium specialization between 5% and 15% and low specialization < 5%.

Source: Authors’ elaboration based on the stocktaking of “Policies for Upgrading in the Automotive Industry” carried out in the framework of the OECD Initiative for Policy Dialogue on GVCs, Production Transformation and Development.

Targeted programmes for the automotive industry

50. Five countries are implementing targeted programmes for the automotive industry (Brazil, Colombia, France, Morocco and Uruguay). They all prioritise the strengthening of the domestic supply chain. Three include incentives for innovation (Brazil, Colombia and France) and two (Brazil and France)
green targets. Of the five countries, Morocco is the one that prioritises FDI attraction as a lever for transformative change, the others point to the strengthening of the domestic base and its export orientation.

51. Targeted programmes to promote the automotive industry, as reported by responding countries, differ in most aspects, but also present some similarities. Table 5 summarises the main characteristics of the different targeted programmes. Three major country approaches seem to appear:

i) strengthening domestic industrial capacities, as, for example, Inovarauto in Brazil, the production transformation programme in Colombia and the Automotive Plan in France;

ii) leveraging on FDI as a driver of transformative change, as in the case of Morocco which points to increase the attraction of FDI in 2nd and 3rd tier types of operations in targeted industrial platforms;

iii) strengthening export capacities, as in the case of Uruguay where the opportunities of participation and upgrading in the chain are mostly determined by the MERCOSUR agreement.

52. Country approaches also differ in time horizon and objectives. The Colombian programme is embedded in a long-term strategy of production transformation with targets to be achieved by 2032. Brazil and Morocco follow a multi-year planning, while the French Automotive Plan does not have a pre-determined end date. In Uruguay, the incentive regime expired in 2015 due to WTO requirements.
<table>
<thead>
<tr>
<th>Name</th>
<th>Brazil</th>
<th>Colombia</th>
<th>France</th>
<th>Morocco</th>
<th>Uruguay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectives</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Strengthening National Supply Chain</td>
<td>Strengthen national supply chain (reaching a minimum investment of 1% of gross revenues from sales of goods and services net of taxes, of qualified companies)</td>
<td>Revenues (including exports) of at least 3.4 USD billion Exports of 1.1 USD billion Jobs: at least 33 000 (by 2032)</td>
<td>Strengthening linkages among local suppliers</td>
<td>Increase in GDP of 12 billion Dirhams and 70 000 new jobs by 2015 Setting up of 2nd and 3rd tiers factories</td>
<td>Promotion of exports in certain industrial segments, mostly focused on MERCOSUR</td>
</tr>
<tr>
<td>b. Green Targets</td>
<td>Increasing energy efficiency of vehicles (efficiency goal of 1.82 MJ/km of all cars sold in the country by 2017)</td>
<td>To develop affordable green vehicles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Innovation</td>
<td>Increasing R&amp;D and engineering capacities (0.5% of gross revenues from sales of goods and services matching with grants from FNDCT)</td>
<td>Promote innovation through the Centre for Technological Development of Automotive Industry (CDTIA/TECNNA)</td>
<td>Increase innovation content</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Territorial Dimension</td>
<td>National Initiative</td>
<td>National Initiative, in coordination with Regional Competitiveness Commissions</td>
<td>National initiative in coordination with local authorities</td>
<td>National, with territorial dimension (Tanger, Kénitra and Casablanca)</td>
<td>National Initiative</td>
</tr>
<tr>
<td>Budget</td>
<td>N. A.</td>
<td>N. A.</td>
<td>1.4 billion Euros</td>
<td>N. A.</td>
<td>N. A.</td>
</tr>
<tr>
<td>Monitoring and Evaluation</td>
<td>ABDI is in charge of developing a monitoring system for the programme</td>
<td>National Planning Department is in charge of M&amp;E</td>
<td>No evaluation foreseen</td>
<td>A Monitoring Committee with private and public stakeholders has been established</td>
<td>No evaluation carried out, or foreseen</td>
</tr>
<tr>
<td>Links</td>
<td>Here</td>
<td>Here</td>
<td>Here</td>
<td>Here</td>
<td>Here</td>
</tr>
</tbody>
</table>
53. All respondents have identified the strengthening of the domestic supply chain as a key objective of the targeted programmes. In some cases, countries have set job targets (Colombia and Morocco), in other export targets (Brazil, Colombia), in others investment targets (Brazil), or generic indications (Uruguay). Brazil and France also have specific targets linked to green cars and sustainable development, while Brazil and Colombia have identified as main objectives of government support the promotion of technological development and innovation. Colombia has instituted a new Centre for Technological Development of the Automotive Industry to support R&D and technological development in the sector.

54. According to the results of the questionnaire, Colombia, France and Morocco are the countries in which the targeted programmes for the automotive industry have the highest territorial component. In Morocco, the Plan for Industrial Development is articulated through territorial industrial platforms in which MNC companies engage in operations with domestic suppliers.

