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Role of Intellectual Property in Auto Industry

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Industry Overview

Invention of wheel has been the most fascinating of all the inventions of ancient times. From inventing wheel to present advancements in automobiles, human mind has given the mankind the most sophisticated technologies through creativity. Automobile Industry has gone through major shifts and drifts as far as technology is concerned, thus giving momentum to the economies of various countries.

Indian Automobile Industry has emerged as one of the fastest growing automobile industries and may become one of the global leaders in following years. It is enjoying major foreign investments since past few years. The Indian automotive industry contributes about 5 percent to India's GDP with turnover of around $34 billion. Presently, the Indian auto industry has a combined manufacturing capacity of about 1.5 million vehicles per annum. It employs 13 million people either directly or indirectly.

According to a report of Ministry of Heavy Industries & Public Enterprises the turnover of the Indian Automobile Industry is expected to rise up to USD 122 Billion in 2016.

Indian Auto Industry is the:

- Largest Three Wheeler Market in the World
- Second largest Two Wheeler Market in the World
- Fourth largest Passenger Vehicle Market in Asia
- Fourth largest Tractor Market in the World
- Fifth largest Commercial Vehicle Market in the World

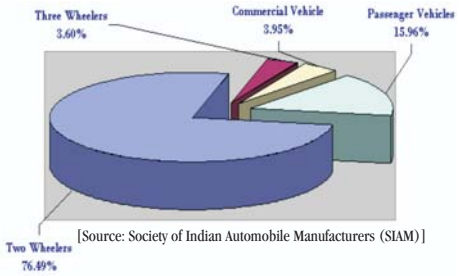
The Indian Automobile Industry comprises of manufacturers, suppliers, dealers, retailers, original equipment manufacturers [OEMs], aftermarket parts manufacturers, automotive engineers, motor mechanics, auto electricians, spray painters or body repairers, fuel producers, environmental and transport safety groups, and trade unions which amounts to more than 800 players.

Major Players

The Indian automobile industry is largely dominated by global automobile manufacturing corporations namely Toyota, General Motors, Ford, Hyundai, Honda, Suzuki and Skoda. These corporations have their presence in almost every country as mergers and joint ventures. However, among Indian automobile manufacturing companies, Tata Motors, Mahindra & Mahindra, Bajaj Auto, Hero Honda, TVS motors and Ashok Leyland predominate.

Hero Honda: Largest Two-wheeler manufacturer in the world.
Bajaj Auto: Second largest Two-wheeler manufacturer in India and the largest 3 wheeler manufacturer.
TVS Motor Co: Third largest Two-wheeler manufacturer in India.
Maruti Udyog: Largest passenger car manufacturer in the country with strategic association of Suzuki.
Tata Motors: Largest automotive player in the Indian industry; launched the Rs. 1 lakh (US$ 2,500) car "NANO". Tata motors are largest commercial vehicle manufacturer in the country.
Hyundai Motors: Third largest passenger car manufacturer in India, has established its manufacturing bases in India.
Ashok Leyland Ltd: Second largest player in M&HCV segment.
Swaraj Mazda Ltd: One of the leading players in the LCV segment.
Volvo India: One of the leading players in luxury passenger buses and heavy duty tippers

Domestic Market Share in 2008-09



[Source: Society of Indian Automobile Manufacturers (SIAM)]

Major Segments

The Indian auto component industry produces a comprehensive range of components which include:

Engine Parts: It comprises of different parts like pistons, piston rings, engine valves, carburetors, crankshaft, sump connecting rod etc. Engine parts form one of the largest product segments of the automotive components industry. The major technical advancements have been in this segment with improved designs for optimal fuel consumption and lesser emission. The Engine parts sector contributes around 31% to the auto components industry.

Electrical Parts: It comprises of generators, starter motors and spark plugs. Electrical parts segment is one of the major upcoming segments of the Indian Automotive components industry. Digital Twin Spark Plug Ignition [DTSI] mechanism in different motorcycles is the latest concept in the automobile industry. Electrical parts sector contributes around 9% to the auto components industry.

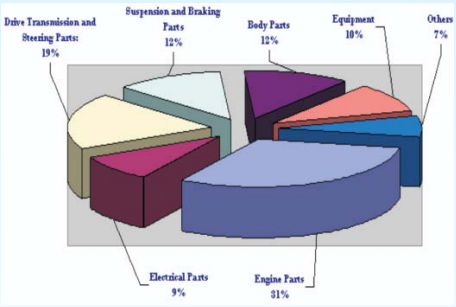
Drive Transmission and Steering Parts: It comprises of gears, wheels, steering systems, axles, and clutches. After the engine parts, this segment is considered the largest product segment contributing 19% to the auto components industry.

