

Research Paper

NANO THE PEOPLE'S CAR



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PREFACE

The people's car Tata Nano will be the reality of a dream for not only the homeland but throughout the developed world. The reaction of David Richards, CEO of Austin Martin just few minutes after the unveiling of the Nano at the Geneva Motor Show March 2008, "There are so many beautiful cars around but you guys have stolen the show". A visibly thrilled Ravi Kant, Managing Director, Tata Motors replied, "Coming from you that's a great compliment".

Despite being born to luxury, Ratan Naval Tata had felt for the Indian families riding four persons on a bike, and thought of a machine – a so called dream of these families. This dream machine – Tata Nano was launched on January 10, 2009 at Pragati Maidan, New Delhi after of all the odds (from Singur to Sanand) and critic's pessimism.

The flutter created by the Nano will not subside soon. This car costing about a lakh rupees (\$ 2,500) is half the cost of the next cheapest car made in China (about \$ 5,000). It reportedly meets the required benchmark on safety, fuel efficiency and emission norms.

People world over were keen to see what Tata Motors' People's Car looked like, and know more about it. The Tata Motors website saw nearly 7.9 million hits on January 10 (the day the Nano was unveiled), while the Tata Nano website saw 4 million hits in 30 hours, making these sites among the busiest in the world.

We are often been told by the likes of Management Guru C. K. Prahalad that there is enormous opportunity at the bottom of pyramid and Nano is yet one more example.

This paper studies the beginning of the new era in Indian Automobile Industry, with the rebirth of the concept of People's Car – only this time ... in India. This paper forms part of the GMCS course of The Institute of Chartered Accountants of

India, conducted at Lala Lajpatrai Institute of Management, Lala Lajpatrai Marg,
Mahalaxmi, Mumbai – 400 034, India.

We have compiled this from various news sources, journal, websites and books.

But the real big story behind Nano cannot be described in words.

Genesis of the DREAM

Tata Nano may not need any introduction. Tata Nano is a city car – a small, affordable, rear engine, four-passenger car aimed at Indian market – presented by India's Tata Motors first at the ninth annual Auto Expo on 10th January, 2008 at Pragati Maidan in New Delhi, India. The word Nano is derived from the Greek root “Nanos”, which means dwarf – as in nanometer. ‘Nano’ also mean small in Gujrati, the native language of the Tata family, founders of the Tata group. It's the world's cheapest car produced by Indian car manufacturer Tata Motors, priced for One Lakh Rupees only (\$2,500). Tata Nano is reportedly going to be exported to other car markets in different parts of the world. Now, let us take a look at the background story of Tata Nano, dubbed as “people's car” and what the concept of “people's car” is all about.

History of Economy Cars

At the birth of the car, in 1890's it was considered a replacement for the carriages of the rich, or simply a toy. Later during 1908-27 Fords Model T was considered to be the first true economy car because previous vehicles were ‘horseless carriages’ rather than practical cars.

At the New York Motor Show in January 1915, William Durrant the Head of Chevrolet and the founder of General Motors launched the Chevrolet Four-Ninety, a stripped down version of the Series H to compete with Henry Ford's all conquering Model T.

The subsequent decades led to economical cars that reflected the needs of the creators. The cycle car was an attempt in the period before 1922 in the post First World War austerity period, as a form of ‘four-wheeled motorcycle’ with all the benefits of a motorcycle and side-car in a more stable package.

In 1923, Chevrolet tried again with the Chevrolet Series M 'Copper-Cooled', air cooled car, designed by General Motors genius engineer at AC Delco, Charles Kattering.

But by far, the most development occurred in Europe. There was less emphasis on long-distance automobile travel, a need for vehicles that could navigate narrow streets and alleys in towns and cities (many were unchanged since medieval times), and the narrow and the widening roads commonly found in the European countryside.

In the 1930s, Fiat in Italy produced the advanced and very compact Topolino or 'Little Mouse', the precursor of the 1950s Fiat 500. It was a similar size to the Austin Seven but much more advanced than the Seven which was produced with updated restyled body until the Second World War, but still on the early 1920s Chassis.

The Volkswagen Beetle would be the longest lasting icon of the 1930s era. Adolf Hitler admired the ideals exemplified by the Ford Model T and sought the help of Ferdinand Porsche to create a peoples car - literally Volkswagen, with the same ideals for the people of Germany. More than 70 years down the line, with brands like Lamborghini, Bentley, Audi, Škoda and others, Volkswagen hardly has any car under its product line which a common man could afford.

In the 1960s, the Renault 4 (arguably the first five door hatchback) was launched in France. In layout it was an economy car version of the Citroen Traction Avant. Citroen responded with 2cv based 1960 Citroen Ami and 1967 Citroen Dyane.

In 1964, Fiat designed the first car with a transverse engine and an end-on gearbox – the Autobianchi Primula, that was developed into the Autobianchi A112 and Autobianchi A111. They were only sold in mainland Europe where they were popular for decades but virtually unknown in the UK.

In 1983 Fiat launched next step forward in small car design, the Fiat Uno. It was designed by Giorgetto Giugiaro's ItalDesign. The tall square body utilizing a Kamm tail achieved a low drag coefficient of 0.34 and it won much praise for a airy interior space and fuel economy.

However, the narrow profit margins of economy cars caused financial instability for the manufacturers Volkswagen in the 1970s and Ford in the 1920s almost collapsed because of their one model economy car policies. Ford was saved by the Model A and Volkswagen was saved by the Golf. Ford started the Mercury and Lincoln brands to diversify its product range.

The Indian Revolution – Tata Nano

India has become one of the fastest-growing car markets with a preference towards cheap basic cars. With response to these requirements a *small* idea was taking birth in India. In 2003, almost a century later from the inception of the concept of economy car by Ford, Ratan Tata, chairman of Tata Motors with his four member team, came up with the idea of making world's cheapest car, inspired by the number of Indian families travelling with two-wheeled rather than four-wheeled vehicles. Cars, thought to be a thing of luxury, always eluded the common man, due to their high prices. The car is based on a vision from Ratan Tata, who said, "I observed families riding on two-wheelers – the father driving the scooter, his young kid standing in front of him, his wife seated behind him holding a little baby. It led me to wonder whether one could conceive of a safe, affordable, all-weather form of transport for such a family. We are happy to present the People's Car to India and we hope it brings the joy, pride and utility of owning a car to many families who need personal mobility."

Design engineers first came up with a car which had bars, instead of doors, along with plastic flaps which would protect the passengers from rain. However, that design looked poor and the company turned it down. In the following chapters we

shall get on a journey with the nation's largest conglomerate taking us from its ***small*** idea to this idea becoming the next ***big*** thing.

The Company

Tata Motors

Tata Motors Limited is a multinational corporation headquartered in Mumbai, India. Part of the Tata Group, it was formerly known as **TELCO**. It is India's largest company in the automobile and commercial vehicle sector, and a mid-sized player on the world market with 0.81% market share in 2007 according to OICA data. The OICA ranked it as the 19th largest automaker, based on figures for 2007 and the second largest manufacturer of commercial vehicles in the world. The company is the world's fourth largest truck manufacturer, and the world's second largest bus manufacturer. In India, Tata ranks as the leader in every commercial vehicle segment, and is in the top 3 makers of passenger cars.

Tata Motors is a part of the Tata Group manages its share-holding through Tata Sons. The company was established in 1945 as a locomotive manufacturing unit and later expanded its operations to commercial vehicle sector in 1954 after forming a joint venture with Daimler-Benz AG of Germany. Despite the success of its commercial vehicles, Tata realized his company had to diversify and he began to look at other products. Based on consumer demand, he decided that building a small car would be the most practical new venture. So in 1998 it launched Tata Indica, India's first fully indigenous passenger car. Designed to be inexpensive and simple to build and maintain, the Indica became an instant hit in the Indian market. It was also exported to Europe namely the UK and Italy. Since then it has never looked back. In 2004 it acquired Tata Daewoo Commercial Vehicle and in late 2005 it acquired 21% Aragonese Hispano Carrocera giving it controlling rights of the company. It has formed a Joint Venture with Marcopolo of Brazil and introduced low-floor buses in the Indian Market. Recently it had acquired British Jaguar Land Rover (JLR) business, which also includes the Rover, Daimler and Lanchester brand names.

Tata Motors Limited is India's largest automobile company. It is the leader in commercial vehicles in each segment, and among the top three in passenger vehicles with winning products in the compact, midsize car and utility vehicle segments. Tata Motors' presence indeed cuts across the length and breadth of India. Over 4 million Tata vehicles ply on Indian roads, since the first rolled out in 1954. The company's manufacturing base in India is spread across Jamshedpur (Jharkhand), Pune (Maharashtra), Lucknow (Uttar Pradesh), Pantnagar (Uttarakhand) and Dharwad (Karnataka). Following a strategic alliance with Fiat in 2005, it has set up an industrial joint venture with Fiat Group Automobiles at Ranjangaon (Maharashtra) to produce both Fiat and Tata cars and Fiat powertrains. The company is establishing a new plant at Sanand (Gujarat). The company's dealership, sales, services and spare parts network comprises over 3500 touch points; Tata Motors also distributes and markets Fiat branded cars in India.

Tata Motors have some distinct advantages in comparison to other multi-national competitors especially a cost advantage as labor costs for Tata Motors is 8-9 percent of sales as compared to 30-35 percent for most multinational companies. Another advantage in the increasing demand is in its own backyard, India due to infrastructure developments and rising GDP. India remains one of the few developing auto markets where domestic brands have managed to keep a large presence, Tata and fellow compatriots account for more than 60% of the passenger vehicle sales and 95% of commercial vehicle sales. There are also favourable Government policies and regulations in place in order to help boost the auto industry. However, Tata has not been able to capitalize on its global presence. Tata relies heavily on its sales in India and has not yet managed to create a foothold in international markets even though it has a number of well reputed subsidiaries. However, Tata Nano may boost its international presence at least in developing economies.

