Indian Automotive Industry: The Road Ahead

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Abstract

The automotive industry is an important driver of economic growth in India and one of the thriving sectors in which the country participates strongly in global value chains (GVCs). The auto industry is one of the main drivers of the country's economic growth. Since the industry was downgraded in 1991 and subsequently opened up to 100% FDI in the automatic route, India's auto sector has come a long way. With the licensing and opening of the sector to FDI, the sector experienced rapid growth due to the entry of global companies. Today, nearly all of the world's major automakers have installed facilities in the country. Automotive production trends show the growth of the automotive sector. The production trend of the auto industry is in an incremental mode. This paper analyzes the role of government policy, infrastructure and other factors in driving the expansion of the auto and auto parts industries.

Introduction

The automotive industry is an important driver of economic growth in India and one of the thriving sectors in which the country participates strongly in global value chains (GVCs). This paper analyzes the role of government policy, infrastructure and other factors in driving the expansion of the auto and auto parts industries and the growth direction they are likely to take. present in the coming years. Structure and composition of India's auto industry

The Indian auto industry – Indian auto industry is the main driver of gross domestic product (GDP), exports and jobs. The field has grown thanks to its traditional strengths in casting, forging and precision machining, fabrication (welding, grinding and polishing) and cost advantages (due to the availability of an abundant skilled workforce with low cost) and large foreign direct investment (FDI) inflows. India is the sixth largest automobile manufacturer in the world with an average annual production of about 29 million vehicles in 2017-2018, of which about million were exported.

India is the largest producer of tractors, the second largest manufacturer of two-wheelers, the second largest manufacturer of heavy duty vehicles, the sixth largest manufacturer of automobiles and the second largest producer of commercial vehicles. The sector's contribution to GDP has grown from 2.77% in 1992-1993 to about 7.1% today and accounts for about 9% of manufacturing GDP (2015-2016). It employs more than 29 million people (direct and indirect jobs). The turnover of the auto industry is about $67 billion (in 2016-2017) and that of the components industry is about $ 3.5 billion (2015-2016). According to OICA statistics, Indian industry accounted for .92% of global vehicle production in 2017 (5.38% of production in passenger car

segment and 3. 8% of production in commercial truck segment). India is a destination chosen by many multinational auto companies looking to expand their business in Asia. It attracted about US$ 1 . 8 billion (5.2% of total) in cumulative FDI equity inflows between 2000 and 2015. The basic advantages that the country provides as an investment destination include costeffectiveness of operations, efficient manpower, and a fastgrowing dynamic market. In the past, major investments have come from Japan, Italy, and the USA followed by Mauritius and Netherlands. The industry manufactures a wide range of products to meet both domestic and international demands. Irrespective of any policy regime, the twowheelers segment has dominated the market share. Its share in manufacturing has grown from about 5 % in 1970-1971 to 80% in 1990-1991, almost 75% in the 1990s, and 80% today. about 20% market share in manufacturing. After the mid-1980s, passenger cars became the second dominant segment, increasing its share from 7% in 1985-1986 to about 15% in 2011-2012 and 1 % in 2015-2016. Passenger car sales reached 1.2 million units in 2006 and 3 million units in 2016-2017 to maintain the second largest market share in the industry. The manufacturing of this sector is mainly concentrated around four major automobile manufacturing hubs across the country:

Roadmap of Indian Automotive Industry

1950-1980: Very Slow Growth

India's passenger car industry was kicked off in the 19 0s with the founding of Hindustan Motors and Premier Automobiles Limited. The two companies together won the majority of the market share until the 1970s, along with Telco, Ashok Leyland, Mahindra and Mahindra (MandM) and Bajaj Auto. The automobile market was unimportant given the low rate of economic growth in the country at the time, and so the industry developed very slowly until the 1980s. Attempts to establish an integrated industry Auto parts assembly was launched in the 1950s. The industry was protected by high import taxes and production that met the needs of domestic car Manufacturers. Production is allowed and there are quantity restrictions on the import of cars and auto parts. However, a significant demand for passenger cars was emerging as the country's population and per capita income began to grow. The government felt the need to introduce modern, fuelefficient, and lowcost utility cars that could also be affordable for "the common man."

