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Automotive

Inside India

Indians view their
automotive future



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Automotive Analysis Division (formerly OSAT)

The University of Michigan Transportation Research Institute (UMTRI) Automotive Analysis Division (AAD)

This joint project with the IBM Institute for Business Value represents UMTRI-AAD's continued focus on key issues facing the global automotive industry. It also fulfills UMTRI-AAD's mission to describe and analyze the global automotive industry's current developments and future directions. This report serves as an example of the informed research and analysis that UMTRI-AAD provides to industry stakeholders, including manufacturers, suppliers, retailers, labor, scholars, government, the media and the general public.

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IBM Global Business Services, through the IBM Institute for Business Value, develops fact-based strategic insights for senior business executives around critical industry-specific and cross-industry issues. This executive brief is based on a joint research study with the University of Michigan Transportation Institute's Automotive Analysis Division and the extensive client engagement experience of IBM Global Business Services. It is part of an ongoing commitment by IBM Global Business Services to provide analysis and viewpoints that help companies realize business value. You may contact the authors or send an e-mail to iibv@us.ibm.com for more information.



Inside India

Indians view their automotive future

By Bruce M. Belzowski, Allan Henderson and Penny Koppinger

When automotive executives and experts from India look at their industry's recent past, they see major improvements in manufacturing capabilities, a growing market with great potential, and a very positive industry/government vision for the industry's future. But they also see a number of challenges, including the need for a better transportation infrastructure, improved product quality, more skilled workers, changes in labor and tax regulations, and the need to increase the scale of their companies in order to meet the demands of the global automotive industry. Despite these obstacles, India's executives and experts are optimistic about their ability to overcome these challenges and make India an important destination for automotive production and sales.

What do Indian industry executives and experts consider as the real issues and challenges for the Indian automotive industry?

To answer that question, the Automotive Analysis Division at the University of Michigan Transportation Research Institute (UMTRI-AAD), along with the IBM Institute for Business Value, interviewed 29 Indian automotive executives and experts from government, industry, and academia. Our questions covered a wide range of issues, including India's future market and industry structure, relationships between domestic auto companies and their foreign joint venture (JV) partners, as well as the challenges in the areas of infrastructure, air quality, and oil security.

From our interviews, we developed a picture of how the Indians view their own automotive future. India is an emerging automotive economy, facing all the challenges of a country working hard to grow its automotive industry. Its market is small but growing; its roadway system is incomplete; and its domestic automobile manufacturers and suppliers still need to mature to world-class status.

Yet despite these challenges, there is tremendous optimism among our interviewees about India's automotive future. We believe this optimism stems from the contrast between India's past economy and its present state, particularly from the government's increasing encouragement of the automotive industry.

Inside India

Indians view their automotive future

Developing India's unique automotive market

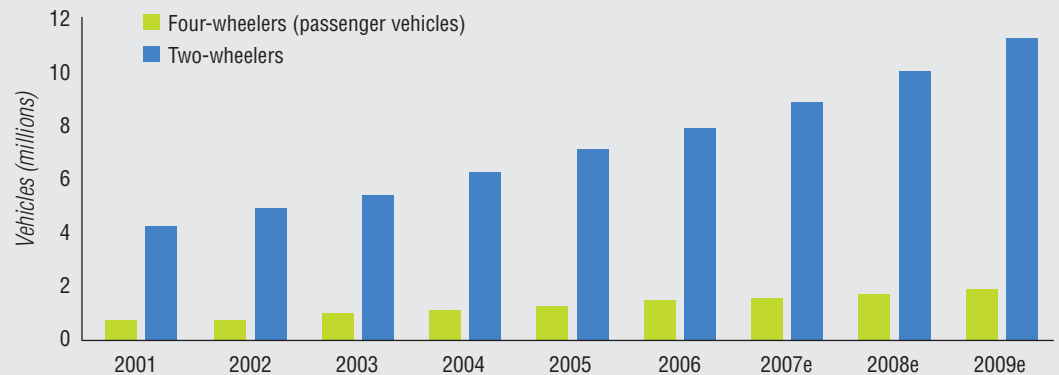
Prior to the early 1990s when India opened its then-restricted market, owning a vehicle was viewed as a luxury and taxed accordingly. During the early 1990s, domestic companies, such as Tata Motors, Maruti Udyog, Mahindra & Mahindra, Hindustan Motors, and Premier, manufactured a relatively small number of vehicles.

In the mid-1990s, foreign manufacturers entered the market through JVs with domestic manufacturers as required by the government. This entry raised the level of competition and brought many global suppliers to India to support their manufacturer customers. It was also a time when the Indian population began

to adjust to a new, global automotive economy and manufacturers adjusted to their new partners, developed their supply chains, and began to understand India's challenges and the Indian consumer.

In 2000, the government lifted the requirement that foreign companies establish JVs with domestic companies. As its gross domestic product (GDP) grew, India built and sold more vehicles, reaching the 1-million-vehicle mark in the 2004-2005 fiscal year, as shown in Figure 1.¹ In 2006, government support for the industry reached a high point with the creation of the Automotive Mission Plan (AMP). This plan not only documents the importance of the automotive industry to the Indian economy but also the increased support the government will provide through 2016.

FIGURE 1.
Indian vehicle sales.



Sources: Actuals from "Automobile Domestic Sales Trends." Society of Indian Automobile Manufacturers. <http://www.siamindia.com/scripts/domestic-sales-trend.aspx> (accessed May 31, 2007); Estimates based on IBM Institute for Business Value and UMTRI-AAD analysis.

India's Automotive Mission Plan

The Indian government has recently begun to play a key role in the development of the automotive industry through its collaboration with the industry in the Automotive Mission Plan (AMP).² Our interviewees were nearly unanimous in their high level of optimism for their government's support of the industry.

The AMP sets development goals for the automotive industry for the years 2006 to 2016. What makes the document important is the Indian government's recognition of the value of the automotive industry, first, as a creator of jobs at all levels of society – laborers, managers, engineers, dealers, suppliers, and manufacturers – and second, as a way to increase GDP and exports. The plan estimates that India's automotive industry will double its contribution to GDP by 2016.³

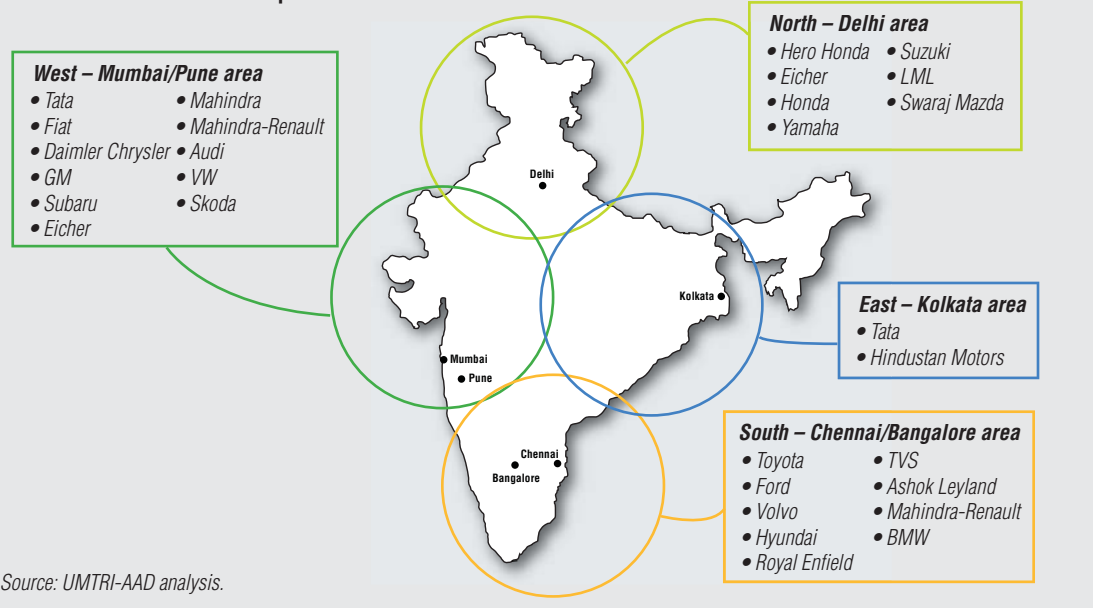
The plan also clearly describes the role of government in supporting the industry, especially through improved infrastructure and tax and labor law revisions. How quickly the government responds to these challenges will influence how soon India's internal and export markets expand.

