GROWTH OF AUTOMOBILE INDUSTRIES IN INDIA

Birth of Automobiles
Horses had dreams of them since time immemorial, but it was only in the 18th century that the first horseless carriage actually hit the roads. That's not to say that the idea never struck anyone. Seeds of the idea, in fact, originated long before the first contraption was rolled.

The History of the automobile actually began about 4,000 years ago when the first wheel was used for transportation in India. Several Italians recorded designs for wind-driven cars. The first was Guido da Vigevano in 1335. It was a windmill-type drive to gears and thus to wheels. Vaturio designed a similar car that was also never built. Later Leonardo da Vinci designed clockwork-driven tricycle with tiller steering and a differential mechanism between the rear wheels.

In the early 15th century, the Portuguese arrived in China and the interaction of the two cultures led to a variety of new technologies, including the creation of a wheel that turned under its own power. By the 1600s, small steam-powered engine models were developed, but it was another century before a full-sized engine-powered automobile was created.¹

A Catholic priest named Father Ferdinan Verbiest is credited to have built a steam-powered car for the Chinese Emperor Chien Lung in about 1678. There is no information about the automobile, only the event. Since James Watt didn’t invent the steam engine until 1705, we can guess that this was possibly a model automobile powered by a mechanism like Hero’s steam engine—a spinning wheel with jets on the periphery.
Although by the mid-15th century the idea of a self-propelled automobile had been put into practice with the development of experimental cars powered by means of springs, clockworks, and the wind, Nicolas-Joseph Cugnot of France is considered to have built the first true automobile in 1769. Designed by Cugnot and constructed by M. Brezin, it is also the first automobile to move under its own power for which there is a record. Cugnot’s three-wheeled steam-powered automobile carried four persons and was meant to move artillery pieces. It had a top speed of a little more than 3.2 km/h (2 mph) and had to stop every 20 minutes to build up a fresh head of steam.

Evans was the first American who obtained a patent for "a self-propelled carriage." He, in fact, attempted to create a two-in-one combination of a steam wagon and a flat-bottomed boat, which didn't receive any attention in those days. During the 1830's, the steam car had made great advances. But stiff competition from railway companies and crude legislations in Britain forced the poor steam automobile gradually out of use on roads. The early steam-powered automobiles were so heavy that they were only practical on a perfectly flat surface as strong as iron. A road thus made out of iron rails became the norm for the next hundred and twenty-five years. The automobiles got bigger and heavier and more powerful and as such they were eventually capable of pulling a train of many cars filled with freight and passengers.

Carl Benz and Gottlieb Daimler, both Germans, share the credit of changing the transport habits of the world, for their efforts laid the foundation of the great motor industry as we know it today. First, Carl Benz invented the petrol engine in 1885 and a year later Daimler made a car driven by motor of his own design and the rest is history.
Daimler’s engine proved to be a great success mainly because of its less weight that could deliver 1000 rpm and needed only very small and light vehicles to carry them.

France too had joined the motoring scenario by 1890 when two Frenchmen Panhard and Levassor began producing automobiles powered by Daimler engine, and Daimler himself, possessed by the automobile spirit, went on adding new features to his engine. He built the first V-Twin engine with a glowing platinum tube to explode the cylinder gas—the very earliest form of sparking plug. The engines were positioned under the seat in most of the Daimler as well as Benz cars. However, the French duo of Panhard and Levassor made a revolutionary contribution when they mounted the engine in the front of the car under a ‘bonnet’.

Charles Duryea built a car carriage in America with petrol engine in 1892, followed by Elwood Haynes in 1894, thus paving the way for motor cars in that country.

For many years after the introduction of automobiles, three kinds of power sources were in common use: steam engines, gasoline or petrol engines, and electrical motors. In 1900, over 2,300 automobiles were registered in New York, Boston, Massachusetts, and Chicago. Of these, 1,170 were steam cars, 800 were electric cars, and only 400 were gasoline cars.

In ten years from the invention of the petrol engine, the motor car had evolved itself into amazing designs and shapes. By 1898, there were 50 automobile-manufacturing companies in the United States, a number that rose to 241 by 1908. In that year, Henry Ford revolutionized the manufacture of automobiles with his assembly-
line style of production and brought out the Model T, a car that was inexpensive, versatile, and easy to maintain. The introduction of the Model T transformed the automobile from a plaything of the rich to an item that even people of modest income could afford; by the late 1920s the car was commonplace in modern industrial nations.