Suspension and Braking Parts: It comprises of automobile components like brakes, brake assemblies, leaf springs, shock absorbers, brake linings. Suspension and braking parts segment has around 12% share in the global auto component industry.

Body and Chassis Parts: It comprises of body and chassis, sheet metal components, and plastic-molded parts. This product segment has 12% share in the automotive component and parts industry.

Equipment: The equipment includes those that are used to perform various functions like servicing, repairing, fitting, fixing, cleaning, welding, painting, polishing of automobiles. It comprises wheel aligner, wheel balancers, auto tyre changer, heavy vehicle tyre changer, two post lifts, Collision Repair System, Paint Spray Booth etc. This product segment has 10% share in the auto component industry.

Others: It includes all those additional or supplementary devices or products used in automobiles for various purposes like convenience, appeal, safety, etc. This product



segment has 7% share in the auto component industry.

[Source: Automotive Component Manufacturers Association of India (ACMA)]

Major automotive component manufacturers in India are:

Amtek Auto, Asahi India, Automotive Axles, Balkrishna Industries, Bharat Forge, Bharat Gears, Bosch India, Bosch Chassis Systems, Clutch Auto, Denso India, Exide Industries, Fag Bearings, Gabriel India, Jamna Auto, Jay Bharat Maruti, Lumax Industries, Minda Industries, Motherson Sumi, Munjal Showa, Omax Auto, Pricol, Rane Brakes, Rico Auto, Setco Automotive, Sona Koyo Steering Systems, Subros, Sundaram Clayton, Sundram Fasteners and Ucal Fuel Systems.

Intellectual Property

Since last decade world's industries are going through a period of fundamental revolution due to the rapid development of information technology, utilization and proliferation to most fields of technology. Demand of new product and improved standard of living encourages industries to innovate efficient equipments to keep up with the domestic and international competition.

Renewal and innovation are the key factors for the success and survival of any business. Intellectual Property Rights and associated strategies have stood the tests of time efficiently. The most common ingredient of the success recipe of all business giants is their Intellectual Property (IP) and its proper & strategic protection followed by enforcement and commercialization. IP has become an integral and essential part of business plans and budgets of business houses. Now, Business development and Intellectual Property Rights [IPR] are interlinked in many ways which include:

Development in terms of intellectual capital of an enterprise;

Overall business strategy with respect to Intellectual property and Innovation strategies as part of the agenda;

Vision endorsing the importance of Intellectual property rights and its implementation;

Investment in terms of intellectual property management, product development, and innovation; and

Market hold in terms of new products, competitiveness, and international expansion.

Despite of many development stages and difficulties from invention to prototype and further prototype to actual product stem, intellectual property rights have a great impact on businesses and their competitiveness, success, and development.

Patents

In 1789, the first patent of Oliver Evans for his steam engine laid the stepping stone for the new generation road vehicles. In 1885, Carl Benz successfully developed a road vehicle having internal combustion engines to efficiently powering the vehicles. For that, he received the

patent (DRP No. 37435) for a **Gas-Fueled Car** on January 29, 1886. Benz's **DRP 37435** today is recognized as the official birth certificate of

the motor car.
Carl Benz had started the company Benz & Company in 1883 which became the world's largest manufacturer of automobiles by 1900. On June 28, 1926, Benz and DMG merged as the **Daimler-Benz** company. They adopted all of its automobiles as Mercedes Benz including the most important model of the DMG automobiles, the 1902 Mercedes-35hp. A new logo was created, consisting of a three pointed star (representing Daimler's motto: "engines for land, air, and water") surrounded by traditional laurels from the Benz logo, and the brand of all of its automobiles was labeled Mercedes Benz.

As of today, they are still using the same convention of model names follow the brand name viz. **Mercedes Benz S 350 L, Mercedes Benz ML 350, Mercedes Benz S 320 CDI L** etc.

In 1903, Henry Ford incorporated the Ford Motor Company with $28,000 capital and started manufacturing the Model A car. Beginning in 1906, the company manufactured the Model N. Based on its success, they released the Model T in 1908. It had the steering wheel and entire engine and transmission were enclosed; the four cylinders were cast in a solid block; the suspension used two semi-elliptic springs.

Driving of Model T was very simple and easy with a price at $825 in 1908. By 1916, production exceeded 700,000 units and the sticker price dropped to a mere $345. By 1927, fifteen million Model T's were sold.