55. Brazil, Colombia and Morocco have set up mechanisms for monitoring implementation; while in France and Uruguay no targeted evaluations have been carried out or are foreseen. Morocco has set up a Monitoring Committee composed by representatives from the Ministry of Interior, Ministry of Economy and Finance, Ministry of Industry and Trade, Ministry of Employment, and representatives from private sector including the General Industrial Confederation of Morocco and from professional associations. Morocco has also indicated that the system in place has benefited from inspiration of other countries’ experiences including Brazil, Turkey and China.

56. Targeted programmes are implemented through multi-institution settings and a broad policy mix. Countries use different combinations of tools, including fiscal incentives, programmes for skills development, business services, demand side support and standards setting. In addition to the Ministries of Trade, Industry and Economy, development banks and institutions in charge of science, technology and innovation are involved as responsible institutions.

57. Countries promote the automotive industry through a multi-institution and broad-policy mix. From the responses of the five countries that declared to have in place targeted programmes to support the automotive industry, it appears that government’s promotion is done through a multi-institution and broad policy mix which includes financial support, programmes for skills development, business services, demand-side incentives and systems for standard-setting.

58. Table 6 summarises the replies about the composition of the policy mix. It highlights the domain of intervention (finance, skills, business services, demand-side support and standards) and it presents an overview of the conditionalities and the innovation content of main programmes.

Table 6. Policy mix of targeted programmes for the automotive industry, 2015

<table>
<thead>
<tr>
<th>TYPE OF INCENTIVE</th>
<th>COUNTRY/ RESPONSIBLE INSTITUTION</th>
<th>DESCRIPTION/ BENEFICIARIES</th>
<th>CONDITIONALITIES</th>
<th>INNOVATION CONTENT</th>
</tr>
</thead>
</table>

Source: Note: FNDCT (National Fund for Scientific and Technological Development); ABDI (Brazilian Agency for Industrial Development), Brazil.

Source: Based on country responses to the questionnaire on "Targeted Programmes to Promote the Automotive Industry".
<table>
<thead>
<tr>
<th>Country</th>
<th>Sector</th>
<th>Incentives Provided</th>
<th>Requirements/Activities</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FINANCE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Brazil</strong></td>
<td>MNCs and domestic companies</td>
<td>Minimum requirements of R&amp;D and investments in engineering and BIT</td>
<td>Domestic tech. dev; adoption of foreign frontier technology.</td>
<td></td>
</tr>
<tr>
<td>Colombia (Bancoldex)</td>
<td>Domestic companies</td>
<td>NO</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>France (Ministry of Research)</td>
<td>All companies carrying out R&amp;D</td>
<td>NO</td>
<td>All innovation activities</td>
<td></td>
</tr>
<tr>
<td>Morocco (Ministry of Economy and Finance)</td>
<td>Total exemption for 5 years for all companies located in SEZs</td>
<td>Beneficiaries need to be located in SEZ</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>Uruguay</td>
<td>(tax credit linked to export performance)</td>
<td>Local content requirement (20% of national value added)</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>Colombia (Innpulsa Colciencias)</td>
<td>Domestic companies, specific line for SMEs</td>
<td>Cooperation among local suppliers</td>
<td>Adaptation to domestic market</td>
<td></td>
</tr>
<tr>
<td>France (Ministry of Economy)</td>
<td>All companies carrying out R&amp;D on future cars</td>
<td>NO</td>
<td>Future-oriented research and affordable green vehicles</td>
<td></td>
</tr>
<tr>
<td>Morocco</td>
<td>State contribution of up to 10% of total investment</td>
<td>Beneficiaries need to be located in SEZ</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td><strong>MATCHING FUNDS/GRANTS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colombia (National Learning Service and Centre for Technological Development of Automotive Industry)</td>
<td>Technical (Pronatec) &amp; Higher Education</td>
<td>Cooperation between private sector, local universities and training institutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morocco</td>
<td>Creation of Training Institute for Skills for Automotive sector; grants for training</td>
<td>Partnerships with private sector</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BUSINESS SERVICES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brazil (Brazilian Agency for Export Promotion)</td>
<td>Domestic and MNCs Companies</td>
<td>The company should operate in Brazil (or willing to)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colombia (Bancoldex)</td>
<td>Domestic companies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morocco (Industrial Platforms offer a one-stop-shop for business services)</td>
<td>Domestic companies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DEMAND SIDE SUPPORT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brazil (Ministry of Planning and Agrarian Development)</td>
<td>MNCs and domestic companies</td>
<td>Companies capable of giving after-sale assistance over all national territory</td>
<td>Special incentives for adaptation to local markets</td>
<td></td>
</tr>
<tr>
<td>Colombia (Agency for Efficient Purchase)</td>
<td>Domestic companies</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>Taxes on high emission vehicles and fiscal incentives to buy green cars</td>
<td>Green Cars</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>STANDARDS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Brazil (Inmetro- National Institute for Metrology, Quality and Technology) |                                                |                                                             | Source: Based on country responses to the questionnaire on “Targeted Programmes to Promote the Automotive Industry”.