India's automotive endowment is located in four major industrial areas spread across the country as shown in Figure 2. The distribution of automotive investment throughout the country implies the overall industry is well-positioned to receive support from a variety of local governments as well as the national government and local consumers. Thus, the Indian automotive industry is poised for growth as government support and personal income increase.

These developments set the stage for the general optimism in our interviews about the future of India's automotive industry, but our interviewees also report significant challenges. Our study results can be categorized into three major areas:

- India's automotive market
- India's production capabilities
- External challenges that impact India's automotive industry.

FIGURE 2.
Automotive investment is spread across four different industrial areas.



India's fast-paced GDP growth and pent-up demand are expected to fuel growth in automotive sales. Indian executives expect passenger vehicle sales to double by 2010 and triple by 2015.

India's automotive market

GDP growth drives industry growth

India's automotive market is driven by overall GDP growth, which has been about 7 to 9 percent for the past three years. One estimate predicts GDP growth will level off at 6 percent annually and remain at that rate until 2020.⁴ As a developing automotive economy, India today ranks very low in terms of vehicles per 1000 people, but past experience in other markets suggests that as GDP per capita grows, the automotive market should also grow, as shown in Figure 3.

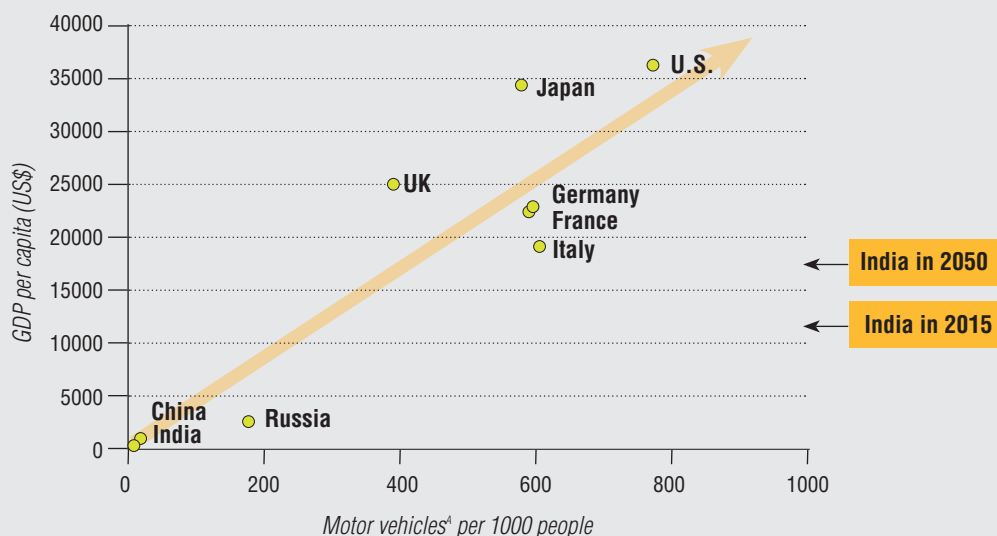
A GDP per capita of US\$3,000 is considered the inflection point where four-wheeler sales begin growing at a faster pace.⁵ However, one executive notes that there are 40 million Indian households that can afford a four-wheeler today but are not buying one. This executive lists a combination of issues that are dissuading potential buyers in India from actually buying a car:

- They don't need a car.
- They are uncertain about the cost of operation.
- Roads are not good enough.
- Congestion makes driving unappealing.
- Parking space is not sufficient.
- They don't know how to drive.
- They are unsure whether some manufacturers will last as long as the vehicle, creating a "trust" gap.

Any combination of these issues may cause people to delay purchasing a vehicle, but it is unclear which solutions would cause reluctant buyers to change their minds.

Several interviewees highlight the dampening effect of recessions on their fragile economy. One executive explains it this way: "The last five years have shown continued growth, and everything is great now. But people worry

FIGURE 3.
Growth in vehicle sales tracks closely to GDP per capita.



Note: ^a Cars, buses, and freight vehicles, but not two-wheelers.

Source: "World Development Indicators 2005." The World Bank. March 2005; Wilson, Dominic and Roopa Purushothaman. "Dreaming with BRICs: The Path to 2050." Goldman Sachs. October 1, 2003; IBM Institute for Business Value analysis.

about the end of the cycle. In general, a recession comes every seven or eight years.” Recessions create cautionary spending. One executive describes this as India’s “scarcity use” economy, one in which families find ways to continually reuse products until the products completely wear out.

“India is still changing. We are still cautious. Only this last generation has lived in an expanding economy. Strong family ties made people cautious because of the past failures of the economy.”

– Automotive supplier executive

The domestic market forecast is cautiously optimistic
The recent optimism concerning the Indian automotive market is based on a compound annual growth rate (CAGR) since 2001 of 15.4 percent for four-wheelers and 13.3 percent for two-wheelers.⁶ Our Indian industry interviewees expect a doubling and tripling of four-wheeler sales by 2010 and 2015, respectively. The number of four-wheelers sold in 2006-2007 was about 1.4 million, and a doubling (2.8 million) or tripling (4.2 million) of that figure would make India one of the top ten countries in terms of vehicle sales.⁷ The interviewees also see 2005’s sales of nearly 7 million two-wheelers increasing 60 percent to 11 million by 2010 and by 240 percent to 17 million by 2015.

But Indian optimism is tempered by the low number of four-wheelers India sells domestically compared to domestic sales numbers

in the rest of the world, especially its neighbor China, which has a similarly sized population yet about four times the four-wheeler sales and nearly three times the two-wheeler sales.⁸ The gap between China and India is not expected to close in the near future, despite one forecast that has India becoming one of the top five automotive economies by 2025.⁹

The impact of infrastructure on the market is crucial
Infrastructure permeates almost every discussion with our interviewees about the current and future market. It impacts the types of vehicles sold both now and in the future. For both domestic sales and exports, many interviewees see a direct relationship between infrastructure improvements and growth of the auto industry. Roads in India’s large cities continue to be plagued by overcrowding, with large delivery trucks, small cars, three-wheelers, two-wheelers, pedestrians, and the occasional cart drawn by a cow, all sharing the same road. Today, the combination of fuel cost and insufficient infrastructure has led Indian consumers to purchase primarily two-wheelers and small cars. So, even though some people can afford larger cars, many purchase smaller ones.

Financing systems are strong

One of the key differences between India and China today is their respective financial institutions and systems. While China’s systems are still in the process of modernizing, India’s financial institutions are already mature. India has a financial loan system for purchasing vehicles that can serve as the basis for the development of India’s automotive industry for years to come. In developed economies, 60 to 80 percent of vehicle buyers use financing

Though the Indian automotive industry is supported by strong financing systems – poor road infrastructure and underdeveloped dealer networks hinder four-wheeler market growth.

for their purchases. Our interviewees estimate that, in India, 77 percent of four-wheelers and 50 to 60 percent of two-wheelers are currently financed.

Forty percent of the interviewees think financing already plays a major role in vehicle sales and will change only marginally in the future. However, they cited two areas that may affect future growth: the ability of financial institutions to assess risk of potential countryside buyers and lowering interest rates to match Western countries (which improves the ratio of interest rate to earnings of Indian households, making vehicle ownership more affordable).

The dealer body is underdeveloped

In general, our interviewees do not see the dealer body as being very successful today, with brands largely selling themselves rather than dealers selling the brands. Dealers currently own their franchises, but there are few multiple-franchise dealers selling more than one brand at one location. One executive thinks that the Indian market will some day resemble the U. S. market, which has nearly 20,000 dealers across the country. Another executive thinks networks of service-only workshops will manage a large part of after-sales service. A number of interviewees envision consolidation of current dealers into groups of dealers, creating large dealer groups. Based on these diverse opinions, it looks like buyers will need to make some important decisions about their relationships with dealers, and their final decisions will help shape the future of the dealer body.

The most significant market-related themes from our interviews focus on three points:

- Will the small car be India's automotive destiny?
- Understanding India's consumers will be key to future market success.
- Exporting to the world market will be a challenge.

Will the small car be India's automotive destiny?

Two aspects of the future domestic vehicle market stand out when speaking to our Indian interviewees. First, the target of four-wheeler sales is the large number of two-wheeler owners. And second, the bulk of four-wheeler sales will be small cars.

