Chapter 1

Introduction and History of Automobile Industry

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1.1 Introduction

An automobile, motor car or car is a wheeled motor vehicle used for transporting passengers, which also carries its own engine or motor. Most definitions of the term specify that automobiles are designed to run primarily on roads, to have seating for one to eight people, to typically have four wheels, and to be constructed principally for the transport of people rather than goods.

The term motorcar has also been used in the context of electrified rail systems to denote a car which functions as a small locomotive but also provides space for passengers and baggage. These locomotive cars were often used on suburban routes by both interurban and intercity railroad system.

There are approximately 600 million passenger cars worldwide (roughly one car per eleven people) Around the world, there were about 806 million cars and light trucks on the road in 2007; they burn over a billion cubic meters (2360 billion US gallons) of petrol/gasoline and diesel fuel yearly. The numbers are increasing rapidly, especially in China and India.

In this chapter first, developments of automobile industry in the World and India is presented and finally the importance and scope of the study is presented.
1.2 Development of Automobile Industry in the World

The word automobile comes, via the French automobile, from the Ancient Greek word αὐτός (auto’s “self”) and the Latin mobiles (“movable”); meaning a vehicle that moves itself, rather than being pulled or pushed by a separate animal or another vehicle. The alternative name car is believed to originate from the Latin word carrus or carrum (“Wheeled vehicle”), or the Middle English word carre (“cart”) (from Old North French), or from the Gaulish word karros (a Gallic chariot).

The First working steam-power vehicle was probably designed by Ferdinand Verbiest, a Flemish member of a Jesuit mission in China around 1672. It was a 65 cm-long scale-model toy for the Chinese Emperor, that was unable to carry a driver or a passenger. It is not known if Verbiest’s model was ever built.

In 1752, Leonty Shamshurenkov, a Russian peasant, constructed a human-pedaled four-wheeled “auto-running” carriage, and subsequently proposed to equip it with odometer and to use the same principle for making a self-propelling sledge.

Nicolas-Joseph Cugnot is often credited with building the first self-propelled mechanical vehicle or automobile in about 1769, by adapting an existing horse-drawn vehicle. However, this claim is disputed by some who doubt Cugnot’s three-wheeler ever ran or was stable. In 1801, Richard Trevithick built and demonstrated his Puffing Devil road locomotive, believed by many to the first demonstration of a steam-powered road vehicle. It was unable to maintain sufficient steam pressure for long periods, and was of little practical use.

In the 1780s, a Russian inventor of merchant origin, Ivan Kulibin, developed a human-pedaled, three-wheeled carriage with modern features
such as a flywheel, brake, Transmission, and bearings; however, it was not
developed further.

In 1807 Nicephore Niepce and his brother Claude probably created
the world’s first internal combustion engine which they called a
Pyreolophore, but they chose to install it in a boat on the river Saone in
France. Coincidentally, in 1807 the Swiss inventor Francois Isaac de Rivaz
designed his own ‘internal combustion engine’ and used it to develop the
world’s first vehicle, to be powered by such an engine. The Niepces’
Pyreolophore was fuelled by a mixture of Lycopodium powder (dried
Lycopodium moss), finely crushed coal dust and resin that were mixed with
oil, whereas de Rivas used a mixture of hydrogen and oxygen. Neither design
was very successful, as was the case with others, such as Samuel Brown,
Samuel Morey, and Etienne Lenoir with his hippo mobile, who each
produced vehicles (usually adapted carriages or carts) powered clumsy
internal combustion engines.

In November 1881, French inventor Gustave Trouve demonstrated a
working three-wheeled automobile powered by electricity at the International
Exposition of Electricity, Paris.

Although several other German engineers (including Gottlieb
Daimler, Wilhelm Maybach, and Siegfried Marcus) were working on the
problem at about the same time, Karl Benz generally is acknowledged as the
inventor of the modern automobile.

An automobile powered by his own four-stroke cycle gasoline engine
was built in Mannheim, Germany by Karl Benz in 1885, and granted a patent
in January of the following year under the auspices of his major company,
Benz & Cie., which was founded in 1883. It was an integral design, without
the adaptation of other existing components, and included several new
technological elements to create a new concept. He began to sell his production vehicles in 1888.