First Wave of FDI from 1981 to 1991

FDI in automotive assembly was allowed in two major waves in 1983 and in 1993. This FDI was mainly "marketseeking" in nature. Government policies such as import barriers and local content requirements contributed to the influx of FDI and helped the industry to compete with international players. In February 1981, an Indian company called the Maruti Udyog Limited (MUL) was incorporated as a government company with Suzuki Motor Corporation as a minor partner to make an efficient people's car for middleincome class in the country. In October 1982, the company signed a license and joint venture agreement with Suzuki. Suzuki

took a 26% stake in the company and invested US$260 million. MUL made history when it launched its first car in 13 months, the Maruti 800 in 198 . It was the first domestically produced car with completely modern technology. MUL has taken important strategic steps including building a very strong ancillary supplier network around it and reaching an installed capacity of one thousand units, representing about 62% of the market share within a decade. In 1989, Suzuki increased its share to 0% and in 1992 to 50%. However, private sector participation is still limited in the passenger car segment with just three major players - MUL, Hindustan Motors and Premier Automobiles Limited. The government also introduced a Phased Manufacturing (SMP) program to localize components, whereby domestic original equipment manufacturers (OEMs) must increase the proportion of domestic inputs used. used in their production for a certain period of time. Indian companies have decided to cooperate with a number of Japanese and foreign OEMs. This has allowed Indian companies to benefit from capital flows and technology transfer. This period is considered by many to be the first wave of FDI into this sector.

second wave

In mid-1991, the Indian government made significant changes to economic and industrial policies leading to market liberalization. This has created an impetus for the Indian auto industry to develop further. A new automobile policy was introduced in 1993, facilitating the entry of global assemblers. The automobile license was abolished in 1991 and the weighted average tax rate was reduced from 87% to 20.3% in 1997. The PMP policy ended in 1992. The Government of India introduced a Memorandum of Understanding (MOU) system further emphasizing component localization, up to 50%, for the approval of financial cooperation proposals on a case-by-case basis, subsequently increasing up 70%. Regulatory emissions standards for vehicles have been introduced and the National Highway Policy has been published throughout the decade.
In 1997, allowing automatic approval of FDI for joint ventures with 51% controlling interest for foreign partners. Liberalization policies and the lure of a huge, unsaturated market have spurred many globally competitive automakers to enter the passenger car market. The most common entry route is through joint ventures with Indian companies. Some manufacturers have also withdrawn from the market due to increased competition.Japan's entry into the Indian auto industry has brought about significant changes to the structure of the passenger vehicle market, including commercial vehicles. Gradually, established companies such as Telco entered the commercial passenger vehicle segment by leveraging their technical capabilities and advantages of scale, and domestic players in the commercial vehicle segment began to develop passenger cars on a limited scale. Indian companies such as Telco, MandM, Hindustan Motors, Premier Automobiles and DCM have entered into joint ventures with Ford, Mercedes, General Motors (GM) and Peugeot to assemble mid-size cars from disassembled units. This has increased competition in the market and restructured the pressure on existing players. The period after 1992 is considered by many to be the second wave of FDI into the industry, playing an important role in bringing dynamism, diversification and fierce competition to the industry. Many companies have begun to operate on a significant scale in the market and have started operating in the mid-size car

