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## Nano-The People's Car

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### Author Profile

I did **Ph.D. (Statistics)** from Faculty of Science, **Banaras Hindu University** and **Diploma in Information Technology** from R.C.S.M.I had seven years of teaching experience. Seven of my papers were published in International and eleven were published in National Journal. I have attended number of international conferences. I have been nominated **Member Editorial Board** for the **Journal of Bioinformatics and Sequence Analysis (JBSA)**, **African Journal of Business Management (Impact factor 1.015)** and **International Journal on Business Management, Finance, Human Resource, Marketing and Economics (ISI Index Journal)**, **Asian Journal of Marketing, (ISI index journal)**, **Research Journal of Business Management (ISI index journal)**, **Asian Journal of Mathematics and Statistics (ISI index journal)**, **Singapore Journal of Scientific Research (ISI index journal)** and **Journal of Economics & International Finance, ISSN:2006-9812 (ISI index journal)**. **Vice-Chancellor of Central University of Jharkhand, Ranchi** has been nominated me to act as an **expert member** in the selection committee meeting for the post of **Jr. System Executive**. I have been selected in the panel of experts in a round table discussion held on 10 February 10, 2010, entitled "**Denmark: Better, Faster, Stronger - Leading the Way in Translational Medicine**". I have been also selected in the panel of experts in a round table discussion held on 10 December 2008, entitled, "**State of the Nation: Science in Ireland.**" My thrust areas are **Statistics, Quantitative Methods, Marketing Research, Research Methodology and Operation Management.**

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### Introduction

Nicolas J. Cugnot was the first person who invented automobile in 1769. It was a self-powered, three-wheeled, military tractor that made use of a steam engine. Robert Anderson was the first to invent an electric carriage between 1832 and 1839. However, Thomas Davenport of the U.S.A. and Scotsman Robert Davidson were amongst the first to invent more applicable automobiles, making use of non-rechargeable electric batteries in 1842. The Automobile Industry finally came of age with Henry Ford in 1914 with the bulk production of cars. It first begun with the assembly lines of his car factory and then consolidated his position in the industry.

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## **Indian Background**

Until the dawn of 1980's there were a few car manufacturers' like Hindustan motors, Premier automobiles etc. in the country and it was almost a seller's market; customers having neither the choice of models nor the delivery.

### **Maruti Suzuki India Ltd.**

Maruti Suzuki India Ltd. came in the Indian car industry in December 1983 keeping in mind of an average Indian individual who could afford a car. Maruti Suzuki India Ltd. was the joint venture of Maruti with Suzuki of Japan. Maruti Suzuki India Ltd. is the India's largest automobile company which entered in the market with focused aim to provide high quality, fuel efficient and low cost vehicles. Maruti comes in a variety of models. Its cars operate on Japanese technology suited to Indian conditions. By the year 1998-99, the company has modernize the existing facilities and expanded its capacity by 1, 00,000 units.

Due to growing competition, Maruti has completed Rs. 4 billion expansion project which has raised the total production capacity to over 4,00,000 vehicles per annum. In the small car segment it produces the Maruti 800 and the Zen.

On 17 September 2007, Maruti Udyog was renamed Maruti Suzuki India Limited. It is India's leading automobile manufacturer and the market leader in the car segment and total sales recorded in June 2008 was Rs. 4,753.58 crores.

### **Indian domestic auto industry in 2008**

India auto market is a promising industrial sector that is growing immensely every passing year. Indian auto market grew by 18 percent over previous fiscal by the end of February, 2007. As per the survey were conducted by Society of Indian Auto Manufacturers total number of automobiles manufactured by auto industry in India throughout financial year 2006-07 was 15.5 lakh. Export of cars manufactured in India comprised nearly 13 percent of total number of cars manufactured domestically by auto industry in India. In financial year that ended in February, 2004, Indian auto markets were fastest growing in the world, with registered growth rate touching nearly 20 percent. Auto industry in India mainly comprises of small car section, which enjoys nearly a 2/3rd market share of entire market for autos in India. In this respect, Indian markets are largest in world for small cars, behind Japan. India domestic auto industry has been passing through a tough phase since 2008 and signs of improvement and now visible in 2009. Leading members of India auto industry have forecast a difficult path in 2009. Shinzo Nakanishi, managing director of Maruti Suzuki, has said acknowledged 2009 would present them with a number of challenges.