A significant migration from two- to four-wheelers is expected. The two-wheeler market is composed of motorcycles, scooters, and mopeds and represents 75 percent of India's annual new vehicle sales.¹⁰ Interviewed executives believe that many of these buyers will migrate to four-wheelers not only because of increases in GDP per capita, but also because of the development of small, inexpensive four-wheelers. The expected delivery of the Tata Group's "1 lakh car" (a price of approximately US\$2,500) is the prime example interviewees use to describe the potential affordability of four-wheelers and India's developing expertise in small cars.¹¹ There are differing predictions about the introduction of the "1 lakh car" into the vehicle market. One executive thinks, "If they really come out with a US\$2,500 car, there will be, at a minimum, a 10- to 15-percent shift from two-wheelers to four-wheelers." Other predictions are much greater – some say a million consumers will migrate.

“There are 7 million first-time buyers who want an affordable car. We are attempting to develop a low-priced, entry-level car because we think there is a much larger demand, and we think we can make a difference.”

– Automotive manufacturer executive

In most developed countries, used vehicles are transition vehicles for buyers who are not ready to migrate to new vehicles. But because Indians tend to keep their vehicles until they are no longer usable, India lacks a large stable of newer-model used vehicles. Hence, India’s used vehicle market is very immature and is not expected to grow, adding more reason for interviewees to predict that buyers will move from two-wheelers to new, inexpensive four-wheelers.

Small cars dominate

Practically all of India’s manufacturers (domestic, foreign, and JV) offer a variety of small cars in different price ranges. But the “1 lakh car” is priced close to that of a high-end two-wheeler, making it easier for buyers to migrate. The competition has always been fierce in this ultra-low-price segment, with local JVs such as Maruti Udyog (the Maruti-Suzuki JV) selling the 2007 model of its very popular Maruti 800 for about US\$5,000, along with three other low-priced models.¹²

Foreign competition is also gearing up. Renault recently formed a JV with Mahindra & Mahindra to build its low-cost Logan car as well as an even less expensive vehicle.¹³ Other global manufacturers such as Hyundai already offer low-priced vehicles or are coming to India with the expressed purpose of building and selling inexpensive, small vehicles.

Many of India’s best-selling vehicles are small and inexpensive

Maruti 800: US\$5,093

Tata Indica: US\$5,945

Maruti Alto: US\$6,093

Hyundai Santro: US\$7,100

Maruti Wagon R: US\$8,299

Sources: Maruti Udyog Web site; DriveInside.com Car Pricing Web site.

Note: Prices as of May 2007.

The small car strategy promotes Indian automotive industry growth

Interviewees report that the demand for two-wheelers and small cars has focused Indian and foreign manufacturers and suppliers on making India the center of expertise for these small, inexpensive vehicles. Fuel-efficient, small vehicles support India’s long-term goal of energy independence, and from a safety perspective, they move people from two-wheelers, which are generally considered less safe, into four-wheelers. Smaller vehicles also typically provide a higher level of emissions control than two-wheelers. And if India becomes home to the recognized global experts in two-wheelers and small cars, it will position India to export more globally.

Executives believe India's small car strategy holds promise, but the rush to trade two-wheelers for inexpensive four-wheelers may create more congestion for India's already strained infrastructure.

But there are some potential drawbacks to this strategy. The introduction of very inexpensive four-wheelers to the Indian market might trigger the migration of two-wheeler buyers to four-wheelers before the nation's infrastructure is improved and expanded. This could cause even more congestion in the short term. Fuel consumption could also increase dramatically. And the low levels of safety and emissions equipment on these vehicles might make them attractive exports only to developing economies rather than developed economies. Exports to developed economies will face formidable competition from global manufacturers with their own inexpensive small cars. In the final analysis, the Indian automotive industry's aspiration of growing through the development of small, inexpensive cars is a reasonable one, built on the desire to improve India's economy now rather than wait for incomes to reach levels of developed economies. But there are potential unintended consequences that Indians must be aware of as they pursue this strategy.

Is there a market for larger vehicles?

Though India is similar in geographic size to the United States, it seems to be following the Japanese market model, where the most popular vehicles are small. As India's GDP per capita grows and its infrastructure develops and improves the intercontinental driving experience, will Indian buyers begin to purchase larger vehicles or will they continue to focus on smaller vehicles because of fuel prices? This is a question that manufacturers must consider when planning to serve India's future market.

Understanding India's consumers will be key to future market success

Understanding how to market to India's diverse consumers is very important for success in this marketplace. Interviewees described today's top-priority vehicle purchasing factors as price, fuel economy, brand image, and after-sales service (quality and styling were not at the top of the list as they are in developed markets):

- *Price and fuel economy:* Considering the current state of India's economic development, it is not surprising that price and fuel economy are the top purchasing factors for buyers. The Indian government currently offers an 8-percent excise tax reduction on the cost of vehicles that have low engine displacement (<1200 cubic centimeters).¹⁴ It also controls the cost of gasoline. In India, fuel purchases represent a larger proportion of a family's income than in Western countries.

“The cost of fuel keeps people with two-wheelers from buying cars. It's US\$1 per liter and there's the possibility of it rising to US\$3 per liter. The two-wheeler gets 60 miles per liter, or about 220 miles per gallon.”

– Automotive supplier executive

- *Brand:* Interviewees ranked brand second only to price and fuel economy. Buyers tend to purchase vehicle brands based on their perceptions of what a vehicle says about them.

Purchase-decision factors are shifting in India; price and fuel efficiency are still top criteria, but the prestige conferred by particular brands will become more important to increasingly sophisticated consumers.

- *After-sales service:* Indian consumers generally keep their vehicles until they are no longer usable, making after-sales service capabilities a crucial factor in buying decisions. As a consequence, it is not only price and vehicle characteristics but also the reputation for superior after-sales service that helps sell new vehicles. One executive observes the importance of the dealer network in this process, “Manufacturers need a dispersed service network with quality manpower and superior capabilities for obtaining replacement parts and handling customers. Today, dealers are only half as efficient as they need to be in this area. They need to handle customers without rupturing the relationship.”

Vehicle purchase factors will change in the future

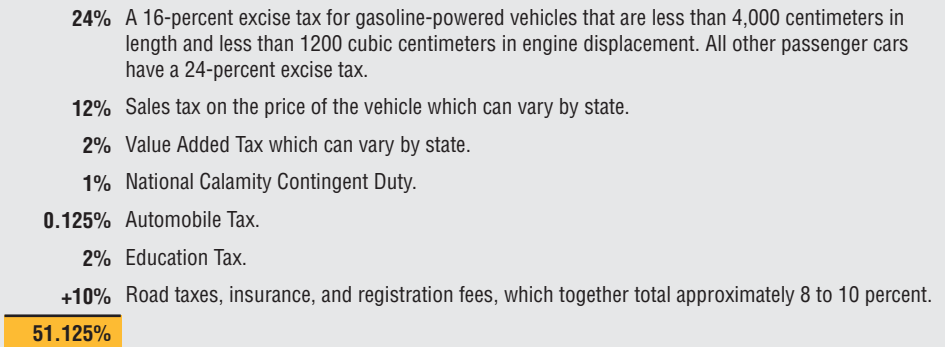
A very different picture emerges when interviewees predict the main vehicle purchasing factors over the next five to ten years.

Executives clearly see greater emphasis on brand image and status as well as increased buyer sophistication in evaluating what a vehicle has to offer. They believe consumers will strike a balance in terms of performance, features, and safety, while at the same time considering the price and fuel efficiency of a vehicle. The increasing importance of status and brands may signal a developing car culture.

A number of interviewees think vehicle prices will not rise in the future. They believe competition will remain keen among strong domestic and foreign manufacturers, creating continual price pressures throughout the system. Several executives focused on the effect of taxes on the final price of the vehicle. One executive suggested that taxes represent as much as 40 percent of the final price of the vehicle, with taxes cascading on top of other taxes (see Figure 4).

FIGURE 4.

In India, taxes make up a significant portion of the final price of a passenger car.



Source: UMTRI-AAD analysis.

Despite its ability to manufacture low-cost vehicles and components, India has a number of hurdles to overcome before it can be considered a major automotive exporter.

Exporting to the world market will be a challenge

One of the most serious issues that Indian automotive manufacturers and suppliers face is the export of low-cost vehicles and components. One executive summarizes the realistic attitude of most of our interviewees, “There is a happy picture where everyone is euphoric about the positive side of Indian exports [exporting more] and then there is a sad picture where we have not done really well [total is still low relative to other markets].” Interviewees estimate a significant increase in vehicle (~20 percent) and component (~30 percent) exports in both 2010 and 2015, but this is not a dramatic overall change considering India’s low beginning point.