36
Attracting FDI and creating jobs through horizontal schemes

59. Four countries (Costa Rica, Czech Republic, Mexico and Turkey) have affirmed that they rely on horizontal programmes to promote industrial development. Despite the differences, most of these programmes include a broad policy mix, including incentives for FDI attraction, but also for innovation, job creation, training and strengthening of the local supply chain.

60. In Czech Republic, the National Incentive Scheme defines the conditions for the attraction of FDI. The scheme includes tax incentives, grants for job creation and training, preferential rates for land and infrastructure use and grants for capital investment. Beneficiaries not only include manufacturing companies setting up a green field project or expanding an existing business, but also technology centres and business support services centres. Beneficiaries need to comply with certain conditionalities, including job creation targets. Conditions differ for type of investment and region in which the investment is made. Preferential conditions are applied for “strategic” investments, as identified by the government. Table 7 summarises the main characteristics of the policy mix of the National Incentive Scheme.

| Table 7. Policy mix of the National Incentive Scheme, Czech Republic, 2014 |
|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|
| **POLICY MIX**                                   | **CORPORATE INCOME TAX RELIEF**                 | **PARTIAL CORPORATE INCOME TAX RELIEF**         |
|                                                  | **JOB CREATION GRANTS**                         | **TRAINING AND RETRAINING GRANTS**              |
|                                                  | **SITE SUPPORT**                                | **CASH GRANT ON CAPITAL INVESTMENT**            |
| **BENEFICIARIES**                               | **Manufacturing firms**                        | **Technology Centres**                         | **Business support services centres** |
| **CONDITIONALITIES**                            | **REGULAR**                                     | **STRATEGIC**                                   | **REGULAR**                             |
|                                                 | Min. investment within 3 years CZK 100 million (approx. USD 5 million). This limit is reduced in regions with high unemployment. Investors' own equity half of the investment min. Min. investment in new machinery CZK 50 million (approx. USD 2.5 million). | Min. investment within 3 years CZK 500 million (approx. USD 25 million) Min. investment in new machinery CZK 250 million (approx. USD 12.5 million) The investor must create at least 500 new jobs. | Min. investment within 3 years CZK 200 million (approx. USD 10 million) Min. investment in new machinery CZK 100 million (approx. USD 5 million) The investor must create at least 120 new jobs. |
|                                                 | Creation of at least 40 new jobs at software development centres. Creation of at least 100 new jobs at other business support services centres (shared service centres and high-tech repair centres). |                                                                                                    |                                                                                      |
| **ELIGIBLE COSTS**                              | Long-term assets, when the value of machinery comprises at least half of the value of acquired assets. | Long-term assets, when the value of machinery comprises at least half of the value of acquired assets. |                                                                                      |
61. In Mexico, there are several horizontal programmes that can benefit the automotive sector. These include PRODIAT, the Technological Development Programme for Industry, PROSOFT, the incentive to promote the productive use of ICTs for business, the CONACYT’s incentives for innovation, NAFIN’s programme to strengthen local suppliers and the ProMexico fund to attract FDI and promote regional development (Table 8).

Table 8. Non targeted schemes with high impact for the automotive industry, Mexico, 2015

<table>
<thead>
<tr>
<th>Technological development Programme (PRODIAT)</th>
<th>PROSOFT</th>
<th>Programmes to promote innovation</th>
<th>Suppliers Financing Programme</th>
<th>ProMexico Fund</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business services, training, certifications and fiscal incentives to allow SMEs to become suppliers of large companies.</td>
<td>Promoting use of ICT to increase productivity.</td>
<td>Fund for technological development and innovation</td>
<td>Financing for working capital and fixed assets acquisition to suppliers of any industry to promote growth and increase local content.</td>
<td>Financial incentives to attract FDI and promote national and regional development.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year of introduction</th>
<th>2009</th>
<th>2008</th>
<th>2009</th>
<th>N/A</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time of frame</td>
<td>3 year programme, but with annual budget approval</td>
<td>N/A</td>
<td>Budget is approved annually by congress</td>
<td>Upon exhaustion of current budget</td>
<td>N/A</td>
</tr>
<tr>
<td>Main Responsible Institution</td>
<td>Ministry of Economy</td>
<td>Ministry of Economy</td>
<td>National Council for Science and Technology (CONACYT)</td>
<td>NAFIN (SMEs Development Bank)</td>
<td>Ministry of Economy</td>
</tr>
<tr>
<td>Territorial Dimensions</td>
<td>Federal</td>
<td>Federal</td>
<td>Federal</td>
<td>Federal</td>
<td>Federal with matching resources from States</td>
</tr>
<tr>
<td>Budget</td>
<td>200 million pesos approved in 2014 (USD 15.4 million).</td>
<td>700 millions pesos approved in 2014 (USD 5.4 million).</td>
<td>4 000 million pesos in 2014 (USD 30.8 million).</td>
<td>500 million pesos (USD 38.5 million).</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Source: Based on country responses to the questionnaire on "Targeted Programmes to Promote the Automotive Industry".

