ECO-FRIENDLY (GREEN) CARS IN INDIA – THE ROAD AHEAD

Mr K K Sunil Kumar
Associate Professor,
Department of Management Studies,
Gokaraju Rangaraju Institute of Engineering & Technology, Hyderabad, India

ABSTRACT

The Indian automotive industry has flourished like never before in the recent years. On the canvas of the Indian Economy, Auto Industry occupies a prominent place. The car industry in India has been on steroids. The domestic sales have reached a level of 2 million units per annum, growing in double digits. It is expected to rise further to 3.66 million units by 2014-15 and 5.2 million units by 2019-20. The extraordinary growth that the Indian automotive industry has witnessed is a result of two major factors namely, the improvement in the living standards of the middle class and an increase in their disposable incomes. Moreover, the liberalization steps, such as, relaxation of the foreign exchange and equity regulations, reduction on tariffs on imports, and the banking reforms, initiated by the Government of India, have paled an equally important role in enabling the Indian Automotive Industry achieve great height. Also, the institutionalization of automobile finance has further paved the way for a sustainable long-term high growth of the industry. Now, the challenge ahead for the Indian Automobile Manufacturers, especially Cars, is to make eco-friendly cars, i.e. GREEN CARS. At the same time, they also have to satisfy the needs and demands of the consumers in the automobile industry. They have to market the cars, by not only using the features, discounts, offers, and other privileges, but also by as an eco-friendly car that does not damage the ecological balance of the environment. The study is based on GREEN CARS and their future in the Indian Automobile Market.

Keywords: green car technologies; global automobile industry; automotive education; automotive research; intellectual capacity; knowledge; global learning clusters; vehicle design.

INTRODUCTION

The Indian automotive industry has flourished like never before in the recent years. On the canvas of the Indian Economy, Auto Industry occupies a prominent place. The car industry in India has been on steroids. The domestic sales have reached a level of 2 million units per annum, growing in double digits. It is expected to rise further to 3.66 million units by 2014-15 and 5.2 million units by 2019-20. The extraordinary growth that the Indian automotive industry has witnessed is a result of two major factors namely, the improvement in the living standards of the middle class and an increase in their disposable incomes. Moreover, the liberalization steps, such as, relaxation of the foreign exchange and equity regulations, reduction on tariffs on imports, and the banking reforms, initiated by the Government of India, have paled an equally important role in enabling the Indian Automotive Industry achieve great height. Also, the institutionalization of automobile finance has
further paved the way for a sustainable long-term high growth of the industry.

The overall automobile industry performance has showed encouraging results for all the segments of the industry. Today, India has become the second fastest growing car market in the world. Passenger car sales have tripled in six years. It’s also to be noted that the demand for luxurious models, SUVs, and mini-cars for family owners have shot up, largely due to increase in the consumer’s buying capacity. Indian automobile industry would serve as a key input for the business decisions and segmentation of Indian market for future demand. The paper focuses on the consumer awareness towards green car and involves the critical analysis of factors influencing the purchase behaviour of environmental-friendly cars.

The role of plastics for green cars

A front side panel or a car fender is usually made of stamped sheet metals. In reality, the car fender acts as a decorative exterior panel, and they significantly contribute to build up aerodynamic geometries. It also gives the car a new look and an aesthetic appearance. For years, plastics have been considered as material for making car fenders because of good impact strength, great noise damping, and the high corrosion resistance ability. Furthermore, plastic car fender is a large exterior automotive part, so it significantly reduces the weight compared to the steel one. Moreover, it is convenient for recycling because of the ease of removal of end-of-life plastic fender. For these reasons, some of car manufacturers have tried plastics in off-line painting and short series of plastic fender applications since 1987 [1]. Nowadays, the innovation in plastic industry introduces engineering resins that can withstand the high temperatures required during the painting process, enabling plastic fender to utilize its normal on-line body painting process. Some leading carmakers such as BMW, GM, Mercedes, Mitsubishi, Nissan, and Peugeot are trying to develop the plastic fenders [2]. However, the application of plastic car fender is not popular due to the complexity of the development process [3].

Finding ways of choosing appropriate material and proposing suitable conceptual designs are necessary for increasing the dimensional stability and fostering the application of plastic fender in automotive. This will contribute to make automobiles become more energy-saving and friendlier to the environment. In addition, minimizing the thickness and optimizing the molding process parameters are also important tasks that reduce the material usage and increase the product's quality.