Exporting creates an additional burden on Indian companies as they develop their products and their local market. Interviewees report that India has important advantages, such as low-cost manufacturing and design, English language proficiency, adequate intellectual property protection, government support, a young and talented workforce, availability of raw materials, and the potential to build world-class quality at low prices. But interviewees

also report a significant number of challenges that could potentially outweigh these advantages, including the need to:

- Understand export markets, which involves understanding foreign consumers and developing a range of models, a stronger brand presence, and dealership networks.
- Develop products that can succeed in developed as well as developing economies.
- Manage difficult global supply chain logistics.
- Increase manufacturing scale to global levels.
- Build resources to survive a large recall campaign.
- Improve technology development, such as technology features that differentiate the company, or engines that conform to global norms.
- Upgrade Indian port facilities to support high export volumes.

These are significant challenges that may delay expected export growth, especially for vehicles. They may also force Indian manufacturers and suppliers to establish JVs with larger global companies to reach global scale more quickly.

Key implications for India's automotive market

Interviewees from all parts of the Indian automotive industry express optimism about their country's automotive future, yet they also draw the following conclusions about major market challenges:

Steady economic growth may lead to success in the domestic market, but India must overcome significant challenges to succeed in the global market. Steady rather than exponential growth may provide time for the Indian government to complete the infrastructure improvements necessary to support the expansion of its domestic automotive market. But significant growing pains must be overcome if India is to become a dominant exporter to the world.

The small car and the "1 lakh car" are key growth strategies. Indians view development of small cars, in general, and inexpensive cars, in particular, as their country's contribution to the global automotive industry. They consider design, development, and manufacturing of these vehicles as their country's global niche, as well as a way to fulfill the needs of Indian buyers. However, global manufacturers could challenge India's claim by leveraging the economies of scale of their global platforms to compete in these two areas.

Attracting untapped buyers in India is a matter of understanding them. Teasing out the real reasons preventing qualified buyers from purchasing new vehicles will take some work because there are so many possibilities.

The impact of infrastructure on the domestic market is significant. Government needs to address the overarching future needs of India's automotive infrastructure to support the industry's development in the near and long term. Infrastructure drives the choices of buyers and the designs of manufacturers. Understanding the timeline of large-scale infrastructure projects could help companies anticipate the timing of market growth.

The role of "status" in Indian buying patterns is important for sales. Though the purchase decision for Indian buyers is primarily tied to objective matters, such as price, fuel economy, and after-sales service, there is a large part of the Indian psyche that is focused on the level of status a vehicle offers. Understanding how each vehicle fits into the status spectrum could provide a competitive advantage to manufacturers and dealers.

India's financial system provides an important building block for a developing industry. As is the case in developed economies, strong financial systems support India's automotive industry. In India, the cost of a vehicle comprises a larger portion of earnings, so the ability to negotiate loans becomes invaluable. Having mature financial systems should serve the country well in its automotive development.

Improving dealer performance may confer a competitive brand advantage in the future. Though interviewees have a low opinion of the current dealer body, this may be a reflection of the limited amount of effort manufacturers put into supporting their dealers. Manufacturers that can raise the level of professionalism of its dealers have the opportunity to reverse these negative views.

India is one of the world's top two-wheeler producers but manufactures only a fraction of the four-wheeler volume produced by North America or Europe.

India's production capabilities

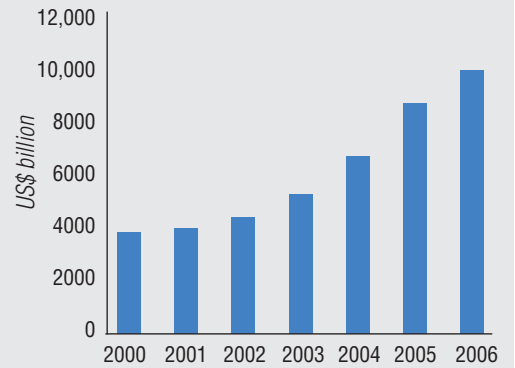
The combination of great optimism mixed with significant challenges that characterizes India's automotive market also extends to its production capabilities.

India's automotive production has experienced tremendous growth since the start of the millennium. Total vehicle production is up about 80 percent since 2001, although as Figure 5 shows, the bulk of production is still two-wheel vehicles. The Indian auto components industry has also grown fast, as Figure 6 shows. Overall, the automotive industry in India has come a long way in a short time.

But India faces big challenges if it is to meet its goal of becoming a world-class automotive production center. India's production levels for four-wheelers are still small compared to other countries. India today produces only 10 percent of the number of four-wheel vehicles produced in North America or Europe, and 30 percent of those produced in China.¹⁵

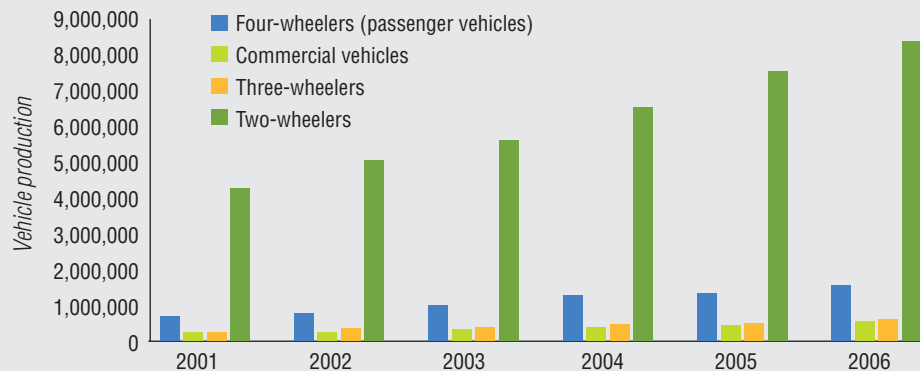
India is currently a much more significant player in two-wheelers – manufacturing nearly 20 percent of world production, and trailing only China, which produces nearly 50 percent.¹⁶

FIGURE 6.
Production of auto components.



Source: "Industry Statistics, Automotive Component Industry." Automotive Component Manufacturers Association of India. http://acmainfo.com/docmgr/Industry_Statistics_Graphs/Industry_Statistics_Auto_Components_06.xls (accessed May 31, 2007).

FIGURE 5.
Vehicle production in India.



Source: "Automobile Production Trends." Society of Indian Automobile Manufacturers. <http://www.siamindia.com/scripts/production-trend.aspx> (accessed May 31, 2007).

More than 40 manufacturers produce vehicles in India today, including manufacturers of trucks and commercial vehicles.¹⁷ About 500 major component manufacturers account for more than 85 percent of the country's component production (the remainder is produced by another 5,000 minor component manufacturers).¹⁸ As Figure 7 suggests, India's automotive industry includes established international companies competing against domestic Indian companies, as well as JVs between global companies and Indian firms.

FIGURE 7.
A variety of players are manufacturing vehicles for the Indian market.

International automakers	Joint ventures (JV)	Domestic automakers
Hyundai Motor Co.	Maruti Udyog Ltd.	Tata Motors
General Motors	Toyota Kirloskar Motor	Mahindra & Mahindra
Ford Motor Co.	Honda Sael Cars Ltd.	Hindustan Motors
Volkswagen (Skoda Auto)	Mahindra Renault	Premier
...and others	...and others	...and others

Source: IBM Institute for Business Value analysis.

The most significant responses from our interviews about production capabilities centered on four areas:

- Concerns about India's labor pool
- India's JV experience
- Developing India's own R&D capability
- India's supply base.

Concerns about India's labor pool

One of India's well-known strengths is its large, low-cost labor pool. But the executives we interviewed are troubled by a shortage of skilled labor, as well as by inflexible labor regulations and the threat of rising wages.

Skills are limited

Several interviewed executives noted the quality and quantity of skilled labor as problematic, especially the lack of engineers. One executive explains that "graduates are not capable. They need a complete training process." According to another, "the number of available people (trained engineers) is much less than the demand." Another interviewee commented that "every kid from college has four job offers. They want a 15-percent raise in one year, or they think they need to join another company. There are not enough people to do the job." However, one executive takes a longer view, saying that the "skills issue will ease over the next ten years," indicating that the ongoing government and industry actions to provide supplemental training and new education centers will make an impact.