Ratan Tata: The VISIONARY

Ratan Naval Tata is the present Chairman of the Tata Group, India's largest conglomerate founded by Jamsedji Tata and consolidated and expanded by later generations of his family.

He joined the Tata Group in December 1962, after turning down a job with IBM on the advice of JRD Tata. He was first sent to Jamshedpur to work at Tata Steel. He worked on the floor along with other blue-collar employees, shoveling limestone and handling the blast furnaces. Ratan Tata, a shy man, rarely features in the society glossies, has lived for years in a book-crammed, dog-filled bachelor flat in Mumbai's Colaba district.

Awards and Recognition

On the occasion of India's 58th Republic Day on 26 January 2000, Ratan Tata was honoured with the Padma Bhushan, the third highest decoration that may be awarded to a civilian. On 26 January 2008 he was awarded the Padma Vibhushan, the second highest civilian decoration.

He recently received an honorary doctorate from the London School of Economics and Indian Institute of Technology Kharagpur. He was listed among the 25 most powerful people in business named by Fortune magazine in November 2007. In May 2008 Mr Tata made it to the Time magazine's 2008 list of the World's 100 most influential people. Tata was hailed for unveiling his tiny Rupees one lakh car 'Nano'.

On 29 August 2008, the Government of Singapore conferred honorary citizenship on Ratan Tata, in recognition of his abiding business relationship with the island nation and his contribution to the growth of high-tech sectors in Singapore. Ratan Tata is the first Indian to receive this honour.

After the 26 November 2008 Mumbai attacks, Forbes opined Ratan Tata be brought into politics, calling him India's most respected business leader.

In 2009 he was appointed an honorary Knight Commander of the British Empire.

Global Scenario ... Launch of Nano

“The collapse of the global financial sector, the consequent lack of access to credit and working capital, along with the meteoric rise in commodities and fossil fuel prices, have collectively had an unprecedentedly devastating effect on the global automotive sector.

The passenger car and utility vehicle segments have been particularly hard hit and almost all automobile companies have been facing operating losses... The most visible disruption in the industry was, without doubt, the collapse of two of the three major U.S. car makers that filed for bankruptcy...

Worldwide car sales are down 5% as compared to the previous year. The automobile industry the world over is rationalizing production facilities, reducing costs wherever possible, consolidating brands and dropping model lines and deferring R&D projects to conserve funds. The crisis goes beyond the car makers in both directions - upstream, it affects steel producers and downstream, it affects thousands of suppliers and small technology companies. Countless jobs will have been lost this year and major projects will probably be put on hold, awaiting better times.

The worst-hit are automobile companies in the U.S, Europe and Japan, where sales of new cars have declined by 16% in the second half of the year and where stimulus packages designed to rekindle demand have only been partially successful. Russia has also seen major declines in the demand for cars. Thus, one of the major foundations of these nations' industrial base has been de-established...”¹

¹ Tata Motors, Annual Report 2009

Despite of slowdown in automobile business, Ratan N. Tata, Chairman of Tata Group, took a bold step and stood by his words saying, “A promise is a promise and that’s what we would like to leave you with” at the launch of Tata Nano – The People’s car at Pragati Maidan, New Delhi on January 10, 2009.

The Business Model

The Dream Team

Nano is a car that has made history. On January 10, 2009 while a select few thousand watched the unveiling of the Nano, the People's Car, a million more around the world saw it on the internet or read about it in newspapers the next day and it still continues to make headlines. At Engineering research centre, Tata Motors Plant in Pune, where it all began and here is where the Nano Team geared up for next phase, putting the Nano on road.

"The execution of the project is a real challenge. While we are happy and proud for appreciation accorded to the Nano, we also know that we have a long road ahead", said self effacing, Girish Wagh, who heads the 500 strong Nano Team.

When he first joined Tata Motors 16 years ago, Girish Wagh had no idea he would one day head the company's now-legendary Rs 1-lakh car project. Although he was part of the Indica vendor development team in 1997, Wagh was actually reluctant to get into full-scale product design with the Ace.

He remembers how Tata Motors MD Ravi Kant hand-picked him for the job and convinced him that it was as important as the work he was doing with the company's excellence group. That was December 2000. The Ace rolled out in May 2005 and almost singlehandedly helped beat a recession in the commercial vehicle space.

Impressed by his ability to deliver under tight deadlines, chairman Ratan Tata and Ravi Kant decided to move Wagh to the small car project in August that year. Almost painfully media shy, the Nano's strobe-steroidal launch this week was one of Wagh's few public appearances.

A mechanical engineer from the Maharashtra Institute of Technology, which was followed by a post-graduate programme in manufacturing from Mumbai B-school

SP Jain Institute of Management and Research, the 37-year-old Wagh has had a pretty dramatic career at Tata Motors.

But nothing comes near the Nano experience. Heading a 500-strong team, Wagh's biggest challenge was to define the product's specifications as they went along. "Unlike the Ace where we knew what the necessary specs were, in this project all we had was a cost target," said Wagh. "That and the fact that it had to be a real car which met all the regulatory requirements."

The small car team had already put in about 18 months' work by the time Wagh came on board. The R&D team was in place and work was on to get a fix on the styling, packaging, engine and transmission. Because there were no guidelines, the team used the M-800 for comparison. "The idea was that we had to achieve at least this much and more," said Wagh.

"As we went ahead, we redefined performance specs. As recently as nine months ago, we tweaked the engine to increase the power." The team also decided to launch the car with a manual transmission instead of the earlier-announced continuously variable transmission (CVT).

The CVT will come but the first variants will have a four-speed manual. Widely known as one of Tata Motors' new bunch of engineering whiz kids, Wagh enjoys a formidable reputation in the company. A stickler for perfection and a hard taskmaster, Wagh is the first to admit that the Nano experiment had its own share of hiccups. Part of the problem was the constantly evolving design. His solution was to "leverage the collective knowledge" in the company.

In a somewhat hidebound company like Tata Motors that's never be easy. But then folks inside knew that this was no hypothetical project, the chairman had made it amply clear that he wanted it done. Ravi Kant also made sure the team was insulated from all these pressures. So by the time the project hit top-gear, "the

R&D team, vendor development team and manufacturing team were all working together,” said Wagh

The Nano’s development was encouraged by the company’s success in producing the low cost four-wheeled ace truck in May 2005. “The vehicle is a properly designed and built car”², contrary to speculation that the car might be a simple four-wheel auto rickshaw. The Chairman is reported to have said, “It’s not a car with plastic curtains or no roof – it’s a real car”.

Nano has 21% more interior space and an 8% smaller exterior, when compared to its closest rival the Suzuki Maruti 800. The car will come in different versions including one standard and two deluxe variants. The deluxe version will have Air Conditioning but no power steering. Initial production target set by Tata Motors is 250,000 in units per year.

Cost Reduction

Consider a top-brand company dropping the price of its high-end product to one fourth its original price. Now, will it be reliable, long lasting, have all the required features and meet all needs? Because it’s cheap, will it be of inferior quality? The answer is an obvious no. A few years back, cheap meant bad. Any product that was sold cheap would be considered of low quality. For example, it was awkward to tell your colleagues that you are wearing a cheap shirt as it meant you couldn't pay for a better brand. Things are different now. Tata Motors Nano would be made available at one fourth the price of cars in its segment.

Now, for a car to be produced at that selling price and to have sustainable margins, severe cost reduction programs were required to be implemented. In fact, Tata wanted to introduce a proper car with all the common features of a typical car. First Tata made the prototype of Tata Nano and called on its top suppliers to help

² The Times of India

to make this car possible. Tata received help from both local and foreign suppliers and engineers.

GKN Driveline India, a subsidiary of global auto parts leader GKN, made the driveshaft—the component that transfers power from the engine to the wheel.

The team spent a year developing 32 experimental variants to create the perfect driveshaft for the Nano. It roped in designers from the company's French and Italian operations and changed the design to make it lighter and easier to manufacture. For the Nano's rear-wheel drive system, GKN designed a smaller diameter of shaft, which made it lighter and saved on material costs.

Fitting the parts of the car together required lots of head-breaking details. The engine was designed three times. Initially, the plan included buying an off-the-shelf engine and so study was made in all the small-capacity engines available. They were unsuitable, so in early 2005 it was decided to build it in house. The first was a 540 CC engine that, when fitted on the prototype, lacked the necessary power. So its capacity was increased by 9%, then by another 9%, before finally settling on a 623 CC engine. Then the foot pedal had to be realigned to create more legroom.

Tata Nano has created a new segment in the car market. It is true that it is targeted at the segment A or entry level consumer. However, considering the price tag, you cannot put it in this segment. Those who were earlier thinking of buying second hand car will defiantly consider Tata Nano car. The markets of three wheelers and motor bikes will also be affected because of Tata Nano. The company is also planning to make an updated version of Tata Nano with a little bit higher price tag. So, it seems that Tata Nano is still without any strong competitor in this segment. However, much of its success will be proven, only if it runs well and satisfy the car users of India and abroad.

Difficulties in maintaining low costs

Tata initially targeted the vehicle as the least expensive production car in the world aiming for starting price of One Lakh Rupees or approximately USD 2,500 despite rapidly increasing material prices.

Material costs have risen from 13 to 23 percent over the period of cars development and Tata faced the choice of:

- Introducing the car with an artificially lower price through Government subsidies and Tax breaks
- Using vertical integration
- Partially using inexpensive polymers or biodegradable plastics instead of the full metal body
- Forgoing profit on the car
- Rising the price of the car

An increased price on the Nano will likely decrease demand and image of the company. Hence Tata Motors stuck to their original promise of a One Lakh Rupees car without compromising on aesthetics, value to the customer, safety and environment requirements.