Fuel economy and environmental issue are getting more and more important nowadays. Global transportation energy use accounts for approximately 23% of the greenhouse gas emission. The European Commission and the European Automobiles Manufactures’ Association agreed to adopt a new legislative proposal aiming at the reduction of CO2 emission from light vehicles. In the new legislation, the requirement becomes more strictly; 65% of new vehicles sold have to meet 130 g/km by 2012, 75% in 2013, 80% in 2014, and 100% by 2015. The long-term target of 95 g/km is specified for the year 2020. To achieve this target, besides using hybrid vehicles, reducing the weight of the vehicles is a practical and promising technological solution. In addition, reduction of the weight also reduces the fuel consumption of vehicles.

Lightweight design is an important strategy and a constant challenge for carmakers to improve fuel economy and to reduce CO2 emission. To reduce the weight of new
vehicles, automotive designers and car makers can act on following methods: changing vehicles to smaller size and/or reducing the weight of car components through alternative lighter materials, innovative design, and technology. Reduce the size of the vehicles; of course, significantly decrease the weight, but this method makes the automobiles less comfortable in terms of space. Therefore, reducing the weight of vehicle components is the best choice showing the technical advancement in automotive design and manufacture. It is reported that the lifetime energy consumption for motion of a car account for 75–80%. This infers that priority should be given to the development of materials and design with low weight for reducing the energy consumption related to cars’ motion.

One of the important methods to reduce the vehicle weight is developing non-steel substitution materials such as aluminum, composite, and plastics in which plastics have been drawing a great attention to the researchers and automakers. Although the thermoplastics have lower mechanical strength and lower dimensional stability than steel, they offer a huge potential for lightweight design due to their low density and the possibility of functional integration. Over the past 30 years, the use of plastics has steadily increased in automotive applications. More and more metallic automotive components have been replaced by plastic counterparts for better performance, production time reduction, weight reduction, and fuel efficiency. Plastic parts can be molded into more complex shapes than the one made of stamped steel; as a result, this allows greater flexibility and creation to car-designers. In addition, the productivity of manufacturing a plastic part by injection molding method is higher than that of the metal one fabricated by stamping method. The tooling cost per part of plastic product is also lower than that of steel part made by stamping. Engineering plastics today are well-proven construction materials for interior and exterior automotive application in comparison with metallic materials. Furthermore, it is stated that plastics have a positive contribution to manage climate change or to climate protection. Also, the innovation in plastic industry has successfully identified workable technology for recovering, treating, and recycling solid plastic waste from discarded products. Therefore, replacing metallic automotive components into plastic ones is the contribution to save energy, to make the car to be eco-friendly, and to protect the environment.

LEAN PRODUCTION

Scholars have argued that the adoption of lean production may improve environmental and economic performance in the supply chain ([12] Hart, 1997; [20] King and Lenox, 2001; [31] Rao and Holt, 2005). Lean production relates to technical and human capabilities and to work-place management. In the automobile industry, lean production has become a popular approach to gain environmental efficiency and reduce environmental impact through more efficient use of materials and natural resources in manufacturing ([20] King and Lenox, 2001; [31] Rao and Holt, 2005; [37] Vachon, 2007). Proponents of a "lean is green" approach assert that the adoption of lean production may lead to pollution reduction whereas critics point out that reducing one factor of production may increase another. For example, the reduction of inventory may lead to a greater production of waste. Despite criticism of the "lean and green" perspective, many scholars assert that firms may reduce waste in the production process by practicing

SUPPLY CHAIN MANAGEMENT

Supply chain is a set of three or more organizations linked directly by one or more of the upstream or downstream flows of products, services, finances, and information from a source to a customer. SCM involves proactively managing the two-way movement and coordination of goods, services, information, and funds (i.e. the various flows) from raw material through to end-user.

Material and information flow both up and down the supply chain. Thus, SCM is the integration of all activities associated with the flow and transformation of goods and information from the raw materials stage through to the end-user. In line with this definition, related fields include purchasing, sourcing, and supply and logistics.

Adopting green issues in the supply chain may also be motivated by regulatory and institutional stances internationally. [15] Hoffman (1999) studied organizational attitudes toward environmental issues using an institutional approach, and found that institutional forces can be used for strategic gain and institutionalism may bring a change in corporate attitudes toward environmental issues. Developing lead-free soldering in electronics and automobiles provides a good example. Under the RoHS (Reduction of Hazardous Substances) and ELV in the EU, using lead for products is now prohibited. Manufacturers in the electronic supply chain have worked together to develop new, alternative soldering technologies without lead in the concerned products. Similarly, a paint and coating supplier worked on-site in the paint shop of an automobile manufacturer to develop a better product-based solution under the ever-increasing pressure faced by automobile manufacturers to reduce volatile organic compound emissions. A variety of external pressures from legislators, consumer groups, NGOs, and other stakeholder groups may influence the development of green practices within firms. In advance of regulations, firms are willing to respond to the demands from a variety of stakeholders. This proactive stance may include green supply chain and carbon management practices.