A photograph of the original Benz patent-Motorwagen, first built in 1888 and awarded the patent for the concept.

In 1879, Benz was granted a patent for his first engine, which had been designed in 1878. Many of his other inventions made the use of the internal combustion engine feasible for powering a vehicle.

His first Motorwagen was built in 1885, and he was awarded the patent for its invention as of his application on January 29, 1886. Benz began promotion of the vehicle on July 3, 1886, and about 25 Benz vehicles were sold between 1888 and 1893, when his first four-wheeler was introduced along with a model intended for affordability. They also were powered with four-stroke engines of his own design. Emile Roger of France, already producing Benz engines under license, now added the Benz automobile to his line of products. Because France was more open to the early automobiles, initially more were built and sold in France through Roger than Benz sold in Germany.

In 1896, Benz designed and patented the first internal-combustion flat engine, called boxer motor. During the last years of the nineteenth century, Benz was the largest automobile company in the world with 572 units produced in 1899 and, because of its size, Benz & Cie., became a joint-stock company.

Daimler and Maybach founded Daimler Motoren Gesellschaft (DMG) in Cannstatt in 1890, and sold their first automobile in 1892 under the brand name, Daimler. It was a horse-drawn stagecoach built by another manufacturer, that they retrofitted with an engine of their design. By 1895 about 30 vehicles had been built by Daimler and Maybach, either at the Daimler works or in the Hotel Hermann, where they set up shop after
disputes with their backers. Benz, Maybach and the Daimler team seem to have been unaware of each others’ early work. They never worked together; by the time of the merger of the two companies, Daimler and Maybach were no longer part of DMG.

Daimler died in 1900 and later that year, Maybach designed an engine and named Daimler-Mercedes, that was placed in a specially ordered model built to specifications set by Emil Jellinek. This was a production of a small number of vehicles for Jellinek to race and market in his country. Two years later, in 1902, a new model DMG automobile was produced and the model was named Mercedes after the Maybach engine which generated 35 hp. Maybach quit DMG shortly thereafter and opened a business of his own. Rights to the Daimler brand name were sold to other manufacturers.

Karl Bez proposed co-operation between DMG and Benz & Cie. When economic conditions began to deteriorate in Germany following the First World War, but the directors of DMG refused to consider in initially. Negotiations between the two companies resumed several years later when these conditions worsened and, in 1924 they signed an Agreement of Mutual Interest, valid until the year 2000. Both enterprises standardized design, production, purchasing, and sales and they advertised or marked their automobile models jointly, although keeping their respective brands. On June 28, 1926, Benz & Cie. And DMG finally merged as the Daimler-Benz company, baptizing all of its automobiles Mercedes Benz, as a brand honoring the most important model of the DMG automobiles, the Maybach design later referred to as the 1902 Mercedes-35 hp, along with the Benz name, Karl Benz remained a member of he board of directors of Daimler-Benz until his death in 1929, and at times, his two sons participated I management of the company as well.
In 1890, Emile Levassor and Armand Peugeot of France began producing vehicle with Daimler engines, and so laid the foundation of the automobile industry in France.

The first design for an American automobile with a gasoline international combustion engine was drawn in 1877 by George Selden of Rochester, New York, who applied for a patent for an automobile in 1879, but the patent application expired because the vehicle was never built. After a delay of sixteen years and a series of attachments to his applicant, on November 5, 1895, Selden was granted a United States patent (U.S. Patent 549,160) for a two-stroke automobile engine, which hindered, more than encouraged, development of automobiles in the United States. His patent was challenged by Henry Ford and others, and overturned in 1911.

In Britain, there had been several attempts to build steam cars with varying degrees of success, with Thomas Rickett even attempting a production run in 1867. Santler from Malvern is recognized by the Veteran Car Club of Great Britain as having made the first petrol-powered car in the country in 1894, followed by Frederick William Lanchester in 1895, but these were both one-offs. The first production vehicles in Great Britain came from the Daimler Motor Company, a company founded by Harry J. Lawson in 1896, after purchasing the right to use the name of the engines. Lawson’s company made its first automobiles in 1897, and they bore the name Daimler.