segment. Indian companies like Tata Motors have introduced specialized vehicles and platforms to enter the passenger car segment. This period saw the formation of extensive networks, as many companies had the technology and skills to produce advanced vehicle designs and signed contracts with their component suppliers. The foreign role in the passenger car segment has increased significantly compared to all other automotive segments, followed by the utility vehicle segment. As a result, the foreign partners now own all or more of the capital in most of these cases, even though most of these partners initially formed an equal joint venture. The inability of the Indian partners to contribute to the capacity expansion has allowed the foreign partners to increase their shares or gain full control by acquiring their Indian counterparts.
During the two waves of FDI that occurred in 1983 and after 1992, a significant amount of FDI by multinational corporations (MNEs) poured into the country to build modern factories. Maruti Suzuki's investment in the early 1980s was made primarily by a willingness to invest capital. After that, various multinational manufacturers invested millions of US dollars in the country.
In the period after 2000, Indian companies such as Maruti Suzuki gradually began to develop their own design and development capabilities. Tata Motors has made rapid progress in developing cutting-edge technology by launching India's first domestically developed vehicle, "Tata Indica" (1998). In 2002, MandM released "Scorpio" as a sport utility vehicle (SUV) - a product of in-house development and design efforts. In 200 , Tata Motors signed a joint venture with DaimlerBenz to manufacture MercedesBenz passenger cars in India. Increased competition leads to restructuring and cost reduction, quality improvement and better response to demand. MNC carmakers such as Hyundai, Nissan, Toyota, Volkswagen and Suzuki, which have established manufacturing plants in India, have finally started using India as an export hub for networks abroad. their. The small car segment has performed exceptionally well and India's potential as a hub for global small car production has begun to be recognized.
From 2001 to 2010, passenger vehicle sales grew at a compound annual growth rate (CAGR) of 15.67%. Of the total revenue, about 10% comes from exports. From 2000 to 2015, the average annual growth rate of the country's vehicle exports was about 23%. The industry is known for exporting small sedans and a growing export base for midsize cars and compact SUVs. According to the World Trade Organization's 2017 Assessment of World Trade Statistics, India was the 10th largest exporter of automotive products in the world in 2016, accounting for $13 billion in exports. Since 2001 Fully Licensed, Importing Free and 100% Allowed Over the past decade, various trade and investment restrictions have been lifted to promote the impetus for large-scale production. As of today, the government encourages foreign investment and permits €100 in the sector through an automatic route. The industry is fully licensed and allows free importation of auto parts. India is the second fastest growing automotive and components market in the world (after China). With an outside view of component manufacturers and competitive pressure from international companies, the components industry has had to improve process and product quality as well as technological standards to achieve gain and maintain capacity. Many manufacturers now comply with global environmental standards in terms of emission standards technology and quality certification. The industry grew by about 20% annually during the 1990s, and

average annual export growth was about 15% during this period. Over the years, the company has been able to modernize technology and improve quality as well as develop its ability to manufacture components for next-generation vehicles. Indian companies have maintained their traditional strengths in casting, forging and precision machining, and fabrication (welding, grinding and polishing) at a level of technology commensurate with the scale of operations required. They have had considerable success in achieving technical competence and adapting to local requirements through local design. Strong developments took place in the engine, transmission and steering systems. Engine parts, which have a high added value created by nature, contribute the most to total output. Endowed with the potential for quality products at low prices, India is ahead of many other developing countries in the field of components manufacturing.
There are many reasons for the impressive growth that Indian manufacturers have achieved over the past two decades. These will be discussed in detail in the next section. Key strengths are the large, unsaturated domestic market for small cars (and the presence of a large middle class), low production costs (due to the availability of cheap labor and other key factors). other inputs) and qualified engineers. Global linkages and collaborations have also enabled technology upgrading.
In the passenger car segment, there are more than 30 international quality car models on the market, some of which have now been exported to the domestic market by multinational companies. Major Indian manufacturers are transforming from local to global companies. Indian automakers, namely Tata Motors, MandM and Ashok Leyland, have developed production facilities, large RandDs, technology development and testing centres. In addition, Indian companies have purchased capacity or entered alliances with other manufacturers in East Asia. Low labor costs and economies of scale have made India an ideal export hub for small cars. The Indian auto industry is expected to be the world's third largest auto market in terms of volume by 2026. Export promotion is part of the companies' business strategy to make better use of them. installed capacity. Low production costs and the advantage of scale gained from supplying to foreign markets have allowed automakers to become competitive and offset weak demand.