62. Turkey has introduced in 2012 an Investment Incentives System with the objectives of promoting production transformation and specialisation in higher value added activities, increasing jobs and reducing territorial disparities. The system targets both domestic and foreign companies and it includes four categories of incentives by type of investment: general, regional, large scale and strategic. Each includes a different mix of incentives (Table 9). The different schemes are applied taking into account the characteristics of the region in which the investment is made. In order to apply the scheme, the Ministry of
Development has set up six economic and functional regions, grouping Turkish provinces on the basis of socio-economic indicators. The most favourable conditions are applied to lagging regions. The monitoring results of the Ministry of Economy indicate that the sector plans further new investment projects.

Table 9. Incentives schemes in Turkey, 2015

<table>
<thead>
<tr>
<th>Incentives</th>
<th>General Investment Incentives</th>
<th>Regional Investment Incentives</th>
<th>Large-Scale Investment Incentives</th>
<th>Strategic Investment Incentives</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAT Exemption</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Customs Duty Exemption</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Tax Reduction</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Social Security Premium Support (Employer’s Share)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Income Tax Withholding Allowance *</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Social Security Premium Support(Employee’s Share) *</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Interest Rate Support **</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land Allocation</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>VAT Refund***</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

Source: Based on country responses to the questionnaire on "Targeted Programmes to Promote the Automotive Industry".

Success stories and lessons learned

63. [to be completed]

Special Economic Zones are increasingly used to create capabilities in new-comers countries

64. Some countries use SEZs as main tools for setting up capabilities linked to the automotive value chain. Colombia, Costa Rica, Dominican Republic and Morocco rely on these schemes as main drivers of support for industrial development. Despite the differences in approach, all respondents highlighted the importance of setting up schemes for local-supply and human capital development. Colombia, Costa Rica, Dominican Republic and Morocco have reported that they have SEZs that can be instrumental to linking domestic industry to the global automotive value chain. Even though no SEZ is targeted to any specific sector, on average companies operating in similar sectors and activities tend to locate in the same SEZ.

65. In Morocco the implementation of the action plan for the automotive industry is linked to the operationalisation of Integrated Industrial Platforms, two of which are targeted to the automotive industry, the Tanger Automotive City which started its operations in 2013 and the Kenitra Automotive City. The SEZs of Tanger and Casablanca host automotive assembly MNCs. The novelty of the integrated industrial platforms is the willingness to develop localised clusters of competencies, including the training of specialised workers and the objective of developing a more integrated value chain in the country. The majority of the automotive industry is clustered in the northern regions, which account for more than 43% of the total number of companies operating in the automotive sector at the national level. The Casablanca region and the city of Kenitra account for the residual 39% and 7% respectively. The Grand Project Renault (with an estimated production capacity of 340 000 vehicles per year) has represented a major step in supporting the development of the industry in the country and put Morocco on the spot of global investors.

66. Since the 1990s, manufacturers of auto parts, components and accessories for the automotive industry have established manufacturing operations in the SEZs in Dominican Republic. In addition to
fiscal incentives, the availability of skilled human resources in disciplines related to the automotive industry, such as electrical and electronics manufacturing played an important role in attracting foreign companies. Moreover, the industrial parks located near Santo Domingo have top quality infrastructure and provide business services to hosted companies. The processing of leather used for seats and interiors manufacturing is clustered in the northern region, where there is a cluster of footwear and leather goods products.

67. In Dominican Republic, the Free Trade regime was introduced at the same time as in Costa Rica. It is managed by the National Free Zones Council (CNZFE) and it aims at attracting domestic and foreign companies engaged in the manufacturing of goods and/or provision of services, primarily for the export market, through the provision of fiscal incentives. The fiscal incentive scheme (Table 10) includes technology transfer as a provision, but not as a mandatory requirement. The CNZFE has created a Division of Productive Chains with the aim of establishing business linkages between companies operating in the SEZs and domestic ones. As in Costa Rica, the government has invested in promoting training of human capital in disciplines related to the main industries operating in the SEZs, in partnership with the National Institute for Vocational Training (INFOTEP).

68. Dominican Republic is now in the process of shifting towards a more selective approach to FDI attraction by prioritizing technology intensive sectors and higher value added activities. The CNZFE is developing an investment attraction programme to foster strategic partnerships with countries that have a high share of trade in the automotive industry. Incentives are offered to set up trade missions to scout out potential investors, benefiting from the preferential access to the US and EU markets through existing trade agreements.