Production Strategy

*BI Cost: The Nano Way*³

State-of-the-Art Design: The Secret Lever

The fact that Nano is the cheapest car ever made does not mean that it is either low quality or a knock-off copy of some high-quality variant. The cost-effectiveness and quality have been achieved by understanding the specific critical customer need in that segment and creating the design accordingly. It is providing what the customer wants by first eliminating what is not required. Similarly offering a low-cost BI solution does not mean inferior quality architecture equipped with only the basic

³ Shailesh Kosambia, business intelligence and performance practice Manager for TCS for North America, BI Review online, March 27, 2008

components. It does not mean that such implementations would be supported by less experienced or graduates fresh out of college. What will deliver such efficient low-cost BI solutions are inexpensive technical solutions produced using state-of-the-art design and components. The design would be sleek and will map to exact customer needs. Low costs in BI could be engineered by designing the slimmed-down version of information needs within the organization. It will be achieved by efficiently leveraging existing infrastructure components, resources, technology, processes and innovative designs. It is about designing your BI solution based only on the prioritization of the key user needs of your enterprise. These basic needs have to then be converted into critical success factors by management buy in.

Data Management: The Central Lever of Cost Reduction

When we talk about BI, it's all about data and how to transform it into information, and this in turn would help to make better business decisions. BI systems are like the eyes of an organization that help them to see things around before taking any step rather than taking decisions blindly. If you walk down the aisle of any organization, you would always hear employees unhappy as they find it difficult to get the right data to make their business decisions. At the same time, if they get the data, they are not very confident if it is accurate. It is very interesting to see how most organizations get into this kind of situation. The root cause of this problem is lack of data management and data governance in most organizations. A Forrester consulting survey of 407 senior IT decision-makers at companies with more than \$250 million in annual revenues found that manual efforts remain the dominant approach for integration of data silos. Due to this, there is a huge unmanaged accumulation of data over a period of time. Multiple versions of the same data get created from different sources. After that, there is a big confusion as to which is the most accurate data. This leads to data quality issues which at times run out of control. On average, if you are looking for particular information within an organization, you are bound to find at least four to five instances from where you

can obtain the same information. Almost 90 percent of the time you will find that there are data discrepancies in all the four to five instances of the same data. It is very important for most organization to get rid of unwanted data and at the same time move less critical data to low-tier storage. The very first thing organizations need to do is to lose weight by rationalizing their data and eliminate redundancies created by unwanted data. This is very similar to Tata Nano's central approach for its car. It has kept the base minimum that would be required for its customer to make a comfortable ride. This not only reduces the cars cost but also improves miles per gallons.

Reduce Architectural Complexities: The Simple Lever

BI architecture of many mid-sized or large companies are incredibly complex with tangled systems, which are difficult to digest at first instance. There are several components within BI architecture that are built without any strategic vision and some of it gets mushroomed due to tactical thinking at various department levels in the enterprise. Over a period of time, many insignificant architectural components become more or less part of the whole BI body. It becomes difficult to just cut such components many times. Removing such unwanted architectural components might turn out to be a painful, cumbersome process. A simple sleek design is what the Tata Nano theme is based on. When the car was designed, they asked the question, "What parts of the car can we eliminate?" This kind of design makes it less complicated to maintain in the long run. Fewer BI architectural components would mean minimizing on interfaces, fewer databases, less hardware and less process to run it. All this would have large savings on cost to keep your BI up and running. The fact still remains that companies struggle to come up with a BI strategy that would address their architecture issues at the enterprise level and make it more simple and sleek. A survey by Accenture indicates that 75 percent of 162 CIOs surveyed said they want to develop an overall information management

strategy in the next three years in order to leverage that data for strategic advantage.

Rationalize: The Soft Lever

Most large organizations have all kinds of databases, data integrations tools and reporting tools. This wide range of BI tools not only increases the overall cost of BI but also takes the company a large leap away from standardization. The dollars you spend on people for maintaining your BI environment with different BI software and their license renewal cost would hardly justify its usage. If you count the different features that all your current BI tools provide in your organization and compare them with how many are being used, the number will not go above 20 percent. In the case of Tata Nano, the car's dashboard features a speedometer, fuel gauge, the essential light indicators and an oil light. These are the functions used most often in a car. This is exactly what is required in a BI solution. Only provide the features that are required and most frequently used. Just imagine the cost you could save by having complete tool rationalization with a single vendor database, single data integration tool and single BI reporting tool. Moreover, if you reduce the unwanted database tables and interfaces and simplifying reports by including only the most important features and, life becomes simpler for everyone. All this would reduce your technology and people cost to run your BI environment. Tata has used regular bulbs that meet regulations instead of long-life bulbs in the Nano. These are small things, but building your BI just to specifications like this matters most to reduce your overall BI cost. With some of the leading vendors in BI moving to open source BI, companies could explore this path and achieve a huge cost advantage.

Standardize Process: The Difficult Lever

BI needs at corporate level in most organizations are of strategic nature. The data needs for corporate information are more aggregate in nature. The corporate BI reports maps directly to goals and policies of organizations. The BI needs at

different business unit levels under corporate are more of operational level. These facilitate managers to take their day-to-day business decisions. The business processes across these different business units vary some way or other. However, as the final business goal for all units are the same and they work under the same corporate policies, there are many processes within the organizations that can be standardized, streamlined and shared. Nevertheless, the reality is far from this kind of ideal scenario in most companies. Employees in organizations do same things differently. Just imagine the cost the organization would have to bear for reinventing the wheel in different business units every time. When Tata Nano was manufactured, the organization noticed this critical factor on saving cost on processes. The manufacture of steering columns, steering gear and differential drive assembly for Tata Nano used a tubular design instead of the conventional rod design in all cars. This helped to cut costs, particularly in the processes involved, as it had fewer steps to create tubular design. In tubular design, there was large scope to have the same repeatable process that could be leveraged in different assembly units in manufacturing process. Organizations should conduct a deep due diligence to investigate the long, repetitive processes. Based on this, they have to figure out to what extent they can standardize the processes and reuse them across different business units consistently. Fewer processes to deliver BI would mean less resources and considerable cost savings.

Outsourcing: Last but not Least

Tata Nano got some car parts from vendors who did their own research and development for them to reduce cost. Some vendors developed products with Tata Motors, and quite a few were given designs by Tata Motors. The company even helped some vendors find international partners to make products that met the company's requirements. Some vendors who supplied parts to Tata Nano did competitive buying of material from countries like China and Thailand. This is very similar to leveraging an onsite offshore model in IT. Customer can outsource their

work to IT vendors who can then do some part of the BI work at offshore at lower cost. This model would give companies huge savings as the cost of developing and supporting BI applications would be drastically lower when done offshore in countries like China and India. Most of the offshore vendors also promise certain productivity gains over a period of time for customers. This is achieved through the automation of some long-running manual task and also by cross-training resources to reduce effort. The different levers explained in this article, if used appropriately, will bring amazing results to deliver low-cost and high quality BI solution to your organization.

For the first time in India, those on the fringes of the middleclass can hope to fulfill their aspirations of owning a Tata Nano car due to low cost. Similarly, if we are able to reduce the BI cost drastically, this technology would cover a very large segment of the population on the affordability parameter. Just as the mobile revolution heralded inclusion in communication, making a telephone affordable to even a student, affordable BI can make every common man take advantage of it. BI usage would improve common man's quality of life by helping him to make the right personal decisions. Most of us could make better decisions in managing our personal finance, investment decisions, spending habits, insurance policies, vehicles or even which companies to work for using BI solutions. Tata Nano achieved the low price tag through sheer design innovation and not cutting corners on essentials. The same mantra has to be applied to get major cost reduction for a BI solution. This will spread BI solutions for better decision-making beyond the walls of organization and out to everyone. It will help each of us to make better decisions in our personal life. BI would soon become common people's BI.

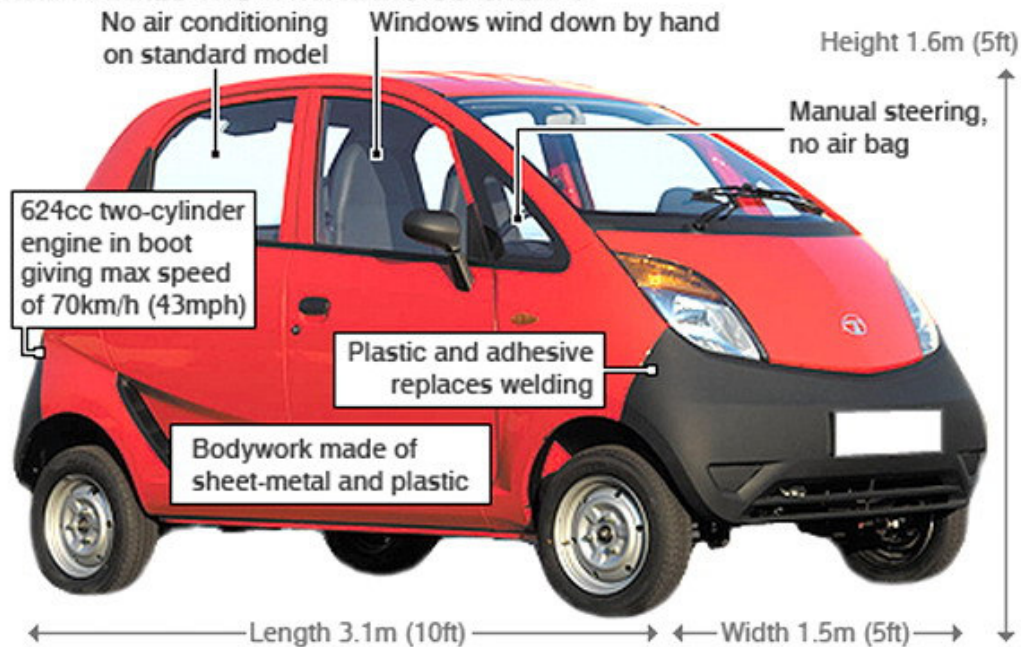
Towards the Final Product

Technical specifications

“The Nano is a 33 PS (33 hp/24 kW) car with a 623 cc rear engine and rear wheel drive, and has a fuel economy of 4.55 L/100 km (21.97 km/L, 51.7 mpg (US), 62 mpg (UK)) under city road conditions, and 3.85 L/100 km on highways (25.974 km/L, 61.1 mpg (US), 73.3 mpg (UK)). It is the first time a two-cylinder non-opposed petrol engine will be used in a car with a single balance shaft”⁴. Tata Motors has reportedly filed 34 patents related to the innovations in the design of Nano, with power train accounting for over half of them. The project head, Girish Wagh has been credited with being one of the brains behind Nano's design.

