CHAPTER: 1
PERSPECTIVE OF THE CAR INDUSTRY

Introduction

1. Automobile is the world's largest industry holding maximum capital investment share in the world economy with a global turnover more than any other industry in the world. It has had the maximum impact on society evolution. It has driven the world economy and in turn has been driven by it. Globally, over 44 million cars, 20 million two wheelers and 11 million commercial vehicles are sold every year contributing to a gross turnover of close to a trillion dollars making the automotive industry one of the largest in the world. In India the auto industry has achieved considerable scale (RS 420 billion or $10.4 billion) and depth (component industry has 400 firms in the organized sector with an estimated turnover of RS 120 billion or $3 billion and the turnover of the unorganized sector comprising about 5000 component manufacturers cannot be estimated). The industry in India is poised for a major growth in the coming years. Host of factors like technological obsolescence, price of complementary goods, fuel prices, aesthetics and several other subjective variables affect the industry making it very dynamic. A few major market players dominate world Car Industry. Recent tie-ups, mergers and collaborations and the growing concept of global marketing have caused formulation of global consortiums to forge lower costs, better products, higher quality, conformance etc. India has a large potential in terms of production and sales. The industry in the period 1992-97 outstripped industrial production growth by about 30%, increasing its contribution to industrial output from 4.3% in 1992-93 to about 5.4% in 1996-97. It achieved a CAGR (Cumulative Average Growth Rate) of about 22% during this period or approximately about 13-14% in real terms. The component industry has in the same period grown by a CAGR of 28%. Automobile Industry's contribution to the GDP has risen from 2.7% of GDP in 1992-93 to 4.5% by 1996-97, increasing about 1.8 percentage points. Over the same period gross turnover in the automotive sector increased from RS 128 billion to RS 420 billion. The Indian industry is still small (5% of the size of General Motors with a turnover of over $160 billion and is the largest automobile company in the world) with low vehicle penetration (passenger car penetration of 6 per thousand as compared to 20 in Indonesia and 178 in Malaysia). The Industry has deep forward and backward linkages with the economy. These backward and forward linkages generate the maximum value and employment in the automobile sector. It is estimated that for every truck sold generates employment for around 10 persons annually. Over 3 million people are estimated to be employed in the distribution and after sales service industry in India. The Auto Finance and Leasing industry and the Auto Insurance industry are estimated at RS 70 billion and RS 35 billion. Auto Component industry has had the biggest impact and has become a
key sector in the Indian Economy with a strong export thrust, a turnover of about RS 120 billions and exports close to RS 12 billion.\textsuperscript{4} Thus the auto industry has a multiplier effect on the manufacturing and service industry and is considered as an engine of growth by developed nations, as can be easily noticed in developed economies. For example '1 out of every 6 persons employed in Germany is in Auto or related industries as compared to India’s one in 40 persons'\textsuperscript{5}. Due to deeper linkages with the economy, the industry has a larger growth multiplier effect on the economy as compared to others and this multiplier increases with increase in the share of the auto industry. Three requirements to cross the threshold as defined by the global consultancy firm of A.T Kearney are\textsuperscript{6}

\begin{itemize}
  \item[a)] Sufficient scale – India is second largest producer of two-wheelers, fifth largest producer of commercial vehicles and manufactures close to 400 thousand passenger cars
  \item[b)] Sufficient depth – wide component base (over 400 players in the organized sector and more than 5000 in the unorganized sector), significant industrial base for key raw materials- steel, plastics, rubber, aluminium, machine tools etc., forward and important linkage industries like auto distribution and finance
  \item[c)] Sufficient product proliferation – wide variety of products, spread of motorization
\end{itemize}

Due to a host of factors the segment profile in India for the automobile industry is distorted. Low penetration levels in all segments and a general neglect of a vital and dynamic industry have resulted in a low share of industrial output in India of about 5\% as compared to about 8-10\% for developing countries like Indonesia, Brazil and China and up to 15-17\% for developed countries like US and Germany. Several countries have identified the automotive industry as the key industry and used it as an engine of growth.

Though having one of the oldest automotive industries in Asia, the industry stagnated. Industry origin in India can be traced back to 1942 when Hindustan Motors was set up in Calcutta, though import and assembly of cars can be traced back much earlier. Bureaucratic control and redundant regulations hampered industry growth over the years. At the beginning of the 1980’s, the car industry in India could be summed up by several peculiarities like: small scale operations; technological obsolescence; absence of competition; operations on a sellers market; controlled economy bottlenecks; low priority on development agenda and absence of foreign direct investment. The automobile industry in India shows distinct phases, as under, in its evolution

\begin{itemize}
  \item[a)] Phase 1 – till early 1970’s there was a preponderance of commercial vehicles
  \item[b)] Phase 2 – by early 1980’s there was a distinct diversification with personal transport vehicles increasing more than 8 times the commercial vehicles
  \item[c)] Phase 3 – the take-off wherein total production of passenger cars increased from a mere 19267 in 1948 to 34366 in 1976 to 181416 in 1990-91 showing an increase of 527\% on 1976 figures
  \item[d)] Phase 4 – slight shrinkage of demand and demand stabilization as new entrants affected the market
The industry is a major growth driver, which is a major factor especially for a developing economy like India. The industry is vital to the economy because of a large variety of reasons. It is the largest single industry in the world. The industry has very strong cross linkages with other industries. The major reasons that can be seen are given as under.

a) Promotes development of components and other ancillary industry
b) Attracts foreign investment direct in nature
c) Export orientation
d) Promotes a balanced growth if proper indigenisation controls and other tariff controls are maintained
e) High employment potential

The opening of the economy by the reforms ushered in by the New Economic Policy was expected to transform the industry. This study investigates how the reforms have changed the scenario for the automobile industry in India.

Evolution of the World Car Industry

1.1 The history of the growth of the world car industry is given as under

The Early Years
1.1.1 Assuming that the term ‘motor car’ describes a self-propelled vehicle for road use, the building of first car may have been claimed by Father Verbiest, a missionary in China in 1765 when he was reported to have built a steam turbine powered four-wheel machine. The next well authenticated car was a twin cylinder steam driven, three-wheel gun carriage on which Nicholas Euginot, a French army officer worked in the late 1760’s with a massive boiler hung ahead of the front wheel. By 1825 Sir Goldsworthy Gurney had taken out his first patent for steam carriages and by 1828 his steam vehicles were sufficiently reliable for him to run a steam coach from London to Bath at about 19kmh comparable to the time honoured horse drawn carriages. Experiments with steam engines continued however the search for a more compact form of motive power led to the gas engine with the typical power unit being an Internal Combustion engine. Though gas was not readily transportable, a number of gas powered vehicles were built in the 19’Th century of which the most notable was that of Siegfried Markus of Australia. His four-wheel vehicle of 1875, purpose built and not a modified horse carriage could be regarded as the first car, though historians question its date.

Four Germans, all closely associated with one another at various times, have been regarded as the fathers of the motorcar: Carl Benz, Gottlieb Daimler, Nicholas August Otto and Wilhelm Maybach. Otto developed the gas engine to an advanced state of efficiency with his introduction of the four stroke (Otto) cycle requiring only the availability of a freely evaporating fuel like petrol to make lightweight four stroke internal combustion engines, the ideal motive power for the private users personal
transport. Daimler worked for Otto before setting up his own engineering business and by 1885 had 4-stroke engine working well, with one mounted in a bicycle and in 1886 built a four-wheel car. In the same year Benz (a former employee of Otto) put a four-stroke engine into a tricycle and the machine ran successfully. Maybach's early contribution was the development of an efficient float chamber controlled carburettor allowing a reliable mixture of fuel and air to be drawn into the engine. The two rival vehicles of Benz and Daimler were an interesting comparison. Whereas Daimler was dissatisfied with his car, carrying on experimental and developmental work for several years before going into the market, Benz goes into history as the first car producer because he found a demand for his tricycles. Instead Daimler put his engines into production and as well as selling his own products; he licensed others in various parts of the world to build them. Among the first user of the Daimler engine was the French engine making company of Panhard et Levassor. In 1890 they went into production with a car that turned out to have the classic automobile layout of front mounted engine, clutch, gearbox and rear wheel drive. This was known as the ‘System Panhard’. Amedee Bolee and his son Leon were the first to develop the shaft drive. Their first model in 1873, the L’obeisante was the first to have a steering wheel with both the front wheels having the same turning radius. Amedee Bolee, in 1878 produced ‘La Mancelle’ which was more in common to the modern car and its suspension system was to be used till the modern day car. There was a third type of car, the electric car at the same time as Daimler and Benz models. A Frenchman Jeantaud produced a series of electric cars in the 1880’s.

The Development of the Industry

1.1.2 The attitude of authorities had a profound effect on car development. In France it was allowed to develop with little restraint and it was in France that the idea of motoring blossomed. The British attitude was of continuous and well organized hostility causing stagnation of road going steam transport in the 19th century. There was also a certain amount of opposition in the USA. Builders had to get vehicle approved by local city authorities and hold high engineering qualifications. However despite all this the pace of development of motorcars was extremely rapid. Though further away from Europe even North America was at pace with the rest of the world. In 1893 brother’s Frank and Charles Duryea built their first car and set up North America’s first automobile factory. Extraordinary ingenuity was displayed during those times and there are very few modern ideas that were not produced first in the 19th century or the first few years of the 20th century. In many cases they had to be put aside until improved materials and manufacturing techniques made them feasible. However disc brakes (1896), hydraulic brake actuation (1897), electric starting (1898), overhead camshaft valve operations and four wheel drive (both in 1902) and windscreens wipers (1903) are examples of early motoring innovations. The car whether powered by the internal combustion engine, the steam engine or the electric engine soon overcame its early setbacks and developed into a practical form of personal transport before the end of the 19th century.
One of the most significant pioneer motorists was Comte de Dion, who combined his entrepreneurial skills with the engineering expertise of Georges Bouton and his brother in law, Trepadoux who immortalized de Dion name by first producing tricycles and then expanding on to four-wheeler. Boley was a rival to de Dions tricycles. The Michelin family, to popularise their product (pneumatic tyres), bought a whole range of Peugeots, fitted them with pneumatic tyres and retailed them to the public. Benz was rather slow though the 2.75 hp Benz of 1894 is on record as being the first car to be produced in any quantity (Benz sold 250 cars by the end of the year). Italy, due to the effort of the Ceirano family, was also on the verge of creating a motor industry by the end of the 19'th century. A group of wealthy men led by Agnelli commissioned a car from Giovanni Ceirano known as ‘Wellyes’. The car became the foundation of the Fiat Empire. Agnelli was the driving force behind the company, which his family developed into Italy’s leading industrial concern. A British contemporary was Herbert Austin who became interested in cars in mid 1890’s and built his first prototype in 1895 for the Wolseley Sheep Shearing Machine Company, which during the next two decades became Britain’s leading car manufacturers.

Interest in car building spread rapidly and in 1890’s in Moravia (part of Austro-Hungarian empire, which became Czechoslovakia), the Nesseldorf railway equipment factory took an interest and acquired a Benz as the basis of the first car-manufacturing venture. The first Nesseldorf car called a Prasidant was basically a modified version of the Benz, which included alterations by Hans Ludwinka. From this beginning grew a motor manufacturing business under Ludwinka’s guidance, which was to develop into the Tatra works now renowned for its extremely advanced designs. In Austria electric cars were attracting attention. One example came from Ferdinand Porsche’s fundamental innovation the Lohner Porsche. Built by the Viennese firm of Lohner it had electric motors on the hub of the front wheels. It was one of the first successful front wheel drive cars and also one with four wheel braking. However electric cars had major limitations. The solution was to have a petrol engine generating electric current for motors in the wheel hubs. The Mixte system was sold to Mercedes, whose Mercedes Mixte was an extremely smooth running and controlled vehicle of its times with electric starting. Another contemporary was Louis Renault; son of a button maker who made a car so successful that friend wanted replicas. With his brother Marcel he set up a company to make cars. As his first attempt Renault produced a definitive car in the modern idiom. Its contribution to development being the way of putting the power from the clutch straight through the gearbox with a direct top gear. Renault was also the pioneer of the saloon car. Though numerous models were made in series during the 19’Th century, the car in production form can be regarded as essentially a 20’Th century phenomenon. Essentially as a rich man’s plaything it has changed the way of life as it gradually developed until it became the normal possession of most families in the western world and the aspiration of others in the less developed parts. The Mercedes designed by Wilhelm Maybach was built by the Daimler Company in Germany for sale by Emil Jellinek, the Austro-Hungarian consul
in Nice and the main importer (the car was named after Jellineks daughter). The car was the company’s first major design after the death of its founder Gottlieb Daimler.