Table 10. Main characteristics of the SEZ regime, Dominican Republic, 2015

<table>
<thead>
<tr>
<th>Main characteristics</th>
<th>Legal reference</th>
<th>Governance</th>
<th>Year of introduction</th>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Act Promoting Free Zones (Ley 8-90 de Fomento a las Zonas Franca)</td>
<td>National Free Export Zones Council (CNZFE)</td>
<td>1990</td>
<td>Job creation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FDI attraction</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Export promotion</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Technology transfer</td>
</tr>
<tr>
<td>Origin</td>
<td>Modification on the basis of the 1969 Act 299 for Industrial Incentive and Protection.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Focus</td>
<td>It targets domestic and foreign companies engaged in the manufacture of goods and/or provision of services, primarily for the export market.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Budget</td>
<td>Estimated tributary expenditure: US$ million 541, according to 2014’s Budget Act.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring and Evaluation</td>
<td>Free Zone Sector Statistic Report 2013</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional information</td>
<td><a href="http://www.cnzfe.gob.do/documentos/informesestadisticos/InfEst2012Esp.pdf">http://www.cnzfe.gob.do/documentos/informesestadisticos/InfEst2012Esp.pdf</a> (Spanish)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Based on country responses to the questionnaire on “Targeted Programmes to Promote the Automotive Industry”.

Well-managed programmes for client-suppliers linkages help connecting domestic SMEs

69. Strengthening domestic suppliers’ capabilities and reducing information gaps are the main objectives of programmes to support the creation of linkages between clients and suppliers.

70. Linkages between domestic suppliers and lead companies in the automotive industry do not happen spontaneously. Most countries highlighted the need to increase the business and technological capabilities of domestic companies in order to allow them to match the standards and requirements of lead companies, in terms of capabilities, quality and scale of operation. Countries also reported the need to
reduce asymmetry of information and facilitating matchmaking between local suppliers and lead firms, considering that in many emerging and developing economies, local firms still need to develop a trustworthy and reliable reputation.

71. Supplier’s development programs are both targeted and horizontal. For example, Brazil reported about a targeted program to promote supply chain development in the automotive industry, while Costa Rica informed about a national suppliers’ development scheme (Costa Rica Provee) which does not have a sectoral focus. Table 11 presents an overview of these two programs.

Table 11. Promoting suppliers development and linkages, Brazil, Costa Rica, 2014

<table>
<thead>
<tr>
<th>Country</th>
<th>Brazil</th>
<th>Costa Rica</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Productive Linkage Automotive Sector Brazil</td>
<td>Costa Rica Provee</td>
</tr>
<tr>
<td>Targeted to</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>the automotive</td>
<td>Brazilian Service to Support Micro and Small Enterprise - SEBRAE</td>
<td>PROCOMER (Costa Rica Foreign Trade Promotion Agency)</td>
</tr>
<tr>
<td>Responsible Agency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year</td>
<td>2014/2017</td>
<td>1999 (no termination date)</td>
</tr>
<tr>
<td>Objective</td>
<td>Measurable targets: Participation of 9 automakers and training of at least 9 groups of 25 small and medium companies.</td>
<td>Matchmaking and build capacities to engage with MNCs</td>
</tr>
<tr>
<td>Origin</td>
<td>The programme has been designed based on other country experiences in a partnership with UNCTAD.</td>
<td>Support of IADB</td>
</tr>
<tr>
<td>Main focus</td>
<td>Service providers and SME auto parts producers</td>
<td>Based on demand from MNCs, focusing on domestic producers and service providers</td>
</tr>
<tr>
<td>Territorial Dimension</td>
<td>National actors responsible for the design and coordination of the programme</td>
<td>National Initiative</td>
</tr>
<tr>
<td>Public-private partnership</td>
<td>Automakers companies provide training to their suppliers.</td>
<td>On-going design of new line of action, in partnership with WB to involve MNCs in training of local suppliers.</td>
</tr>
<tr>
<td>Policy mix</td>
<td>Services to increase the quality of the process and the product innovation human capital training.</td>
<td>Matchmaking, feasibility studies, online marketplace for connecting MNCs and local suppliers.</td>
</tr>
<tr>
<td>Budget</td>
<td>N/A.</td>
<td>Small annual budget. The Agency is managed by 1 director with 6 trade specialists.</td>
</tr>
<tr>
<td>Evaluation</td>
<td>N/A.</td>
<td>The Presidential Council for Competitiveness and Innovation carried out, jointly with the IADB, an evaluation of the programme. Results suggest that there are significant positive, albeit small, impacts, and that these are significantly magnified when matchmaking efforts are combined with innovation oriented grants that support in the development of domestic innovation capacities.</td>
</tr>
</tbody>
</table>

Source: Based on country responses to the questionnaire on “Targeted Programmes to Promote the Automotive Industry”.