In 1892, German engineer Rudolf Diesel was granted a patent for a “New Rational Combustion Engine”. In 1897, he built the first Diesel Engine. Steam-, electric-, and gasoline-powered vehicle competed for decades, with gasoline internal combustion engines achieving dominance in the 1910.
Although various piston less rotary engine designs have attempted to compete with the conventional piston and crankshaft design only Mazda’s version of the Wankel engine has had more than very limited success.

Production: The large-scale, production-line manufacturing of affordable automobiles was debuted by Ransom Olds at his Old mobile factory in 1902. This concept was greatly expanded by Henry Ford, beginning in 1914.

As a result, Ford’s cars came off the line in fifteen minute intervals, much faster than previous methods, increasing productivity eightfold (requiring 12.5 man-hours before, 1 hour 33 minutes after), while using less manpower. It was so successful, paint became a bottleneck. Only Japan black would dry fast enough, forcing the company to drop the variety of colors available before 1914, until fast-drying Duco lacquer was developed in 1926. This is the source of Ford’s apocryphal remark, “any color as long as it’s black”. In 1914, an assembly line worker could buy a Model T with four months’ pay.

Ford’s complex safety producers- especially assigning each worker to a specific location instead of allowing them to roam about – dramatically reduced the rate of injury. The combination of high wages and high efficiency is called “Fordism”, and was copies by most major industries. The efficiency gains from the assembly line also coincided with the economic rise of the United States. The assembly line forced workers to work at a certain pace with very repetitive motions which led to more output per worker while other countries were using less productive methods.

In the automotive industry, its success was dominating, and quickly spread world wide seeing the founding of Ford France and Ford Britain in 1911, Ford Denmark 1923, Ford Germany 1925; in 1921, Citroen was the first native European manufacturer to adopt the production method. Soon,
companies had to have assembly lines, or risk going broke; by 1930, 250 companies which did not, had disappeared.

Development of automotive technology was rapid, due to in part to the hundreds of small manufacturers competing to gain the world’s attention. Key developments included electric ignition and the electric self-starter (both by Charles Kettering, for the Cadillac Motor Company in 1910-1911), independent suspension, and four-wheel brakes.

Ford Model T, 1927, regarded as the first affordable American automobile.

Since the 1920s, nearly all cars have been mass-produced to meet market needs, so marketing plans often have heavily influenced automobile design. It was Alfred P. Solan who established the idea of different makes of cars produced by one company, so buyers could “move up” as their fortunes improved.

Reflecting the rapid pace of change, makes shared parts with one another so larger production volume resulted in lower costs for each price range. For example, in the 1930s, LaSalles, sold by Cadillac, used cheaper mechanical parts made by Oldsmobile; in the 1950s, Chevrolet shared hood, doors, roof, and windows with Pontiac; by the 1990s, corporate power trains and shared platforms (with interchangeable brakes, suspension, and other pars) were common. Even so only major makers could afford high costs, and even companies with decades of production, such as Apperson, Cole, Dorris, Haynes, or Premier, could not manage; of some two hundred American car maker sin existence in1920, only 43 survived in 1930, and with the Great Depression, by 1940, only 17 of those were left.

In Europe much the same would happen. Morris set up its production line at Cowley in 1924, and soon outsold Ford, while beginning in 1923 to follow Rod’s practice of vertical integration, buying Hotchkiss (engines),
Wrigly (gearboxes), and Osberton (radiators), for instance as well as competitors, such as Wolseley; in 1925, Morris had 41% of total British car production. Most British small-car assemblers, from Abbey to Xtra had gone under. Citroen did the same in France, coming to cars in 1919; between them and other cheap cars in reply such as Renault’s 10CV and Peugeot’s 5CV, they produced 550,000 cars in 1925, and Mors, Hurtu, and other could not compete. Germany’s first mass-manufactured car, the Opel 4PS Labbfrosh (Tree Frog), came off the line at Russelsheim in 1924, soon making Opel the top car builder in Germany, with 37.5% of the market.