Government Initiative

In many ways, the auto industry has been shaped by Indian government policy and nurtured in the microeconomic environment it has helped create. out. In addition to its direct impact through fiscal policy tools, industrial policy even influences learning at the firm level and shapes the accumulation of technological capacity.

Since 1970, the Indian government has gradually added the automotive industry to its list of core or "pillar" industries, recognizing it as an important engine for achieving growth. economic growth because it has many backward and forward linkages. manufacturing sector to encourage and support favorable policies to promote productivity. In 1975, as part of a common industrial policy, the government allowed automatic capacity expansion by 25% every 5 years and removed price controls.

During the 1980s, government-funded training programs and the establishment of clusters also led to changes in supplier relationships, allowing for supplier development and supply chain management. effective effect. More liberal import policies were introduced in 1986 when capital goods importers increased their foreign exchange quotas by about 50%.

In July 1991, the New Industrial Policy was introduced which removed most constraints on investment, expansion and foreign investment in Indian industry. The industrial license system was abolished for all industries (except for industry 18), and the passenger automobile industry was abolished in May 1993. Foreign investment was automatically allowed in 3 industries. , including the automotive industry. The liberal policies of the 1990s led to the entry of new competitors and spillovers, especially in terms of technology, as well as increased R&D spending and a desire to innovate to differentiate products on the market. The time between new product productions has been shortened rapidly. Policies still favor the domestic industry as MNCs still have to make specific capital investments and meet their export obligations. In 2001, the government abolished the auto import quota and allowed 100I in this area. The excise tax has been reduced to 2 % for passenger cars.

High tariffs have forced OEMs to set up component factories in India. Institutional support for supplier capacity development has led to the establishment of flexible relationships with suppliers, which has also helped the industry build innovation capacity. One initiative targeted specifically in this direction is the establishment of the National Automotive Test and RandD Infrastructure Project (NATRIP) within the framework of the 2006-2016 Automotive Mission Plan (AMP 2016).) at a cost of US$388.5 million to enable the industry to achieve parity with global standards.

The protection policies of the 1980s and 1990s encouraged acquisition of basic production capabilities. Local content requirements or indigenization of up to 70% forced OEMs and their suppliers to make significant capital investments and created a chain of worldclass component suppliers. The process of indigenization has also been recognized as a key regulation responsible for enhancing technological capabilities This entailed collaborative effort between local suppliers and engineers from parent company and led Indian firms toward development of technological capabilities.

Key interventions undertaken by the government under this plan have been in areas of tariff policy, infrastructure (improved and expanded road network, development of auto wagon rakes, creation of few specialized ports in the private sector), RandD (setting up of NATRIP, upgradation of existing centers), and promotion of electric and hybrid vehicles. Currently, the automobile manufacturing policy in India is being governed by the Automotive Mission Plan 2016–2026 (AMP 2026), which lays down the achievements and targets of the industry by 2026.

Other Enabling Factors in the Growth of the Industry

Other enabling factors in the growth of the industry include domestic market demand, FDI, JVs, and corporations' competitive strategies.

Role of Domestic Demand

A growing working population and an expanding middleclass have been the key demand drivers for automobiles in India. India has the second largest road network in the world at .7 million kilometers. Road development activity has gradually increased over the years with an improvement in connectivity between cities, towns, and villages in the country. The Government of India's policy to set aside substantial investment layout for infrastructure development in every 5year plan has included the focus on the development of country's roads. This has given a fillip to the demand for cars and other vehicles.

India is home to the second largest population in the world. The estimated population is about 1.3 billion people. The GDP per capita has grown from approximately US$ 1 32 in 2010 to US$ 1500 in 2012 and US$ 1939 in 2017. Factors like increasing disposable incomes in the rural agriculture sector, presence of a large pool of skilled and semiskilled workers, and a strong educational system will continue to increase vehicle demand in future. It is estimated that by 2020, migration on account of urbanization will be over 1 0 million. India is projected to add over 68 million households to its already significant middleclass by 2030, which would drive an increased demand for automobiles. The number of registered motor vehicles per 1000 population was only 167 in 2015. These facts point to a huge potential of increasing private vehicle ownership penetration in the future.