Across the Atlantic in America automobile was to develop into a vast industry and to lead the world in size of the industry, which it does, till date. The originator of this trend was the Oldsmobile ‘curved-dash’ model, which by 1904 was to reach an annual production of 5000. Ransom E Olds set up his factory in Detroit just before the turn of the century. The factory later became part of the General Motors group. Henry Leland, who made the engines, by his precision engineering brought a new era of expertise in motor manufacturing. There was a major impetus of engineers and craftsmen to automobile engineering. One was Henry Ford whose effort was a twin cylinder Quadra cycle built in 1896. Henry Ford was the man behind the Detroit Automobile Company, which was restructured as the Henry Ford Company in 1901. After trouble with the board, Ford left the company in the same year. The directors called Leland for possibilities of liquidation who talked them into reforming organization. The company was called the Cadillac automobile company after a French adventurer who founded the original settlement in Detroit. Leland set high standards with all parts of the car being interchangeable with those of identical models. Henry Ford in 1903 found the Ford Motor Company and produced a series of models identified by the series of alphabets with twin or four cylinder engines. Ford developed cars but also manufacturing technologies. The car that made him world famous, the model T, also transformed the entire process of car building. It broke all production figures record achieving over 15 million sales; a figure only surpassed by the Volkswagen Beetle in the second half of the century. In France, the industry flourished. Renaults racing rivals, Peugeot and Panhard prospered in the wake of their competition success. However cars were mostly very conventional. Out of character was the Bebe Peugeot designed by Ettore Buggatti, an independent engineer who had migrated from his native Italy to Molshiem in Alsace-Lorraine. After a slow start the British Motor Industry flourished early in the century with many variants. The Daimler Company set up by Lawson began its own design in 1901 and caught the imagination of the British public. Lancaster and Napier cars were in proper production. Henry Royce an engineer in Manchester decided to try building cars. His initial design was a twin cylinder car of such high standards that it attracted the attention of Charles Rolls, one of country’s most enthusiastic motorists. Royce was persuaded by Rolls to become a full-scale manufacturer and let Rolls be the sole vendor from his showroom in the west-end of London. The cars were called Rolls Royce and have remained world’s most prestigious cars. Car production began at the same time in Scotland but died down till artificially revived by Rootes under strong pressure from the government. Another company was Austin in the industrial midlands of England. Herbert Austin left the wholesale company and set up his own business at Longbridge on the outskirts of Birmingham. Another cycle maker, the Rileys Company of Coventry, Warwickshire got to making cars. Initially involved in production of motorcycles and Quadra cycles, they began production of tricars in 1900, and built their first proper car only in 1905. Another convert from cycles to cars was the Rover Company of Coventry. They are known for their luxury cars since the
end of the Second World War. William Morris with a long history as a cycle and motorcycle repairer, salesman and manufacturer produced his first car in 1913: the Morris Oxford.

Fiat, after its early Cierano design soon expanded into much more advanced designs. After 1910, Fiat made serious attempts to expand beyond the up market sector and with their type 51, Fiat were set upon an expansion path that would make the Agnelli empire, Italy’s biggest car manufacturer and an industrial giant. Two of company’s former employees Lancia and Nazzaro became racing drivers of great fame and then car manufacturers in their own right. Lancia became a subsidiary of Fiat when it got into financial troubles. Though cars originated from Germany, Germans did not immediately enjoy the full benefits of motoring. Though Daimler-Mercedes luxury cars sold well for the relatively rich it was left for Opel to produce popular priced cars. Opel soon became known in motoring circles as they participated with compatriots Mercedes against the likes of Peugeot, Austin, and Fiat etc. However soon the First World War engulfed Europe, bringing motorcar development to a halt. As the young industry matured, some of its better products became desirable machines for pure pleasure. The Rolls Royce 40/50 model appeared first at the London motor show of 1906. It was called the Silver Ghost inspired by the paintwork on the 13'Th car produced and the uncanny silence of the design compared with its contemporaries. It became the most famous car in the history of motoring. The demand caused the company to drop all other models. It was sold till 1925, one of the longest production runs in the history of motoring. Cadillac had been making high quality four cylinder cars for the US market but had been overtaken by a number of 6-cylinder rivals. The main claim to fame of the Buick Company in its early days was that it became the nucleus of the world's largest motor company, the General Motors. DD Buick made engines for other people's car before making his own cars in 1904. W.C Durant a financier put a large amount of money into the company. Brother's Horace and John Dodge had been engine and chassis suppliers for the Oldsmobile to Henry Ford. Dodge was a relatively late arrival on the North American car-manufacturing scene in 1905.

Post First World War Development

1.1.3 When the First World War ended in 1919 the attitude toward the motorcar had changed drastically. The prejudice against motoring and the motorist had disappeared. In North America a booming market, which favoured the considerable rivalry, between Ford and General Motors, new and improved product could flourish. Henry Ford's model T was a major success. When production ceased in 1927, 15007003 model T's had been built. By 1931, Chevrolet overtook Ford as the world's most prolific make of cars and General Motors has held this position ever since. Chevrolet became part of General Motor's group in 1917. General Motors manufacturing expertise soon boosted the production and enhanced public popularity of the marque. The Chevrolet 6 was one of the cars that enabled General Motors to overtake Ford in 1931. The other large-scale General Motors make, Buick, was also doing well. General Motors launched new makes little different from the existing ones, having a
substantial amount of interchangeable parts to reduce costs. This approach stemmed from marketing needs and introduction of extra franchise outlets. From mid-1930’s fashion changed. Chrysler’s Airflow of 1934 led the way in styling. Though designers had been aware of benefits of styling and smooth shaped bodies, Chrysler put these bodies in the hand of the buying public. Chrysler developed into the world’s third largest motor manufacturer behind General Motors and Ford. General Motors tended to be the leading innovators in mechanical refinement. In 1930, the Cadillac was the first to have synchromesh gears. By the end of 1930’s General Motors had introduced a major new development: fully automatic transmission.

The European motor industry on the other hand, at the end of the First World War, had to go back to 1914 and pick up the pieces. The slump was years away and the time was ripe for an immense expansion of the marketing market. Model T and several other models were reintroduced in the market. The old Oxford was reintroduced with modification. Oxford and Cowley put Morris amongst the industrial giants of Europe. By 1927 Morris had acquired the Wolseley Company, which had at one time been Britain’s biggest car manufacturer. The French automobile industry took on a different complexion after the First World War. Sensing financial troubles ahead the French carmakers launched a whole series of modestly powered cars for the masses. Renault’s range was wide but the company remained very rational at a time of major difficulty in international finances and increased competition. Peugeot however enjoyed excellent sales during this period. French motor industry in the 1920’s was transformed by the efforts of Andre Citroen a production engineer who revolutionized European car manufacturing techniques. The first Citroen was launched in 1919. The 1922 sensation was the type C known as the ‘Citroen Presse’ for its bright yellow bodywork. It was so successful that it killed the French cycle car industry before it was discontinued in 1925. By 1929, Citroen had become France’s biggest car manufacturer with an annual production exceeding 100000, which was equal to the entire output of all its rivals put together and Citroen was regarded as one of the most innovative manufacturers. The Fiat 500 demonstrated the giant Italian company’s determination to provide the widest possible range of cars for the needs of the people, in particular the Italians. In 1924 came the 509, soon to be Italy’s most popular car offered under the new marketing trick of hire purchase. Lancia produced some models in large numbers with some making major impact due to their advanced design. In Germany, after the armistice the car industry was in a poor state for sometime and Germany’s national troubles did not help. Mercedes linked up with founder Daimlers rival Benz in 1926 and started production of a whole series of fine luxury or powerful sports cars some designed by the legendary Ferdinand Porsche. It was left for Opel to produce a car for the masses, which they did in 1924 with the 4112PS, painted green and called Laubfrosch. It was the first car to be made on a production line in Germany, over 100 a day being produced at one time to make it the country’s biggest selling car. In 1928 Opel were bought by General Motors as the giant American corporation expanded into Europe. Aero - engineers turned motorcycle manufacturers Bayerische Motoren Werke (BMW) made inroads into the automobile business. The first original BMW design came out in 1931.
The development of the diesel engine for car use by Rudolf Diesel was a major contribution to motoring technology. Born in Paris but of German parentage he had developed his compression ignition to a stage of working operation. However he was lost from a North Sea ferry and did not live to see his work come to fruition. Mercedes Benz carried out the development work and early 1930’s saw their cars fitted with diesel motors offering exceptional economy though their lack of refinement and modest performance were opposed to the accepted standard of power and luxury associated with Mercedes Benz. More conventional were the products of the Neckersalum Company of NSU. Porsche’s Volkswagen designs were also built for them. The First World War created the state of Czechoslovakia out of the ruins of central Europe. Within its borders was the firm of Nesselndorf. In 1923 the company was reformed as Tatra and its unorthodox designer Hans Ludwinka designed the firms first car. Another car firm to appear in the 1920’s in Czechoslovakia was Skoda. In Sweden, Assar Gabrielson was seeking backing for a firm to assemble cars for Swedish roads. The SKF ball bearing company eventually provided the finance and several prototypes were built in 1926. The resulting car was the Volvo P4. Bugatti catered to the luxury end of the market. In Germany, Porsche rejoined Mercedes Benz then again left Mercedes Benz to go to Austria to join Steyr and then left it to found his own business as an engineering consultant when Steyr- Daimler- Puch were formed. However soon Europe was clouded by war once again.

Post Second World War Development

1.1.4 The motoring scene was quite fine in America after the war due to its almost complete immunity from it. Through the war, motoring had gone on with little change though car development had slowed and so had production. In Europe the industry was crippled with widespread devastation. In USA, factories turned back from wartime production in a short time and by mid 1940’s automobile sales were at an unprecedented level. By mid 1950’s the US industry comprised five major groups: General Motors, Ford, Chrysler, American Motors (formed by union of Hudson and Nash) and Studebaker Packard (which collapsed in 1960). In Europe, Britain was the only country not overrun by warring armies and its motor industry was quite intact. In November 1948 in the London Show the first new design emerged with the Morris Minor making the maximum impact. There was tremendous pressure on the industry to bring it and its product up-to-date. With the merger of the Nuffield group (Morris, MG, Riley and Wolseley) and Austin in 1952 the British Motor Corporation was formed. By this time worldwide demand for cars was immense and British manufacturers worked hard to satisfy it. Vauxhall expanded General Motor’s market in the UK. Nazi occupied Europe showed immense energies in returning to peacetime normality. With Renault’s death, his company and factory were nationalized but it was carried out with minimal political interference and able men were put in charge to run the business in a highly efficient and profitable manner.

Italy remained largely dependent on Fiats for its cars, for Lancia and Alfa Romeo were small in comparison. In the post war years, Italy became firmly
established as the centre of automobile styling with the houses of Pininfarina, Touring, Gilia, Vignale and Fissore among the famous establishments. Their expertise became sought after worldwide and they did much to make the car not only a means of transport but also a desirable possession for aesthetic reasons. Germany’s plight when the war ceased was desperate, with factories in ruins and appalling financial problems. The hopes of the masses for their own cars, which had been raised in the 1930’s, seemed further away than ever. However the Germans set about to rebuild their economy with a will and discipline that were an example to the rest of the world. As a General Motors subsidiary, Opel thrived and generally improved both the quality and the engineering of their cars. BMW survived a severe financial storm to move into the upper reaches of the market place. Daimler Benz also produced substantial number of cars for ordinary motorists as well as many of their more prestigious models with long lasting qualities that were good value for their money. With the 1960’s came a new nation of car builders, which in a short time were to transform the entire motoring scene. Japan did not have a motor industry of significance before the Second World War, and when Datsun produced a near copy of Austin Seven, Herbert Austin did not even try to take legal action to protect his patent. When the first Japanese cars reached western markets, there was a good deal of complacency. The cars were old in design, cramped in accommodation, poor in performance. They were however well finished, sturdy in construction and well equipped for the price. The Japanese listened to the criticism and reacted immediately. In the 1960’s, Japanese penetration into the market was insignificant but was noteworthy in Africa, Australia, Asia and in North America. By 1970’s, Japanese exports to Europe had grown so much that local motor manufacturers were deeply worried and also making complaints of unfair competition, demanding legislation to curb Japanese car import and trying to find ways of reversing the process by selling cars in Japan. In a remarkably short time, Japanese manufacturers had analysed the market need in their export areas, examined what the western customers thought of their existing product, carried out complete redesigns and produced cars which were entirely in the European mould. Early offerings were in the form of Nissan Datsun, which gave a reasonably lively performance, excellent economy and simple reliable construction. Similar was Toyota’s Corolla, soon to become one of the biggest selling cars in the world. These two companies expanded rapidly overtaking Chrysler and eventually outstripping all European manufacturers to become the third and fourth largest car producing companies of the world after General Motors and Ford. Another Japanese company rivalled the two giants for technical advancements. Honda, already the world's biggest motorcycle manufacturer entered the car market with enthusiasm and expertise, producing cars with excellent handling and high quality despite modest pricing.