"We need 600,000 workers, but only graduate 300,000. And only 150,000 are of high quality."

– Automotive industry expert

Executives also report that labor churn, where employees move to rival firms for better compensation or conditions, is a growing problem. One says, "In the auto industry, job changes occur frequently, with about a 20-percent attrition rate ... 40 to 45 percent in certain cases."

Though the overall talent pool is plentiful in India, a shortage of skilled labor, inflexible labor laws, and the threat of rising wages are causes for concern.

Labor regulations present hurdles

Our interviewees view India's labor laws as a hindrance to future growth and investment. One executive suggests, "Indian labor is over-protected. It is not a flexible system." Another says, "Labor laws are strict and inflexible. It is hard to right-size a company." This situation has led to a practice of employing a small group of core employees and a larger number of temporary workers who can easily be let go. Executives generally look to the government to fix this problem, but they recognize, as one interviewee remarked, that "it will take a long time to reform because this is a democratic country."

Wages may become a problem

Several executives note that wage growth might start to price India out of the market. As one interviewee explains, "India is a low-cost labor country, but wages are rising. Ten years down the line India's wage structure will be similar to that of the West. Wages have risen about 20 percent in the last couple of years."

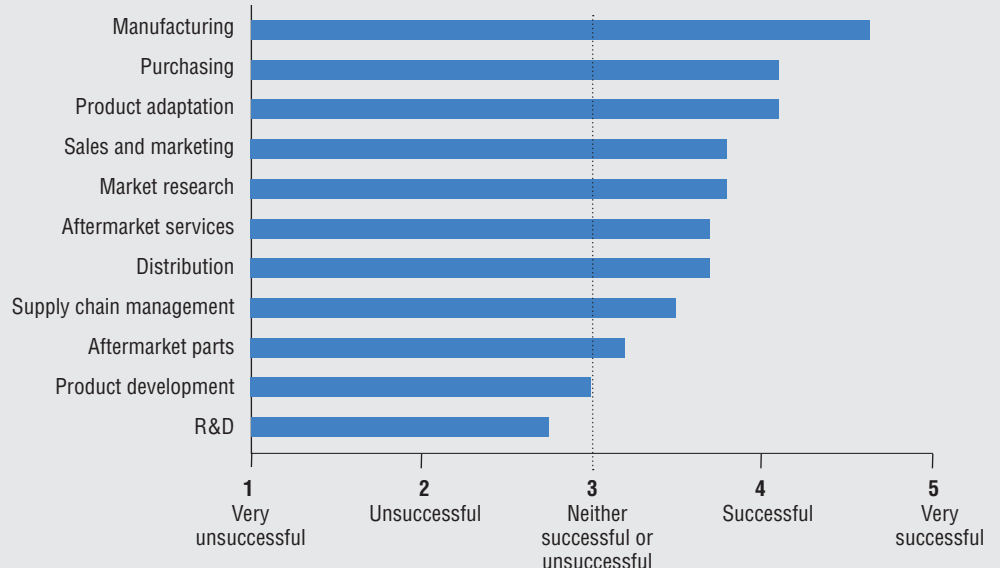
Because our interviewees think these labor problems can be overcome, they are still optimistic about India's ability to become a global player.

India's JV experience

Global automotive companies are attracted to India because of its skilled workforce, its low wages, and its growing domestic market for powered vehicles. Before recent legislative changes were enacted, the only way for a global automotive company, such as General Motors, Toyota or Delphi, to operate in India was through a JV with an Indian company.

We asked industry executives whether collaboration between international and domestic partners has been successful. They view India's JV collaborations as successful in some areas, but not in other key areas (see Figure 8). Manufacturing, purchasing, and product adaptation are considered the most successful JV collaboration areas.

FIGURE 8.
How successful is collaboration?



Note: n=29.
Source: IBM Institute for Business Value/UMTRI-AAD Inside India Study Interviews, 2007.

The major problem area seems to be in research and development (R&D). As the figure shows, R&D is the only collaboration score from our interviews that is less than neutral. Interviewees seem to think foreign companies are withholding important knowledge and technology. These results parallel those of our previous “Inside China” study.¹⁹

Indian executives agree that for JVs to work well there needs to be equality in the relationship. For example, one partner’s strength in finances and technology can complement the other partner’s strength in understanding the market.

On the whole, our interviewees seem satisfied with how the JV collaborations are progressing. This may be because JVs are no longer required for global companies to operate in India, so the ones that are still operating are doing so because the two partners continue to work well together. Or, possibly, the Indians are just realistic about the inherent conflicts of JVs.

Protection of intellectual property is an advantage

One of the reasons for the satisfaction with JVs may also be the almost unanimously positive report executives give to India’s protection of intellectual property (IP). In India, IP is, on the whole, respected, and lawful rights are enforced. Major violators of IP rights are prosecuted. Our interviewees feel that India understands the value of IP and honors it by paying royalties or licensing fees, and they believe that this is an advantage India has over China.

Views about the future of JVs vary

Interviewee responses about the future of JVs in the Indian automotive industry were extremely diverse, from predictions of JVs growing in number, predictions of JVs shrinking in number, and predictions about shifting relationships within the partnerships.

Sumi Motherson – A strategy based on JVs

The Sumi Motherson Group, a maker of wiring harnesses, wires, and plastic components among other products, is an Indian automotive supplier with an urge to partner. Sumi Motherson bills itself as a JV specialist, “providing customized integrated solutions combining multiple technologies supported by our global partners.”²⁰ Here is a short list of what the company is collaborating on with its strategic business partners:²¹

- Fuses, with Wilhelm Pudenz GmbH and Wickmann Werke GmbH
- Rear vision systems, with Schefenacker AG
- Sunroofs, with Webasto AG
- Air compressors, with Anest Iwata Corporation
- Cutting tools, with Sumitomo Electric Industries
- Precision machining, with Reiner Präzision GmbH
- Industrial robots, with Yaskawa Electric Corporation
- Automotive manufacturing engineering, with Automotive Engineering Services Co.

Developing India’s own R&D capabilities

India’s ability to perform its own automotive R&D is perceived as a gap between India’s domestic companies and the international automotive companies they compete with, especially in the areas of powertrain and alternative fuels. Indian executives report that this gap is large and may take more than five years to overcome.

The cost of running full-scale R&D programs is beyond the grasp of some Indian original equipment manufacturers (OEMs) and many suppliers. Also many Indian OEMs and suppliers have relied on their foreign partners for technology for so long that they have not developed their own competencies.

India's path to become a dominant automotive center requires strengthening its own domestic R&D capabilities.

An Indian company has two primary choices for getting into the automotive R&D game: develop its own R&D technical expertise slowly over time, or partner with companies that already have the expertise and quickly learn from them.

Executives are divided about JVs and R&D

The executives we interviewed are almost evenly divided between those who think Indian companies will continue to use JVs to gain access to technology and those who think Indian companies will develop in-house R&D capabilities. Some assert that Indian companies today lack the R&D capability to create their own automotive technologies (especially in some important areas like powertrains). Through JVs, they are in effect buying technology to get them into the game faster. But others believe that buying technology via JVs is too expensive, and indicate that some Indian companies are already developing their own R&D competencies. One executive suggests that Indian companies will continue to manufacture the technology originated by others but then adapt it to their own products.

“We cannot depend on selling others’ creations as our own products.”

– *Automotive supplier executive*

Government is supporting Indian R&D

The Indian government is supporting the National Automotive Testing and R&D Infrastructure Project (NATRIP) to encourage growth of the auto industry in India.²² NATRIP is a partnership among the national government, several state governments, and the Indian automotive industry to create a state-of-the-art testing, validation, and R&D

infrastructure. The government is funding the construction of six major facilities throughout the country expressly for this purpose. The project aims to create core global competencies in the automotive sector.

Strengthening India's supply base

Executives we interviewed are concerned about whether India's automotive suppliers are developing rapidly enough to go beyond India's own market and meet the needs of the global market. If India is to compete with established global manufacturers and suppliers on the world stage, then it needs to get on par with those competitors in terms of scale, quality, and delivery capability. Right now India is still catching up to the global multinationals.

“We are good at supplying domestic partners, but when it comes to supplying the USA and European locations, logistics issues create a huge problem.”