1.3 Development of Automobile Industry in India

The Indian automotive industry is represented by two industry associations – Society of Indian Automobile Manufacturers (SIAM) which represents the OEMs and the Automotive Components Manufacturers’ Association (ACMA) which represent the components industry. Both associations actively engage with industry, government and other stakeholders to promote the interests of the sector and improve competitiveness.

The automotive sector comprises of Original Equipment Manufacturers (OEMs) and auto component manufactures. The industry encompasses commercial vehicles, multi-utility vehicles, passenger cars, two wheelers, three wheelers and auto components. Global as well as local forces have affected the Indian auto industry, leading to a rapid transformation over the last decade or so. After the end of licensing era in early 1990s, the industry has witnessed rapid growth in volumes and capacity and several new ventures have come up in the last 10 years.

The industry (OEMs and suppliers together) contributed nearly 5 per cent to the country’s GDP in 2006. The automotive sector also offers significant employment opportunities. It employs approximately 13 million
people directly and indirectly. The industry’s capabilities in design engineering and manufacturing have been recognized the world over and most automotive majors are looking to increasingly source auto components from India.

Cost and quality remain the underlying issues of India’s auto industry internationalization, Indian makes are being challenged on several counts. Cost, especially labor costs are rising for Indian manufacturers, while the cost reductions that should come with infrastructure improvements are painfully slow in materializing. The quality imperative means that Indian makers have to seek new technological resources through alliances and acquisitions, challenging the capital and management resources of companies that are often small and family owned.

Infrastructure development projects which are underway in India combined with favorable government policies will also drive automotive growth in the next few years. Easy availability of finance and moderate cost of financing facilitated by double income families will drive sales in the next few years. India is also emerging as an outsourcing hub for global majors. Companies like GM, Ford, Toyota and Hyundai are implementing their expansion plans in the current year. While Ford and Toyota continue to leverage India as a source of components, Hyundai and Suzuki have identified India as a global source for specific small car models.

At the same time, Indian players are likely to increasingly venture overseas both for organic growth as well as acquisitions. India is emerging as one of the most attractive automotive markets in the world and is poised to become a key sourcing base for auto components.

The Indian automotive component industry is highly fragmented. There are nearly 6,400 players in the sector, of which only about 6 percent are organized and the reaming 94 per cent are small-scale, unorganized
players. In terms of value added, however, the organized players account for nearly 77 per cent of the output in the sector. The sector manufacturers components across all key vehicle systems.

- Unorganized Sector: The unorganized sector accounts for a sizeable chunk of the total production of components in the country. Most of these manufacturers use primitive technologies and buy second-hand machinery, sometimes at near-scrap value. This sector serves mainly the replacement market.

- The Counterfeit Components Market: The Indian automotive components market has long been affected by the presence of a large spurious-pars market. Further, counterfeiting is largely prevalent in those segments (or models) that offer sufficient volume. Manufacturers have been using bar coding techniques to partly offset the problems created by the spurious market.

The Indian automotive industry has witnessed an unprecedented boom in recent years. It is owing to the improvement in living standards of the middle class, and a significant increase in their disposable incomes. The industry is expected to touch the 10 million mark, to which the commercial vehicle segment will be a major contributor industry experts peg the Indian Automobile sales growth at a compounded annual growth rate (CAGR) of 9.5% per cent by 2010.

India has made a mark in the global automobile industry; the salient aspects below make for India featuring on every leading automobile player’s roadmap.

- India is the second largest two-wheeler market in the world
- Fourth largest commercial vehicle market in the world
- Eleventh largest passenger car market in the world
- Fifth-largest bus and truck market in the world (by volume)
• Envisaged to be the seventh largest automobile market by 2016, and world’s third largest by 2030 (behind only China and the US).

The Industry structure spans all segments and is concentrated in regional clusters. Automobile manufacturing units are located all over India. These are, however, concentrated in some pockets such as Chennai and Bangalore in the south, Pune in the West, the National Capital Region (NCR, which includes New Delhi and its suburban districts) in the north, Jamshedpur and Kolkata in the east and Pithampur in the central region. Following global trends, the Indian automotive sector also has most auto suppliers located close to the manufacturing location of OEMs, forming regional automotive clusters Broadly, the three main clusters are centered around Chennai, Pune and the NCR.