Tata Motors worked with a French Firm on using compressed air as fuel which is eco-friendly and revolutionary for a car. The Company has tied up with Moteur Development International (MDI) of France for this purpose.

WHAT MAKES THE TATA NANO SO CHEAP?



*Design and Engineering*⁵

⁴ Ratan Naval Tata, Chairman, Tata Group

⁵ Nano Mania - <http://www.autocarindia.com/new/Information.asp?id=2002>

In the Indian car world the proverbial pot of gold lies at the bottom of the pyramid. Basically, the more affordable a product, the wider the appeal and the greater the number of potential customers it has. And the Nano represents this very philosophy. Talk to engineers at Tata Motors and the word 'Chairman' pops up regularly. As is common knowledge, the Nano has been primarily Ratan Tata's vision; to transport families that are currently perched on the fuel tanks and seats of motorcycles in a basic and very affordable car. So Tata engineers set out to design and build not just a new car, but an all-new class of car.

But how minimal can minimalist be? This is a Tata car after all, and that means lots of space. If you're expecting a tiny car, you are going to be in for a shock. The Nano is not only wider and taller than a Maruti 800, it's wider and taller than an Alto as well. But the fact that the compact engine sits just above the rear wheels allows it to use space more efficiently. The overall shape is that of a mono-volume – one even more extreme than a Chevrolet Spark or the Maruti Zen Estilo, meaning almost no bonnet section. And since space has been used more effectively and the Nano doesn't have a nose section like the distinctly 'two-box' 800 or Alto, the car is around 20cm shorter than an 800. Still, space available to the passengers is, according to Tata Motors, 21 percent more than a Maruti 800.

Tata has made design and styling a key differentiator with its products, and the Nano is no exception. In fact, styling is one area where there is no compromise. There are no cost-saving flat surfaces or flat plane glass on the Nano. Tata engineers admit that they could have whittled down lots of rupees if they used simple surfaces that reduce manufacturing costs, but that road was clearly a 'No Entry'. Tata's focus on design stands vindicated with the Nano. It's a stunning-looking car by any standards and proves the point that cheap cars don't have to look cheap. Logan stylists please take note.

The Nano's styling was penned by a team led by Justin Norek (ex-IDEA and now head of Trilix), in close consultation with Ratan Tata, who signed off every stage of the design process. The result is a pretty futuristic design that's quite radical by Indian standards. Because of the rear-engine, rear-wheel-drive layout that Tata has adopted, the Nano has very short overhangs, the wheels look like they have been pushed out to each corner of the car. This has allowed for a generous wheelbase – 2230mm, which is 55mm more than a Maruti 800 – on an overall length that is significantly shorter. Stand-out features include a very steep bonnet, triangular front quarter-glass, high roof and mini side vents under the rear doors that cool the engine compartment with fresh air. The bonnet has a central ridge or fold, which is part of Tata's new design language and, though there is no grille, the 'smiling grille' look has subtly been incorporated into the bonnet. The striking headlamps, which vaguely resemble the Zen Estilo's contribute further to the perky nature of the styling. There are a few traces of the Mitsubishi 'i' as well, especially in the overall silhouette and the stylistic cut that runs along the flanks of the car and arcs up to the rear vents.

The rear of the car looks familiar because the Nano uses tall tail-lights similar to those seen on the Indica. Superbly detailed and classy looking, the rear section also has a Tata logo at the centre. Notice the word hatch is not used. This is because the rear of the car has no hatch, access to the motor only available from the inside. Yes, it is welded shut! This maybe taking cost-cutting a bit to the extreme.

The bumpers are nice and aggressive and an integral part of the strong design statement of the car. At the rear, it has a sporty-looking mesh effect and the inverted 'V' cut above the centrally-mounted exhaust pipe looks neat. The only letdown in the overall design is the weedy tyres, which make the Nano look dainty.

Body Building

Various things were explored which set this styling direction with inputs from the Institute of Development in Automotive Engineering, Italy. Differently shaped headlights, larger and more vertical, were designed giving the front of the car the appearance of a little kid, with big eyes in a small face. But Tata asked them to try something different. Horizontal rear lamps were tried out before the vertical lamps (much like the Indica) were finalized.

In the last week of July 2007 just when the team thought it had all it together and could begin work on the virtual phase, there was one more hiccup. Tata felt that the nose of the car looked snub, while the team felt that the nose gave the car a sportier look. But they went back and did some renderings to increase the nose. It actually helped increase the length of the car as well as internal volume.

More beautiful on the inside



The design work of the interior of the car was even more interesting with maximum scope for innovation. Here again the focus was on cost reduction but without compromising on the comfort factor. The team wanted the wheels to look differently but alloy wheels were too expensive. The final design is called Stylein - Steel wheels – a concept that

looks like alloy but is made of pressed steel and the cost is almost the same as the normal steel wheel. Other interesting and unique concepts include a central exhaust and the scoop (air way) required to cool the engine which became part of the design, part of the door feature.

Heart of the Nano



The original thought was to have a conventional front engine and a front wheel drive. But then the team started thinking differently. Most high ended cost have a front engine to reduce the complexity of controls, but the engine drives the rear wheels. The Tatas took advantage by having a rear engine with front wheel drive. It made the car more low cost, more efficient and more compact. The idea of putting the engine in the rear also turned out to be a major turning point in the design process, a breakthrough of sorts. The engine was designed to fit in the space behind the rear seat. The sourcing team went shopping worldwide for a suitable small 35 HP engine, but could not find anything that fit the budget. In a review meeting, Tata asked whether the engine could be built in-house. A rear engine also meant that all controls had to be changed. The cables that run in front from the engine to the accelerators and others now have to travel from the back. This makes them more complex. Fitting the engine, the gear box and the exhaust system into

the space behind the rear seats was yet another challenge. The engine is actually inclined at an angle of 14 degrees to complement the rear seat incline. Starting with a 554 cc, the team has managed to increase the engine to 624 cc with 27 HP.

Vendor development

There were two primary challenges before the Tatas. The first was to contain the prices because every time there was a change in design or specification, the cost changed. The second and unique challenge was to convince the Vendors about the volumes. Not surprising, since talking volumes of two million over 5 years was not heard of in the four wheeler industry. The major task was to interact with them, to figure out their processes and optimum capacity to which they could deliver.

The major suppliers to Tata Nano are from big players throughout the world, including the likes of

- Robert Bosch GmbH (Bosch, a German diversified company) – for supply of gasoline injection system, starter, alternator and break system
- Caparo (formerly known as Freestream, provides advanced technology development, materials engineering, design services to automotive, motor sports and aero space markets) – for supply of inner structural panels
- Continental AG (Conti) – Petrol fuel supply system, fuel level sensor etc.
- Delphi, USA – Instrument cluster
- DENSO Corp – Wind shield, wiper system
- FAG, Germany - Rear wheel bearing
- Ficoso – Rear view mirrors, interior mirrors, etc.
- Freudenberg – Engine sealing
- GKN plc, a British Engineering Company – Drive Shafts
- INA – Shifting elements
- Johnson Controls Inc (USA) – Seating

- Saint-Gobain SA – Glazing
- TRW (USA) – Brake system
- Visteon (USA) – Air induction system
- Bher GmbH & Co. KG (Germany) – HVAC for luxury version

Nano and Politics

Tata Nano represents a triumph when it comes to a battle between Politicians and Industrialists.

India, the biggest democracy has its share of politicians who try to put “speed-bumps” in any development that happens, to use it for their own selfish purposes. Without going into details, the opposition party of West Bengal opposed the Tata Nano’s factory to be opened and demanded return of 400 acres from the 1000 acres which were allocated by the State Government. This was done on the assumption that since Tata Motors had invested a hefty sum into the Singur factory, they would cave-in to the demands.

Instead of giving in, Tata abandoned the incomplete plant and shifted the facility to Sanand, Gujarat, which not only baffled the people, but also showed the fact that the industrial sector of India is no longer weak and the Politicians cannot change things at the last minute based on their selfish interests. Thus, this Indian brand, with people speculating against it even before its conceptualization had happened, has come out successful defying all the odds.

Political impact of Tata Nano Roll-Out

The name Tata Nano is in itself a project of pride to Indians. The completion of this project changed the name of the Indian Automobile globally, from an industry where people just fixed the auto-parts made in foreign lands, to a place where innovations and research can happen and even reach new heights.

The pull-out of Nano from Singur is not good news to West Bengal, and has also resulted in tarnishing the already bad image of the state in the eyes of the industrial investors. This also led to loss of potential jobs that the new Nano plant, and its dependency industries, would have generated. We still see that Mamta

Banerjee is still harping about her “achievement” of not allowing the Nano to settle in peace.

On the other hand, Narendra Modi’s Gujarat Government added another feather to their cap of achievements. With his dynamic speed, ability to convince and prompt action, Narendra Modi got not only the land leveled, but also got all the required documentation ready to roll a “red-carpet” for Ratan Tata’s favourite project. At the 4th **Vibrant Gujarat Summit** in January 2009, Ratan Tata said, “the Chief Secretary(in his speech) today quite rightly mentioned that two years ago I had said that if you weren’t in Gujarat, you would be stupid, I did said that and I am very proud that I listened to my own advice and that today I can stand in front of you and say that the fact isthat I am not stupid any longer.” This statements from Ratan Tata, raised the bar of Modi Government for Gujarat to a new level.