Other manufacturing nations began to challenge the traditional car making countries as the 20 century moved into its second half. In Sweden, Volvo emerged as a significant exporter of good quality cars. Saab, an offshoot of an aircraft company, which began to rival Volvo on the safety front, gave them competition. In Holland a well-established truck company DAF produced a small car. In Russia, Fiat achieved a deal with the Russians by exporting a complete factory system to build Lada, which
was identical to the Fiat model. In Rumania, Renault did a similar deal. Spain emerged as an important car manufacturing country with General Motors, Ford, Renault, Chrysler/Talbot’s and Fiats. Turkey started building Fiat’s under license. In India, a whole series of outdated cars were manufactured like the Hindustan Ambassador (a Morris Oxford adaptation of the 1960), the Standard Gazelle (Triumph Herald) and the Premier Padmini (Fiat 1100). Iran also assembles cars with British origin. Denied straightforward export markets in many lands, some of world’s biggest manufacturers have subsidiaries or license other companies to make their product in other places. Thus South Africa has thriving Chevrolets, Ford and Leyland factories. South Korea has its own motor industry starting with Japanese cars being built under license, but then the Hyundai Company came up from scratch. Australia has long had its own motor industry with General Motors making its Holden cars. In Brazil, cars are made which bear little resemblance to those made by the parent company—Chrysler, Fiat, Alfa Romeo, and General Motors etc.

As motoring has spread over the world, so has manufacturing expertise with it. Dr Ferdinand Porsche, the brilliant designer foresaw the future of motoring as one in which everyone would be a car owner and he determined to work towards that goal. His major product was a ‘people’s car’ and he decided it should be compact, with enough room for four people. Porsche’s company designed two prototypes and two different forms were built. Financing this project was difficult however an unexpected ally came in the form of Adolf Hitler who was a motor racing fanatic. Aware of Porsche’s design he approved of it and in 1934 ordered the German motor industry to cooperate with Porsche in his design and construction of the people’s car. The car was known as the Kaf-wagen. The government set up a 5 Mark per week savings plan so that the German people could afford to buy the car when it appeared. Over 300000 workers subscribed. Some 300 million Marks were subscribed but after the war it was a major embarrassment to Volkswagen, the company set up to build the car. A complete factory was set up in Lower Saxony to build the car. Some 200 cars were hand built before the war. After the war the strange story of Volkswagen continued. Individuals of the British occupying forces kept the project going as workers slowly revived the badly damaged factory. British and American delegations visited the plant with an aim to take over the plant but rejected it for unfeasibility. Ford turned down the plant flat even when offered for nothing. The worthless object soon became the most popular car in the entire history of motoring reaching a production of some 20 million units exceeding Ford T’s record of over 15 million. At the end of 1947, Heinz Nordhoff was brought in to manage the company and the whole Volkswagen project was returned to German control. After this, the expansion was dramatic. Half a million cars by mid 1953, first million in 1955, 5 millions by end of 1961 and first 10 million by autumn 1965. As the dust of the world war settled, the lead in grand cars was taken by Rolls Royce, which appeared in the same form as in 1934. Design advancements continued over the years. First major technical advancement came in 1959 by General Motors in their Phantom V Limousine. In 1965 Rolls Royce introduced the Silver Shadow with a new chassis, disc brakes on all four wheels, heated rear windows, air conditioning as well as dehumidified and refrigerated air. In
1982 Rolls Royce announced a startling version—the Bentley Mulsanne Turbo with the turbo system providing a massive power boost to the already powerful engine. Rolls Royce led the world in the manufacture of luxury cars. Other companies have also been producing luxury cars. Daimler produced some very refined cars after the world war. Leader in North America has been Cadillac, the top division of General Motors who maintained their position in USA as the more exclusive marque with cars. Ferrari produced some very luxurious and comfortable cars with an immaculate Pinninfarina body. Mesarati is another Italian luxury carmaker. Starting as manufacturers of agricultural machinery, Lamborghini have joined the ranks of Italy’s top carmakers. Even mass-market manufacturers Fiat entered the market. Alfa Romeo has approached the grand car theme but came closest with the GTV of 1980. Daimler Benz were soon in the grand car business and have held their position at the higher end ever since. BMW too makes plenty of moulds in the luxury range.

Industry after 1980

1.1.5 The motorcar, though a hundred year old has had the maximum development effort in the 1980’s. The 1980’s have seen cut-throat competition and the bulk of their efforts are concentrated with improvement in refinement, noise reduction, higher performance and economy. Careful attention has been given to the aerodynamics of the bodywork, reduction in weight and rolling resistance by engine efficiency. Special emphasis has been given to fuel consumption due to the crisis of 1970 and the Middle East wars. Wind tunnel testing for better aerodynamics, high-grade steels to reduce body panel thickness, radial tyres etc to ultimately reducing fuel consumption. Another major movement affecting industry was the anti pollution movement with manufacturers having to pay astronomical sums of money to develop engine and exhaust system to eliminate possible pollutant effect. Research is on for electric cars but their performance has been abysmal. Another possibility explored was to have a hybrid of battery-electric in conjunction with low powered internal combustion. The effort was the Lucas hybrid electric car first shown at the 1982 British Motor Show in Birmingham. Attention to energy conservation vehicles (ECV’s) was preceded by a period when emphasis was on experimental safety in vehicles. Manufacturers improved on crash protection in subsequent production models making them better able to withstand rear end, rollover, side and angular impact damage. Seat belts were made compulsory by legislation. There was a perceptible shift towards diesel as the motive fuel as it was cheaper. Volkswagen was the pioneer, followed by an Audi model and then by Mercedes Benz. There was a major research on the gas turbine engine. In Japan, Mitsubishi was the most enthusiastic user of the gas turbine engine followed by Renault, Porsche, and Ferrari. Another major development was the use of electronics and computers. The German company, Bosch, led the way by developing sophisticated systems giving accurate measurement of fuel delivery. Austin first introduced fuel management systems. Another stress area was search for alternate fuels and several were considered like hydrogen. The world industry at the beginning of the 1990’s is summed up as given. In the USA, the two giant’s General Motors and Ford maintained relatively prosperous positions. Chrysler came to track after a major financial shock. In Germany, Opel (General Motors) and Ford are strongly
entrenched. The Volkswagen-Audi was looking strong. Mercedes Benz and BMW were producing cars for the higher end of the market. Even Porsche was doing extremely well. In France only two manufacturers remain, the Renault and the PSA group consisting of Peugeots, Citroen and Talbot’s. In Britain, Ford is the biggest seller. General Motors has presence in Vauxhall. Certain specialist car builders remain like the Rolls Royce, Lotus and Reliant. Italy’s industry is dominated by the Agnelli family’s Fiat Company, which has absorbed both Ferrari and Lancia. Only major rival is Alfa Romeo, which has become state owned. There are major specialist coachbuilder companies like Pinninfarina and Bertone who have considerable production capacity. Fiats were being sold in Russia, Poland and Yugoslavia. Spain is the manufacturing base for Ford, General Motors and Renault. Sweden sustains two major carmakers, the Volvo and the Saab.

Though there is only a relatively low level of car manufacturing in India, Korea and China, the Orient has emerged as one of the major car making areas around the world. Japan in 1982 overtook US as the major producer of cars. Worldwide, General Motors remained the leading manufacturer, but Toyota and Nissan pushed Ford to fourth place. The Japanese industry comprises Toyota, Nissan, Mitsubishi, Honda, Subaru, Daihatsu, Isuzu and Suzuki. The 1990’s also witnessed a complicated series of linkups forged over recent years aiming at reducing development and research costs, avoiding duplicating research, sharing manufacturing facilities. Examples are the French engine factory at Dourin, a joint operation for Peugeot, Citroen and Renault of France and Volvo of Sweden, and the collaboration of Mazda and Ford in America. Saab of Sweden and Fiat/Lancia of Italy have manufacturing and research arrangements with Mitsubishi. General Motors are in collaboration with both Isuzu and Toyota to build one of the Japanese company’s models in USA etc. The 1990’s have seen some major upheavals; mostly in the way cars have been marketed. With most carmakers almost at the same level of technical evolution, subjective variables like styling, décor, versions etc have become the major variables to promote car sales. Customer satisfaction, value maximization and several other marketing tools have been applied with great vigour to promote car sales. The industry has concentrated their efforts on sensory features, aesthetics and performance. The concept of promoting a World Car has been the major focus of industry worldwide. The attempt is to produce a car at some regional centres in the world and the product should be such as to appeal and sell in markets all over the world. Fiat has already announced and started production of its range of World Cars: the Palio and the Sienna. It is aimed to integrate the world market into one mass market. In 1998 Toyota displayed its Prius concept car, promoted as the hyper car blending a massive power pack to power a small frame. The concept is to promote widespread and responsible commercialisation of ultra light, hybrid- electric vehicles that will bring a quantum change in fuel and emission efficiency. There was cooperation amongst major corporations in a number of fields. Daewoo and General Motors are in negotiations. To start, Daewoo will provide after sales cover to General Motors customers in Korea. Companies are collaborating to avoid competing products. More important is
the effort of companies to fight in new growing markets. The 1990’s have seen a major competition of these global collaborations in India.

Evolution of the Indian Car Industry

1.2 The first car to be brought in India was by an Englishman in Bombay in 1897. There are documented pictures of an 1896 Oldsmobile taken in India, one of the three historic cars imported into India in 1898 and the first American car ever exported. The original owner was Rustom Cama of Bombay who described his car as having a rod for a steering and a bicycle bell for a horn. The car had a chain drive, wooden panels of a dogcart and kerosene lamps. The body was high sprung on dogcart springs. Carriage wheels were made of wood, the ignition system was crude while gears were on the outside of the cars and difficult to control. The first vehicle to be registered in India was a French De Dion Bouton car, imported by the Maharaja of Patiala with an “O” number plate. Due to problems in the availability of petrol, several cars running on alternative motive power like steam and electric cars were brought into India, including a loco mobile steam car by the Nawab of Hyderabad. In Madras, the first automobile was a 1904 De Dion Bouton which today exists in the private collection of Mr. Vijay Mallaya. The first Fiat to be brought to India was a 1902, 12hp. The Maharaja of Gwalior was delivered a 1902 Wolseley car in 1904. A Fiat double decker bus was launched in Bombay, which took a group of journalists for a ride at a speed of 23.68 kilometres per hour. In 1911 the Maharaja of Kota chose for his state car a 20-25 hp Fiat. The sale of Fiats in India picked up in the early 20’s when the 501 was introduced. Fiats popularity in India grew with the 509’s. Barker and Hoopers Company were the dealers for Fiat in Delhi and were also the body makers of the commercial vehicles. The first “Reliability Trial” for motorcars was organized in 1904 with a 1300-kilometer course between Delhi and Bombay for which the Maharaja of Bombay donated a trophy. A De Dietrich car won this. Rolls Royce established its presence only after a 40/50 hp model; christened “The Pearl of the East” won the First prize at the Bombay Motor Show in 1908. There was a heavy influx of cars in 1905, with 70 orders being placed by a Bombay firm. In 1911, because of the Coronation Durbar in Delhi, manufacturers achieved considerable sales. Car companies had their displays and test trials at the Delhi gymkhana’s horse shows where representatives from the companies would encourage their prospective clients to take trials. The major market leaders were Henry Fords Model A and the Austin 7. Cars had to be ordered through agents. Bigger manufacturers like Rolls Royce had their showrooms in Delhi, Bombay and Calcutta. They were advertised in leading newspapers and magazines.