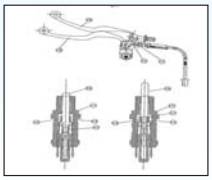
Henry Ford invented a transmission mechanism U.S. Patent 1,005,186 in 1911 and a plastic-bodied car in 1942. He also invented the first one-piece engine, the V-8. Ford fought and won a patent battle with George B. Selden, who was being paid royalties by all American car manufacturers for his patent on a **"road engine". Henry Ford had succeeded.**

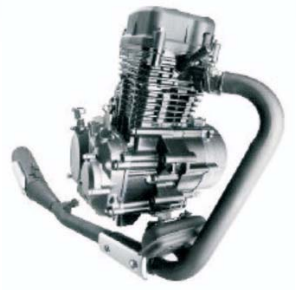
In 1886, Robert Bosch incorporated the Bosch Company in Germany. The Bosch automotive is pioneering in automobile parts viz. spark plug, batteries, wiper blades, lighting, horns, brake systems, lubricants and other accessories. Bosch invented the spark plug in 1902 and sold its 10 billionth piece in 2007. Some of the most popular automotive technology innovations like Common Rail Systems, ABS and ESP are Bosch innovations. The company holds around 77,000 patents, patent applications and registered designs around the world. In 2007 alone, Bosch filed over 3200 patent applications across the globe.

Bosch started its operations in India since 1951 and is still the single largest auto component, manufacturer and the largest Indo-German company in India. The Bosch has developed the gasoline systems, brakes and auto electrical parts of the world's most economical car – TATA Nano. Fuel injection systems for diesel traction on the Indian Railways are supplied by Bosch.

The Bishop group, well known for its power steering technology, currently has more than 500 patents and patent applications from which it earns more than $7 million each year in royalties. Ninety per cent of this comes from licensees overseas and 25 per cent of motor vehicles produced every year incorporate Bishop technology.

The modern automobile is the outcome of 100,000 patents and dedication of millions of inventors. The process of invention in the automobile sector is still going on. Smaller companies are making their presence through the innovations in grey areas and getting bigger and bigger day by day.





The **DTSi** (digital twin spark ignition) [Patent No. 195904], **'SNS'** [Patent No. 234044] and **'ExhausTEC'** [Patent No. 231498] technologies of Bajaj Auto are the latest examples of revolutionary growth of a company through R&D efforts. Years back, Bajaj auto was considered as King of Indian Scooter industry with no direct link to Motorcycle manufacturing. Now, they have almost shut down the production of Scooter and are a leading name in Motorcycle with stock shares twice higher than Hero Honda. While Hero Honda was not inventing with time, Bajaj has been constantly innovating. The Splendor was still the same Splendor for more than 10 Years but, the Pulsar has undergone 4 up gradations in 5 years.

From last five years Indian Automotive Industries have filed many patent applications and using the same technologies in their product line to overwhelm the market competitions.

In last five years:

Ashok Leyland Ltd has filed 11 patent applications in India.

Bajaj Auto has filed 45 patent applications in India.

Clutch Auto has filed 3 patent applications in India.

Exide Industries has filed 3 patent applications in India.

Ford has filed 8 patent applications in India.

General Motors has filed 77 patent applications in India.

Gabriel India has filed 3 patent applications in India.

Honda Motor has filed 376 patent applications in India.

Hero Honda has no record on patent filing.

Hyundai Motor has filed 74 patent applications in India.

Maruti Udyog has filed 2 patent applications in India.

Mahindra & Mahindra has filed 51 patent applications in India.

Minda Industries has filed 4 patent applications in India.

Motherson Sumi has filed one patent application in India.

Tata Motors has filed 159 patent applications in India. Tata Motors has filed 34 patent & design applications alone for the car "TATA NANO".

TVS Motor has filed 69 patent applications in India.

LML Limited has filed 3 patent applications in India.

Patent's Technology Landscape

In last 10 years, the automotive industry is highly active in protection of its IP and doing extensive research and development to overcome the current competitive market force. The following data is just an overview of this activity in terms of patent filings in specific automobile sectors:

Sector	Foreign Filings	Indian Filings
Pistons	33	10
Engine valve	34	5
Carburetors	1500	2
Fuel delivery system	20	13
Spark plugs	2000	3
Gears	344	39
Wheels	1000	400
Steering	1068	155
Axle	162	50
Clutch	480	222
Starter motor	600	6
Leaf spring	10	6
Brake	922	318
Shock absorber	94	34
Brake lining	12	6
Body	975	16
Wheel aligner	13	0
Wheel balancers	9	0
Tyre	112	179
Rim	55	2
Seat Belt	117	15
Seat	1404	60
Safety device	192	35
Door lock	256	45
Oil pan	7	1
Filter	145	25
Cooling Fan	17	5
Window glass	91	3
Wiper	460	18