### **Prospects of Indian auto industry in 2009**

In 2009, estimated rate of growth of India auto industry is going to be 9 percent. Auto industry in India has been hit by ongoing global financial recession. Sales figures of India automobile industry for December 2008 have shown devastating after effects of global financial slowdown.

However, there is still hope for automobile industry of India in 2009 as there are certain factors working in its favor. India is blessed with a growing middle class, which is getting

economically stronger with every passing day. This class is being seen as potential consumers for India auto industry in years to come. Indian economy has been, more or less, able to withstand tremors of global financial meltdown. Even though its rate of growth has slowed down considerably, there are hopes of an early economic revival. Work force of auto industry of India is relatively well trained. All these factors indicate that there could be a decent future for India auto industry in days to come.

Thus, India automobile market is likely to be in good shape in 2009. Much of this optimism results from renewed interest being shown in Indian auto industry by reputed overseas car makers. Nissan Motors, which is a well known Japanese car making company, regards Indian automobile market as a global car manufacturing hub for future.

## Advent of Nano

The introduction of the Nano received massive media attention due to its amazing features at a very low price. The Financial Times of London reported: "If ever there were a symbol of India's ambitions to become a modern nation, it would surely be the Nano, the tiny car with the even tinier price-tag. A triumph of homegrown engineering, the \$2,200 (€1,490, £1,186) Nano encapsulates the dream of millions of Indians groping for a shot at urban prosperity" (David Pilling — India hits bottleneck on way to prosperity". Ft.com. 2008-09-24. Retrieved 2009-06-08.) The car is expected to boost the Indian economy, create entrepreneurial opportunities across India, as well as expand the Indian car market by 65% according to CRISIL (The Economic times, 12 Jan, 2008). The car was envisioned by Ratan Tata, Chairman of the Tata Group and also Tata Motors, who has described it as an eco-friendly "people's car". Nano has been greatly appreciated by many sources including its adversaries and the media for its low-cost and eco-friendly initiatives which include using compressed air as fuel and an electric version (E-Nano). Tata Motors has indeed commercially launched the Tata Nano on March 23, 2009. Tata Nano initially has come in three variants, Standard, Deluxe and Luxury. The small car is priced between Rs. 1 lakh and Rs. 1.34 lakh. The dealer price is still believed to be Rs 1 lakh, but on-road price could be as high as Rs 1.34 lakh. Tata Motors in fact received 203,000 inaugural bookings with a total booking amount of Rs.2,500 crore (\$502 million) for its small car Nano. Among the three variants of the car, 20 percent bookings are for the Nano Standard, 30 percent for the Nano CX and the remaining 50 percent for the top-end Nano LX, the statement added((May 4,(IANS)).

Ratan Tata has fulfilled his promise of delivering the world's cheapest car, Tata Nano which is safe, affordable and fuel efficient at the same time. "**A promise is a promise**", said Ratan Tata. Nano launched by Tata Motors is going to change the face of Indian automotive industry. With this launch India has most definitely upped its presence in the global automotive industry. A lot has been talked about this car and another first has been associated with this car. Usually with the launch of a new product a company goes into a spending spree in terms of marketing of the product. However, Nano managed to get free publicity because of the hype which was associated with every move that it made. The initial 1 lakh customers which have been picked through a computer draw have advantage of promised price protection which means they will be getting the cars as per the promised launch day prices despite any adverse economic conditions in the future.