Impact of FDI

The impact of FDI can be seen in terms of output and productivity, technology, and better practices, all of which could make the industry more competitive. These aspects are discussed in detail below.

Output and Productivity

FDI has positive impact of output and productivity growth. In the period 19 7–1983, the output growth remained limited. The models of cars sold were unchanged for decades, and foreign models assembled in the country were primarily European. The number of models manufactured in the passenger car segment was 2 in 1982–1983, which rose to 8 in 199 –1995 and 28 in 2001–2002. The most prominent spillover impact of FDI was on the component industry, whose turnover more than tripled from 1992–1993 to 2001–2002. Supplier productivity increased as foreign firms colocated suppliers (i.e., put them in a common area) and required homecountry suppliers to invest in India. Competition was also provided by international MNCs which entered the sector to serve international assemblers, resulting in increased quality and reliability. This led to the

establishment of a reliable component supplier industry, which encouraged more MNCs to enter the Indian market after the 1990s.

Technoogy

A significant infusion of global technology occurred with the entry of foreign firms. The first 192 cars to roll out of the Maruti Suzuki factory in December 1983 were almost entirely Japanese cars, with only tires and batteries sourced from MRF and Chloride India, respectively. Localization ambitions of Indian firms were facilitated through 0 JVs between Indian vendors and Japanese collaborators by the end of the century There were 50 greenfield investment projects in the sector between 2000 and 2007. In some clusters such as Pune and Chennai, global OEMs played important or even dominant roles in technology diffusion and were responsible for development of domestic innovation capability

Role of JVs

As mentioned before, JVs and technical collaboration played a vital role as a source of innovation for local auto component supplier firms in India. Acquiring knowledge and skills through external collaboration is an efficient way to achieve innovation within automotive clusters. Collaborations result in frequent interactions, reflected in acquisition of knowledge, sharing, diffusing, and creation of it. Linkages among settings such as clusters result in learning through networking and interacting and are seen as important for innovative activities. There are a number of examples in India which have shown that the JV collaboration has been an efficient way of achieving greater growth in the industry through benefits such as technology sharing, learning best practices, and training of workers. For instance, MUL's first established plant was a close copy of Suzuki's Kosai plant in Japan in terms of plant layout, equipment, the organization of production, and operating principle. Also, it was the first firm to introduce a partial "justintime" and total quality management in India, which aimed to reduce inventory cost. MUL has followed a strategy of investing heavily in its supplier development program, which involves stable and close relationships with tier one suppliers (top 0), engagement shares from key suppliers and promote technical cooperation between its suppliers and Suzuki's suppliers in Japan.

Other leading companies. Indian origin including TVS Group, Rane Group and Ashok Leyland Limited have played a key role in the development of Chennai Automotive Cluster. Ashok Leyland Limited, one of the largest manufacturers of commercial vehicles, trucks and buses in India and the world, has signed an agreement with Leyland Motors, UK to manufacture Leyland vehicles.

Corporate strategy, ownership and management vision

In addition to the above reasons, corporate strategy, ownership and management vision of large diversified business groups such as Tata Group and MandM play an important role. in enhancing the technological capacity of the industry. . For example, the ambition and vision of the head of Tata, Ratan Tata, in developing first the

"Indian car" and then the "people's car", was the driving force behind the development of the company. Tata Indica and Tata Nano. The company's relationships with the expat community and diverse family businesses have also facilitated cross-industry learning and played an important role.