Assembling of cars started late with General Motors setting up operations in Bombay in 1928 followed by Ford Motor Company in Madras in 1930 and at Bombay and Calcutta in 1931. Combined production capacity of General Motors and Fords in India prior to Second World War was a high 96000 unit per annum. The Peninsular
Motor Corporation Limited, Calcutta claims that its sister concern, the G Mckenzie and Company was the first to start assembling motor vehicles from imported components in their workshop in Calcutta in 1926. The National Planning Commission in 1938 set up by the Indian National Congress appreciated the “real long range importance of this new means of transport and its place in India’s planned economy”. In 1942, the Hindustan Motors Limited was set up in Calcutta to assemble and later to manufacture cars in India. In 1944, Premier Automobiles Limited was set up in Bombay to manufacture cars in India with the help of imported completely and semi knocked down kits with the aim of converting them into fully Indian producing units in the years to come. They could get into production only in 1947. The Standard Motors, Ashok Leyland and the Automobile Producers of India Limited submitted their program of manufacture to the Government of India before 1950. Automobile Producers of India later dropped out. In March 1952, Government of India asked the Tariff Commission to enquire and recommend measures for development of the industry. The Commission, in its report in 1953 recommended that only firms which have a manufacturing program should be allowed to operate and firms which only assemble imported completely knocked down kits to be discouraged and terminated within a period of three years. Government kept the industry small and number of makes and models selected for production was kept low commensurate to volume of demand. By the end of 1955 there were six approved manufacturers of automobiles. These were

a) Hindustan Motors Limited, Calcutta
b) Premier Automobiles Limited, Bombay
c) Standard Motors Private (India) Limited, Madras
d) Mahindra and Mahindra Limited, Bombay and
e) TELCO, Bombay

The Government of India, Ministry of Defence, entered the field of automobile production in 1958 through an agreement with MAN of West Germany for manufacture of modified medium trucks by Ordnance Factory. In 1960-61, the agreement with NISSAN trucks of Japan for manufacture of trucks by Ordnance Factories was signed. Protection by the Tariff Commission allowed a sound development of the industry. In 1953 investment of manufacturers with programs for automobile production stood at RS 3 crores. It increased to 6.4 crores in 1956 at the time of the second enquiry by the Tariff Commission. It increased to 16.8 crores in 1959 and to 24 crores by 1961. At the end of the Third Plan period it stood at more than 100 crores. In 1965-66, the duty and tax structure on the automobile industry is given as Table 1.2.1.

Between independence and the entry by Maruti Udyog in 1983, many attempts were made by private and government concerns to produce a wholly indigenous car. Associated Corporation of India Private Limited, Bombay exhibited the Goggomobil at the Auto Technic and Accessories Exhibition in February 1960. This car could seat four, had a 400 cc two-cylinder engine and returned 24 kilometres per litre of fuel. Hans Glas of West Germany originally designed it. In September 1960, the Defence Ministry presented six economy cars. These included the Lloyd Alexander TS, a front
Table 1.2.1 – Tax Structure of Automobile Industry in 1965-66

<table>
<thead>
<tr>
<th>S Nos</th>
<th>Tax</th>
<th>Rate</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Import Duty on Vehicles</td>
<td>9%</td>
</tr>
<tr>
<td>2</td>
<td>Excise Duty on Vehicles</td>
<td>5%</td>
</tr>
<tr>
<td>3</td>
<td>Import and Excise Duty on Tyres and Tubes</td>
<td>8%</td>
</tr>
<tr>
<td>4</td>
<td>Import Duty on Motor Fuels</td>
<td>8%</td>
</tr>
<tr>
<td>5</td>
<td>Passenger and Goods Tax</td>
<td>5%</td>
</tr>
<tr>
<td>6</td>
<td>Sales Tax on Motor Fuels</td>
<td>9%</td>
</tr>
<tr>
<td>7</td>
<td>Motor Vehicle Taxes and Fees</td>
<td>17%</td>
</tr>
<tr>
<td>8</td>
<td>Excise Duty on Fuels</td>
<td>39%</td>
</tr>
</tbody>
</table>

Source: Automobile Industry in India: A Study; Department of Economic and Marketing Research; Hindustan Motors Limited; Calcutta

Table 1.2.2 - Profile for the Year 1997 – 98

<table>
<thead>
<tr>
<th>S. Nos</th>
<th>FIGURES</th>
<th>STATISTICS</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Revenue to the government from auto and auto related industry</td>
<td>Rs 317141.3 million</td>
</tr>
<tr>
<td></td>
<td>a) Excise Duty</td>
<td>Rs 78307.6 million</td>
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<tr>
<td></td>
<td>b) Custom Duty</td>
<td>Rs 101390.3 million</td>
</tr>
<tr>
<td></td>
<td>c) Passenger Taxes</td>
<td>Rs 20270.7 million</td>
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<tr>
<td></td>
<td>d) Vehicle Taxes</td>
<td>Rs 47576.4 million</td>
</tr>
<tr>
<td></td>
<td>e) Road Transport</td>
<td>Rs 6123.9 million</td>
</tr>
<tr>
<td></td>
<td>f) Sales Tax (Motor spirits and lubricants)</td>
<td>Rs 31532.4 million</td>
</tr>
<tr>
<td></td>
<td>g) Octroi Duties</td>
<td>Rs 31940.0 million</td>
</tr>
<tr>
<td>2</td>
<td>Expenditure on roads and bridges (Central and State)</td>
<td>Rs 67396.4 million</td>
</tr>
<tr>
<td>3</td>
<td>Production (in nos.)</td>
<td>4.01 million</td>
</tr>
<tr>
<td>4</td>
<td>Sales (in nos.)</td>
<td>3.98 million</td>
</tr>
<tr>
<td>5</td>
<td>Exports (in nos.)</td>
<td>0.19 million</td>
</tr>
<tr>
<td>6</td>
<td>Gross Turnover</td>
<td>Rs 365410 million</td>
</tr>
<tr>
<td>7</td>
<td>Research and development expenditures</td>
<td>Rs 3335 million</td>
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<tr>
<td>8</td>
<td>Employment (in nos.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Direct</td>
<td>0.20 million</td>
</tr>
<tr>
<td></td>
<td>b) Indirect</td>
<td>10 million</td>
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Source: SIAM Database
engine front wheel drive car with independent suspensions on all wheels. Similar was the HAL developed by the Hindustan Aeronautics Limited of Bangalore. It was similar to the Lloyd Alexander TS but had a plastic resin body especially suited for Indian conditions. The front wheel drive TDE developed by the Technical Development Establishment had an integral gearbox and differential unit. The Datsun was the first attempt of collaboration with the Japanese. The Datsun Bluebird was an improved version. The Komatsu’s “Farmers car Wheel Tractor” was a multi purpose vehicle that could be used for transport as well. Fiat entered into a partnership with Premier Automobiles Limited in 1951 to assemble the Fiat 500, decided to turn into manufacturing the Millicento in 1954 with a minor percentage of local content. This practice continued till 1967 when due to the Mudaliar Commissions recommendations to increase the local contents and the new policies prohibiting foreign equity participation forced Fiat to de-link. It retained only a technical alliance with Premier Automobiles Limited to manufacture Fiat cars in India under license of technology transfer. In 1972 the name Fiat was dropped on the completion of technology transfer and the car was renamed the Premier Padmini signalling 100% Indianisation. In 1964, Premier Automobiles and Fiat launched the Fiat 1100 Delite in India. There was not much change in the model till as late as 1992 when adhering to a new legislation on safety the brakes were changed from single to dual circuit type. Fiats had a booking or waiting period of 8 to 10 years during the 1970’s. Reacting to competition in the 1980’s by the growth of Maruti Udyog, Fiat brought in certain changes in 1985, like replacing the bypass oil circulation system with a full flow system. In 1991 the water jacket in the inlet manifold was brought to facilitate air fuel mixture distribution for more efficient combustion. However competition and laws caught up with Premier Automobiles and the company ceased production especially after the phasing out of its power train due to emission laws. The Tata Engineering and Locomotive Company Limited (TELCO) was founded on the 1st September 1945 with a factory at Jamshedpur to manufacture locomotives and is currently among the largest private sector companies in India. Initially established to manufacture locomotives, TELCO began manufacturing trucks in collaboration with Daimler Benz in 1954 that also owns a 10% stake in the company and started manufacturing Medium Commercial Vehicles (MCV’s) with a 5Tonne payload. It set up its Research and Development facility at Jamshedpur in 1969. In 1969 it got into collaboration with Pawling & Harnischfeger (P&H), USA, for manufacturing cable type excavators and cranes. It introduced 7.5Tonne payload commercial vehicles in 1964 and acquired Investa Machine Tool Company and set up a Machine Tool Division at Pune. In 1967 it set up the Engineering Research Centre at Pune. Since 1969, TELCO has been manufacturing vehicles on its own. In 1976 it manufactured the first commercial vehicle at its second plant at Pune and in 1983 introduced Heavy Commercial Vehicles (HCV’s). In 1986 it developed the first indigenously developed 4Tonne Light Commercial Vehicle (LCV) meeting fuel efficiency norms specified by the government and in 1987 produced the indigenously developed high-end 6Tonne (608) light commercial vehicle. In 1989 it produced the sophisticated LCV commercial vehicle Tatamobile pick-up and in 1991 introduced the first indigenously designed cars- the Tata Sierra and the Tata Estate. The millionth Tata vehicle was produced in
1991. An insight into the impact of the industry on the economy is seen from Table 1.2.2, which gives the profile of Government Earnings and other features for Year 1997-98.

The Indian Economic Scene till the Reforms in India

1.3 On the eve of independence, India was a backward, undeveloped, agricultural economy. However the outstanding industrial events of the 19th century were the decline of the indigenous industry and the rise of the modern large-scale industries. By the last quarter of the 19th century there were 51 cotton mills and 18 jute mills. By the end of 1800's, there were 194 cotton mills, 36 jute mills and coal production had touched 6 million tones per annum. The First World War created enormous demand for factory goods in India and industry prospered, though not at the desired rate. The trend continued during the Second World War, when production shot up by 20%. However, overtime as the struggle for freedom intensified, the rate of industrialization also declined. The growth momentum started with independence. The annual growth rate of gross domestic product (GDP) however remained below 4% until the end of the seventies. The annual growth rate in the Fifties was 3.94% followed by a rate of 3.74% in the Sixties and 3.17% in the Seventies. It was only in the Eighties that the growth rate crossed 5% per annum. Between 1981-82 and 1990-91, the growth rate was 5.68% per annum. However due to the rapid increase in the population since independence the growth rate of per capita income has not shown the desired results. The development process, which took place in India, is explained in terms of certain proposed growth models in the economy and the various policies, especially industrial policies and Licensing policies, which were applied in the country.

Growth Models

1.3.1 Growth Models – the early years saw several growth models being applied to the Indian economy. These were borrowed from more developed countries but were adapted to match the conditions required by the Indian Economy. Two important models need to be discussed, which have to a large extent shaped our economy from the time of Independence to what it is today. These are

Mahalanobis Model of Growth

1.3.1.1 - After independence, the basic objective of our five year plans were “development along socialist lines to secure rapid economic development, growth and expansion of employment…In India, with its diverse and varied resources, conditions are favourable for securing a balanced pattern of development.” 17 The first clear enunciation of strategy for development was by P.C Mahalanobis. He recommended the setting up of heavy industries for rapid industrialization. The approach was adopted from the Soviet Model. Core strategy was rapid industrialization through lumpy investment on heavy, basic and machine building industries. This strategy was
implemented till the 1980’s with a brief gap of about 3 years, from 1977 to 1980, when the Janata party was in power. Based on a long run development strategy, it accorded “greater preference to the long-term development goals by not succumbing to the immediate and short-term goals. Strategy emphasized” 8

a) High saving rate to boost investments to a higher level
b) Heavy industries bias to develop industrial base of the economy
c) Protectionist path to safeguard infant industry
d) Encourage import substitution to promote self reliance
e) Enlargement of opportunities for all

Bonafide achievement of this strategy was 9

a) Increase in saving rate from 7% of GDP in 1950-51 to a high level of 24% by 1990-91
b) Financing the development process till the 7th plan, almost entirely by domestic savings. Only about 1.5% of the finances for development were in the form of foreign saving inflow
c) Develop an industrial base of the economy in the form of heavy industries and infrastructure.
d) Train a large pool of scientific and technical manpower

However certain fundamental failures were

a) Necessitated a heavy pattern of dependence on foreign know-how
b) Heavy population patterns necessitate development of consumer good industries
c) Failure of public sector. Public Sector Undertakings (PSU) have become centres of corruption, inefficiency and labour indiscipline.
d) Heavy trade deficit, which grew from RS 340 Crores in 1950-51 to RS 54200 Crores in 1985-90. 10
e) Public Sector Undertakings not run on commercial lines and the government continued to meet losses out of the exchequer
f) Bureaucrats were given the top posts instead of technical and management experts in PSU’s
g) Subsidies by government to appease certain lobbies

Rao-Manmohan Model of Development

1.3.1.2 The model was introduced in 1991 to chart a new strategy with emphasis on privatisation and globalisation. The changes ushered by the application of this model were

a) Certain areas reserved for public sector were opened for the private sector investment
b) Dis-investment of public sector undertaking
c) Partial de-licensing to accelerate process of private investment
d) Freeing business houses by raising threshold limit in respect of MRTP (Monopolies and Restrictive Trade Prevention Act) companies
e) Approval for Direct Foreign Investment of up to 51% in high priority areas. For proposals involving more than 50% equity, prior clearance of the government to be required
f) Chronically sick Public Sector Undertakings to be referred to a Board for Industrial and Financial Restructuring (BIFR)
g) Greater autonomy to management to improve productivity of Public Sector Undertakings
h) Making economy more porous to exports

The Rao-Manmohan Development Model emphasizes a bigger role for private sector with a much larger quantum of FDI (Foreign Direct Investment). The strategy aims at growth led by exports, reducing the role of state and abandons planning fundamentals yielding to a pattern of development that is more market driven.