## Comparative study of Nano, Maruti 800, Alto and Santro

Features	Nano	Maruti 800	Alto	Santro
Base model	Nano	M800 Std	Alto	Santro Non-AC
Plus air conditioner	Nano CX/LX	M800 AC	Alto LX/LXi	Santro GL/GLS
Plus heater	Nano CX/LX	Feature not available	Alto LX/LXi	Santro GL/GLS
Plus tinted glasses	Nano CX/LX	M800 AC	Alto LX/LXi	Santro GL/GLS
Fully loaded	Nano LX	M800 AC	Alto LXi	Santro GLS
Plus front power windows	Nano LX	Feature not available	Feature not available	Santro GLS
Plus body colored bumper, door handle & ORVM	Nano LX	Feature not available	Feature not available	Santro GLS (only body colored bumper)
Plus central locking	Nano LX	Feature not available	Feature not available	Santro GLS
Plus front & rear fog lamp	Nano LX	Feature not available	Feature not available	Feature not available

(Source: [www.automobile/tata-nano](http://www.automobile/tata-nano))

## Pollution issues

Nano was conceived and designed around the section of the Indian population who are currently using eco-friendly bicycles and motorcycles. Environmentalists are concerned that its extraordinarily low price might lead to mass motorization in countries like India and therefore possibly aggravate pollution as well as increase the demand for oil. The ecology focused German newspaper *die tageszeitung* feels that such concerns are "inappropriate" as the Tata Nano has lower emissions compared to the average Volkswagen, and that developing countries shouldn't be denied the right to motorized mobility when industrialized countries should be looking to reduce their emissions and usage of cars. *Die Welt* reports that the car conforms to environmental protection, and will have the lowest emissions in India. In crowded metropolitan cities like Mumbai, Ratan Tata has conceived a scheme to only offer the Nano to those individuals who do not have an automobile already. The Nano will also replace many overloaded and worn-out two-stroke polluting vehicles, both two and three-wheeled. According to Anumita Roy Chowdhury, associate director of the Centre for Science

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and Environment in New Delhi, "the low-cost cars will be disastrous" in the current policy and regulatory framework as regards pollution.

## **Future of Nano**

Critics of the car have questioned its safety in India (where reportedly 90,000 people are killed in road-accidents every year), and have also criticized the pollution that it would cause (including criticism by Rajendra Pachauri, director general of TERI, a research and policy organization in India, and chancellor of TERI University). However, Tata Motors has promised that it would definitely release Nano's eco-friendly models alongside the gasoline-model. India has 8 percent of the world's vehicle fatalities and less than 1 per cent of its cars, with more than 90,000 people killed on the country's roads every year. Introducing a million Nanos into the mix may bring more – and unwelcome – headlines. Tata, which has the only crash-test facility in the country, said that the Nano "exceeds current regulatory requirements". And while it is not a deathtrap – it has crumple zones, seat belts and strong seat anchors – it is worth bearing in mind that total vehicle crash testing (rather than just frontal impact), airbags and antilock braking systems are not mandatory. Tata Motors has said that the four-door Tata Nano can comfortably seat four people, with more leg space and head room. That is entirely right - the design of the Nano - especially interiors - is much superior to the Maruti 800 which is the only car one can compare it to. And the Nano is miles ahead in the interior space department. The Tata Nano promises lower pollution levels compared to two-wheelers made in India, says the company. Tata claims that the Tata Nano offers a high fuel efficiency of 20 km/liter, thereby ensuring low carbon dioxide emissions. The Nano promises to provide a safe and environment-friendly mode of transport to a large segment of the population who, till now, did not have such option. This will give a major fillip to the Indian automobile industry.

Despite liberalization during the last decade, the penetration of automobiles in India has just reached about seven per thousand people, compared to double digits in even Sri Lanka and Pakistan. With the launch of the Nano, we will experience many new important facets. It is now well-accepted that India has emerged as an attractive hub for the manufacturing of compact cars. But, with the launch of the Nano, the world will also accept India's competence in design values and frugal engineering. In India over 300,000 auto rickshaws are sold in a year for about the same price as the Nano. The Nano is intended to be a substitute for two-wheeler transport which is safer, far more environment-friendly and convenient.