Companies like Tata Motors and MandM have global aspirations and their business models focus on the domestic market as well as markets in other countries with similar characteristics, such as in Africa, Latin America and South Asia. In 200 , Tata Motors purchased Daewoo's truck manufacturing unit in Korea. In 2005, Tata acquired a 21% stake in Hispano Carrocera, SA, a Spanish bus manufacturer. In 2005 MandM acquired the Stokes Group, one of the UK's leading automotive component manufacturers. In 2008, MandM acquired Jaguar and Rover, and set up factories in Malaysia, Kenya, Bangladesh, Spain, Ukraine and Russia to assemble fake cars for export to these countries. The same pattern has spread to Australia, South Africa, Italy and Uruguay. In 2006, MandM formed a joint venture with Marco Polo, a Brazilian company, to manufacture and assemble complete buses and coaches. In November 2017, MandM opened a new US$230 million manufacturing facility in Detroit, USA. Profits of group-affiliated businesses exceed those of other businesses due to advantages such as better access to capital, a diverse and skilled workforce, and other resources . These business groups or consortia can often fill the institutional gaps commonly found in developing countries by creating institutions for the benefit of their group members.

Innovation

India's leading companies have made great efforts to modernize over the years, including using advanced modular platforms, new materials and sharing platforms in India. Upgrading refers to the ability of companies to produce better, more efficient products and to shift to more skilled activities. The government has encouraged RandD in this area by reducing taxes on these expenditures. The NATRIP project, launched in 2005, was established to enable industry to adopt and implement global performance standards and provide low-cost product development and manufacturing solutions. Among Indian companies, MandM and Ashok Leyland have invested significantly in R&D and technology development centers and testing centers and have ventured abroad. Global companies have set up development centers in India either individually or in partnership with local companies (eg GM, DaimlerChrysler AG, Johnson Controls International Plc, Delphi and Bosch). These have enabled their partners to obtain the best technologies and global standards in a short time. Some global OEMs like Ford, GM, Hyundai, Toyota and Volvo India Pvt. Limited (Volvo) has established technology centers in India to carry out R&D in automotive design. FDI in RandD and design in India followed FDI in manufacturing. RandD's collaborative activities have paved the way for alternative materials, better design of energy and resource efficient vehicles.

With the upgraded RandD, innovation will naturally increase. The outcome or measure of this is their intellectual property (IP) rights. Most of the major auto manufacturers are actively engaged in filing their intellectual property in the country. Recent patent implementation strategies from established companies show

significant improvement in areas such as propulsion technology, telecommunications, vehicle safety and security. Statistical data published by the World Intellectual Property Organization (WIPO) and the Office of the Comptroller General for Patents, Designs and Trademarks, Ministry of Commerce and Industry of India provides estimates of applications Patent registration filed by the automotive industry in India. Table 5 shows the number of patents granted to some of the major Indian manufacturers in India between January 1, 1990 and July 31, 2018. It can be seen that the number of patents is equal. Patents granted have increased over the past 10 years. Among the Indian companies, TVS Group, Tata Motors and MandM are among the top Indian patent applicants.

The majority of Indian patent applications filed by auto manufacturers are in the mechanical engineering sector, in areas such as placement or mounting of propulsion units, powertrains, equipment for vehicles, common control of transmissions, arrangements relating to cooling, intake, exhaust or fuel supply of propulsion units. However, the supplier or seller is usually small and medium enterprises (SMEs) that do not have many opportunities or resources to upgrade. The main challenges facing domestic component manufacturers are high capital costs, unavailability of skilled labor and rising operating costs. Strong competition from China and other Asian countries on price is also emerging. Under these pressures, the convergence towards international security standards will encourage companies to adopt (and contribute to) international best practices. The recent adoption of automation and robotics has helped the industry significantly improve quality, productivity and delivery results, as well as reduce costs. To meet the needs of tomorrow (including electrification of vehicles) and stay competitive, SME manufacturers must also meet the challenges of continued growth, digitalisation, and automation. chemical. However, in this process, they may need the support of focal companies and the government.

The way forward

The current political debate in India revolves around the question of increasing competitiveness, efficiency standards and the need to introduce electric vehicles. The Draft National Automotive Policy 2018 developed by the Ministry of Heavy Industry (Government of India) is expected to increase exports by 35- 0% of production and make India one of the key automotive export hubs. big bowl in the world. The country is also considering a long-term roadmap for emissions standards beyond Bharat Phase VI and harmonization with global standards by 2028,With the aim of promoting electric mobility in the country, the Indian government India adopted the National Electric Mobility Mission (NMEM) in 2011, and subsequently, the National Electric Mobility Mission Plan 2020 was announced in 2013. This mission plan was designed with consideration in mind.