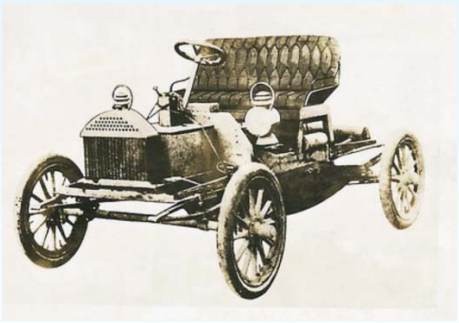
Major Automotive Clusters:

West: Mumbai-Pune-Nasik-Aurangabad;
South: Chennai-Bangalore-Hosur; and
North: Delhi-Gurgaon-Faridabad.

Designs

The aesthetic look of an automobile is the ultimate commercial feature of any automobile company. The Mercedes, GM, Honda, Toyota, Tata, Bajaj and many more have already established their own brands with unique design impressions on a customer. They are changing their product lines both in functional and aesthetic terms in accordance with the changing consumer tastes.

The wooden frame of 19th Centaury Motor



vehicle has been dramatically changed now with the advent of new technologies and aesthetic designs. The introduction of steel, aluminum, fiberglass, PVC sheets enabled the designers to create shapes with more freedom and imagination.

In 1915 **H.J. Hayes** introduced a new solution: a **body** with **structural functionality,** with benefits in terms of lower costs and reduction of noise and vibration. In this car the body panels had a tubular shape and provided the necessary stiffness, while the

engine and the suspensions were mounted on a horizontal floor-pan. In the same years **Edward G. Budd** proposed a car **made entirely of steel.**

In 1922 the **Lancia Lambda** stirred a revolution in the evolution of chassis design. It was created by Vincenza Lancia, who found his inspiration in the monocoque structure of boats.

With the Lambda, for the first time, the structural issues of both the body and the frame found a common solution. Lambda's structure was entirely made in steel.

Automotive design reached a turning point in 1924 when the American national automobile market began reaching saturation. To maintain unit sales, General Motors head Alfred P. Sloan Jr. devised annual model-year design changes to convince car owners that they needed to buy a new replacement each year. GM surpassed Ford's sales in 1931 and became the dominant player in the industry thereafter. The frequent design changes also made it necessary to use a body-on-frame rather than the lighter, but less flexible monocoque design used by most European car makers.

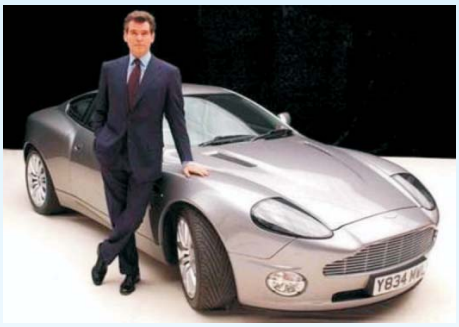
The designs of automobile have also taken a major role on the **Big Silver Screen,** and remind us of our childhood or a certain phase

Automobile classification based on design

Car	Examples
Micro car	BMW Isetta, Smart Fortwo
City Car	Daewoo Matiz, Renault Twingo, Toyota Aygo, VW Lupo
Subcompact car	Hyundai Accent, Ford Fiesta, Opel Corsa, Suzuki Swift
Compact car	Ford Focus, Toyota Corolla, Opel Astra, VW Golf
Mid-size car	Ford Mondeo, Opel Vectra, Toyota Avensis, VW Passat
Entry-level luxury car	Alfa Romeo 159, BMW 3 Series, Audi A4, Mercedes C-Class, Volvo S60
Full-size car	Ford Crown Victoria, Holden Commodore, Opel Omega, Chrysler 300C
Mid-size luxury car	Audi A6, BMW 5 Series, Jaguar XF, Mercedes E-Class
Full-size luxury car	Audi A8, BMW 7 Series, Jaguar XJ, Maserati Quattroporte, Mercedes S-Class
Sports car	Chevrolet Corvette, Porsche 911
Grand tourer	Jaguar XK, Maserati GranTurismo
Supercar	Bugatti Veyron, Ferrari Enzo, Lamborghini Gallardo
Convertible	BMW 6 Series, Mercedes CLK, Volvo C70, VW Eos
Roadster	Audi TT, BMW Z4, Opel GT, Porsche Boxster, Lotus Elise
Compact minivan	Mazda5, Opel Zafira, Renault Scénic, VW Touran
Minivan	Ford Galaxy, Toyota Previa, Renault Espace
Mini SUV	Daihatsu Terios, Mitsubishi Pajero iO , Suzuki Jimny
Compact SUV	BMW X3, Ford Escape, Honda CR-V, Subaru Forester, Toyota RAV4
Mid-size SUV	BMW X5, Ford Explorer, Jeep Grand Cherokee, VW Touareg
Full-size SUV	Cadillac Escalade, Chevrolet Suburban, Range Rover, Toyota Land Cruiser
Mini pickup truck	Chevrolet Montana, Fiat Strada, Volkswagen Saveiro
Mid-size pickup truck	Chevrolet Colorado, Ford Ranger, Mitsubishi Triton/L200, Nissan Navara
Full-size pickup truck	Dodge Ram, Ford F-150, Nissan Titan