Overall, institutional and market forces will stimulate and foster corporate efforts toward curbing CO₂ emissions over the supply chain. Production processes and SCM play an important role, as they bear sizable potential for achieving significant CO₂ emission reductions.

GREEN MARKETING

Toyota Motor Corp.'s Prius and a number of other green-themed vehicles made their India debut at this week's New Delhi Auto Expo, but auto executives and experts agree it will be years before many people buy the cars. Toyota said this week it would start selling its hybrid Prius, which runs on both gasoline and electricity, by the end of this year. India's largest auto maker, Maruti Suzuki India Ltd., unveiled its answer to the Prius on Thursday -- an electric concept car called Eeco Charge that it won't mass-produce until 2015, if ever. India's Tata Motors Ltd., South Korea's Hyundai Motor Corp., General Motors Co. of the U.S. and France's Renault SA also have electric or gasoline-electric hybrid vehicles on display here this week. Hyundai brought in Bollywood superstar Shah Rukh Khan to
unveil its electric car, the i10 Electric, at the Auto Expo, but the company doesn't expect to sell many. "I don't think India is really ready for it," said Arvind Saxena, director of marketing and sales at Hyundai. "We don't have the infrastructure to use this car." Vehicles like the Prius have become popular in developed countries. In the U.S., Prius sales in 2009 fell 12% from the year earlier to about 159,000 vehicles amid economic weakness. But the Prius remains one of Toyota's most popular vehicles in the U.S. Indian consumers are extremely price-sensitive, and few are willing to pay double the standard sticker price it can cost for a battery-powered vehicle. Electric-car batteries likely would still be more expensive than gasoline-fueled cars and subject to India's high tariffs because they would come from abroad.

"The battery will end up costing as much as the vehicle itself," said Paul Blokland, director of Segment Y Automotive Intelligence Pvt. Ltd., a Goa-based automotive consulting company. "Adding the green element just costs too much," he added. Analysts project that the Prius will cost more than $40,000 in India. Few cities in India have regular power and few homes have parking spaces near electric outlets. Regular blackouts make it tough to charge even a cellphone in much of India. Therefore, a battery-powered car is unlikely to sell well, analysts and industry executives said. "You can bring in electric vehicles; that's fine. But where are you going to get the electricity?" said Pawan Munjal, managing director and chief executive of Hero Honda Motors Ltd., India's largest motorcycle maker.

Electric scooters and motorcycles have been on Indian roads for a few years. After initial interest, sales of battery-powered two-wheelers have plunged over the past two years at two of India's top electric-two-wheeler makers, TVS Motor Co. and Electrotherm India Ltd. Both companies combined sold about 12,000 battery-powered vehicles last year, down from 22,000 in 2008, Mr. Blokland said, amid concerns about cost and battery replacement. When the price is right and regulations required it, Indians have embraced environmentally friendly options. India has close to one million compressed-natural-gas vehicles on the road, mostly taxis and trucks. That makes it one of the largest users of CNG vehicles in the world, according to industry group Asian NGV. Natural gas has worked in India because CNG vehicles are close to the same price as gasoline-powered ones. It is also relatively inexpensive to switch a regular car or truck to CNG.

**CHINA'S POLICY**

The recent shifts in China's auto industry policy from development only, through development with emission control, to development with cleaner vehicle technology demonstrates that China is attempting to balance the challenges of economic development, environmental protection and energy security. National policies and programmes have played a major role in implementing this shift, but the greening of the auto sector is challenged by major obstacles, such as the high cost of manufacturing cleaner vehicles and building new infrastructure, and the low immediate economic benefits to consumers and producers. It is unrealistic to expect China to limit vehicle production or to transition to hydrogen vehicles quickly. However, China can move to cleaner vehicle technology by implementing both short- and long-term policies that reduce individual conventional vehicle emissions by strengthening vehicle emission standards, advancing fuel quality,
promoting hybrid vehicles together with other alternative fuel vehicles, and preparing for an eventual transition to hydrogen vehicles. The government should also establish incentive policies for cleaner vehicle production and purchases, promote investment in infrastructure, strengthen partnerships between government and industry, disseminate information to raise public awareness, and encourage multinationals to use China as a testing ground for innovative hybrid and hydrogen vehicles.

As the global automotive industry sector is attempting to embrace the new green car technology paradigm, there is an urgent need to build the intellectual capacity of its workforce to achieve this objective. The challenge is to rapidly consolidate the relevant enabling knowledge as a strategic resource and make this available to relevant stakeholders, including students, engineers, researchers, managers and others. This paper provides a comprehensive overview of research that aims to build industry-aligned automotive research and education capability in green car technologies, address government policy objectives to build a domestic green car industry and create new labour market opportunities. The paper describes the global learning clusters concept and the key technological challenges and opportunities considered by the established clusters.