72. The programme Productive Linkage Automotive Sector in Brazil was introduced in 2014 with the main objective of providing services to SMEs; the programme includes targeted training carried out by automakers to their suppliers in order to enhance their production and innovation capacities. PRODIAT is
a program managed by the Ministry of Economy and introduced in 2009 to support technological development. It focuses on reducing the information gap between large companies and potential domestic suppliers; the programme also offers financial support for SMs certifications to allow them to operate as sub-contractors. The Costa Rica Proove was introduced in 1999 and was not directly designed for automotive. The objective of the program is matchmaking and building capacities to engage with MNCs. Although it has a small annual budget there is an evaluation program. The Presidential Council for Competitiveness and Innovation carried out, jointly with the IADB, an evaluation of the programme.

73. In Colombia, PROEXPORT COLOMBIA is responsible for promoting exports and investment and to develop business opportunities between local suppliers and foreign companies. Other countries that have horizontal programs for enhancing linkages between domestic suppliers and foreign MNCs that are not specifically targeted to the automotive sector include Dominican Republic and Ireland.

Learning from FDI is not automatic and targeted initiatives are needed

74. [to be completed]

SCENARIOS FOR THE FUTURE

75. [to be developed]

76. New technology and vehicles concepts as well as new transportation services are contributing to redefine the industry. Open questions remain about the impact of these changes within the firms, between firms and across the globe. This section summarises what countries have reported has priorities for their strategies, as well as indications for future business scenarios based on consultations with the private sector.

What countries see ask key challenges for the future

77. Growing demand from middle classes, shift in consumer preferences, growing electronic knowledge content of cars and search for greener solutions are among the major issues that are redefining the competitive landscape of the automotive industry. Most countries and companies are devising new strategies to cope with them.

78. Countries face different challenges about how to strengthen their position in the automotive value chain, depending on the level of development of the industry, their market structure and their historical patterns. All countries face the major challenge of getting prepared for more energy efficient and green solutions to address sustainable development goals, especially in emerging economies where new middle classes are boosting new consumer markets.

79. Countries that have consolidated assembly capacities, such as Brazil, Mexico and Turkey face the challenge of increasing the domestic content and locally generated value added of domestic production. The challenges include not only improving market conditions, distribution chains, domestic technological capabilities and increasing market access in emerging markets. They also include addressing the need of strengthening reputation and “made in” concepts which can support the domestic scaling up. Korea is facing the challenge of increasing the flexibility and experimentation capacity of the industry which so far...
has been mostly dominated by large domestic conglomerates reducing the possibilities for SMEs to enter into the value chain. The countries which are pointing to develop over the medium run a domestic automotive industry, such as Morocco, face the major challenge of getting the number and quality of trained personnel and of increasing regional trade with the growing African market. Smaller countries, such as Costa Rica, face the challenge of overcoming size barriers to promote further expansion of the operations hosted in the country.

*Tapping into new consumers’ preferences and increasing linkage with emerging markets.*

80. Countries with a well-established automotive industry, such as Korea, Mexico and Turkey are looking forward to tap into the growing demand from the emerging middle classes in emerging and developing economies and they are looking forward to strengthening their capabilities to benefit from the shift in consumers’ preferences towards light vehicles. Korea has highlighted that its domestic industry, led by large domestic original equipment manufacturers (OEMs) has started to benefit from new market opportunities in emerging economies, including China and India, Mexico, which is host to main international OEMs, already produced light vehicle models for the US market, the associated accumulated learning in know-how has been indicated as an asset to be able to quickly respond to the new demands coming from priority emerging markets, which for Mexico are China, Brazil and India. Uruguay, whose linkages with the automotive supply chain are mostly determined by MERCOSUR, has focused on strengthening the capacities of its supply base to respond to the evolution of the industry in the regional market. A major step in this direction has been the trade agreement with Brazil, signed in 2008, which favours the installation of new suppliers in Uruguay, allowing an increase in export and the diversification of destination markets.

81. Peru recognises the potential in strengthening its domestic production and exports of vehicle and auto parts and accessories, but declares that there is no targeted policy to promote this activity. Ethiopia has declared to identify a potential opportunity in attracting MNCs for assembling activities in automobiles and tractors in order to benefit from the growing demand coming from the new middle class in the regional market and due to the growing demand for tractors from agricultural cooperatives, but has highlighted that there is no targeted policy in place yet and that a major challenge to increase participation in the value chain is the fact that country is land-locked. Ireland, on the other hand, sees an opportunity in the growing internationalisation of its niche of subcomponent manufacturers specialised in precision engineering, tool making, plastics and metal fabrication supplying both the automotive and aviation industries, and has developed a targeted Global Sourcing Strategy to this purpose.