– *Automotive supplier executive*

India serves as Volvo's sourcing hub

Volvo now considers India a sourcing hub for automotive components, joining others including General Motors, Toyota, Hyundai, and Fiat that source automotive parts from India.²³

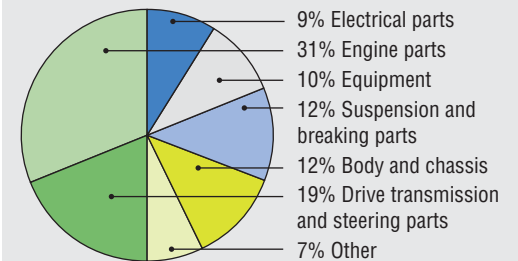
And because of low cost and an available talent pool, Volvo has also decided that India will be a sourcing hub for its worldwide operations, with plans to increase its R&D, engineering design activities, and IT services sourcing from India. The company plans to increase the headcount at its engineering design office in India from about 80 to nearly 200.²⁴

Executives report that today's focus for the supply base is delivering world-class-quality components, improving global just-in-time (JIT) delivery, and bolstering its ability to create new designs. Suppliers also need the financial strength to compete globally (for example to survive a potential global recall). Many global suppliers have invested in developing their local supplier base in India – exposing them to global requirements and standards. Overall, India includes many excellent suppliers; however it still needs to develop the capabilities of its entire supply base, especially lower-tier suppliers, to be globally competitive.

Executives believe the future focus for India's suppliers should be keeping costs low, increasing quality levels, and increasing the number of skilled employees. A friendly business environment, especially intellectual property protection, is also seen as very important. Another future focus area for suppliers is moving further up the product

chain to position themselves for long-term success. Figure 9 shows the segmentation of today's automotive component parts. Executives report that suppliers need to move upward from simple components, to more complex components, and finally to whole modules or systems.

FIGURE 9.
Production range of auto components.



Source: "Indian Automotive Component Industry: Engine of Growth Driving the Indian Manufacturing Sector." Automotive Component Manufacturers Association of India. http://acmainfo.com/docmgr/Status_of_Auto_Industry/Status_Indian_Auto_Industry.pdf (accessed May 31, 2007).

Key implications for India's production capabilities

India's automotive industry is traveling up the same maturity curve as other nations have traveled, but at a faster pace. Some important areas need close attention:

- **India needs to strengthen its own R&D capability.** India's automotive industry success, so far, has largely been in manufacturing. But to be a global player, it must be considered an innovative designer in the automotive industry. This is a tall order since the automotive industry today is very complex, with myriad sophisticated technologies used in the manufacturing of vehicles and in the products themselves.
- **The supplier base needs to get stronger.** Many of India's major suppliers have world-class capabilities, but the Indian automotive industry needs to develop the capabilities of its entire supplier base to support improved quality and low-cost delivery throughout the supply chain.
- **Costs need to be contained.** India's path to the world stage has been through low-cost production. And India will need that advantage for some time to come. However, wages are slowly starting to rise, as are infrastructure costs like electricity and shipping.
- **Labor and skills could be a surprise constraint.** Despite its reputation for low-cost skilled labor, India's automotive industry is starting to suffer from undersupply of key skills, attrition, and churn. Labor laws and regulations seem to be hampering business, and although the government is aware of the problems, labor reforms may evolve slower than needed.

For the automotive industry, India's road to success may literally depend on its roads.

External challenges: Infrastructure, oil supply, and air quality

The executives we interviewed see India's automotive industry as significantly impacted by its infrastructure, oil supply, and air quality. India's government-issued, ten-year Automotive Mission Plan, discussed earlier in this report, shares this view of infrastructure as a crucial factor in the success of the industry.

As part of our survey, we asked each interviewee to assess the top three external challenges the industry faces. They ranked infrastructure as, by far, the number one challenge, followed by oil security, with air quality as third. We believe these results indicate infrastructure is one area where executives feel India can act to solve issues. Oil security, on the other hand, is much more dependent on the global market for oil. And air quality is viewed as already being addressed, with India closing the gap with the European Union in adhering to Euro emissions norms.²⁵

Despite the external challenges, the future appears bright to those we interviewed. They seem hopeful that each issue can be methodically overcome – either by government or private industry, or a partnership of both.

Infrastructure

Designing an automotive infrastructure for over one billion people is a daunting task for a developed economy, but developing economies must also contend with other challenges, including limited funds and inadequate roads. For India, the lack of roads may affect consumer buying decisions. Lack of port capacity may restrict export growth. And lack of power availability may slow industry development.

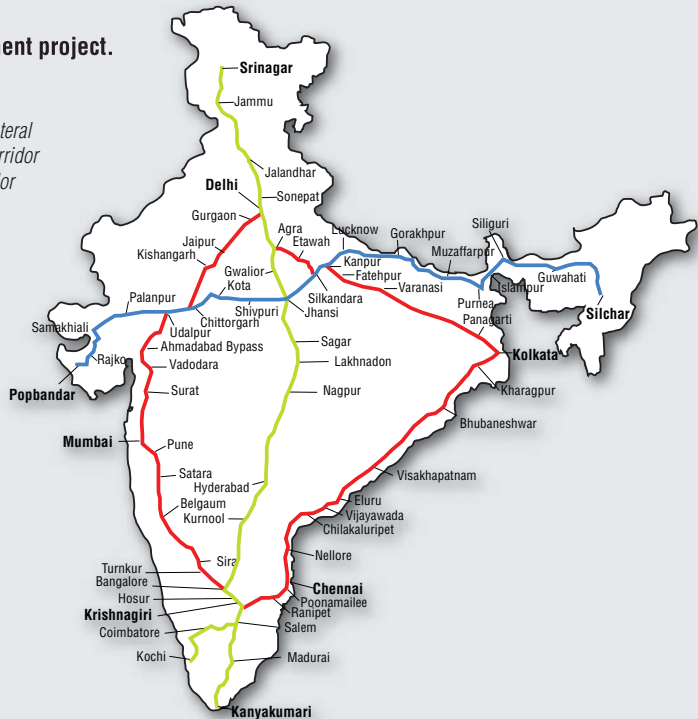
Transportation infrastructure is a vital element to the automotive industry

Most of the executives interviewed agreed – road construction is key, and it is a task only India's government can tackle. As one executive states, “There is a direct relationship between better connectivity of the metropolitan areas and the progress the industry can achieve. Roads are clearly the biggest bottleneck, both the quality and availability of roads.”

As shown in Figure 10, the Golden Quadrilateral, 3,625 miles of national highways connecting 19 of the largest Indian cities, encircles the country.²⁶ Additional east-west and north-south corridors are expected to eventually cross the interior countryside. Progress, however, is slower than planned (see Figure 11)²⁷ For example, from April to June 2006, 986 kilometers of national highways were upgraded, undershooting the target by nearly 14 percent.²⁸

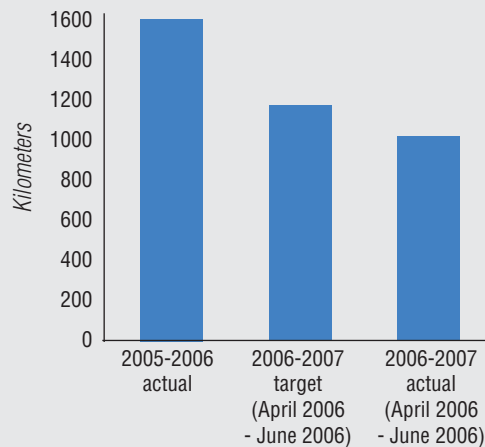
FIGURE 10.
National highways development project.

— Golden Quadrilateral
— North-South Corridor
— East West corridor



Source: "National Highways Development Project." Government of India, Department of Road Transport and Highways. <http://morth.nic.in/mapnew.asp?linkid=161&langid=2> (accessed May 31, 2007).

FIGURE 11.
Upgrade of national highways.



Source: "Capsule Report on Infrastructure Sector Performance (April - February 2007)." Government of India, Ministry of Statistics and Programme Implementation. http://www.mospi.nic.in/mospi_pi_capsule_report.htm (accessed May 31, 2007).

Land acquisition slows road improvements

According to interviewees, laws governing land use and land reclamation hinder road development. And getting the governments for each state to cooperate in building cross-country roads is difficult. The Index of Economic Freedom ranks India 104th in the world with regard to property rights, which it says are "applied unevenly. Because of large backlogs, it takes several years for the courts to reach decisions."²⁹ The New York Times observes that India's urbanization, compared to China, is more of a "saunter" due to economic policies that have "crimped the kind of manufacturing that has spurred China's urban growth."³⁰

To become dominant vehicle exporters, Indian automakers and suppliers will need help from the government to improve the nation's port system.