of life. This is one of the prime examples of how brand or design can make an everlasting impression.

Herbie - The VW Beetle.
Back to the Future - The Delorean
James Bond 007 - The Aston Martin.
The dukes of Hazzard - 1969 Dodge Charger.
Beverly Hills Cop - The Red Ferrari.



Knight Rider - The Pontiac Firebird Trans Am
Gone in 60 Seconds - The 1967 Shelby GT 500 Mustang.
Back to the future - 1981 DeLorean DMC 12
The Herbie Series - 1963 Volkswagen Beatles
Mr. Bean - The good old mini
The Fast and furious – Mitsubishi Eclipse, Mazda Rx8, Toyota Supra
Thunderbirds - The Pink Rolls Royce

Transporter - Audi A8

Branding & Trademarks

Brand value is determined if a consumer is willing to pay more for one brand over the other and it is not always the product that makeup the brand value. Brand value creates an image of desirability. BMW 3 Series tops 20 cars of all global sales, but is still one of the top grosser for the BMW. And, Trademark is always synonym to that Brand.

There are brands which were defined by products:

- Ford and Holden for well engineered large cars developed for local conditions.
- Toyota and Nissan for their compact and midsized cars.
- Mitsubishi are known for their intermediate size cars like Magna and Diamante.
- Hero Honda for their low maintenance bike.
- Rolls Royce for their luxury automobiles.
- Ambassador cars for political leaders in India.
- Maruti 800 & ALTO for the middle class family cars.

These companies and many other car companies have created a niche in a specific field and then moved on to other segments encashing their brand value. Companies like Mercedes can no longer be defined by a product niche as they cater a feel of exclusivity. They downsized the brand to fit in the market like production of A class Hatchback instead of C class. They established a production in Alabama to convince people that they are no longer made in Germany thus improving their Branding and strengthening their trademark.

Leading car companies like TOYOTA had to pay special attention to make its name and trademark a global success. They modified the name Toyoda to Toyota to make it catchier in 1936 and the logo started appearing in 1990-91.

The current Toyota Mark consists of three ovals: the two perpendicular center ovals represent a relationship of mutual trust between the customer and Toyota. These ovals combine to symbolize the letter "T" for Toyota. The space in the background implies a global expansion of Toyota's technology and unlimited potential for the future.

A survey conducted by consultancy firm Interbrand and Business week for the annual best global top 10 brands in order and values are as follows:

Brand	Brand Value [USD]
Toyota	$ 34b
Mercedes-Benz	$ 25.6b
BMW	$ 23.3b
Honda	$ 19.1b
Ford	$ 7.9b
Volkswagen	$ 7b
Audi	$ 5.4b
Hyundai	$ 4.8b
Porsche	$ 4.6b
Lexus	$ 3.6b

Indian Companies have grown in automobile industry using global name and technology. The Maruti Udyog Limited came into existence in 1981 but after their merger with Suzuki in 1991 they surpassed their close rivals Tata Motors and Mahindra and Mahindra in less than a decade.

Maruti Suzuki which is the current leader in car manufacturers in India has 25% of its shares to Indian Financial Institution and 54.2% by Suzuki Japan. The success of joint venture led Suzuki to increase its equity from 26%-40% in 1987 to 50% in 1992.

These instances showed how the brand value and trademark of a company helped the automotive brands to expand and create a new market through merger and technology sharing. It also showed how brand management can create more revenue.

Conclusion

Indian Auto Industry is now pacing up with the impact of Intellectual Property [IP] in their business field. But, they are still way behind in comparison to US and European Auto Industry. Growing with IP should be new mantra for Indian Auto Industry. The IP should be incorporated in an industry with a long term vision. Identifying, recording and registering of own IP should be in company agenda.

Indian Auto industry has to realize that an intellectual property right is the essence of present knowledge economy and would be able to hold the industry against strong competitive market force. That would ultimately lead to a new future for Indian business and would participate in making the economy stronger by enriching it with new technologies.

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