Herbert Austin and William Morris, two different car makers introduced mass production methods of assembly in the UK, thus paving the way for a revolution in the automobile industry. Austin Seven was the world's first practical four-seater 'baby car' which brought the pleasures of motoring to many thousands of people who could not buy a larger, more expensive car. Even the 'bull-nose' Morris with front mounted engine became the well-loved model and one of the most popular cars in the 1920s.

Automobile manufacturers in the 1930s and 1940s refined and improved on the principles of Ford and other pioneers. Cars were generally large, and many were still extremely expensive and luxurious; many of the most collectible cars date from this time. The increased affluence of the United States after World War II led to the development of large, petrol-consuming cars, while most companies in Europe made smaller, more fuel-efficient cars. Since the mid-1970s, the rising cost of fuel has increased the demand for these smaller cars, many of which have been produced in Japan as well as in Europe and the United States.

**History of the Automobile industry in India**

The history of motor cars has surely been a well-traversed one. The automobile, as it progressed, was a product of many hands, of revolutionary concepts, and of simple, almost unnoticed upgrading. In the end, the one who received the most for
these challenges and changes was the motorist, whose interest, money, and enthusiasm have forced the auto-moguls to upgrade, perfect, and add to previous achievements in order to stay in the competition. The economic liberalization that dawned in India in the year 1991 has succeeded in bringing about a sustained growth in the automotive production sector triggered by enhanced competitiveness and relaxed restrictions prevailing in the Indian soil. A number of Indian automobile manufacturers including Tata Motors, Maruti Suzuki and Mahindra and Mahindra, have dramatically expanded both their domestic and international operations. The country’s active economic growth has paved a solid road to the further expansion of its domestic automobile market. This segment has in fact invited a huge amount of India-specific investment by a number of multinational automobile manufacturers. As a significant milestone in its progress, the monthly sales of passenger cars in India exceeded 100,000 units in February 2009.

The beginnings of automotive industry in India can be traced during 1940s. After the nation became independent in the year 1947, the Indian Government and the private sector launched their efforts to establish an automotive component manufacturing industry to meet the needs of the automobile industry. The growth of this segment was however not so encouraging in the initial stage and through the 1950s and 1960s on account of nationalization combined with the license raj that was hampering the private sector in the country. However, the period that followed 1970s, witnessed a sizeable growth contributed by tractors, scooters and commercial vehicles. Even till those days, cars were something of a sort of a major luxury. Eventually, the country saw the entry of Japanese manufacturers establishing Maruti Udyog. During the
period that followed, several foreign based companies started joint ventures with Indian companies.\(^5\)

During 1980s, several Japanese manufacturers started joint-ventures for manufacturing motorcycles and light commercial-vehicles. During this time, the Indian government selected Suzuki for a joint-venture to produce small cars. Following the economic liberalization in 1991 and the weakening of the license raj, several Indian and multi-national car companies launched their operations on the soil. After this, automotive component and automobile manufacturing growth remarkably speeded up to meet the demands of domestic and export needs.

Experts have an opinion that during the early stages the policies and the treatment by the Indian government were not favorable to the development of the automobile industry. However, the liberalization policy and various tax reliefs announced by the Indian government over the recent past have pronounced a significantly encouraging impact on this industry segment. Estimates reveal that owing to several boosting factors, Indian automobile industry has been growing at a pace of about 18% per year. Therefore, global automobile giants like Volvo, General Motors and Ford have started looking at India as a prospective hot destination to establish and expand their operations.

Like many other nations India's highly developed transportation system has played a very important role in the development of the country's economy over the past to this day. One can say that the automobile industry in the country has occupied a solid space in the platform of Indian economy. Empowered by its present growth,
today the automobile industry in the country can produce a diverse range of vehicles under three broad categories namely cars, two-wheelers and heavy vehicles.

**An Overview of the Indian Automobile Industry**

Starting its journey from the day when the first car rolled on the streets of Mumbai in 1898, the Indian automobile industry has demonstrated a phenomenal growth to this day. Today, the Indian automobile industry presents a galaxy of varieties and models meeting all possible expectations and globally established industry standards. Some of the leading names echoing in the Indian automobile industry include Maruti Suzuki, Tata Motors, Mahindra and Mahindra, Hyundai Motors, Hero Honda and Hindustan Motors in addition to a number of others.