Lack of traffic-law enforcement is often cited as an inhibitor to growth

Traffic fatalities in India are 8.7 per 100,000 people, as compared to 5.6 in the United Kingdom, 5.4 in Sweden, and 6.7 in Japan.³¹

As congestion grows, enforcement becomes increasingly more critical. One interviewed executive says, "Driving and road discipline needs to be enforced both individually and by policy." A dealer we interviewed paints this picture: "There may be a pedestrian lane and four-wheeler lane but no two-wheeler lane or space. There is no enforcement [to prevent shops from crowding] sidewalks, forcing pedestrians into the street." Another interviewee estimates that 30 percent of drivers have had no driver's education, do not understand signals or lane discipline and, as a result, are causing accidents on newly built highways. Executives acknowledge that progress in government education, national auto testing centers, licensing of individuals, and the reduction of varying velocity vehicles on the same roads are key to dealing with the problem.

The executives we interviewed are generally satisfied with the progress on road improvements to date but feel India still may not meet the requirements for future expansion. "If you start building based on what is needed in India today, you will not build enough. You have to build to future levels of the vehicle population," expresses one interviewee.

India requires world-class port facilities to export vehicles and components

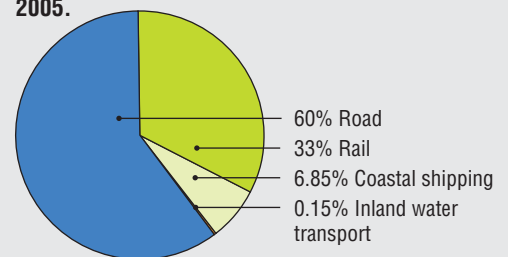
India's port system consists of 12 major ports and 187 intermediate ports under the jurisdiction of the respective state governments and handles over 90 percent of its foreign trade along its 7,517-kilometer coast line.³² During the

2004-05 fiscal year, the major ports handled record traffic of 384 million tons with a growth rate of around 11.3 percent over the previous year, outpacing GDP growth.³³

Executives we interviewed are convinced the current port facilities cannot support vehicle-based exports nor the oil imports required to meet India's automotive goals. "We need to improve on the oil tanking facilities at ports, oil terminals, and cross-country pipelines. Significant investment is required to provide a level playing field between public and private sector companies," says one manufacturer. Exports in the automotive sector have experienced an average CAGR of 30 percent over the last five years.³⁴ Executives we interviewed believe that past port traffic has primarily been container transport, but are hopeful that capabilities will be successfully expanded within the next three years to handle the increased export of four-wheelers.

India's freight transport system handles approximately one trillion ton-kilometers, with roads handling 60 to 65 percent of the load and coastal shipping only 6 to 7 percent, as shown in Figure 12.³⁵ In comparison, the European Union utilizes coastal shipping for

FIGURE 12.
India's freight transport system by mode, 2004-2005.



Source: "National Development Maritime Programme." Ministry of Shipping, Road Transport and Highways, Department of Shipping, March 2006.

more than 40 percent of its exports.³⁶ The demand on India's ports will likely double in the next eight to ten years, requiring a plan to shift some freight to coastal shipping.³⁷ Less freight transport will help ease road congestion and improve air quality. The Indian Department of Shipping's goal is to divert at least 5 percent of the cargo moved by rail and road today to shipping over the next ten years.³⁸

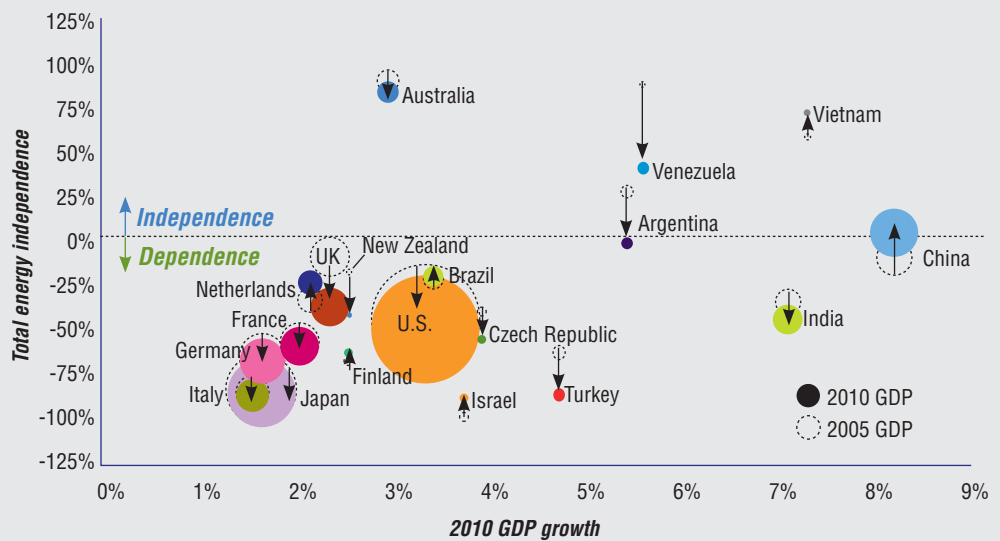
India is struggling to meet its growing power requirements

Primary energy consumption is expected to rise an average of 2.8 percent per year between 2004 and 2030 compared with the world average of 1.8 percent.³⁹ To address this growth, India plans to increase power production to create an additional 68,500 megawatts of electricity capacity from 2007 to 2012, and is working on renewable sources of energy such as wind power.⁴⁰

GDP growth drives energy consumption – and when domestic supply can not keep pace, this results in greater energy dependence, as shown in Figure 13. When interviewed, both manufacturer and supplier executives reiterate that power availability is critical for industry expansion. “In the next five years, there will be difficulties because of the poor roads and power shortages,” notes one manufacturer.

India's inadequate power structure and fuel shortages increase the cost of doing business because companies are sometimes forced to provide their own power generation as a backup to the normal power grid. Natural gas shortages, for example, have reportedly left natural-gas-fired electric power plants and fertilizer plants underutilized in the past few years.⁴¹ To remedy the situation, the interviewed executives mention two options:

FIGURE 13.
World energy dependence versus GDP growth.



Notes: The size of the two bubbles for each nation represent the size of the country's gross domestic product in 2005 as compared to 2010. The position of the bubbles represent their energy independence in those same two years. The energy independence percentage is calculated as the amount of domestic production in excess of consumption divided by overall consumption. A positive value indicates a measure of independence, while a negative value represents the degree of dependence on energy imports.
Sources: IBM Corporate Economics analysis; "Annual Energy Outlook 2006," U.S. Department of Energy, Energy Information Administration.

In the short term, rising oil prices could result in slow growth in four-wheel vehicles sales and curtailed vehicle production. However, India is pursuing alternatives to reduce its dependency on foreign oil.

foreign direct investment and energy industry deregulation. The regulatory changes of 2005 have already eased restrictions on new electricity generation JVs.⁴² However, regulation of foreign investments can vary widely from state to state – sometimes hindering progress. Executives anticipate additional regulatory changes including deregulation of electricity generation, elimination of subsidies, and phase out of price controls.

Oil supply

Increasing dependence on oil seems unavoidable in the near term

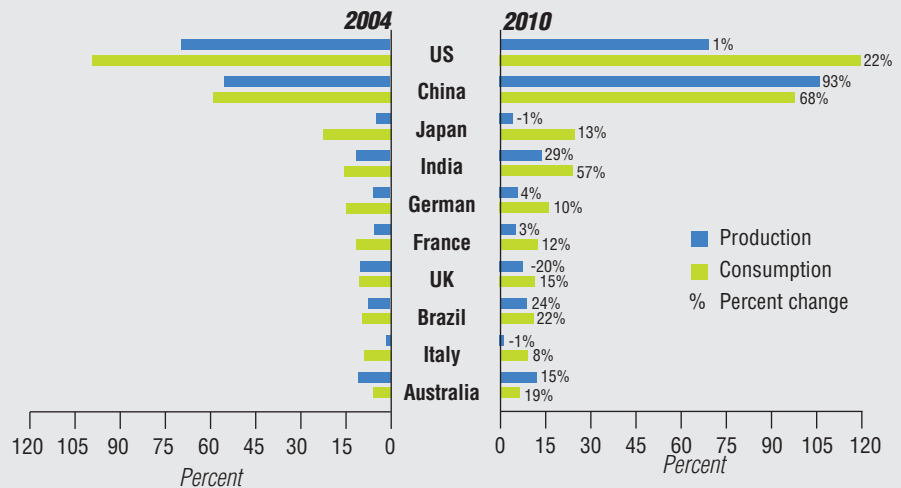
Forecasts estimate that India's transportation sector energy use will grow at an average rate of 3.3 percent per year to 2030, compared with the world average of 1.7 percent per year.⁴³ Like most of the world, India will depend on oil for a long time. Figure 14 shows the widening gap between India's oil production and

consumption. However, India's deepwater oil prospects are projected to provide additional production increases during this decade.⁴⁴

One major concern of the interviewed executives is the risk of unstable oil prices derailing growth in the auto industry. Another is that governmental fuel-price controls will limit private investment.