It aims for cumulative fuel economy of about 9500 million liters equivalent, resulting in 2 million tons of pollution and greenhouse gas emissions reductions with a target of entering the market between 6 and 7 million vehicles. 'In 2020. As part of this mission, the Department of Heavy Industries launched a program called Faster Electric Vehicles (Hybrid and) Production and Adoption in India (FAMEIndia) in April 2015 This program is

proposed to be implemented over a period of 6 years, i.e. by 2020, which is intended to support the development of the hybrid electric vehicle market and the production ecosystem to achieve self-sufficiency. grant. The program has four areas of focus: technology development, demand generation, pilot projects, and toll infrastructure. Under this program, 1 8,275 electric/hybrid vehicles have received direct support through demand-side incentives amounting to approximately $28 million between their launch April 1, 2015 and June 30, 2017. Another major initiative in this area is the launch of the new Green Urban Transport Program in 2017. The goal of this program is to promote sustainable low-carbon public transport systems in urban areas. urban area. The program will be implemented with private sector help, including support from central and state governments, over a seven-year mission with a total budget of $10.76 billion. It promotes the promotion of non-motorized transport, public bicycle sharing, bus rapid transit systems, intelligent transportation systems and urban freight management.

With plans to introduce electric vehicles, Indian carmakers are preparing for new machinery and manufacturing processes. In 2017, NITI Aayog suggested that 0% of the country's personal vehicles could run on electricity by 2030. Currently, MandM is the only manufacturer of electric cars - the e20, a microcar with a real-time clock. . Mahindra Electric, a wholly owned subsidiary of MandM, has announced a roadmap for the adoption of the EV 2.0 platform for electric vehicles. Maruti Suzuki revealed plans to produce electric vehicles at its factory in Gujarat in 2017. Other companies such as Volvo are also planning to expand their electric and plug-in hybrid vehicle portfolios in India. The main reason for driving electric mobility is to steer India away from over-reliance on imported oil. However, about 50% of electric cars produced by domestic companies are now imported. This includes the battery, the main part of the vehicle. Global companies such as Suzuki and Toshiba have announced plans to set up battery factories in India. However, challenges such as capital investment and large-scale infrastructure development remain.

conclusion

With a vibrant economy, large young population and growing foreign direct investment, India is an attractive investment destination for global auto and component manufacturers in the past two decades. Its growth story has been dominated by many leading companies in the country. However, adoption of best practices globally has been slower than in China. Corporate strategies in the Chinese auto industry have stimulated technology learning more rapidly and widely than in India78. The company started exporting to other countries. India-based manufacturers engage in global innovation networks and seek out the right technologies worldwide to complement their own RandD efforts.AMP 2026 predicts that by 2026, India's auto industry will be in the top three in the world in terms of engineering, manufacturing and exporting of vehicles and auto components, increasing in value to more than 12% of GDP. India and will create 65 million more jobs. According to OICA statistics, the Indian industry accounted for only 5.38% of output in the auto segment and 3. 8% of output in the commercial vehicle segment in 2017. It has ceased to generate jobs. Larger or larger multinational companies

are more successful. players such as Japan, Korea and other western countries have created. Despite the success of government policy in building the auto supply industry, India continues to be a net importer of auto parts, with the trade deficit in auto parts falling from 210 million USD in 200 -2005 to . billion USD in 2009-2010. and $13.8 billion in 2015-2016.

The current policy debate around how to achieve greater resource efficiency and the need for new materials builds on the industry's plans to produce electric vehicles in India. Innovation in new product development is lagging and remains vital for India's future to gain competitive advantage or at least maintain its low cost advantage. Production technology must be constantly updated. Substantial investments to develop new, green, indigenous technologies that meet recognized high efficiency standards will help India move up the value chain.

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