Economic Benefits of Tata Nano Roll-out – To the Tatas and to the Customers

The Tata Nano is expected to roll out in 3 versions, the basic version is known as the Nano with no prefixes or suffixes. Next up is the Nano CX which comes with HVAC and central locking while the top of the line Nano LX adds power windows to the front doors. which are priced from the lowest around 1,00,000 which is from Pantnagar (would be around 1,30,000 on road) and the LX Model which will be around 1,80,000 which makes it still cheaper than most other cars in the same small-cars segment. This new car will not only be a saver in this recession time, but will also open the automobile segment to a whole new class of customers, who till now, could have only dreamt of owning a car of their own. Other than this, Tata group may think of exporting this “innovation”, though they are currently looking at only the Indian Markets. A new version is seemingly going to be unveiled in a couple years which have higher average and match European Emission Standards.

To the customers, the Tata Nano Revolution is going to help in seeing a cut in the prices in the other cars. This car has also made other players in the automobile

industry interested and Bajaj Auto Ltd, the country's second largest two-wheeler maker has announced a joint venture with Renault-Nissan to produce a 2,500 dollar car as well. In yet another independent announcement, Japanese major Toyota announced a Rs 1,400 crore (Rs 14 billion) investment in its Chennai plant to launch a 'strategic small car' within next 2-3 years.

These things are good news to us the customers and also to India as a nation, which will attract not only the huge investments, but also new jobs and developments due to this. As for Tatas, they are getting set to start lapping up this new Market segment.

Living with Nano – Redefining our Visions

After saying all the good parts, this is one area where we might have a concern, though in long term. The presence of the new “People’s car” will surely empower a lot more people to own the car. This is going to have a direct negative impact on the traffic conditions, especially in cities like Bangalore and Hyderabad, where there are problems even now. Apart from this, the overall fuel consumption is bound to increase which may yield in further price hikes of petroleum products. The third addition on the same lines will be a problem of finding parking lots for the additional cars which will enter the system.

All said and done, the above mentioned fears will have lesser impact considering a few realities.

The Singur Saga led to the postponement of the Nano roll-out and also the capacity is bound to be less now. From what I read, the Tatas are planning to roll-out some Nanos from Pantnagar and the full capacity will reach 3,00,000 cars per year only once the Sanand plant becomes functional. Secondly, with its sleek look and absolutely small 4-metre turning radius, the Nano will get fitted in even the smallest of places. This of course could cause issues with the other cars around it, but the Nano in itself seems a nice option. Another vision is that the Tata Nano will

replace the auto-rickshaws in a big way and this I think would be a very welcome change for most of us.

Final Verdict and Personal Take:

With a few changes like no mirror on the Passenger side to save money, Nano does have some turn-downs, but my overall impression of the car is pretty optimistic. The new Nano is surely going to compete for being the first car for a lot, and a second car for another bunch of people.

The impact of Nano release on the Used-Cars industry will be evident only once the Sanand Factory starts in a full-fledged way.

Till that happens, if you are a prospective Nano buyer, just pray that you win the Nano registration lottery and get your set of wheels sooner than others; and if you are in construction business, keep looking, we are bound to see a lot of Government Tender notices for building more roads and flyovers.

Briefly, after a controversial stay in West Bengal, Tatas shifted their One Lakh Rupees Nano Car Project to Sanand near Ahmedabad at an investment of Rs. 2,000 crores with the satellite plant near Pantnagar where assembly lines of ace trucks have been modified to produce Nanos.

After the pullout from Singur, Tata Motors decided to set up the mother plant in the State of Gujrat with its proximity major ports like Mundra and cities like Rajkot where 30 % of the Nanos components are manufactured. A group of 23 Rajput families were demanding compensation for what they say is their land in Sanand. But the government says that since the Lease expired in 2001, and the lease contract was not renewed, the land is now owned by government. And so there is no obstacle to hand it over to the Tata Motors.

The Tata Nano has drawn over 2.03 lakh fully paid bookings amounting to nearly Rs.2,500 crores, in an encouraging response to the car launched on 23rd March.

The Tata Nano website recorded an unprecedented 3 crore (30 million) hits from the date of launch of the car to the closure of the booking period (25th April, 2009), nearly 1 million hits a day. About 14 lakh people walked in to Tata Motors Showrooms, Croma and Westside stores across the country to catch a glimpse of the car. A total of 6.10 lakh forms were purchased from the booking centres. 70% of the 2.03 lakh bookings received were financed, while 30% of the applicants booked in cash by paying fully. About 4,000 cash bookings were made online through www.tatanano.com, a first for the auto industry in India. Among the three variants of the car, 20% bookings are for the Nano Standard, 30% for the Nano CX and the remaining 50% for the top-end Nano LX.

As announced on 23rd March, the first 100,000 allottees from among the applicants will be chosen through a computerised random selection procedure, and the announcement will be made within 60 days of closure of the booking. Deliveries will start in July 2009, and are expected to be completed in the last quarter of 2010, while all efforts would be made to ramp up production and deliver earlier. Simultaneously along with the announcement of the first 1 lakh successful allottees, Tata Motors will also announce the allotment of those booking applicants who have expressed their interest in retaining their bookings with the company even if they do not form part of the first 1 lakh allottees. The retainees will earn an interest on their booking amount, effective from that date. The booking amounts of unsuccessful applicants who have not chosen to retain their booking amounts will be refunded at the same time.

Tata Motors places on record its gratitude to the people of India for according such a warm welcome to the Tata Nano, and to all its preferred financiers, dealers and partner companies in making the Tata Nano far more accessible.

Domestic Market for Cars

The **automobile industry in India** — the ninth largest in the world (with 2008 production) of over 2.3 million cars and commercial vehicles — is one of the fastest-growing global automotive industries. A number of domestic companies, as well as the growing multinational investment, has led to rapid increases in automobile production.

Following economic liberalization in India in 1991 the Indian automotive industry has demonstrated sustained growth as a result of increased competitiveness and relaxed restrictions. The monthly sales of passenger cars in India exceed 150,000 units.

History

An embryonic automotive industry emerged in India in the 1940s. Following the independence, in 1953, the Government of India and the private sector launched efforts to create an automotive component manufacturing industry to supply to the automobile industry. However, the growth was relatively slow in the 1950s and 1960s due to nationalization and the license raj which hampered the Indian private sector. After 1970, the automotive industry started to grow, but the growth was mainly driven by tractors, commercial vehicles and scooters. Cars were still a major luxury Japanese manufacturers entered the Indian market ultimately leading to the establishment of Maruti Udyog. A number of foreign firms initiated joint ventures with Indian companies.

In the 1980s, a number of Japanese manufacturers launched joint-ventures for building motorcycles and light commercial-vehicles. It was at this time that the Indian government chose Suzuki for its joint-venture to manufacture small cars.

Following the economic liberalization in 1991 and the gradual weakening of the license raj, a number of Indian and multi-national car companies launched

operations. Since then, automotive component and automobile manufacturing growth has accelerated to meet domestic and export demands.

Industry Today

Following India's economic liberalization in 1991, the automobile industry was opened for 100 percent foreign direct investment. A surge in the country's economic growth rate and purchasing power has fuelled a 17% annual growth rate in the Indian automobile industry since 1991. The automotive industry generates direct and indirect employment to about 13.1 million people as of 2006-07.

The automotive parts and cars exports has grown at an annual rate of 30% per year in the 21st century. However, the India's share of the overall global automotive industry remains low as of 2007. Increased competition amongst automobile manufacturers provides for a variety of competitive options for the consumer.

India was one of the largest manufacturers of tractors in the world in 2005-06, when it produced 293,000 units. India produced 65 Million tyres during FY 2005-06. India's tyre production meets domestic demand, as well as are exported to over 60 countries.

Most of India's current automobile production meets domestic demand. Forecasts predicts sales of 4.2 Million four-wheel automobiles in India by 2015. But, several manufacturers are now focusing on exports, and a diverse range of automotive components are now built and exported from India. India's passenger vehicle exports are forecast to rise from 170,000 in 2006 to 500,000 in 2010.

Investment

India is able to attract investment in this sector due to the following reasons:

- For upto 100% of Foreign Direct Investment, no need for Govt. of India's Foreign Investment Promotion Board Approval. Only need to inform Reserve Bank of India of the plans and seek a formal clearance.

- Complete exemption from Customs Duty on industrial inputs and Corporate Tax Holiday for five years for 100 per cent Export Oriented units and units in Export Processing Zones.
- Ability to manage global automotive standards.
- Low cost, Highly productive, Quality oriented workforce which is capable of managing the latest in automotive technology.
- A strong influence of Japanese Best practices.
- Partnering linkages with global supply chain with efficient Tier 2/3 suppliers.
- A Strategic location - access to the vast domestic and South Asian market.
- A potential synergy in IT/Software/ Embedded software and auto components.
- Sophisticated legal and financial system.
- Availability of a package of fiscal incentives including benefits of double taxation treaty.
- English is the medium of communication.

The auto industry growing steadily in terms of installed capacity, production, technology and 24 product diversification. With the high level of foreign direct as well as domestic investment in manufacturing ventures in the automotive industry, the component sector specially will benefit.

A large number of FDI proposals to establish auto component units have been approved by Government. The latest technology is needed as is quality improvement in products to meet international requirements. With the globalization of the industry, exports of auto components have been growing steadily and will continue. The reforms adopted by Government recently such as delicensing and rationalization of duty structure will open up tremendous investment opportunities for investment and transfer of technology.

Exports

India has emerged as one of the world's largest manufacturers of small cars. According to *New York Times*, India's strong engineering base and expertise in the manufacturing of low-cost, fuel-efficient cars has resulted in the expansion of manufacturing facilities of several automobile companies like Hyundai Motors, Nissan, Toyota, Volkswagen and Suzuki.

In 2008, Hyundai Motors alone exported 240,000 cars made in India. Nissan Motors plans to export 250,000 vehicles manufactured in its India plant by 2011. Similarly, General Motors announced its plans to export about 50,000 cars manufactured in India by 2011, Volkswagen is also having plans to export 50% of its 110,00 vehicle by the end of 2011. India automobile companies, mainly Maruti Suzuki, Tata Motors and Mahindra, have been aggressively expanding their overseas market too. Prominent India-made automobiles which are widely exported include:

Maruti Suzuki - exports Suzuki Alto, Maruti 800, Maruti Omni, Maruti Wagon-R and Zen Estilo;

Hyundai Motor Company - exports Hyundai Santro, i10, Hyundai Getz, i20 and Hyundai Accent - 42% of its India production;

Tata Motors - exports Tata Safari, Tata Novus and Tata Xenon

Mahindra & Mahindra Limited - exports Mahindra Scorpio and Mahindra Xylo.