The Policy for Industrialisation
1.3.2 – Industrial Policy - Industrial policy is a vast concept. It incorporates fiscal and monetary policies, tariff policies, labour policies and government’s reaction to a plethora of activities like foreign investment, technology transfer even governments attitude towards private and public sector. Ruddar Dutt defines ‘Industrial policy’ as “covering all those procedures, principles, policies, rules and regulation which control the industrial undertaking of a country and shape industrialization patterns”11. At the time of Independence, the need for a policy statement to streamline the direction of industrialization in India was felt. This resulted in the Industrial policy resolution of April 1948.

Industrial Policy Resolution 1948
1.3.2.1 - It proposed a Mixed Economy with clear demarcation between public and private sector. Main features of the policy resolution were
a) Categorization of Industry into four broad categories. The First were industries under direct command of the central government. Second were to be undertaken only by the state. Third group were industries of basic importance and hence necessary for government to plan and regulate them. The fourth category included the remaining industries open to the private sector
b) Foreign Capital – Need to secure foreign capital and enterprise to promote industrialization but “major control to remain in Indian Hands”12
c) Main thrust was to provide a mixed economy

Industrial Policy Resolution 1956
1.3.2.2 - The completion of the First Five-Year Plan and the policy shift towards a “Socialist Pattern of Society” made necessary a new direction to industrialization. The Second Industrial policy Resolution of April 1956 superseded and replaced the resolution of 1948. New Resolution provisions were
a) New Classification of Industries – into 3 categories, more broad in coverage and better defined. They were Schedule A industries, which were exclusive responsibility of the State and listed 17 items. Schedule B industries were state owned but private sector could implement them and 12 industries were listed. Included in Schedule C were remaining industries but subject to controls in terms of Industries (Development and Regulation Act) etc. Private Sector to be encouraged through financial and other aid through financial institutions
b) No policy shift towards foreign capital  
c) Promote a balanced development by removal of regional imbalances  
d) Boost to small industries  
The Industrial Policy Resolution gave a major fillip to industrial development, especially to private sector industries "private sector investment zoomed in the wake of public sector expansion."

**Industrial Policy Resolution 1977**  
1.3.2.3 In March 1977, the Janta Party assumed power and announced its new industrial policy. Policy statement stressed on social objectives of industrialization. The main elements were

a) Small scale sector to get a massive boost
   
   aa) Classification - Small scale industries were classified into three: the Tiny Sector with investment of up to 1 lakh and location in towns with population of less than 50000; the Small Scale with investment of up to 10 lack's (15 lack's for ancillary's) and the Cottage and household industries.

   bb) Promotion Measures included Government expanding the list of reserved industries from 187 to 807 items by May 1978; Setting up District Industrial Centres providing all service and support under one roof; Enlarging the area of operations of Khadi and Village Industries Commission and making suitable technology available.

b) Large-scale sector to be contained in the following areas: Basic industries such as steel, non-ferrous metal, cement, oil refineries etc; capital goods industry; high technology industry and industry outside reserved list for small-scale industries.

c) Promotion to medium and new enterprises to check economic wealth concentration.

d) Public sector role expanded.

e) Technological self-reliance - need for continued inflow of technology in sophisticated and high priority areas where Indian skill and technology is not developed.

f) Foreign collaboration - majority interest to remain in Indian hands.

g) Sick PSU’s - it was recognized that costs could not be ignored and the government was told to take remedial action.

**Industrial Policy of 1980**  
1.3.2.4 The major features were

a) Public Sector Undertaking efficiency to be reviewed

b) Economic Federalism promoted by establishing a few "nucleus plants" in each district identified as backward to generate ancillary and small scale units

c) Investment limit for Small scale units raised to promote growth: Tiny units - from 1 lakh to 2 lakhs; Small scale units - from 10 lakhs to 15 lakhs and Ancillaries - from 15 lakhs to 25 lakhs

d) Promote industries in rural areas
e) Industrial dispersion encouraged to remove regional imbalances
f) Unauthorized excess capacity installed to be regularized
g) Automatic expansion to all industries specified in First Schedule of (Industrial Development and Regulation) Act 1951
h) Industrial sickness to be dealt firmly

The Policy for Licensing
1.3.3 – The Licensing policies were framed with an aim to prevent the uncontrolled growth of industries and to promote a more balanced economic development.

Industries (Development and Regulation) Act 1951
1.3.3.1 - Act was passed in 1951 to implement Industrial Policy Resolution of 1948. Important provisions of the Act were
a) No new industrial units could be set up or substantial expansion to existing capacity or plant made without a license from the Central Government and government could lay down conditions regarding location, minimum production, prices etc
b) Government could investigate certain specified industries or specific undertakings in industries and issue proper directives for industries: which shared fall in production, deterioration in product quality, rise in product prices or movements in these directions; which used resources of national importance and which were managed in a manner likely to harm shareholders or consumer interest
c) Government could take under its management undertakings which failed to carry out its instructions for improvement in management and policies
d) Government can prescribe prices, methods and volume of production and channel of distribution
e) Government can set up a Development Council for individual or a group of industries
f) Units employing less than 100 workers and heavy fixed assets of less than RS 10 lakhs were not required to obtain any license whatsoever

Hazari Report
1.3.3.2 - Over a period of time it was felt that the Industries (Development and Regulation) Act 1951 had failed in certain aspects. The Government, in 1967, nominated Dr R.K. Hazari to review the working of Industrial Licensing under the Act. He presented his report to the government on Industrial Licensing and Planning in 1967. Some facts brought out were
a) Industrial Houses pre-empt and block entry of other, existing or potential entrepreneurs by a policy of submitting multiple applications
b) It did not bring in balanced regional development
c) There was an absence of follow up action once licenses were issued. Companies did not utilize even 50% of the license issued
d) Projected an exaggerated picture of economic development, industrial capacity etc. Large business houses prevented entry by early application of licenses and did not fulfil targets laid down in the plans

Dutt Committee Report
1.3.3.3 - A discussion of Hazari Report in Parliament, prompted Government of India to appoint a committee in 1967 known as Industrial Licensing Policy Inquiry Committee under the chairmanship of Mr. Subimal Dutt. The committee submitted its report in July 1969. The committee recognized the concept of “Large Industrial Houses, as business concerns whose day to day affairs of the concerns are run independently by those with whom the authority rests under proper legal sanction, but the ultimate source regulating overall policies can be traced back to a common authority”. It also defined Large Independent Companies as companies with assets about RS 5 Crores. On this basis, 20 Larger Industrial Houses, 53 Larger Industrial Houses and 60 Large Independent Companies were identified. The aspects on Industrial Licensing as brought about by the Dutt Committee were

a) Share of Large Industrial Houses in proposed investment and import of capital goods. It was found that: 73 Large Industrial Houses accounted for 56% of total proposed investment on machinery by entire private corporate sector; They controlled 60% of value of import of corporate sector; 20 Large Industrial Houses accounted for 41% of total proposed investment in machinery and for 40% in total approved import of capital goods

b) Abuses of system of Licenses – it was not necessary to grant multiple licenses to same House in a given industry or grant capacities higher than necessary. Irregularities did exist in issue of licenses

c) Areas reserved for the Public Sector by the Industrial Policy Resolution of 1956 were opened for private sector on one pretext or another

d) Balanced Regional Development – four industrially advanced states i.e. Maharashtra, West Bengal, Gujarat and Tamil Nadu were able to acquire 62% of the total licenses. Preference to metropolitan town and cities as regards locational concentration of licenses defeats the concept of balanced industrialization

e) Foreign collaboration given licenses even in nonessential consumer goods

New Licensing Policy 1970
1.3.3.4 - On the basis of Dutt Committee Recommendation, following changes were brought about

a) A core list of industries was prepared as included in Schedule A of Industrial Policy Resolution 1956 (as amended from time to time) are reserved for the public sector. Except industries reserved for public sector, Large Industrial Houses could participate in the core and heavy investment sector

b) Reservation for the small scale sector to continue

c) Licensing exemption including that of capacity expansion to be raised from 25 lakhs to 1 crore
Industrial Policy Statement 1973

1.3.3.5 - Modified licensing policy and procedures. Important modifications were
a) Larger Houses (assets more than 20 Crores) could participate in industries in the core sector (included in Schedule A with the Public sector
b) Foreign concerns /subsidiaries could also participate in them
c) Cooperatives and small and medium enterprise to be encouraged for production of mass consumption goods
d) Government would develop joint sector as a promotional instrument in priority areas

In October 1973, government de-licensed 21 industries permitting unlimited expansion beyond licensed capacities to foreign companies and Monopoly Houses in 30 other important subsidiaries. In November 1975 government legalised 25% of unauthorised capacity and another 25% would be covered in 5 years by automatic licensing.

Wave of Economic Reforms

1.4 Economic Reforms – Economic Reforms are covered under the following heads

The First Wave 1985

1.4.1 First Wave- Rajiv Gandhi, the Prime Minister gave a three-pronged growth formula: productivity improvement, modern technology absorption and fuller capacity utilization. The New Economic Policy envisaged a greater thrust for the private sector. The policy focused attention on the dismantling of controls. Major changes initiated were
a) Automatic capacity increase was granted to units wanting to reap scale economies and a 49% rise in capacity for modernization was allowed
b) 23 industries de-licensed for MRTP and FERA provided industrial undertaking was located in any of the centrally declared backward areas
c) Concept of “broad-banding” of licenses was introduced on 11 January 1985 for manufacture of two wheelers to produce any type of two wheelers up to 350 cc engine capacity – scooters, mopeds, motorcycle etc – within the overall licensed capacity. It was extended to another 25 categories of industries
d) Threshold asset limit for companies under MRTP Act raised from RS 20 Crores to 100 Crores
e) Investment above 50 Crores to be cleared only by the Cabinet Committee for Economic Affairs
f) 200 industries in the small sector were de-reserved. Investment limit for small sector to be increased
g) Projects above 50 Crores in Centrally declared backward areas by non-FERA and non-MRTP companies are not required to obtain license from IDRA
h) Number of industries requiring compulsory licensing reduced from 56 to 26
i) Delicensed sector extended to units importing up to 30% of inputs as against 15% earlier
j) Income tax relief under section 80HH and 80I of Income Tax Act to industries in Centrally declared backward areas and for new entrepreneurs
k) A New Export-Import Policy (1985) was announced to facilitate production through easier and quicker access to imports; to bring about import continuity and stability to Exim Policy; to strengthen export production base and to facilitate technological upgradation