The world will also accept the capabilities of the component manufacturers who have developed the parts at low prices. India could now start supplying to the automobile plants of the major international car manufacturers abroad.

Entry of Nano has set a new benchmark in both price and size in the passenger car segment. It has opened up a huge market that was hitherto untapped. Its potential impact on the market can be judged by the recent proposals of competitors to come out with similar cars in the same segment. While the price and fuel efficiency of Nano can have a competitive edge over the two-wheeler segment and entry-level passenger cars, its actual impact on their market share would have to be gauged taking into consideration the interplay of various macro factors. For instance, a sizeable number of two-wheeler users are youngsters whose purchase is guided by fuel efficiency, price, style, parking considerations, besides a host of other

factors. Replacing the two-wheeler with a Nano may not always be an attractive or a feasible option for this segment as they face a budget constraint, parking issues, the absence of style as in a fancy motorbike, the absence of power as in a motorbike of this price. Even the middle-aged group using a two-wheeler will factor in to similar considerations, though to them, the style factor may not play a significant role. Yet existing car owners may opt for a small additional car giving a significant boost to demand for Nano.

Nano's impact on used cars is likely to be more pronounced in tier II and tier III cities. These cities are a potential market for used cars. Given that these cities are also a strong market for small cars, the availability of a brand new car at a price that could probably match a used car could prompt customers to pitch for a Nano in place of a second-hand car. Besides, the client base here typically is price conscious, pays attention to factors such as fuel efficiency, which Nano can aptly satisfy. While these cities can form a potential market base for Nano, the sales could be at the cost of used cars. Given that the tier II and tier III cities are a major market for used cars, a fall in demand here could effect a fall in price of second-hand cars.

### **How Nano can affect 'B', 'C' segment car sales**

The Budget 2008 has reduced the excise duty for small cars and two-wheelers from 16 to 12 per cent, so a Maruti-800 customer should benefit by around Rs 10,000. From the manufacturer's point of view, it was good news for Maruti, Tata and Hyundai and all those planning to launch small cars in the near future. But the excise duty on bigger cars continues to be at 24 per cent, which will cause more disparity between the prices of small and big cars. The demand for big cars may get impacted in the short-term.

"In the infrastructure sector, the Government has increased allocation for the National Highway Development Project (NHDP) to Rs 12,966 crore which will increase demand in the auto sector in medium to long term."

As for entry-level passenger cars, or 'A' segment cars, they could be impacted to a certain extent, especially since Nano, besides its attractive features, is also positioned as an environment-friendly car at a more attractive price. But a larger impact is likely to be seen in the used car segment.

In the same stratum, the availability of Nano could also prompt similar incline in purchases in the tier I cities, in favour of Nano and against used cars. This in turn would again lead to a fall in the price of used cars in tier I cities. Such a fall in price of used cars, both in tier I cities as well as tier II and III could indirectly impact segment B and C cars. Indirectly because, typically, the purchase of segment B and C cars is an upgrade, which means that the car currently in use would have to be disposed of, to make the new purchase. A fall in the price of used cars could act as a restraint at least in the short run, for purchases in the B and C segments. Car sales yield very low margins, especially in the A segment. This is because of high showroom costs and high discounts offered. While Nano would face a similar challenge, yielding low margins, the sheer volume of sales may counter this, ensuring profitability. Besides, a major chunk of the profit for a dealer comes from after-sales service and body shop and, hence, it would pay a dealer to invest in the workshop.

However, given the expected volume of sales, innovation in dealing with sales and after-sales service is certainly called for. For instance, an option of having a central pool of inventory could be explored, from where the dealers can draw their stocks periodically. This would greatly reduce the burden of land cost to hold stocks for individual dealers. To handle the excessive rush and the resultant adverse impact on sales service on other car segments offered by the dealers, individual kiosks could be set up to exclusively cater to orders for Nano. The Internet too could be used to reduce the pressure on dealers.