During the early stages of its development, Indian automobile industry heavily depended on foreign technologies. However, over the years, the manufacturers in India have started using their own technology evolved in the native soil. The thriving market place in the country has attracted a number of automobile manufacturers including some of the reputed global leaders to set their foot in the soil looking forward to enhance their profile and prospects to new heights. Following a temporary setback on account of the global economic recession, the Indian automobile market has once again picked up a remarkable momentum witnessing a buoyant sale for the first time in its history in the month of September 2009.
The automobile sector of India is the seventh largest in the world. In a year, the country manufactures about 2.6 million cars making up an identifiable chunk in the world’s annual production of about 73 million cars in a year. The country is the largest manufacturer of motorcycles and the fifth largest producer of commercial vehicles. Industry experts have visualized an unbelievably huge increase in these figures over the immediate future. The figures published by the Asia Economic Institute indicate that the Indian automobile sector is set to emerge as the global leader by 2012. In the year 2009, India rose to be the fourth largest exporter of automobiles following Japan, South Korea and Thailand. Experts state that in the year 2050, India will top the car volumes of all the nations of the world with about 611 million cars running on its roads.

At present, about 75 percent of India’s automobile industry is made up by small cars, with the figure ranking the nation on top of any other country on the globe. Over the next two or three years, the country is expecting the arrival of more than a dozen new brands making compact car models.

Recently, the automotive giants of India including General Motors (GM), Volkswagen, Honda, and Hyundai, have declared significant expansion plans. On account of its huge market potential, a very low base of car ownership in the country estimated at about 25 per 1,000 people, and a rapidly surging economy, the nation is firmly set on its way to become an outsourcing platform for a number of global auto companies. Some of the upcoming cars in the Indian soil comprise Maruti A-Star (Suzuki), Maruti Splash (Suzuki), VW Up and VW Polo (Volkswagen), Bajaj small car (Bajaj Auto), Jazz (Honda) and Cobalt, Aveo (GM) in addition to several others.
Exports of Automobile Industry

Today, India is among the world’s largest producers of small cars. The New York Times has rated India as a very strong engineering base with an incomparable expertise in the arena of manufacturing a number of low-cost, fuel-efficient cars has encouraged the expansion plans of the manufacturing facilities of a number of automobile leaders like Hyundai Motors, Nissan, Toyota, Volkswagen and Suzuki.

On 22 February 2010, Hyundai motors exported its 10,00,000th car, the feat which was achieved by the firm in just over 10 years. Hyundai Motors is the largest passenger car exporter and the second largest car manufacturer in the country. In the similar lines, General Motors has announced its plans to export not less than 50,000 cars made in India by the year 2011. In yet another proposal, Ford Motors is to setup a manufacturing facility costing about US$500 million in India with an annual capacity of 250,000 cars. The firm has stated that the facility will play a major part in its strategic plan to make India a hub for its global production business. In yet another significant move, Fiat motors has stated that it will source a big volume of auto components from India worth about US$1 billion. In the year 2009, India overtook China by emerging as the fourth largest exporter of cars in Asia.

Various Segments of the Indian Automobile Industry

Motor cycles manufacture makes up the major share in the two-wheeler segment of the Indian automobile industry. About 50% of the motorcylces are manufactured by Hero Honda. While Honda manufactures about 46% of the scooters, TVS produces 82% of the mopeds running on the Indian roads.
About 40% of the three-wheelers manufactured in India are used for transporting goods with Piaggio manufacturing 40% of the vehicles sold in the Indian market. On the other hand, Bajaj has emerged as the leader in manufacturing three-wheelers used for passenger transport. The firm produces about 68% percent of the three wheelers used for passenger transport in India. The Indian passenger vehicle segment is dominated by cars which make up about 80% of it. Maruti Suzuki manufactures about 52% of passenger cars while the firm enjoys a complete monopoly in the manufacture of multi-purpose vehicles. In the utility vehicles segment Mahindra makes up a 42% share.

Tata Motors is the leader in the Indian commercial vehicles market while it holds more than 60% share. Tata Motors also enjoys the credit of being the world’s fifth largest manufacturer of medium and heavy commercial vehicles.

**Potential of Indian Automobile Industry**

There is a very stiff competition in the automobile industry segment in India. This has helped many to realize their dreams of driving the most luxurious cars. During the recent past, a number of overseas companies have started grabbing a big chunk of the market share in both domestic and export sales. Every new day dawns in India with some new launches by active players in the Indian automobile arena. By introducing some low cost cars, the industry had made it possible for common men to buy cars for their personal use. With some innovative strategies and by adopting some alternative remedial measures, the Indian automobile industry has successfully come unaffected out of the global financial crisis.
While the automobile industry in India is the ninth largest in the world, the country emerged as the fourth largest automobiles exporter on the globe following Japan, South Korea and Thailand, in the year 2009. Over and above, a number of automobile manufacturers based in India have expanded their operations around the globe also giving way for a number of reputed MNCs to enthusiastically invest in the Indian automobile sector.