The Second Wave
1.4.2 – Second Wave - The first wave of reforms failed to generate the desired results. The balance of trade deficit increased from RS 5935 Crores (for period 1980-81 to 1984-85) to RS 10841 Crores (during 1985-86 to 1989-90). The country was faced with a serious balance of payment crisis and had to approach the World Bank and IMF for a loan of $7 billion. The World Bank-IMF agreed to a conditional loan in that India had to put its economy in better shape. Finance Minister Manmohan Singh submitted a Memorandum of Economic Policies to IMF Managing Director Michael Camdessus on the 27 Aug 1991 as the blueprint to a restructuring of the Indian Economy. The Memorandum contained the targets and methods to bring about structural readjustment of the Economy. The Second Wave of Reforms included the following changes

a) Fiscal policy – included the following steps
   i. Progressive reduction of Public sector deficit from 12.5% to about 7% by mid1990’s
   ii. Union government deficit to be reduced from 9% of GDP in 1990-91 to 6.5% in 1991-92 and 5% in 1992-93
   iii. Strictly control public expenditure and aim at higher tax and non-tax revenues
   iv. Impose fiscal discipline both on Central and State governments
   v. Reduction of subsidies
   vi. Streamline the working of PSU’s

b) Monetary policy
   i. Restrictive monetary policy to check inflationary pressures and support Balance of Payment system
   ii. M3 growth of 13% in 1991-92, in tune with output and inflation targets
   iii. Reserve money to rise by 5.5%
   iv. Slowdown in the growth of broad and reserve money to 11% to 12% in 1992-93

c) Pricing policy
   i. Administered prices to reduce Budgetary subsidies
   ii. Pricing policies to have greater flexibility
   iii. PSU’S to have flexibility in setting their own prices in tune with market forces

   d) External policy
i. Reduce external account deficit to 2.1% of GDP by stabilization and import compression
ii. Maintain external deficit at about 2%
e) Industrial policy
i. Adherence to objectives of poverty alleviation
ii. Higher outlays on elementary education, drinking water supply, assistance to small and marginal farmers etc
f) Industrial policy –Industrial Policy Statement of July 1991
aa) Industrial Licensing Policy
i. Industrial Licensing abolished for all industries except a small list of Industries related to defence, atomic energy, environmental issues etc
ii. Areas where security and strategic concerns predominate, continue to be reserved for the Public sector
iii. Automatic clearance for projects requiring imported capital goods
iv. Automatic clearance for projects where foreign exchange availability is ensured through foreign equity
v. Automatic clearance for projects with CIF value of imported capital goods required is less than 25% of total value of plant and equipment, up to a maximum value of RS 2 Crores
vi. Units to be provided broad banding facility to enable them to produce any article without additional investment
vii. Licensing exemption to be applicable to substantial expansion of existing units
ab) Foreign Investment
i. Approval for Direct Foreign Investment up to 51% foreign equity in high priority industries. Clearance available if foreign equity covers the foreign exchange requirements for imported capital goods
ii. Reserve Bank to monitor the payment of fees, royalties and dividends. Outflows on account of dividend are to be balanced by export earnings over a period of time
iii. Other proposals to continue to require prior clearance
ac) Foreign Technology Agreements
i. Automatic permission for foreign technology agreements in high priority industries up to a lump-sum payment of RS 1 crore, 5% royalty for domestic sales and 8% for exports, subject to total payments of 8% of sales over a 10 year period from date of agreement or 7 years from commencement of production
ii. Other than certain specific industries, automatic permission to be given subject to same guidelines if no free foreign exchange is required for any payments
iii. No permission required for hiring of foreign technicians, etc
ad) Public sector
i. Review of public sector investments to channelise them on high-tech, core and strategic channels
ii. Sick PSU’s to be referred to a Board for Industrial and Financial Restructuring (BIFR)

iii. Limited disinvestments of PSU’s to mutual funds, financial institutions etc

iv. Thrust on performance and accountability

ae) MRTP Act
i. MRTP Act to be amended to remove threshold limit in respect of MRTP companies and dominant undertakings

ii. Emphasize on regulation and control of monopolistic and restrictive trade practices

g) Trade policy
i. Phase out indiscriminate protection policies

ii. Transition from a regime of quantitative restriction to price-based system

iii. Reduce public sector monopoly over imports and exports

Second Memorandum to IMF (1992-93)
1.4.3 – Second Memorandum - It was submitted on the 2 June 1992, and it reviewed targets for the year gone by and laid down revised targets. The IMF after consideration released the bulk of $647 million on 29 July 1992. conditions laid down by IMF and agreed to by India were

a) Net RBI credit to Union Government fixed at the ceiling of RS 984 million

b) Target of 10.4% for broad money growth and 13.4% for reserve money growth for 1992-93

c) Inflation growth rate targeted at 8% for 1992-93

d) Foreign exchange reserves target to be fixed at US $ 5.4 billion

e) Government to refrain from imposing new restriction on imports as well as on payment and transfers from current international transaction

f) Intensify liberalization by: Widen tax base of indirect taxation by cutting down exemptions; Increase pace of public sector disinvestments; Attempt to unify dual exchange rates within 2 to 3 years; Modify FERA

Monetary Policy Reforms
1.4.4 Monetary Policy Reforms – There have been major changes due to the economic policy reforms on the Banking sector and these constitute the Monetary Policy Reforms. Monetary Policy Reforms have a profound impact on the economy as they impact the economy through the process of their effect on credit and money flow in the economy.

Monetary and Banking sector Reforms
1.4.4.1 Monetary and Banking Sector Reforms – considering the various lacunae in the Indian Banking sector the government set up the Narsimhan Committee, under Mr. M Narasimhan to examine all aspects relating to the structure, organisation, function and procedures of the financial systems. While there has been a spectacular progress in the banking system since nationalisation, it was felt that there has been a
serious decline in efficiency and productivity and hence profitability. Five major causes were detected:

a) Directed Investment – sound banking requires maintenance of adequate liquid assets. The Banking Regulations Act 1954 Section 24 had fixed the Statutory Liquidity Ratio at a rate of 25%. Reserve Bank India (RBI) has been empowered to alter it, which it has been doing occasionally and it has gone up to even 38.5%. This is done to reduce commercial bank’s ability to give loans and grants to private industry and to divert bank fund flows towards Government securities, which has an anti-inflationary effect. Narsimhan committee declared this as a fraud perpetrated by the Finance Ministry on the Banks wherein they were cornering up to 38.5% of aggregate bank deposits while paying lower interest than depositors and using it for wasteful expenditures. In addition, under the Reserve Bank of India Act 1934, each bank has to maintain a certain minimum cash reserve with the RBI. The Cash Reserve Ratio (CRR) was 5% against demand deposits and 2% against time deposits. By an amendment of 1962, the RBI was empowered to vary the cash reserve ratio between 3% to 15%. CRR is an important part of the Demand Management Policy and it is estimated that a 1% change in CRR causes a credit squeeze of up to 2300 crores. Taken together, the CRR and the Statutory Liquidity Ratio (SLR) together present as much as 53.5% of the aggregate deposits of banks with the RBI or in Government securities.

b) Directed Credit Program – wherein credit flow is directed to certain specific flow areas designated as priority sectors. However this is at the cost of the quality of loan portfolio. Also shift from security to purpose oriented credit was at the cost of negligence in project appraisals, no collateral’s and no post credit supervision and monitoring.

c) Political and Administrative Interference – a high percentage of the loan portfolio in each sector is contaminated with irresponsible lending

d) Credit subsidy – misconception that socially oriented credit should also be low cost credit

e) High operating costs of banks making them unable to meet the competitive environment

On the basis of these defaults the committee gave recommendations aiming to ensure

a) Degree of operational flexibility

b) Internal autonomy in the decision making process

c) Greater degree of professionalism in banking operations.

Narsimhan Committee Recommendations

1.4.4.2 The Narsimhan Committee recommendations were

a) Directed Investments – SLR and CRR to be reduced. SLR to reduce it to about 25% of net demand and time liabilities (NDTL’s). Less use of CRR as an instrument of money policy and a higher stress on Open Market Operations

b) Redefining the priority sector for directed credit flow and for a general phase out of the directed credit programs.
c) Interest rates to be market determined. All controls on interest rates to be removed
d) Specific proposals for greater efficiency in the Banking structure
e) Setting up of Asset Reconstruction Fund
f) Removal of duality of control between RBI and Banking Division of Ministry of Finance over the banking system
g) Free and autonomous banks

Assessment of Economic Reforms

1.5 After 9 years of the implementation of reforms, an analysis is necessary to understand their impetus and the direction they have given to the economy as a whole. Firstly a few basic indicators of economic growth are considered and analysed. The performance of certain selected indicators from the period from 1950-51 to 1990-91 is first analysed. As the Table 1.5.1 brings out quite clearly industrial production index has more than doubled for the period 1980-81 to 1990-91. The same trend was seen even in the Gross Domestic Product (GDP) at factor costs taking 1980-81 as the base year. Per capita Net National Product (NNP) has not seen the same growth over the same time frame but this has been primarily due to the growth in population over the same period. An important feature has been the growth in foreign trade. Imports increased almost 5 times in the period 1980-81 to 1990-91 whereas exports out of the country increased more than three times. The government made a special effort to promote India to the world. The government organized Trade Fairs of India outside and India was showcased as a country deeply interested in boosting growth through rapid industrialization. Certain changes over the years from 1950-51 onwards are given as Table 1.5.1. After the process of liberalization was set rolling, especially after 1991, there has been a marked improvement in the performance of the economy. Overall economic growth of GDP at factor costs, after rising to 6.3% in 1994-95 accelerated to 7% in 1995-96. This growth was mainly due to an 11.7% growth of industry and construction sector and 7% growth of the service sector. Consequently Gross National Product (GNP) per capita has increased at the rate of 3.9% per annum during the four-year period 1992-93 to 1995-96. A better picture emerges from the table given below. To be noticed is the fact that the growth rate was not due to exceptional agricultural growth. Industrial production, which grew by 2.3% in 1992-93, picked up to 9.3% by 1994-95 and further to 12.4% in 1995-96. Industrial growth actually declined in 1997-98 as compared to 1996-97. In 1997-98 there was a marked decline in the growth rate of industrial production to 4.2%. Within the overall industrial production the average growth rate of manufacturing was 10.6%. This strong growth was reflected in all the sectors. The rate of capital goods sector was particularly strong. However the downturn of 1997-98 affected this sector also and the growth rate of capital goods as per the old index was negative at 4% compared to an increase of 5.9% in 1996-97, 17% in 1995-96 and 24.8% in 1994-95. Even durable consumption goods after having grown at 10.2% in 1994-95 and 36.1% in 1995-96,
Table 1.5.1 – Change in Certain Economic Indicators Over the Years

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<tbody>
<tr>
<td>GDP at Factor Costs(1980-81)Prices (RS 000Crores)</td>
<td>42871</td>
<td>62904</td>
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<tr>
<td>Per Capita RS NNP (at 1980-81) Prices</td>
<td>1127</td>
<td>1350</td>
<td>1520</td>
<td>1630</td>
<td>2222</td>
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<td>Index of Industrial Production (Base 1980-81)</td>
<td>18.3</td>
<td>36.2</td>
<td>65.3</td>
<td>100</td>
<td>212.6</td>
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<tr>
<td>Index of Agricultural Production (Base: 3 year ending 1981-82)</td>
<td>46.2</td>
<td>68.8</td>
<td>85.9</td>
<td>102.1</td>
<td>148.4</td>
</tr>
<tr>
<td>Food grain Production(million tones)</td>
<td>50.8</td>
<td>82.0</td>
<td>108.4</td>
<td>129.6</td>
<td>176.4</td>
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<tr>
<td>Electricity Generated(Billion kWh)</td>
<td>5.1</td>
<td>16.9</td>
<td>55.8</td>
<td>110.8</td>
<td>264.3</td>
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<td>Wholesale Price Index(Base 1980-81)</td>
<td>16.9</td>
<td>19.6</td>
<td>35.5</td>
<td>91.1</td>
<td>182.7</td>
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<td>Consumers Price Index(Base year 1982)</td>
<td>17</td>
<td>21</td>
<td>38</td>
<td>81</td>
<td>193</td>
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<td>Imports at current prices(RS Crores)</td>
<td>606</td>
<td>642</td>
<td>1535</td>
<td>6711</td>
<td>32553</td>
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<tr>
<td>Exports at current prices(RS Crores)</td>
<td>608</td>
<td>112</td>
<td>1634</td>
<td>12549</td>
<td>43198</td>
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NnNP - Net National Product
GDP - gross Domestic Product
KWh - kilowatt -hour
RS - Rupees