The government had announced it’s Auto Policy in 2002. This aim of the policy has been to promote integrated, based, enduring and self-sustained growth of the Indian automotive industry. The policy states;

• Exalt the sector as a lever of industrial growth and employment and to achieve a high degree of value addition in the country.
• Promote a globally competitive automotive industry and emerge as a global source for auto components;
• Establish an international hub for manufacturing small, affordable passenger cars and a key center for manufacturing tractors and two-wheelers in the world;
• Ensure a balanced transition to open trade at a minimal risk to the Indina economy and local industry;
• Conduce incessant modernization of the industry and facilitate indigenous design, research and development;
• Steer India’s software industry into automotive technology.
Assistant development of vehicles propelled by alternate energy sources;
Development of domestic safety and environmental standards at par with international standards.

The Government of India allows automatic approval for foreign equity investment up to 100 percent for the manufacture of auto components. Manufacturing and imports in this sector is free from licensing and approvals. There is no local content regulation in the auto industry. The Engineering Export Promotion Council under the aegis of Ministry of Commerce and Industry, Government of India, over the years has been engaged in promoting exports of engineering goods including auto parts. Among other initiatives that have been effected in 2006-2007 are:

- Setting up of the National Automotive Testing and R&D infrastructure Project (NATRIP) at a total cost of US$388.5 million for enabling the industry to usher in global standards of vehicular safety, emission and performance standards.
- Finalization of the Automotive Mission Plan (AMP) 2006-2016 for making India a preferred destination for design and manufacture of automobile and automotive components.
- The government has notified setting up an automobile testing and homologation centre. International Centre for Automotive Technology (ICAT), at an investment of US$15.23 million which would act as an accredited agency to approve homologation standards for automobiles.

India is currently experimenting with a range of alternative fuels. In both Delhi and Mumbai, CNG is already widely used for business, taxis, and three-wheelers. Some larger gas-powered vehicles run on LPG, although the distribution infrastructure remains embryonic. There are only two cross-country pipelines, both in North-eastern India, while one more is proposed. Some states have introduced
gasoline blended with 5 percent ethanol derived primarily from molasses, and field trials are underway on a 10 percent ethanol blend. Bio-diesel which can be derived from a wide range of fat bearing agricultural products (in India the crop of choice is the Jatropha plant) or even industrial waste is also limited to field trials in passengers cars, buses and trains. A very small number of electrically-powered vehicles also operate.

Some companies believe the bio fuels will emerge as a significant sector in the Indian economy, as policymakers grasp their potential for bringing new profitability to agriculture. Regulatory changes in India will also create demand for lower-emission alternative fuels. Under the Indian government’s Automotive Fuel Policy, a series of new emission controls known as the Bharat Stage norms – standards modeled on European emission rules – are already being enforced in a rolling program ending in April 2010. The Bharat Stage norms have already resulted in the conversion of all three-wheelers and taxis, in the national capital region (NCR) and Mumbai, to LPG or CNG vehicles; the phased conversion of diesel based commuter public buses in target cities to CNG and the phasing out of commercial vehicles above 15 years in age. Based on a survey of auto industry professionals, KPMG in India estimates that of the 14 select cities with access to piped fuel gas, approximately 10 percent of passenger cars (or 6,80,000 vehicles will be running on CNG by 2015. Commuter vehicles and light Bharat Stage IV emission controls are introduced; a likely total of 2.17 million vehicles will be running on gas fuel in the 14 cities.

The industry expects the growth in the automotive sector to continue, fuelled by rising disposable incomes and increasing consumerism. They also believe that global automakers will continue to allocate a rising proportion of their foreign direct investment into India growing auto manufacturing first and later auto engineering and R&D services. Many companies are aware that their labor cost advantage is beginning in erode as both shop floor and managerial wage costs rise. However, they are optimistic that productivity improvements through low-cost automation and improved management efficiency will compensate for rising direct wage costs.
But even as the sector grows, some concerns are becoming more pressing. A KPMG report found that senior auto executives are also concerned about India’s eroding cost advantage and the increasing challenges of rewarding and retaining talent. The report also expresses concern about the pace of consolidation in some parts of the industry and the challenges firms face in building Indian auto brands.