Nissan Motors has revealed its prospective plans to export 250,000 vehicles produced in its India plant by the year 2011. General Motors has also come up with similar plans.

During the current fiscal year, the Indian automobile industry rode high on the resurgence of consumer demand in the country as a result of the Government’s fiscal stimulus and attractively low interest rates. As a result the total turnover of the domestic automobile industry increased by about 27 per cent.

A reply produced in the Lok Sabha recently has quoted data from the Society of Indian Automobile Manufacturers and has revealed that the total turnover of the Indian automobile Industry in April-February 2009-10 was 1,62,708.77 crores.

This is a remarkable achievement compared with the total revenue of Rs 1,28,384.53 crore reported during the same period of last fiscal year. Specifically, the segment of commercial vehicles witnessed the biggest jump in revenues by 31 per cent by reporting Rs 38,845.09 crores. During the same period, the passenger vehicle segment in the country witnessed a growth of 27 per cent over the last fiscal year by
reporting total revenue of Rs 76,545.96 crores. These figures imply a highly prospective road lying immediately ahead of the Indian automobile industry.

Predictions made by Ernst and Young have estimated that the Indian passenger car market will have a growth rate of about 12 percent per annum over the next five years to reach the production of 3.75 million units by the year 2014. The analysts have further stated that the industry’s turnover will touch $155 billion by 2016. This achievement will succeed in consolidating India’s position as the seventh largest automobiles manufacturer on the globe, eventually surging forth to become the third largest by the year 2030 behind China and the US.
The Automotive Mission Plan launched by the Indian government has envisaged that the country will emerge as the seventh largest car maker on the globe thereby contributing more than 10 percent to the nation’s $1.2-trillion economy.

Further, industry experts believe that the nation will soon establish its stand as an automobile hub exporting about 2.75 million units and selling about a million units to be operated on the domestic roads.

**Bicycle**

Classic bicycle horns usually consist of a single horn operating at a single resonance frequency, with a reed made of steel located in the throat of the horn, and supplied with air by a rubber squeeze bulb. Other variations include battery operated klaxon horns, and small air horns powered by a small can of compressed gas.

**Automobile**

Oliver Lucas of Birmingham, England developed a standard electric car horn in 1910. Automobile horns are usually electric klaxons, driven by a flat circular steel diaphragm that has an electromagnet acting upon it and is attached to a contactor that repeatedly interrupts the current to the electromagnet. This arrangement works like a buzzer or electric bell and is commonly known as "sounding" or "honking" one’s horn. There is usually a screw to adjust the distance/tension of the electrical contacts for best operation. A spiral exponential horn shape (sometimes called the "snail") is
cast into the body of the horn, to better match the acoustical impedance of the diaphragm with open air, and thus more effectively transfer the sound energy. Sound levels are approximately 107-109 decibels, and current draw 5-6 amperes.

Horns can be used singly, but are often arranged in pairs to produce a chord consisting of two notes, sounded together; although this only increases the sound output by 3 decibels, the use of two differing frequencies with their beat frequencies and missing fundamental is more perceptible than the use of two horns of identical frequency, particularly in an environment with a high ambient noise level. Typical frequencies of a pair of horns of this design are 500 and 405–420 Hz.

Some cars, and many motor scooters or motorcycles, now use a cheaper and smaller alternative design, which, despite retaining the name "horn", abandons the actual horn ducting and instead relies on a larger flat diaphragm to reach the required sound level. Sound levels are approximately 109-112 decibels, and current draw 2.5-5 amperes. Again, these horns can be either single, or arranged in pairs; typical frequencies for a pair are 420-440 and 340–370 Hz for this design.8

A horn grille is a part of some designs of automobile or other motor vehicle that has an electric horn, such as a motor scooter.

The radiators of modern cars no longer determine the shape of the grilles, which have become more abstract, the radiator being of different proportions from the grille and over 15 centimeters behind it. Usually grilles
are now designed such that the sound of a horn can readily come out through them. But those designs which maintain the notion that the shape of the grille shall reflect the shape of the radiator behind it no longer have front fenders with rather large crevices which would permit the old trumpet-shaped horns to be mounted on top of them. Thus some cars, often British ones, have a pair of round horn grilles mounted on either side of the radiator grille, behind each of which a horn is located. A luxury car's horn grilles are usually chrome-plated.

Cars with rear engines, such as the Volkswagen Beetle and the early Porsches, necessarily have no radiator grilles in front, and so have horn grilles placed below their headlights.

Some motor scooters have this feature as well, placed below the handlebars. Their horn grilles may be cheap plastic. These vehicles and the cheaper cars have only one horn.