Table 1.5.2 – Economic Indicators for the State of the Economy

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<tr>
<td>GDP at 1980-81 prices(RS 000crores)</td>
<td>213.98</td>
<td>224.88</td>
<td>236.064</td>
<td>251.01</td>
<td>268.70</td>
<td>291.90</td>
<td>307.07</td>
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<tr>
<td>Per Capita RS NNP at 1980-81 prices</td>
<td>2175.1</td>
<td>2243.1</td>
<td>2337.2</td>
<td>2473.2</td>
<td>2608.2</td>
<td>2761.4</td>
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<tr>
<td>Index of Industrial Production(Base year 1980-81)</td>
<td>213.9</td>
<td>218.9</td>
<td>232.0</td>
<td>253.5</td>
<td>279.80</td>
<td>304.6</td>
<td>317.3</td>
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<tr>
<td>Index of Agricultural production(Base: 3 year ending 1982)</td>
<td>145.5</td>
<td>151.5</td>
<td>156.8</td>
<td>164.6</td>
<td>166.1</td>
<td>175.7</td>
<td>169.2</td>
</tr>
<tr>
<td>Food grain Production(million tones)</td>
<td>168.4</td>
<td>179.5</td>
<td>184.3</td>
<td>191.1</td>
<td>190.4</td>
<td>199.3</td>
<td>194.1</td>
</tr>
<tr>
<td>Wholesale Price index (Base 1980-81)</td>
<td>217.8</td>
<td>233.1</td>
<td>258.3</td>
<td>285.2</td>
<td>299.5</td>
<td>320.1</td>
<td>336.2</td>
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<tr>
<td>Consumer Price Index (Base Year 1982)</td>
<td>229.0</td>
<td>243.0</td>
<td>267.0</td>
<td>293.0</td>
<td>319.0</td>
<td>351</td>
<td>380</td>
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<td>Imports at current prices(RS Crores)</td>
<td>47851</td>
<td>63375</td>
<td>73101</td>
<td>89971</td>
<td>121647</td>
<td>138919</td>
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<tr>
<td>Exports at Current Prices(RS Crores)</td>
<td>44041</td>
<td>53688</td>
<td>69751</td>
<td>82674</td>
<td>106465</td>
<td>118817</td>
<td>126286</td>
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the rate fell to 5.4% in 1996-97 and 9.9% in 1997-98. This can be attributed to the unsustainable excessive growth rates in the previous years, building up of excessive capacity, cyclical fluctuations to which this sector is subject to, the uneven growths in agriculture production and the sharp fluctuation in exports. Export growth picked up from 1992-93 and each year they have increased by about 20% but this was just balanced by imports increasing by the same magnitude. Foreign trade showed deterioration in 1997-98 as compared to the previous few years. This was mainly because of the debacle in the ASEAN (Association of South East Asian Region) countries causing an unfavourable change in world prices. After having grown at an average annual growth rate of 18% between 1992-93 and 1995-96, exports fell to a rate of 5.3% in 1996-97 and 2.6% in 1997-98. Sustaining a high growth rate in industrial production requires a high level of investment, a steady growth in agriculture and an improvement in the growth of exports. Exports have shown an upward trend again and compared to 3.7% in 1998-99 they posted a handsome growth of 11.6% in 1999-00. What was disturbing was that manufactured products saw the lowest growth of 1.7% followed by 2.8% in primary articles. The changes in indicators after the period 1990-91 are given as Table 1.5.2.

Implication for the Automobile Industry
1.5.1 The Automobile Industry has been one of the main beneficiaries of the reforms. New joint ventures and 100% subsidiaries of multinational auto companies have joined the rank of auto manufacturers. Their intentions and actions have created a multiplier effect on the Indian manufacturers, who were planning to invest on their own for creating additional capacity for new vehicles. These manufacturers have been given an export bias due to three policy regulations and have made them announce their export orientation. More than 60% of this capacity created will be for exports
   a) The government made Memorandum of Understanding (MoU) a condition of granting completely knocked down and semi knocked down (CKD/SKD) import licenses to new joint ventures hence all of them had an incentive to formulate their export plans in fine details
   b) As exchange rate started moving upwards from $/RS 31 to $/RS 41, it made good sense to have large export plans (and indigenise promptly)
   c) Government has reintroduced dividend rebalancing through seven years of exports

The Elements of Reforms have covered seven areas of policy. They are
   a) Fiscal Incentives
      i. Personal and Corporate Tax Rates - lowered
      ii. Peak Custom Tariffs – lowered from 150% to 50%
      iii. Average Tariffs – lowered from 47% to 32%
      iv. No of Duty Slabs – reduced
      v. Rupee Convertible – up on trade and current account
      vi. Simplification and Rationalization - improved
   b) Foreign Investments have been promoted
      i. In priority 35 Industries including Automobile industry: Automatic approval for Equity – up to 51%
ii. SSI Foreign equity – up to 24%
iii. Foreign equity in High-Tech Industries up to 100%
iv. Technology Imports-Automatic approval of lump sum know-how – up to RS 10 million
v. Approval of Royalty – 5% of domestic sales and 8% of exports sales
vi. Specific permission beyond limits on application
vii. Foreign Investment Promotion Board Created – prompt clearances
viii. No dividend balancing except in consumer goods
ix. 100% EOUs allowed
c) Trade Liberalized
i. Licenses minimized
ii. Export – import allowed freely
iii. A small negative list
iv. Free import of second hand machinery
v. Export Promotion Counter Guarantee (EPCG) Schemes
   • Duty exemption
   • Special imprest license
vi. Standardization of input-output norms
d) Financial Sector Reforms
i. Minimum Lending Rate Deregulated
ii. Capital adequacy norms of 8%
iii. Lending and deposit rates beyond 2 years deregulated
e) Capital Market Opened up
i. Over the counter exchange of India established
ii. Stock Holding Corporation of India established
iii. Foreign Institutional Investors allowed entry
f) Removing Infrastructure Bottlenecks- Private sector\ Foreign participation allowed in Petroleum, Roads, Power, Ports, Railways, Telecom, Airways
g) Higher Outlay on Social Sectors

The agenda of reforms is not complete and requires more changes in the following areas at least 17
a) Trade policy
i. Liberalize consumer goods import. Reduce tariffs; replace existing quantitative restriction on imports with appropriate tariffs. Free remaining ‘canalised’ import items
ii. Phase out remaining export subsidies and remove export control, including those on agricultural and mineral items
b) Industrial policy –
i. Systemize licensing procedures and list of reserved product for SSIs (small-scale industries). Expand coverage of automatic approval for Foreign Direct Investment. Clarify regulatory and administrative arrangements for infrastructure investment
ii. Streamline exit policies by comprehensive legal reforms
c) Financial sector
i. Eliminate interest rate control to permit market-determined rates
ii. Phase out reserve requirements to about 10%
iii. Phase out monetisation with further fiscal consolidation
iv. Reduce directed credit
v. Strengthen prudential regulation and financial supervision of banks
vi. Further liberalize, open and deepen the capital market and improve the legal and regulatory infrastructure
vii. Liberalize competition in financial sector through relaxation of entry and exit barriers to domestic and foreign players

Thus economic reforms have opened up a whole new dimension for the Indian automobile industry, long languishing under the impact of heavy protectionism.

**Structure of the Indian Automobile Industry**

1.6 The Industry in India was a well-distributed industry with stress on commercial vehicles. Due to low purchasing power of the customers, the two and three wheeler market thrived

**The composition of the Automobile Industry in India**

1.6.1 In terms of production, after a steady growth in the 70s, the automobile industry witnessed a phenomenal growth at an average of 13.5% to achieve a production level of 2.5 million vehicles in 1983. Over the sectors the growth was uneven in the various sectors. The industry was jolted by a heavy recession at the beginning of the 1990’s but have picked up again after a heavy slowdown. The structure of the industry has changed quite significantly and the industry is today handling large volumes. The deductions that have emerged from the tabulated data for the whole industry can be summarized as

a) The scale of the industry was small till about the 1980’s with a production of 625093
b) Industry became vibrant after 1983 especially after the setting up of the Maruti Udyog
c) Production grew at an annual average growth rate (AAGR) of 13.5% for the period 1983 to 1990 and achieved a production level of 2.5 millions.
d) Over the period 1990-97 there has been a slowdown of the automobile industry and the annual growth rate has dipped to about 6.76%. Production rose from 2464218 in 1990-91 to about 3670650 in 1997-98. This has been mainly due to recessionary trends in 1991and 92 resulting in a negative growth rate in automobile production of 11.14% and 7.88%.
e) Sectoral composition has changed and most of the sectors have grown. The only exception seems to be the moped industry
f) Multi-utility vehicles have grown from 5501 to 134613 over the period from 1960 to 1997. However the growth rates is difficult to calculate mainly because of a reclassification of the sector in 1996
g) Cars have increased in their production from 19097 in 1960 to 401002 in 1997. The share of the sector in the automobile industry has changed over the years
from 27.45% in 1960 to 15.80% in 1970, down to 4.885% in 1980. It increased to about 7.175% in 1990 and to 10.924% in 1997.

h) Commercial vehicles have grown from a meagre 27518 in 1960 to 160998 in 1997.

i) The maximum rate of growth was shown by the two-wheeler sector, which grew from 16878 in 1960 to about 3072667 in 1997. The sector caters to the lower middle class not able to afford the expenses of a car.

j) Three-wheeler showed modest growth as they grew from 496 in 1960 to about 234867 in 1997. However the sector is caught by the increasingly stringent emission norms and a gradual shift towards multi-utility vehicles which are slowly replacing the 3-wheelers as a form of urban and semi-urban transport.

k) Tractors have been an elusive sector to analyse because of the heavy fluctuation in the demand and its dependence on the agricultural sector. Tractor population increased from only 59 in 1960 to about 224802 in 1997.

**Sector Analysis**

1.6.2 The various sectors of the industry have been analysed piecemeal starting with the multi utility sector.

**Multi Utility Vehicles**

1.6.2.1 A Utility vehicle (IS: 14272 Part 1 – 1995 Automotive Vehicles Type Terminology) is one intended to be used for carrying persons and their luggage and load. In addition the vehicle must have:

   i. Front incidence angle of 25°
   ii. Rear incidence angle must be 20°
   iii. Ramp over angle at least 20°
   iv. Ground clearance under front axle must be at least 180 mm
   v. Ground clearance under rear axle must be at least 180 mm
   vi. Minimum ground clearance between the axle must be at least 200 mm

The utility market has grown from around 2000 vehicles in the 1940’s to a figure of 136143 in 1997. The sector once dominated by a single player today has multiple presence of market players. Current players include market leaders Mahindra and Mahindra Ltd., TELCO, Bajaj Tempo Ltd., Hindustan Motors, Maruti Udyog and Global leader Toyota. Current market is around 0.15 million accounting for 4.76% of the global market. Utility vehicle ownership in India is low at about 1.9 per thousand. In India the demand for multi-utility vehicles has been low because of the significant Excise, Sales Tax and Import duty between passenger cars and them. The sector has shown an annual growth of about 7.86% for the period 1983 to 1985. Due to reclassification of the sector products the data is not comparable for the period 1995 onwards. The sector was dominated by the sole producer Mahindra and Mahindra till about 1985. First competition came from Maruti Udyog in the form of their product Gypsy. Mahindra and Mahindra continued their market leadership and even in 1995 they were the market leaders with a market share of about 55.20%. New product offering came from Bajaj Tempo in the form of their 'Trax', the RTV from Hindustan Motors, from TELCO and the latest product offering comes from Toyota with the
launch of their ‘Qualis’ multi-purpose vehicle. In 1998 Mahindra’s actually increased their share in production to about 57.29%, Maruti had about 6.2%, Hindustan Motors had about 2.59%, Bajaj Tempo had about 4.80% and TELCO captured about 29.032% of the market production.

**Passenger Cars**
1.6.2.2 – to be discussed in subsequent chapters

**Two Wheelers**
1.6.2.3 Asian Two Wheeler market sales have grown from under 3 million in 1985 to over 15 million in 1995. Asia’s share in the annual global 2-Wheeler demand increased from under 35% in 1985 to over 75% in 1995 [18]. This trend was due to large population, high GDP growth as well as underdeveloped infrastructure and public transport network. In Asia, China is the market leader with about 51% of the Asian market. India at 19%, Thailand at 10%, Indonesia at 9% and Taiwan at 5% are the other major markets [19]. All major Asian countries are expanding production capacity and this total planned capacity addition is expected to lead to a supply demand mismatch with supply exceeding demand by 25% by 2000 year-end. The global market is dominated by Japanese players either through joint ventures or technology transfer agreements. With over capacity in most markets, exports are a bleak proposition [20]. India has the second largest 2-wheelers market in the world, with sales of over 3 million vehicles. 2 Wheeler ownership has grown from 187,5522 units in 1990 to 307,2667 in 1997-98 registering a growth of 63.82% over 7 years. The scooter market till about the mid-80’s heavily dominated the Indian 2-wheeler market, but the trends are slowly reversing and a shift towards motorcycles can be made out. Bajaj Auto, the local player, dominates the scooter market whereas the motorcycle market is dominated by Japanese joint ventures.