Some executives we interviewed see deregulation as a way to create opportunities in energy. Some study participants also think vehicle alternatives such as hybrids are the answer. To focus the automotive industry on hybrids, the government may have to establish targets requiring, for instance, higher minimum gas mileage or a percentage of alternative-fueled vehicles sold. One interviewee points to a need for a government energy policy that includes unconventional sources of energy and gives incentives [such as tax exemptions]

FIGURE 14.
India's oil consumption is increasing nearly twice as fast as its domestic production.



Sources: "Annual Energy Outlook 2007." U.S. Department of Energy, Energy Information Administration. February 2007. <http://www.eia.doe.gov/oiaf/aeo/index.html> (accessed May 31, 2007); IBM Institute for Business Value analysis.

The Indian automotive industry needs emission standards for all segments of the vehicle market – not only to improve the nation’s air quality, but also to position its vehicles competitively abroad.

to companies that are doing this or working in this direction.

Air quality

Progress in emissions control is encouraging

Most interviewed executives understand the need to implement emission standards and feel that the government will succeed in improving air quality. Dealers we interviewed believe market forces will prod vehicle manufacturers to adopt better emissions standards because being environmentally conscious sells. This is true not only because customers are concerned about emissions, but also because designing to these standards typically provides better fuel efficiency and a better engine. Serving the world market will also require India’s OEMs to build vehicles with globally accepted emission controls.

Despite recent improvements, there is still work to be done. Executives agree that emission controls should be consistent for all types of vehicles. One expert states, “We need norms for the entire industry, not just for one segment. In the two-wheeler segment, only 25 percent are emission compliant.”

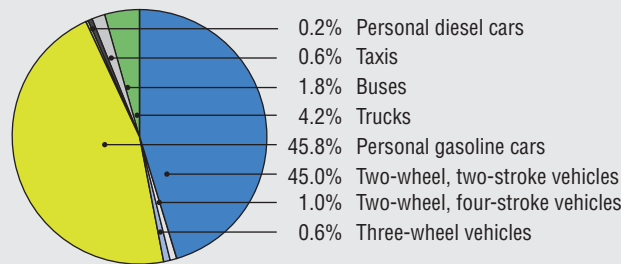
One success story is the way the government was able to increase the commercial vehicle segment usage of compressed natural gas (CNG), as described in the Center for Science and Environment sidebar. Those interviewed feel that positive experiences like this give the government and the people the confidence to try new emissions measures as well as new fuels and technologies.

Center for Science and Environment

Vehicular pollution – especially from two-wheelers – is an ongoing problem in India, as shown in Figure 15. In response, the Center for Science and Environment pressed, through the courts, for a change in the entire transportation structure in Delhi, demanding that diesels be taken out of operation.⁴⁵ In 1998, when the government hesitated to implement diesel limits, the Supreme Court of India imposed limits.

As a result, the national capital region, including Delhi, was forced to replace older autos with clean-fuel vehicles, convert bus and taxi fleets to compressed natural gas (CNG), construct bus terminals at region entry points to restrict entry of non-compliant buses, increase CNG dispensing capacity, and establish fuel testing labs and vehicle inspection and maintenance facilities.⁴⁶

FIGURE 15.
Percentage of contribution to overall pollution load.



Source: Mittal, Akhil, Ashish Arora and Anubha Mandal. “Vehicular Pollution by Introduction of CNG in Delhi- A Case Study.” Department of Civil & Environmental Engineering, Delhi College of Engineering. 2004. http://www.cleanairnet.org/baq2004/1527/articles-59170_AkhilMittal.doc (accessed May 31, 2007).

Key implications of external challenges

India has made strong progress in a short period of time in the areas of infrastructure, air quality, and oil security. However, as the rate of economic expansion accelerates, it is critical that the infrastructure improvements accelerate to keep pace. The focus must be on future needs, not just today's needs. The central government is believed to be the key player in dealing with these external challenges.

Most Indian automotive executives agree infrastructure is the most urgent challenge to its industry. Despite large investments in highways, connections between rural and urban cities are still lacking. Acceleration of road construction and traffic law enforcement are key areas for improvement because of the impact of traffic congestion on consumer purchasing patterns. Port capacity for exporting vehicles needs to be emphasized. Some executives believe electricity price deregulation will accelerate investment in power generation and allow the industry to meet domestic and global expansion goals.

Combating air quality, oil dependency, and congestion issues should be a coordinated effort. Plans for urban environments must meet future needs. Early successes should be expanded to region specific actions such as the use of CNG. Upgrades to roads, rail, ports, electricity, and water supply infrastructure will help all vehicles in India to coexist as the vehicle population expands. Government's efforts to augment public transportation and port capacity, enforce traffic laws, and support alternative fuels will allow it to address multiple problems including oil dependency, air quality, and road congestion. Attacking these problems may also expand India's research and development capabilities.

The Indian government has a large and crucial role to play. The government's Automotive Mission Plan has created the industry vision and goals. Government and industry need to work together to build growth capabilities. It is vital that the government continue to recognize the auto industry as a crucial part of India's growth and success and support the industry by streamlining national and state government regulations and interactions between the two.

Like other developing industries, the Indian automotive industry is experiencing growing pains. But executives are encouraged by increased government support and continued sales growth and are enthusiastic about their industry's future.

Turning optimism into success: What India needs to do next

Underlying many of the responses from our interviews is the idea that the success of the Indian automotive industry depends on the strong partnership of India's government with India's automobile manufacturers, suppliers, and dealers. There are challenges that the industry can solve, others that only the government can solve, and some they can solve only by working together.

Build India's domestic vehicle market

To meet India's ambitious goals for its domestic automotive industry, India's government needs to build more and better roads to support future not just current growth, and hasten the vehicle friendliness of India's cities including wider roads and more parking spaces. Improved air quality is also critical. At the same time, the automotive manufacturers and suppliers need to understand and capture the small car segment of the domestic market, improve India's automotive supply base, and raise quality levels across all suppliers while keeping costs low.

“The current glow in which we bask, with 8 to 12 percent profits, can go away.”

– Automotive supplier executive

Become a global player

To become major players in the global automotive industry, India's manufacturers and suppliers need to accelerate the perception

that “quality vehicles” and “quality automotive components” come from India, and find their niches in the world vehicle market (perhaps small, inexpensive cars), and manage their businesses on a worldwide scale, which includes global logistics, sales, and distribution. In addition, India's government needs to expand the country's port capabilities even faster. As India's auto companies continue to grow, they need to increase their scale while remaining financially strong – strong enough, for example, to withstand a global recall. Furthermore, the automotive industry and the government need to work in partnership to boost skilled labor availability and strengthen India's own R&D capabilities.

The automotive executives and experts we interviewed are optimistic about India's ability to reach its goals. Recent growth has been impressive. Some manufacturers and suppliers are already reaching global levels of quality, and the government seems committed to supporting the industry. However, India's domestic market is still relatively small; India's manufacturers and suppliers are not yet universally recognized as strong global players; and India's government has yet to complete its domestic infrastructure of roadways and ports. Despite these challenges, the recent industry growth and development, along with the government's commitment of support, are strong reasons for optimism about India's future automotive success.

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About UMTRI's Automotive Analysis Division

The Automotive Analysis Division, a research unit of the University of Michigan Transportation Research Institute (UMTRI), has performed research, analysis, and communication activities focused on the future of the global automotive industry for over 25 years.

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