*Upgrading and innovating*

82. Turkey has declared that the accumulated capabilities in the automotive industry, which started to develop in the 1960s in the country, offered a good learning base to be able to tap into the preference shift towards light vehicles, having as a destination market especially the EU. The Turkish industry has strong linkages with traditional car manufactures, and has developed over time domestic industrial and design capabilities that allowed the industry to introduce into the EU markets originally designed cars, such as Fiat-Doblo. Turkey is pointing to increase the innovation and knowledge content of the industry in the country and to intensify the domestic production chain.

83. In Ireland the industries of software and electronics offer increasing opportunities for linkages with the automotive and aeronautics value chain. The technology sector in Ireland directly employs over 105 000 people, with 75% employed in multinational companies and the remainder in the domestic digital technology sector. The sector is responsible for 40% Ireland’s national exports and is
home to the top ten global technology companies\(^1\). The Irish Centre for Composites Research (IComp) was established in 2010 under the EI/IDA Technology Centre initiative. It is hosted by the University of Limerick (UL) which is the leading composites research establishment in Ireland, working in partnership with University College Dublin (UCD). IComp bridges industry and academia to focus on the critical requirements of priority industrial sectors, including aerospace, renewable energy and construction. IComp currently has 14 industrial members from across Ireland.\(^2\)

*Greening the industry*

84. Brazil, France and Korea have identified as future opportunity the development of greener and more energy efficient cars based on the development of new technologies. France has launched two plans on universal cars consuming less than 2 litres per 100 km and driverless vehicles and has two industrial plans on electric charging stations and on battery life and power. Colombia is also working on several initiatives in support of vehicle and auto parts industry including the generation of the regulatory framework for the development of electric vehicles.

*How the future will look like?*

*Changes in demand*

*New preferences: safer and greener cars*

*New markets: rising demand in emerging markets*

85. While demand for cars will most likely remain steady in developed regions in the future, demand will be growing faster in developing countries such as China or India, particularly in light vehicles (PWC 2016). Indeed, over the past 20 years growth in the automobile industry has come from emerging markets—much of it in China, which over the past decade has seen auto sales almost triple, (from slightly less than 8.5 million cars and trucks sold in 2004 to, estimates suggest, about 25 million in 2014). IHS Automotive predicts that more than 30 million vehicles a year will be sold in China by 2020, up from nearly 22 million in 2010.

86. In the decades ahead, China’s emergence as a dominant market and production centre should have major implications for how cars are designed. Chinese tastes and standards, particularly at the luxury end, where automakers are notably raising the bar, will have a global influence (McKinsey, 2014). In addition, with strong local demand as a base, a number of Chinese automakers will probably consolidate, become better able to serve their domestic market, and then seek to achieve an international impact, perhaps through joint ventures, partnerships, or other combinations with global companies (McKinsey, 2014).

87. To some extent, the market size will determine how a country can benefit from the shift in car demand to emerging markets. Smaller developing countries (e.g. Botswana) will only be able to attract FDI of lead firms and first-tier suppliers if they have a cost advantage or are located close to reasonably large and rich countries, such as South Africa. A few mid-sized middle-income countries, such as South Africa, Turkey or Thailand can support hub activities in assembly under the condition that they can supply to the wider region as well (Van Biesebrock & Sturgeon, 2009, Feizabadi, 2014).

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88. The close collaboration of lead firms and global first-tier suppliers may work to the advantage of emerging markets. Currently, the design activities are still very much concentrated close to headquarters of lead firms. However, as emerging markets will grow larger in future, lead firms and first-tier suppliers will inevitably set up local design centres in major emerging markets such as China, India or Brazil. Local suppliers will benefit - particularly tier 2 and tier 3 - from the spill overs that these local design activities generate if they are able to satisfy the quality standards set by lead firms and first-tier suppliers (Van Biesebrock & Sturgeon, 2009).

Changes in products

89. The intelligent car is fast moving from the drawing board to the streets. As an obvious precursor to the autonomous vehicle, the intelligent car can give drivers a first taste of the experience of relinquishing control of a vehicle, with such functions as self-braking, self-parking, automatic cruise control based on road conditions, automatic accident-avoidance features, computer-operated power steering, and electric parking brakes, as well as electronic throttles and engine control.

The green car and the driver-less car

90. Demand for smaller and lighter cars is predicted to increase substantially in the next decade (PWC, 2016 and Feizabadi, 2014). Moreover, consumer preferences are forecast to shift from privately owned “all-purpose” vehicles towards shared “fit-for-purpose” vehicles (McKinsey, 2016). The trend for shared vehicles will be driven by the ongoing trend towards urbanization. There will also be an increasing importance of connectivity services in future car generations that will provide opportunities for entry for a variety of new players from the IT and software industry (McKinsey 2015, 2016). In addition, car-sharing services, which allow people to make a reservation at the tap of a personal mobile device, are expected to grow significantly in the next two years, with dramatic increases in the number of users and in revenues.