**Commercial Vehicles**
1.6.2.4 In 1956, the Tariff Commission recommended a priority for commercial vehicles, limiting them to three categories of one light vehicle model (1 ton), three models of medium vehicles (3 to 5 tons) and one model of a heavy vehicle (> 5 tons). The first one was the rise of the LCV’s. Till early 80’s commercial vehicles were limited to two Gross Vehicle Weight (GVW) categories of around 4 tons of Bajaj Tempo and 15 to 16 tonnes of Ashok Leyland and TELCO. The LCV market of 4 to 6 tons GVW range began with the four Indo-Japanese collaborations in mid-eighties. Response of TELCO was to design their own LCV’s. Starting from a non-existent market LCV’s now have a 50% share in the commercial vehicles market. Second transformation came during the nineties as the manufacturers filled up the entire GVW range between 2 to 16 tonnes, offering niche products for every market and application. There are 55 models, with several variants covering the entire GVW and payload range. The third transformation in the commercial vehicle segment has been multi-axle vehicles. The demand is growing rapidly, particularly with containerisation, since containers require a low chassis and more axles. The last transformation is yet to come: modernizing bus design. Integrated bus designs and
monocoque bodies to make travel more comfortable. Manufacturers have this capacity but State Transport Undertakings; the largest single buyers so far have been unwilling and unable to buy such vehicles. As the market diversifies, as it is expected to, and private sector operators offer luxury buses and limousines, demand for integrated buses and for fitment of power steering, power brakes and other comfort features will rise. Demands for inter city freight and passenger movement increases with a growing export, increasing urbanization around major centres, a growing economy, a developing economy and inadequacy of Railways. Road transport handles about a little less than 60% of inter city freight and about 80% of inter city passenger travel. Development of an efficient road transport (both freight and passenger) is critical for economic growth. Commercial Vehicle (CV) manufacturing has a substantial depth and considerable competitive scale among automotive industry segment. The Indian commercial vehicle industry is comparable with its global counterparts at around 100000 units each year. However value realized per vehicle continues to be low ($12000 for large selling Indian CV’s as compared to $60000 for HCA’s in Europe). Indian MCV’s have a Gross Vehicle Weight (GVW) of around 16 tonnes compared to 44 tonnes for the European HCV’s. Thus per GVW, Indian CV prices are half of their European counterpart. Two primary reasons for low per unit value:

a) The predominance of MCV’s in India as compared to HCV’s in mature markets due to

i. Obsolete goods transportation practices as compared to mature markets – road transportation practices are outdated. Containerisation of cargo has not taken place. Most goods are manually loaded; lack of enforcement causes hazardous carriage of goods. Globally freight moves between cities in HCV’s and the bulk breaking is done at points outside city limits. Inside city limits LCV’s move freight. This combination is cost efficient, has higher speed, and reduces congestion on the streets and superior fuel efficiency. In India majority of freight carriage is through MCV’s.

ii. Poor road infrastructure which does not support efficient use of HCV’s – India lacks a high quality road infrastructure supported by adequate number of strategically located transhipment points and container ports. Without such a network, the efficiencies to be reaped from these high speed modern vehicles cannot be delivered.

iii. Unwillingness of customers to mobilize funds for higher initial price for better products.

b) The vicious cycle leading to relative technology gaps between Indian CV’s and those in the developed markets stemming from the reluctance of the Indian CV owner to accept the price of technology upgradation - Indian CV’s differ from those in more mature markets in that there is relatively lower technology development of the Indian CV OEM (Original Equipment Manufacturer). There is a basic defect in the demand side of the CV user sector in that it does not encourage technological development and upgradation and though they may satisfy Indian customer’s requirements, they
lag behind international standards. The customer does not demand a higher technology product and is not ready to pay for it when industry offers it as he is trapped in a ‘vicious circle’, which cuts, into his capacity to invest in higher priced vehicles. Major reason is that freight rates have not kept pace with even input prices. Another is the existence of intermediaries between the small road transport operators (SRTO’s) and the consumers, who charge high revenues leading to inequalities in revenue earned leading to low demand and lower incentives for the fleet owner in technology up gradation.

There is a heavy localization of the World Commercial Vehicle Industry, worldwide. Local/regional specific products manufactured by the players dominate the market. Thus 70% of European CV production is sold locally in Europe. Only LCV’s are an exception as they are a standardized product all around in the markets. Industry trends in these sectors are analysed piecemeal

a) Light Commercial Vehicle – In India, this segment is very vital as this segment forms the backbone of the freight movement system. The LCV segment has grown at the rate of 13.93% growing from 27032 in 1983 to 145838 units in 1997. Maximum growth was shown by TELCO, which grew from 3384 units in 1986 to 98748 units in 1997, growing at the average annual growth rate of 40.32%. Bajaj Auto has been the follower and has shown an average annual growth rate of 8.392%. Eicher Motor Limited has also shown a healthy growth trend from 2375 in 1987 to 6589 units in 1997 showing an average annual growth rate of 33.54% per annum.

b) Medium and Heavy Commercial Vehicles – this consists of buses and trucks and heavy load carriers. The truck segment, which had a steady growth in 1970’s and early 1980’s, became slightly sluggish till late 1980’s with a sudden growth of 26% in 1990 and became stagnant in 1991 and declined deeply by 19% in 1992 due to severe recession. The bus segment has not witnessed much growth at all in the middle 1980’s but has improved in the early 1990’s with a 5-10% growth. However with the advent of private sector operators in this sector, the situation is bound to change.

Commercial vehicles have been making increasing developments in product development, technology up gradation and are filling up the gaps in the range of GVW. Commercial vehicle demand has a direct linkage with GDP and industrial as well as agricultural production. Consultant study for the Ministry of Surface Transport estimated the elasticity of demand for all categories of commercial vehicles in 1987. The results are as under in Table 1.6.2.4.

Table 1.6.2.4 – Elasticity of Demand for all type of Commercial Vehicles

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Three Wheelers
1.6.2.5 They were having a steady growth at an average rate attaining a peak of 95528 vehicles in 1990, they were then disturbed by the recessionary two years which brought them down to a low of 66363 vehicles in 1992. Bajaj Auto is virtually the sole producer now. As low cost taxis and delivery vans, three wheelers have grown rapidly in all mega towns, cities, metros, and towns and in intercity traffic. Current growth rates are 40% for domestic sales and over 120% for exports. Large freight or passenger carriers are classified under LCV’s even though they have three wheels. With their tough load and operating conditions, three wheelers face a challenge complying with emission regulations. However they may risk losing current growth momentum, if there is break in continuity. The segment has Bajaj Auto as the leader with other minor manufacturers in the form of Bajaj Tempo Ltd. and Greaves Ltd. Bajaj Auto has increased in production share from 3496 units in 1970 to more than 191848 in the year 1997. Scooters India Ltd. has moved up from 516 units in 1980 to about 16192 units in the year 1997. However the industry is declining.

Operating Characteristics of Vehicles in India
1.6.3 A study “Estimation of Total Road Transport Freight and Passenger Movements in India for the year 2000 AD” Final Report submitted to the Ministry of Surface Transport (Roads Wings) Government of India, by Engineering Consultants Private Limited, (ENCONS) January 1987 carried out in consultations with the Society of Indian Automobile Manufacturers has listed the operating characteristics of a vehicle in India. It becomes pertinent to understand these characteristics to understand the dynamics of vehicular movements in India. These are

a) Buses
i. Utilization % - 80
ii. Occupancy Ratio % - 86
iii. Elasticity of
   • Bus Passenger –Km to GNP – 2.7: 1
   • Bus Passenger –Km to Index of Industrial Production – 1.7: 1

b) Cars
i. Utilization Km/Day –35.0
ii. Occupancy nos. of Persons – 3.2
iii. Elasticity of
   • Car Population to GNP – 1.8: 1
   • Car Population to Index of Industrial Production – 1.2: 1
   • Car Passenger – Km to GNP – 2.1: 1
   • Car Ownership/1000 population to per capita income – 3.1

c) Two Wheelers
i. Utilization Km/day – 13.5
ii. Occupancy Nos. of Persons – 1.5
iii. Elasticity of
   • 2 Wheeler Population to GNP – 4.50: 1
• 2 Wheeler Passenger- Km to GNP – 3.60: 1
• 2 Wheeler Population/1000 population to per capita GNP – 9.50

d) Three Wheelers
i. Utilization Km/day – 91.8
ii. Occupancy nos. of Person – 1.8
iii. Elasticity of
• 3 Wheeler Auto rickshaw Population to GNP – 4.4: 1
• 3 Wheeler Auto rickshaw Passenger- Km to GNP – 4.5: 1

e) Trucks
i. Utilization Km/year – 55176
ii. Average load carried Tonnes – 7.3
iii. Elasticity of Freight Movement by Trucks to GNP - 2.5: 1

f) Total Passenger Transport by Road
i. Elasticity of
• Passenger Transport to GNP – 2.6: 1
• Road Passenger Movement to Population – 4.3: 1

Summary

1.7 The history of the World car industry shows that the industry has grown over the years due to the dedicated efforts of pioneers, engineers and motoring enthusiasts over the years. The industry has grown uniformly over the world in certain developed nations. However the emergence of the modern day car is a result of exploration and assessing the needs and trends over a hundred years. In India, the appearance of cars was in sync with the world car industry however after independence due to the restrictive policies of the government the industry stagnated badly. The industry lagged decades behind its counterparts in the rest of the world. However the need for economic development, the urgent need to save industry from the clutches of bureaucratic control and the economic crisis which the country faced in 1990-91 all contributed to a wave of reforms as was enunciated in the New Economic Policy adopted by the government and which has been followed over the years by successive governments. The shift in the development models adopted by the economy has had beneficial affect on industry. The reforms that have come in over the years have been wide in their scope covering industry and sector specific reforms as well as macro reforms that effect both fiscal and monetary policy. As a result of these policies, there was a massive flow of investments, technology, resources and know-how in the economy. One of the beneficiaries of this was the automobile industry which in many countries has been the vehicle for growth but which was unfortunately languishing in India. The benefits of the reforms as enunciated in the new economic policy have been far reaching for the economy as a whole and the automobile industry in particular as can be seen from the change in the profile of the industry. In most developed economies, the car sector has been the leading sector of the industry. How
have the reforms, enunciated under the aegis of the new economic policy, impacted this sector is the principal objective of the study?

REFERENCES

1. SIAM, Recommendations for Developing Indian Automotive Policy, May 1999, Pg. 1
2. Focus: India Automotive Industry, A Special Indo-British Partnership Publication, 1999, Pg. 8
4. SIAM; Recommendation for Developing Indian Automotive Policy, May 1999, Pg. 2
5. IFC Discussion Document; “Radical Reforms in the Automotive Industry” 1996; Pg 12
6. Adapted from: SIAM, Recommendation for Developing Indian Automotive Policy, May 1999, Pg. 4
7. Planning Commission, The First Five Year Plan, p-44
8. Planning Commission, The Second Five Year Plan, p-1
11. Indian Economy, Ruddar Dutt and Sundram, S Chand and Company, 36 Ed, 1997, p-139
17. Shaping the Indian Automobile Industry, S.G Shah; Society of Indian Automobile Manufacturers; March 1996, pg. 2.03 Source: A T Kearney Global Automotive Practice database
18. SIAM, Recommendation for Developing Indian Automotive Policy, May 1999, Pg. 55
19. Fournir Asian Automobile Report, A T Kearney Analysis, A T Kearney Database, 1995; Pg. 18
20. SIAM, Recommendation for Developing Indian Automotive Policy, May 1999, Pg. 61-62
22. SIAM, Recommendation for Developing Indian Automotive Policy, May 1999, Pg. 68

23. Estimation of Total Road Transport Freight and Passenger Movements in India for the year 2000 AD; Final Report submitted to the Ministry of Surface Transport (Roads Wings); Government of India; Engineering Consultants Private Limited, (ENCONS); January 1987; Pg 24