As for customer satisfaction, different car segments call for different levels of customer satisfaction. Lower segment customers are typically less demanding in terms of customer-care expectation and thus, meeting this with a team of stretched customer-care officials may not be a major challenge. As regards after-sales service, these centers need not necessarily be in the heart of the city but could be situated in the outskirts to cater exclusively for Nano. There could be an arrangement with a service centre within the city where the customer can leave his car for servicing. The actual servicing could happen in the centre that is outside the city. This would take care of the spiraling real estate prices within the CBD (central business district) and ensure profitability.

The customer of an A segment car is essentially one who is guided by price, fuel efficiency and other related factors. He is not as discerning or as demanding as a customer in the higher segments. Hence, as long as the above criteria are met to his satisfaction, he is not unduly worried about factors such as the absence of a backdoor or fuel-tank access.

## Conclusion

Thus, Tata Motors has already changed the face of the Indian automobile industry by developing a product that no manufacturer has so far been able to do across the world. This is an achievement of Indian innovation at its best across design, engineering, manufacturing and the supply base. Time magazine has listed the Nano in the dozen most important cars in the world since 1908. The Indian automobile industry has clearly established its place as the ultra-low cost car centre globally and the Nano is likely to spur greater activity in the years to come. Truly, an innovation of this enormity should get the success it deserves. That said, the face of the Indian automobile market has been changing over the years and will change once again after the Nano. We will have a whole new set of customers, both in urban and rural areas, for whom a car will symbolize a dream that can be realized. Car ownership is considered to be a symbol of economic progress and is therefore very high on a consumer's aspirational list of products. Given the sizeable Indian population and the low cost of owning and using the Nano, the car is likely to attract a large cross-section of potential customers, many of them first-time car-owners. As the market expands further, prices of small used cars will fall, a trend we are already witnessing with declines of around 35 per cent, making affordability still higher. The Nano could also have an impact on vehicles used for passenger transportation, particularly three-wheelers which, in some cases, cost more than the Nano. The latter presents a viable alternative with greater driver and passenger comfort, and protection from the vagaries of the weather.

The Tata Ace, which was launched in 2005, managed to change the dynamics of the three-wheeler transportation market. Vehicle distribution, sales and service may also see changes in the post-Nano world. Keeping in line with its ultra-low-cost positioning, there will be a need

to keep marketing and distribution costs significantly lower. Tata Motors has already begun using internet marketing through social networking websites and is potentially considering online sales. One day, in the not very distant future, you may be able to order the car online and track the progress of your order through manufacturing and delivery to a local dealer or retailer.

While these are some of the changes which will impact the Indian auto market, they will certainly not happen overnight. Beyond the initial buzz and the excitement around the launch, it will take some time for sufficient volumes to be produced and sold -- this could take anywhere up to around 2-3 years.

Further, the Indian consumer is very discerning and the product and after-sales service quality will need to live up to the consumers' expectations for the Nano to be successful.

### **Questions for discussion**

1. Will Nano's slow speed be an edge over other cars?
2. How will Nano impact after-sales services' profitability of dealers and service centers?
3. What impact do you foresee of Nano on the two-wheeler and the passenger car segments, and as challenges to motorcycles and entry-level passenger cars in retaining their market share?
4. Do you see the absence of a backdoor, fuel-tank access inside the bonnet acting as deterrents?