91. The car of the future will be connected—able not only to monitor, in real time, its own working parts and the safety of conditions around it but also to communicate with other vehicles and with an increasingly intelligent roadway infrastructure. These features will be must-haves for all cars, which will become less like metal boxes and more like integrators of multiple technologies, productive data centres—and, ultimately, components of a larger mobility network. As every vehicle becomes a source for receiving and transmitting bits of information over millions of iterations, safety and efficiency should improve and automakers should be in a position to capture valuable data. In addition, embedded data sensors should enable more precise monitoring of the performance of vehicles and components, suggesting new opportunities for lean-manufacturing techniques to eliminate anything customers don’t value and dovetailing with the digitization of operations to boost productivity, including the productivity of suppliers, in unexpected ways. For instance, V2V, or vehicle-to-vehicle communication, will allow cars to communicate with each other over a dedicated Wi-Fi band and share information about vehicle speed, direction of travel, traffic flow, and road and weather conditions.

92. Cars and trucks produce air pollution throughout their life, including pollution emitted during vehicle operation, refueling and disposal. Additional emissions are also associated with the refining and distribution of vehicle fuel. In the short term, air pollution will continue to affect car and truck use; however, it is clear that the automobile industry is embarking on an era of significant change. Rapid innovation is delivering a variety of different ways of powering vehicles.

93. The Ultra-Light Electric Vehicle (ULEV), for instance, emits extremely low levels of carbon dioxide (CO2) compared to conventional vehicles fuelled by petrol/diesel. As well as consumers buying lower CO2 emitting vehicles, the reduction in emissions is attributable to a range of technological
innovations including improvements to the efficiency of the internal combustion engine, stop-start technology and vehicle light weighting. Indeed, the increasing uptake of these technologies will play a large role in driving down air pollution in the medium to long term. But, having started from a low base, EV’s still only represent a small fraction of the global car market, so there is still a long way to go. More consumers need convincing that electric vehicles have the range and performance to suit their needs, and ‘charging’ infrastructure across the globe - especially in urban centers - needs considerably more investment.

94. Currently, human error contributes to about 90 percent of all accidents, but autonomous vehicles programmed not to crash are on the horizon. To be sure, some technological issues remain, emissions issues will linger, and regulators are sure to have a say. The most difficult issue is likely to be the transition period, while both kinds of cars learn to share the road before self-driving ones predominate. The possible benefits, by contrast, read like fantasy. If we imagine cars programmed to avoid a crash—indeed, programmed never to crash—this would be a sea change. Passengers, responsible only for choosing the destination, would have the freedom to do what they please in a vehicle. Disabled, elderly, and visually impaired people would enjoy much greater mobility. Throughput on roads and highways would be continually optimized, easing congestion and shortening commuting times (McKinsey, 2014).

95. Crash-free vehicles mean no traffic police, no ticketing and no alcohol-impaired driving. Freed from safety considerations such as crumple zones, bumpers, and air bags, OEMs could significantly simplify the production of cars, which would become considerably lighter and therefore less expensive to buy and run. Related industries, such as automobile insurance, could be affected as well. While car insurance would of course still be necessary for incidents such as catastrophe, theft, and vandalism, insurance claims related to highway accidents (admittedly a small portion of the total) might nearly disappear. Automobiles could also last longer as collisions stop happening (McKinsey, 2014).

Towards connected and shared vehicles

96. [to be competed]

Changes in market structure and localisation of activities: who will be doing what and where?

97. Supply chain consolidation with larger first-tier suppliers at the expense of lower tier suppliers. While in the past, carmakers worked with a large number of direct component suppliers they nowadays deal with fewer, larger first-tier suppliers. There are two reasons for this restructuring of the automotive supply chain: first, design functions have been transferred to suppliers as a result of greater customisation of components tailored to the needs of individual carmakers; second, Just-In-Time (JIT) production and quality-at-source models require larger suppliers with a deep expertise on components quality to oversee and control the sourcing process.

98. A new type of very large first-tier supplier (known as global mega-suppliers) has emerged. These firms are the preferred suppliers of global carmakers because they have the appropriate design, skill, production and financial capacity that allow them to expand their global coverage. This process of consolidation in the automotive supply chain tends to shift the allocation of a larger share of profits among carmakers and global mega-suppliers at the expense of lower tier suppliers that face squeezed profits and compete mainly on price (Humphrey et. al., 2003). Moreover, it will become more difficult for smaller, less established local suppliers from developing markets to become first-tier suppliers. They will need an enhanced design, innovation, scale, technical, financial and management capacity with an adequately skilled workforce to become first-tier suppliers. These required capabilities are likely to increase in the future as supply chain consolidation continues.
CONCLUSIONS

[To be developed]

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