Competition within Small Car Segment

Tata has a first mover advantage in India. Also according to Tata, the Nano complies with Bharat Stage III and Euro IV emission standards. Tata motors has reportedly filed 34 patents related to the innovations in the design of Nano, with the power trend accounting for over half of them. Nano managed to score around

24 km/ltr during its homologation test with ARAI. This makes Tata Nano the most fuel efficient car in India.

The Nano is alleged to have severely affected small car manufacturer and used car market in India. Sales of Maruti 800 dropped by 20% and used one by 30% following the unveiling of the Nano. An automotive journalist summarizes, “People are asking themselves and us why they should pay say Rs. 250,000/- for a Maruti Alto, when they can get a brand new Nano for less in a few months time, a car that is actually bigger”.

However, it is not likely to enjoy the same advantage for a longer time.

Bajaj auto says its \$ 2,500 car which it is building with Renault and Nissan Motor, will aim at fuel efficiency of 30 km/ltr or twice an average small car and carbon dioxide emissions of 100gms/km. Bajaj venture will have an initial capacity of 400,000 units while Tata expects an eventual demand of 1,000,000 Nanos.

Rival car makers including **Fiat, General Motors, Ford Motors, Hyundai** and **Toyota Motors** have all expressed interest in building a small car that is affordable to more middle class consumers in emerging markets. The bulk of demand there is for small cars because people are much more sensitive to Fuel prices.

Honda and Toyota are leading the way on a cleaner petrol, electric hybrid and some environmentalist argue getting prices down on these technologies is where efforts should be concentrated.

Inexpensive and eco friendly electric cars like Tara Tiny (reportedly even cheaper than Tata Nano) and REVA pose even more significant competition to Nano. Tara Tiny is a projected electric car to be manufactured by India's Tara International, an arm of Bengal Enamel, in association with China's Aucma. The Tiny is projected to be the world's least expensive car priced at Rs. 99,000/- which is less than that of Tata Nano.

Nano against Established Indian Brat Pack⁶

How the Tata Nano triumphs over its bigger rivals!

The Tata Nano has more front shoulder room than the Chevrolet Spark

Chevrolet Spark Shoulder space Front - 1120 mm

Tata Nano Shoulder space Front - 1130 mm

Tata Nano has more Headroom and is wider than the Maruti Suzuki Alto

Maruti Suzuki Alto Headroom (F/R) - 960/890 mm

Tata Nano Headroom (F/R) - 1042/970 mm

Maruti Suzuki Alto overall width - 1475 mm

Tata Nano overall width - 1495 mm

Tata Nano has more ground clearance than the Hyundai i10

Hyundai i10 ground clearance - 165 mm

Tata Nano ground clearance - 180 mm

Tata Nano is quicker than the Maruti Suzuki 800 DUO till 80 km/h

Maruti Suzuki 800 Duo 0-80 km/h - 18.84

Tata Nano 0-80 km/h - 17.97

Tata Nano is taller with more headroom, has more shoulder space and ground clearance than Hyundai's tall boy, the Santro

Hyundai Santro overall height - 1590 mm

Tata Nano overall height - 1652 mm

Hyundai Santro headroom (F/R) - 1010/890 mm

Tata Nano Headroom (F/R) - 1042/970

⁶ http://www.zigwheels.com/cars_in_india/Tata-Nano-Mega-Mover--Nano11_20090323--/INDT/SpecialFeatures/Nano11_20090323--3--3

Hyundai Santro shoulder space (F/R) - 1120/1120 mm

Tata Nano Shoulder space - (F/R) - 1130/1130 mm

Hyundai Santro ground clearance - 165 mm

Tata Nano ground clearance - 180 mm

Nano will Benefit Rural India

With Nano billed as a people's car, city transport experts are divided on the benefits or pain that will be caused by it on the streets.

Though the consensus is that the car will add pressure on the already congested roads, experts also say it will benefit rural India.

Additional metropolitan commissioner of MMRDA, Milind Mhaiskar, said: "Though it is a fact that the entry of Nano in metro cities will put pressure on the already stretched infrastructure, one has to understand that the car can boost the rural economy," he said.

Saying that Nano is a good compact car, transport expert Ashok Datar said traffic restraint is a better solution compared to simply criticising the Nano. "It is a fact that more bikers in the city will want to own a Nano, which may put pressure on roads. Instead of taking steps such as banning their entry, authorities should change rules related to road tax. At present, a car owner pays barely Rs140 as road tax, which should be increased," Datar said.

"Rural areas are set to benefit from the tiny car. Wherever there are no issues of parking, Nano will be popular," said an MMRDA official.

Future Outlook

Because of the strong linkages of the automobile industry with other industries e.g; agriculture, investment in this industry acts as a driver of economic development and employment generation. An expanding manufacturing base of vehicles also

leads to development of components and ancillaries with a multiplier effect. With constrained railway infrastructure, road transport is expected to grow further with private sector investment in long term growth and transformation of the rural economy which ultimately leads to greater demand for automobiles. As income levels increase, so will the number of potential buyers in the growing class especially with credit to finance vehicle purchase so that the projected turnover of C\$ 1 billion for 2005 could be attained.

Other major changes happening in the Indian market are:

- Anticipation of a quantum jump in global business - Direct After-Market Exports, Global sourcing for OEM's, Off-shore Manufacturing Bases.
- Global OEM's Sourcing from India e.g. Toyota making India as their Hub for Transmissions, Ford sourcing engines, and plans for sourcing C\$ 220 million worth of auto components from India, Renault for truck parts, 2 Chinese Truck sourcing Transmissions, Fiat plans to source C\$ 390 million, Volvo is exploring Indian sources.
- Global Tier 1s sourcing from India - Cummins for engine parts, Delphi global sourcing operations in India for castings, forgings, plastics, rubber and electrical parts, Visteon Sourcing components and supplying worldwide. Bosch, Denso are buying components for their Global operations from Indian suppliers.

Global Attention and Environmental Issues

Tata's Nano has brought India in the lime light for its:

- ability to produce a cheapest car
- research and development expertise
- ability to produce a world class product (fulfilling all the emission and noise control requirements)
- time and cost bound project completion capabilities

Tata Nano Europa

Thus Nano has now become a global product. Tata Motors unveiled a version of the hatchback for the international markets and an electric vehicle at the Geneva International Motor Show.

With a length of 3.29 metres and width of 1.58 metres, the Tata Nano Europa continues to be stylishly petite but surprises with its spacious interior and generous leg space. The slightly longer wheelbase of 2.28 metres combines excellent space and manoeuvrability, further improving on the benchmark standard set by the Tata Nano. The enhanced spaciousness is complemented by redesigned interiors, marked by smooth curves and a high tech yet gentle feel.

To meet the driving needs of its target customers, the Tata Nano Europa will be powered by a 3-cylinder sporty all-aluminium MPFI engine matched with a 5-speed automatic transmission, and electric power steering. The gasoline engine will be class-leading, providing high fuel efficiency and low CO₂ emission of less than 100 gm / km meeting the twin goals of being environmentally friendly and stylish – just like the Tata Nano.

The Tata Nano Europa meets all safety regulations. In addition to the all sheet-metal body, its energy absorbing design, use of advanced restraint systems, ABS, ESP and Air Bags will enhance passenger safety.

Just like the Tata Nano, the Tata Nano Europa incorporates exterior compactness with interior comfort and seeks to provide motorists the pleasure and utility of personal mobility combined with affordability and environment-friendliness, in a world where smaller, fuel-efficient cars are emerging as a preferred choice.

Nano : Eco Friendly Car

In spite of what Ratan Tata might say, Sunita Narain and RK Pachauri would have spent an uneasy night. The prospect of hundreds and thousands of Nanos trundling down the roads of various Indian cities spewing carbon dioxide and nitrous oxide would have been nightmarish for them.

Are their worries justified? Not really, if the evidence and maths are taken into consideration. But that is getting ahead of the story.

For some experts, Tata Nano is actually a good thing. After all, had the Tata Nano not come along, there would have been another car to take its place.

“India is a growing economy and so people will buy cars. It is a good thing that they will perhaps be buying a smaller car which is complying with more stringent norms rather than a much larger car or a two-wheeler that follows less stringent norms,” says Krish Krishnan, managing director, Green Ventures, a venture fund that invests in green initiative. Mr Krishnan has been an entrepreneur in sustainable environment development.

But let us get to the heart of the argument and look at it clinically. After all, how much pollution will the Nano cause? Automobiles produce many pollutants: carbon monoxide, unburnt hydrocarbons and nitrous oxides. To make things simple, all of these have to be converted into equivalent amounts of carbon dioxide (CO₂) — the Mr Evil of environment today.

Now Euro IV compliant cars, which the Tata Nano is, produce one (1) gramme of carbon monoxide and 0.08 gramme of nitrous oxide. To convert them into CO₂

equivalent, a conversion factor recommended by IPCC (Intergovernmental Panel on Climate Change) of which Mr Pachauri is chairman) is applied. It is 3 for carbon monoxide and 310 for nitrous oxide. Once all the maths is done, we get 30 grammes per kilometre.

So each time the Tata Nano moves a kilometre, it will release 30 grammes of CO₂ equivalent material into the atmosphere. This is 40% less than what all others cars produce (50 grammes/kilometre or more) — and there are more than 5 million cars in India today. But let us take the argument into a zone where the naysayers would be comfortable: on the total amount of CO₂ equivalent that Tata Nanos will produce over the next five years. This involves a bit of some assumptions.

So assume that Tata will from the next year sell 1,00,000 cars a year for five years and reach a total of 5,00,000 — half the size Mr Tata thinks a car at one-lakh price point may sell. Now let us take a range that the Tata Nano runs between 1,000 kilometres and 8,000 kilometres a year. If all those half-a-million cars run 1,000 kilometres then the total CO₂ produced will be 15,000 tonnes annually.