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## Annexure-I

Technical specifications of Maruti 800	
<b>Dimensions</b>	
Overall length	3335 mm
Overall width	1440 mm
Overall height	1405 mm
Wheelbase	2175 mm
Minimum turning radius	4.4 m
Ground clearance	170 mm
Seating Capacity	4 persons
<b>Weight</b>	
Unladen weight	665 kg (AC BS III), 650 kg (Std. BS III)
Laden weight	1000 kg
<b>Engine</b>	

Type	4 stroke cycle, water cooled SOHC (1C2V)
No. of cylinders	3
Piston displacement	796 cc
Maximum output (Std.,AC)	37 bhp at 5000 rpm
Maximum torque (Std.,AC)	59 Nm at 2500 rpm
<b>Power Transmission</b>	
Std., AC	4-forward, all synchromesh, 1 reverse
<b>Steering</b>	
Steering	Rack & pinion
<b>Suspension</b>	
Front	McPherson strut & coil spring
Rear	Coil spring with gas filled shock absorbers
<b>Brakes</b>	
Front	Disc
Rear	Drum
<b>Tyres</b>	
Tyre size	(Radial) 145/70 R-12
<b>Capacity</b>	
Fuel tank capacity	28 liters (BS III)

(Source : <http://www.marutiudyog.com>)**Annexure-II: Basic features of Tata Nano**

Items/Variants	Nano	Nano CX	Nano LX
AC with heater	-	Yes	Yes
Front power windows	-	-	Yes
Cup holders in front console	-	-	Yes
IRVM	Plain	Plain	Antiglare
Gear shift console	Basic	Basic	High end console with provision for mobile charger/ cigarette lighter
Magazine and coin holder on all doors	-	-	Moulded door trim

Map pocket integral with driver & codriver seat	Fabric pocket	Fabric pocket	Separate plastic trim
Front seat headrests	Integrated	Integrated	Integrated
Rear seat headrests	-	Integrated (with nap rests)	Integrated (with nap rests)
Sunvisor on driver & passenger side	Yes	Yes	Yes
Driver seat with slider	Yes	Yes (with recliner)	Yes (with recliner)
Passenger side seat with slider	-	Yes (with recliner)	Yes (with recliner)
Front assist grips	Yes	Yes	Yes
Rear assist grips	Yes	Yes	Yes
Head lamp leveling	Integral feature through innovative suspension design	Integral feature through innovative suspension design	Integral feature through innovative suspension design
Low fuel warning lamp	Yes	Yes	Yes
Rear seat folding	Yes	Yes	Yes
Intrusion beam	Integral feature through innovative door system design	Integral feature through innovative door system design	Integral feature through innovative door system design
Radial tubeless tyres	Yes	Yes	Yes

(Source: [www.automobile/tata-nano](http://www.automobile/tata-nano))**Annexure-III: Technical specifications of Tata Nano Car**

Length	3099 metres
Width	1495 mm
Height	1652 mm
Engine	2 cylinder

Capacity	624 cc
Power	35 PS
Fuel injection	Multi point fuel injection (MPFI)
Fuel type	Petrol, diesel versions
Body type	Sheet metal
Seating capacity	4 (Four)
Mileage	20-22 Kmpl (city drive) 26 Kmpl (highways)
Top speed	105 K.M
Emission norms	Euro-IV, Bharat Stage-III compliant
Safety norms	Frontal crash tested
Versions	One standard and two deluxe
Compression ratio	9.7:1
Power to weight ratio	0.58
Acceleration	0-60 kmph: 8 secs
Transmission	Synchromesh on all forward gears, ½ sliding mesh on reverse gear with overdrive on 4th gear
Gearbox	4 forward speeds, 1 reverse, all forward gears synchronized
Suspension front	Independent McPherson structure, shock absorber
Suspension rear	Semi trailing arm, coil spring with gas filled shock absorber
Brake type	Dual circuit, vertical split operated by tandem master cylinder
Front brake	180 mm drum
Rear brake	180 mm drum
Tyre type	Radial & tubeless
Front tyre size	135/70 R12
Rear tyre size	155/65 R12

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Min. turning circle radius	4 meters
Ground clearance	180 mm
Fuel tank capacity	15 Litres
Battery position	Semi sealed under the driver's seat

(Source: [www.automobile/tata-nano](http://www.automobile/tata-nano))

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