The leading concern is the continuing cost imposed by India’s relatively poor physical in fracture, and the slow pace of improvement in road, rail and port facilities. Add to this the fact that the automotive industry lags behind other sectors such as IT and financial services in management training, reward and retention. Above all, Indian companies recognize that to achieve global scale they will need to meet the challenge of building persuasive global brands. Nevertheless, the overall impression is that India’s auto sector has passed a critical turning point. The inherent strengths of India’s manufacturing economy – an exceptional human resource base, the capacity to delivery high quality engineering products, and the strategic geographical positioning – have been reinforced by a strong domestic economy and a new readiness on the part of global auto manufacturers to make key investments in India. The opportunity for India’s automotive companies to emerge as leading participants in the global industry is clearly present; the challenge is no longer to create the opportunity, but to manage it.

Swiss companies, known for their quality reliability and high-end technology, can effectively position themselves in the Indian automotive industry, especially in the fields of automotive related electronics and instrumentation, capital goods required in the manufacturing process (machine tools, etc.,) products used in the interiors (fittings, fastening system, materials, etc.), automotive coatings, etc. Although it could be possibly difficult for Swiss SMEs to effect a direct entry with the local and international automobile OEMs in India, they should try and leverage their active and existing vendor contacts abroad (Europe, USA and Asia) to effect a “side-door entry” in India with the same entities, if possible. Alternatively, they could also appraise themselves of supplying to Tier II and Tier II automotive integrators, who then in turn could supply the composite product(s) to the OEMs.
While several Swiss companies are already represent in India, for the others this is the time to move while the industry is on an up cycle and in need of high quality products to meet global standards and expectations.  

1.4 Chapter Scheme

The purpose of chapter scheme is to present an introduction that other next chapters are to be followed. In other words the issues and problems under this study that through next chapters would be discussed in short view as introduction to other steps of this research are presented as follows:

Chapter 1: Introduction and Background

This chapter presents an introduction of this study; explain the development of Automobile industry in the World and in India; explain the importance and scope of the study.

Chapter 2: Research Methodology

This chapter describes the approaches that are used in this study in order to the hypotheses testing of the problem under the study and provides the reader with a basis for evaluating the validity of findings, an understanding of the basis for choices that were made, so a short review is given to explain the problem under study, the objectives, hypotheses and their methodologies developed for them, are to be presented, the methodology and data instruments including collection of data and analysis of data are to be explained and at the end of this chapter the limitations of research have been expressed.

Chapter 3: Research Literature

In this chapter first research theoretical literature about accounting records and system, finance and corporate strategy, going concern, Indian accounting standards and finally, highlights the review of previous researches and tries to provide necessary information about what is already known and what is unknown. This literature review emphasizes that prior to the initiation of this study other researches
in this areas have been developed but this study will try to find out the new answers for the new developed questions that have been described under the problem under study.

**Chapter 4: Profile of automobile industry in Pune city**

In this chapter first a profile of every Indian automobile industry in Pune city have been explained; there are 13 Indian automobile industry in Pune city and at the end every company’s performance from 2005-06 to 2009-10 have been presented. Finally the highest and lowest share price in BSE of every company from 2000-01 to 2009-10 have been presented.

**Chapter 5: Analysis of hypotheses**

In this chapter on the basis of numerous collected data, various tables and charts have been presented and hypotheses on the basis of statistical methods have been tested and reported; also for better understanding about Indian Automobile industry’s function, two profiles (first profile about some ratios and their charts of automobile industry in Pune and second one is profile about Indian Automobile export trends (No of vehicles) ) have been presented; finally at the end of this chapter the objectives have been considered.

**Chapter 6: Findings and Suggestions**

In this chapter, the findings and necessary suggestions on the basis of findings have been presented.
References


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