If they all run 8,000 kilometres then the total CO₂ equivalent will be 1,20,000 tonnes. In reality, the figure should be closer to 25-30,000 tonnes because our assumptions of car sales and annual mileage are on the higher side.

So are these numbers large? Taking the worst case — 5,00,000 on roads and each running 8,000 kilometres annually — the total CO₂ equivalent will be less than 8% of India's total CO₂ emission. And if we take a more realistic assumption then it will be less than 1% of India's total CO₂ emission. Environment guys would do well to go after the other 99%.

Safety & Environment measures

The Nano Car has been noted and acclaimed by many sources and the media for its low cost and eco-friendly features which include using compressed air as fuel as

well as an electric version. The Tata Group is expected to mass manufacture the Nano in very large quantities particularly the electric version and besides selling them in India, also export them worldwide. “Keeping in mind the adverse impact of carbon dioxide (CO₂) on the environment, it would be advisable to have Nano’s electric version”⁷.

Safety

For Tata Motors, safety is of paramount importance. This avenue provides no room for the slightest margin of error. Tata Motors ERC is the only high-tech facility in India to evaluate the degree of passenger safety in the event of any high speed impact.

The Nano's safety performance exceeds current regulatory requirements. With an all sheet-metal body, it has a strong passenger compartment, with safety features such as crumple zones, intrusion-resistant doors, seat belts, strong seats and anchorages, and the rear tailgate glass bonded to the body. Tubeless tyres further enhance safety.

Minimizing Noise

The Anechoic Chamber is a highly sophisticated noise & vibration laboratory, the nerve centre of which is vast chamber lined with 88,000 cones projecting at various angles from the walls & ceilings. It is one its kind in India & is developed completely with in-house facilities.

⁷ Matthias Ruete, European Commission’s Director General for Energy and Transport

10 Things to Know About Nano⁸

The tiny Tata Nano is an Indian car that's been getting huge buzz. But what do consumers need to know about this new four-passenger car - and is it green?

1. At about \$2,000, the Tata Nano is the world's cheapest car.
2. Naturally, it's a tiny car. The dimensions are nine feet long, five feet wide and about five feet tall, "smaller than a Toyota Yaris," says Wired. It's powered by a 623 cc engine, and is designed to compete with scooters. The top speed the Nano can reach is 65 mph.
3. The Nano is pretty bare-bones: It has a manual transmission, and no air conditioning, stereo or air bags (they can be purchased as add-ons). It only has a single windshield wiper: "Kind of skimpy for a country with a monsoon season," notes Emily Wax of the Washington Post.
4. The sale of accessories will make Tata steep profits: According to the Economic Times, the accessories will command a 15-20 percent margin, almost thrice the 5-7 percent margin that is usual in the small car segment.
5. Tata hopes to make the car available in the U.S. by 2011 or 2012. However, because of higher emissions and safety standards here, the cars would cost around \$4,000.
6. The Nano is pretty green when it comes to fuel consumption. The car is certified by the Automotive Research Association of India as getting 56 miles to the gallon. That gives it not only the highest fuel rating of any other Indian petrol-powered car but also the lowest CO₂ at 101 gm/km.
7. This doesn't mean the arrival of the Nano is green, though. Because it is so affordable, many environmentalists fear that it could double the amount of cars on already-crowded Indian roads. According to the Centre for Science

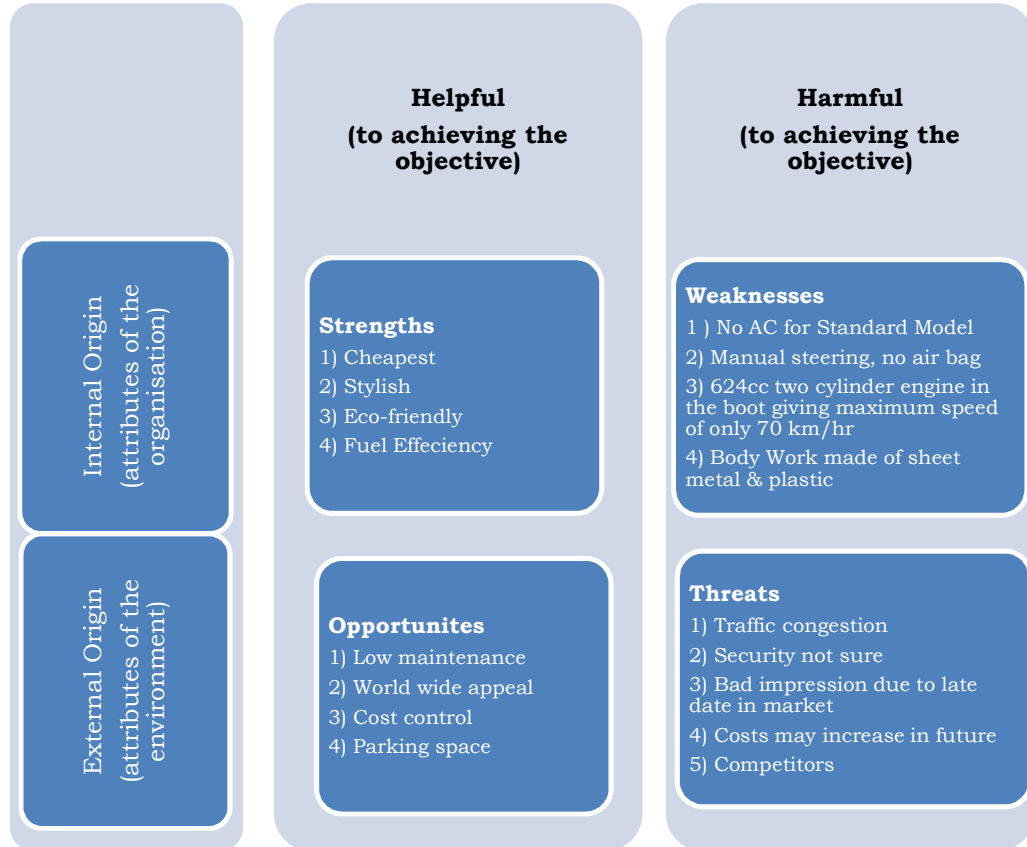
⁸ U.S. News & World Report LP, dated March 24, 2009

and Environment in New Delhi, studies already show one person dies every hour in New Delhi from air pollution-related diseases.

8. However, if people give up their polluting scooters - currently a popular method of transportation in India - for a cleaner Nano, it might not be so bad after all. According to Tata, the Nano pollutes 12 percent less than a typical scooter.
9. Tata will not be able to keep up with the demand for the Nano. Auto analysts say that production will be limited to just 30,000 to 50,000 cars in the first year because of limited production capacity -- a fraction of the original target of 250,000. The first 100,000 Nanos will be sold at random to anyone who has applied early and put down a deposit.
10. Tata hopes to eventually release diesel, electric and compressed air-powered versions of the Nano.

Conclusion

SWOT Analysis



Ratan Tata's View⁹

Ladies and Gentleman, thank you for being with us on this memorable occasion. There are no celebrities at this function nor any dance routines. The center of attraction for this morning's event is the new Tata car which we are unveiling. We're going to take you on a small journey. A journey that symbolizes the human spirit of change, the will to question the unquestionable, the drive to stretch the envelope.

Ladies and gentleman, I invite you to join me in this journey of innovation and

⁹ Excerpts from Ratan Tata's speech at the Nano unveiling ceremony

evolution. The quest to lead and the quest to conquer. It is this quest that led to the first manned flight by the Wright brothers. Today, thousands of aircrafts travel the skies carrying millions of passengers across the globe in safety and comfort. The same quest for leadership and conquering new frontiers led to landing man on the moon, an unheard of and unbelievable achievement at that time.

Innovation and evolution led to the creation of a bicycle which the rider pedaled to move faster than walking. Later, innovation motorized the bicycle to create the motorcycle and the scooter, providing motorized transport for up to two persons. The ENIAC computer in 1945, considered among the highest powered at that time filled an entire room. Today, the power of that huge machine is exceeded in the personal computer that sits on our desks or in fact, that we carry as laptops in our briefcases.

There are solutions for most problems. The barriers and roadblocks that we face are usually of our own making and these can only be demolished by having the determination to find a solution, even contrary to the conventional wisdom that prevails around us, by breaking tradition.

Today's story started some years ago when I observed families riding on two wheelers, the father driving a scooter, his young kid standing in front of him, his wife sitting behind him holding a baby and I asked myself whether one could conceive of a safe, affordable, all weather form of transport for such a family. A vehicle that could be affordable and low cost enough to be within everyone's reach, a people's car, built to meet all safety standards, designed to meet or exceed emission norms and be low in pollution and high in fuel efficiency. This then was the dream we set ourselves to achieve. Many said this dream could not be achieved. Some scoffed at what we would produce, perhaps a vehicle comprising two scooters attached together or perhaps an unsafe rudimentary vehicle, a poor excuse for a car. Let me assure you and also assure our critics that the car we have designed

and we will be presenting to you today will indeed meet all the current safety requirements of a modern day car.

Of late, when it became known that we will in fact be making such a car, the attention has moved to questioning the pollution it would create. Let me again assure those who have concern for the environment that the car we present to you today will meet all current legislated emission criteria and will have a lower pollution level than even a two wheeler being manufactured in India today. Concerns are also now being expressed about the congestion that could be caused by the existence of our small car in large numbers. I believe this needs to be put in the right perspective. There is no doubt that India is woefully behind its neighbours in infrastructure. The government is endeavoring to address this situation with its new road policy. Looking ahead, five years from today, were we to produce and sell 5,00,000 small cars every year, we would then, at the end of five years constitute approximately 2.5% of all passenger vehicles in the country. This could hardly be considered the nightmare of congestion that is being raised today about our new small car.