**Truck**

Truck (lorry) horns may be electromagnetic klaxons of design similar to those of automobiles. Often they are not electrically driven, but are purely acoustic, driven by air from an air compressor which diesel trucks already have on board to operate the air brakes. Such air horns are often used as trim items, with chromed straight horns mounted on top of the cab. This design may also be installed on customized automobiles, using a small electrical compressor. Usually two are used, sometimes more. The frequencies vary in order to produce a variety of different chords, but in
general are lower than those of automobile horns; for instance 125 through 180 Hz. Sound levels are approximately 117-118 decibels.

Train horns can be grouped from one to five horns, to form a chord that has the notes sounded together; these are operated by compressed air from the air system.

**Ships**

Ships signal to each other and to the shore with horns (sometimes referred to as whistles) that are driven with compressed air or from steam tapped from the power plant. Low frequencies are used because they travel further than high frequencies; ships horns have been heard as far as ten miles away. Traditionally, the lower the frequency, the larger the ship. The RMS Queen Mary, an ocean liner launched in 1934, had three horns based on 55 Hz, a frequency chosen because it was low enough that the very loud sound of it would not be painful to the passengers. Modern International Maritime Organization regulations specify ships' horn frequencies to be in the range 70–200 Hz for vessels that are over 200 meters in length.

Portable aerosol-driven air horns are used for small craft water safety as well as for sports events and recreational activities.

**Foghorns**

Foghorns use low frequency tones to warn ships away from unseen coastlines. The large horn mouth is aimed out to sea.
**Klaxon** is a trademark for an electromechanical horn or alerting device. Mainly used on automobiles, trains and ships, klaxons produce an easily-identifiable sound often transcribed onomatopoeically as "awooga" or "ah-WOOGA". Like most mechanical horns, the klaxon has largely been replaced by solid-state electronic alarms, though the memorable tone itself has persisted.

The klaxon's characteristic sound is produced by a spring-steel diaphragm with a rivet in the center that is repeatedly struck by the teeth of a rotating cogwheel. The diaphragm is attached to a horn that acts as an acoustic transformer and controls the direction of the sound.9

In the first klaxons, the wheel was driven either by hand or an electric motor. The electric version has been credited to the inventor Miller Reese Hutchison, an associate of Thomas Edison. The Klaxophone is an instrument that makes use of the klaxon's unique sound.

The Lovell-McConnell Manufacturing Co. of Newark, New Jersey bought the rights to the device in 1908. F. W. Lovell, the founder, coined the name klaxon from the Ancient Greek verb klazō, "to shriek".

Klaxons were first fitted to automobiles and bicycle in 1908. Electric klaxons were the first electrical devices to be fitted to private automobiles. They were originally powered by 6-volt dry cells and from 1911 by rechargeable batteries. Later hand-powered versions were used as military evacuation alarms and factory sirens. The klaxon is also famous for its use as a submarine dive alarm.10
The English company Klaxon Signals Ltd. has been based in Oldham, Greater Manchester, England for the last 80 years, with premises also in Birmingham. The French Klaxon company was acquired by the Italian Fiamm Group in the 1990s. In 2005 Klaxon Signals sold the rights for the hooter or klaxon range to Moflash Signalling Ltd., based in the original Klaxon Factory in Birmingham England. The Famous Klaxet ES and A1 hooters returned home to Birmingham after 10 years.

**Automobile spare parts**

Automotive spare parts and components are a lesser known industry yet a big one. In past few years the industry has grown enormously, even more than the automotive industry itself not only in the Indian but global scenario.

This vast industry includes automotive components, accessories, gadgets, spare parts and tools; the consumers being the Original Equipment Manufacturing (OEM) segment and the replacement and aftermarket sector. Automotive spare parts replacement and aftermarket have in themselves become a major industry.
END NOTES


3. www.chauleong.com


6. www.monster .com


8. www.chauleong.com

CHAPTER – III

THE PROFILE OF ROOTS INDUSTRIES INDIA LTD., COIMBATORE

The Indian automotive component industry has made a sustained shift to the global Tier 1 market for their products. In the 1990s, the Indian auto components market was dominated by supplies to the aftermarket, with only 35 percent of exports being sourced by Tier 1 Original Equipment Manufacturing (OEM). In 2006, it is a very different story. Today, Indian automobile component manufacturers supply 75 percent of their exports to Tier 1 Original Equipment Manufacturing and only 25 percent to the aftermarket.

Indian component suppliers have displayed a growing capability to cater to the engineering and production needs of the some of the world’s biggest auto companies. This is largely due to