Despite what the critics said, despite what our antagonistic did, we pursued our vision to give India an affordable people's car that had not been produced anywhere in the world. In fact, a car that most people said could not be manufactured for that kind of price. But we never took our eyes off our goal. Today we will present what a young group of engineers and designers gave their all, for about four years to achieve.

Anyway I have said enough ladies and gentlemen, now I give you the new car from Tata Motors, the people's car that everyone has been waiting for.

Ladies and gentlemen, thank you again for being with us. We are very pleased to present these cars to you today. They are not concept cars. They are not prototypes. They are the production cars that will roll out of the Singur plant later this year.

And these will come in several variants. You have today on the stage one basic car or standard car and two deluxe cars which will have air conditioning also. Yes there will be air conditioning.

This is been referred to as one man's dream and indeed it was. But it took a tremendous amount of team work to convert this or translate this into reality. And I think it would be but fair and fitting to recognize and acknowledge the achievement of young group engineers who undertook the challenge for four years and great sacrifice to themselves and produced this car. I'd like to acknowledge Girish Wagh who headed the team. Girish, would you come up here? And some of his team members who are here with him. There are close to five hundred people in the team and obviously not all of them can be here, so on behalf of all of us we would like to acknowledge, on behalf of the company what the team has been able to do. All five hundred of them. I would also like to ask Ravi Kant (Managing Director, Tata Motors Ltd.), Prakash Telang (Executive Director (Commercial Vehicles), Tata Motors Ltd.) and Rajiv Dube (President (Passenger Cars), Tata Motors Ltd.) to join me up here at this time.

Let me say something about the car. The cars you see, as you can, are four door, they will seat four to five persons, they are powered by a 33 horse power, 624 cc engine. In size, externally it is approximately 8% smaller, bumper to bumper, than the Maruti 800. But internally it is 21% larger in passenger space. Fuel economy in terms of mileage, it'll be around 20 kilometers per liter or approximately 50 miles a gallon.

As I said earlier, much has been said about emission and much has been said about congestion and safety. Let me address the emission and the safety issues. In emissions as I mention, the car has, in fact passed the full frontal crash test that is required in this country (India). But it is also been designed to pass the offset and

the side crash which is required internationally. So that the car can, in fact, be sold internationally.

In terms of pollution, it today confirms to Bharat III and in fact today with this engine will indeed meet Euro IV which is not yet required in this country (India).

We decided we'd call it Nano because it connotes high technology and small size. So we stayed with the name.

Finally all of you have been conjecturing about the price. And since we commenced this exercise four years ago, we are all aware that there has been a very steep increase in input prices of steel, tires and various and sundry other inputs. Bearing all this in mind, I would like to announce today that the standard car will in fact have a dealer price of One Lakh Only (100,000 INR), VAT and transport being extra. Now having said that, I just want to say that that is because a promise is a promise and that's what we would like to leave you with.

These words of Ratan Tata signify that he has a missionary zeal and is a firm believer of "NOTHING IS IMPOSSIBLE". Nano is just a mean to an end for this concept. It also implies that, DO NOT WAIT FOR OTHERS TO START, YOU START AND THE OTHERS WILL FOLLOW.

Appendix

ZIGWHEELS.com HOW RIVALS MEASURE UP TO THE NANO

TATA NANO

Date of introduction: March 2009

PRICE RS 1.08 LAKH & ABOVE*

ENGINE & TRANSMISSION

Engine624cc, 2-cylinder inline
Power35 PS @ 5250 rpm
Torque48 Nm @ 2500-4000rpm
Gearbox4-speed manual

DIMENSIONS

Shoulder space (F/R)1130/1130mm
Head room (F/R)1042/970mm
Front Knee room (min/max)720/880mm
Rear Knee room (min/max)625/805mm
Front Leg Room (min/max)1004mm
Kerb Weight600 kg
Boot Space135 litres
TyresFront 135/70 R12/ Rear 155/65 R12
Turning Circle Diameter8.0m
Fuel Tank Capacity15litres

PERFORMANCE

Top Speed106 km/h
Fuel Efficiency25 kmpl (claimed)



VALUE FOR MONEY



MARUTI 800

Date of introduction: December 1983

PRICE RS 1.97 - 2.20 LAKH*

ENGINE & TRANSMISSION

Engine796cc, 3 cylinders, 2 valves/cylinder
Power37.5PS @ 5000rpm
Torque59Nm @ 2500rpm
Gearbox4-speed manual

DIMENSIONS

Shoulder space (F/R)1110/1100mm
Head room (F/R)920/900mm
Front Knee Room (min/max)660/810mm
Rear Knee Room (min/max)770/790mm
Front Leg Room (min/max)1040/1165mm
Kerb Weight683 kg
Boot SpaceNA
Tyres145/70R12
Turning Circle Diameter8.8m
Fuel Tank Capacity28 litres

PERFORMANCE

Top Speed108 km/h
Fuel Efficiency15.72 kmpl



VALUE FOR MONEY



HYUNDAI SANTRO XING

Date of introduction: October 1998

PRICE RS 2.77 - 3.67 LAKH*

ENGINE & TRANSMISSION

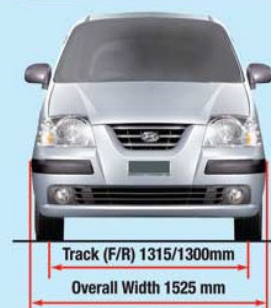
Engine1086cc, 4 cylinders, 3 valves/cylinder
Power63PS @ 5500rpm
Torque89Nm @ 3000rpm
Gearbox5-speed manual / 4-speed auto

DIMENSIONS

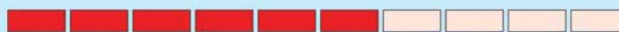
Shoulder space (F/R)1120/1120mm
Head room (F/R)1010/890mm
Front Knee Room (min/max)575/760mm
Front Knee Room (min/max)635/675mm
Front Leg Room (min/max)980/1150mm
Kerb Weight854kg (MT) / 868kg (AT)
Boot Space218 litres
Tyres155/70 R13
Turning Circle Diameter8.8m
Fuel Tank Capacity35 litres

PERFORMANCE

Top Speed145 km/h
Fuel Efficiency12.5 kmpl



VALUE FOR MONEY



CHEVROLET SPARK		Date of introduction: April 2007	PRICE	RS 2.83 - 3.85 LAKH*
ENGINE & TRANSMISSION Engine.....955cc, 4-cylinders, 2-valves/cylinder Power.....63PS @ 5400rpm Torque.....90.3Nm @ 4200rpm Gearbox.....5-speed manual				
DIMENSIONS Shoulder space (F/R).....1120/1150mm Head Room (F/R).....980/880mm Front Knee Room (min/max).....560/750mm Rear Knee Room (min/max).....640/830mm Rear Leg Room (min/max).....1050/1210mm Kerb Weight.....840 kg Boot Space.....170 litres Tyres.....155/70 R13 Turning Circle Diameter.....9.2 m Fuel Tank Capacity.....35 litres				
PERFORMANCE Top Speed.....153 km/h Fuel Efficiency.....16.45 kmpl				
VALUE FOR MONEY				

MARUTI SUZUKI ALTO		Date of introduction: September 2000	PRICE	RS 2.47 - 2.99 LAKH*
ENGINE & TRANSMISSION Engine.....796cc, 3 cylinders, 4 valves/cylinder Power.....47PS @ 6200rpm Torque.....62Nm @ 3000rpm Gearbox.....5-speed manual				
DIMENSIONS Shoulder space (F/R).....1100/1070mm Head room (F/R).....960/890mm Front Knee Room (min/max).....530/790mm Rear Knee Room (min/max).....620mm/900mm Front Leg Room (min/max).....950/1225mm Kerb Weight.....720kg (std), 735kg (LX/LXi) Boot Space.....NA Tyres.....145/80 R12 Turning Circle Diameter.....9.2m Fuel Tank Capacity.....35 litres				
PERFORMANCE Top Speed.....138 km/h Fuel Efficiency.....14.85 kmpl				
VALUE FOR MONEY				

HYUNDAI i10 iRDE		Date of introduction: October 2007	PRICE	RS 3.53 - 4.16 LAKH*
ENGINE & TRANSMISSION Engine.....1086cc, 4-cylinders, 3 valves/cylinder Power.....67PS @ 5500rpm Torque.....99Nm @ 2800rpm Gearbox.....5-speed manual				
DIMENSIONS Shoulder space (F/R).....1150/1120mm Head room (F/R).....1005/930mm Front Knee Room (min/max).....645/790mm Rear Knee Room (min/max).....640/855mm Front Leg Room (min/max).....1075/1210mm Kerb Weight.....860 kg Boot Space.....225 litres Tyres.....155/80 R13 Turning Circle Diameter.....9.5 m Fuel Tank Capacity.....35 litres				
PERFORMANCE Top Speed.....149 km/h Fuel Efficiency.....12.7 kmpl				
VALUE FOR MONEY				

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Glossary

Abb.	Description
ABS	Anti Braking System
AG	Aktien Gessellschaft
ARAI	Automotive Research Association of India
BI Solutions	Business Intelligence Solutions
CVT	Continuously Variable Transmission
ENIAC	Electronic Numerical Integrator and Computer
ERC	Economic Research Council
ESP	Extra Sensory Perception
FAG	Fuerza Aerea Guatemalteca
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GKN	Guest Keen and Nettlefolds
HVAC	Heating Ventilating and Air-conditioning
IBM	International Business Machines
IPCC	Intergovernmental Panel on Climate Change
IT	Information Technology
JLR	Jaguar Land Rover
JRD Tata	Jehangir Ratanji Dadabhoy Tata
MD	Managing Director
MDI	Moteur Development International
MMRDA	Mumbai Metropolitan Region Development Authority
MPFI	Manifold Pressure Fuel Injection
OEM	Original Equipment Manufacturer
OICA	Organisation Internationale Des Constructeurs d' Automobiles
R&D	Research and Development
TELCO	Tata Engineering and Locomotive Company
TRW	Thompson Ramo Wooldridge
UK	United Kingdom
US	United States
USD	United States Dollar
VAT	Value Added Tax