VOLVO CARS

Volvo Cars is a Swedish automaker which was acquired by the Ford Motor Company in 1999. Volvo sells about 450,000 vehicles annually through its worldwide dealer network. For along time, the company has had three main core values as the guiding principles profiling the brand. These are Safety, Quality, and the Environment. This case revolves around the business issues at Volvo Cars that are related to Environmental care, e.g. how the company can capitalize on that core value, in other words how to profile the brand and profitably ‘go green’ by successfully offering more eco-benign cars.

The greening of industry is primarily about the reduction of negative externalities in the production and consumption of products, i.e. ‘de-coupling’ environmental impact from economic growth. This de-coupling is required in order to achieve sustainable consumption within the economic growth-paradigm of society (Ayres 2004). Not surprisingly, most companies have a growth strategy and require competitive profits in order to remain in business.

The messages per se, i.e. the scarcity of oil and the reduction of vehicle CO2 emissions, clashed with the company’s strategy of providing the more affluent consumer segment with premium cars. Hitherto, that customer group had been expecting bigger and more powerful cars, which meant bigger engines. The company’s perception was that affluent consumers did not care so much about environmental issues. Even though consumers show concern for the environment in various surveys, that concern seldom translates into purchasing actions.

Themore powerful and bigger cars sold relatively well, while Volvos environmental offering, a bifuel car running on methane and petrol, only sold in small numbers and mainly to fleet customers. To address anticipated fuel efficiency requirements, technologies such as hybrid powertrains were required. These powertrains required additional competencies and substantial development efforts and they were so expensive that they could not deliver a good business case to the customer in terms of the
payback time from saved fuel. The attitude was also that “our affluent customers do not bother that much about fuel costs”. It was thus primarily a profitability issue. The bigger and more fuel-thirsty cars were also the most profitable ones, while the most environmentally friendly car was the least profitable. Thus, the identified potential future threat was also seen as a threat to profitability.

The first thing to do is gather information about the current position which the scientific community holds on oil scarcity and climate change. By being more informed about the scientific position regarding these issues, the insider action researcher can bring a more trustworthy and comprehensive view of the issues into the company, rather than just represent one practitioner’s view among all the others. This helped to lift the discussion above the level of opinion, and move the organization from a state of denial to recognition.

The second thing to do was agree with his champion at Volvo Cars on the research question, i.e. “how to capitalize on Volvo Cars’ Environmental core value?” and then start an inquiry into it. Obviously, the clash between environmental product improvements and profitability had to be better understood and potentially solved. A conceptual model was designed based on case studies on Volvo Cars, parent company Ford, and competitors. The conceptual model helped explain why some environmental improvements had failed in the marketplace and why some had succeeded. It also provided guidance as to which “thought model” may enable the creation of private consumers’ willingness to pay for improved environmental product performance.

Volvo Cars is in an exploiting mode of operation. The automotive industry is one of the most competitive. That, combined with 100 years of established development centered on the internal combustion engine, has brought most automotive companies into an exploiting rather than exploring mode of operation. It is difficult for a company in such a situation to move from insight to action in other than incremental issues. Although profit margins tend to be constantly low, there is no immediate crisis looming at Volvo Cars which motivates the organization to consider more radical change than further cost-conscious exploitation.

When the insider action researcher experienced this inertia, he realized that the research question “how to capitalize on improved environmental product performance” had to be complemented with the question “how to make the company capable of capitalizing on improved environmental product performance.”

CONCLUSION

“Go Green”. This is one of a common saying which we all have been hearing since our childhood and eventually after the trend of automobiles has rapidly increased in our country, It is translating in a lot of air pollution and Of late, This has become a serious matter of concern which needs to be applied real soon. So how can the auto-manufacturers stay behind to spread the word “Green” which certainly also adds an “environment concerned” tag on their brand name as bonus? Today, The Automotive India tells you about some of the best Green cars available in India which you can buy and help to protect the mother earth. Government needs to provide significant subsidies for green cars which should be standardized across all states. Why have different tax structures in different states? At present the cost of Reva varies from one state to the other, which discourages a customer
from buying one. Government should also think of providing additional carbon discounts to electric vehicles.

"May be India can try this formula to encourage the use of green vehicles particularly in metros. The cost of electric cars should be at par with that of normal cars that run in petrol or diesel. Then only customers will buy cars. Entry level cars should have electric options without the price tag being high.

In order to succeed in this endeavour, governments particularly across emerging economies must be steadfast in moving towards its goal. Steady policies over a long period of time can make the change process more efficient, allowing all the concerned (energy firms, auto manufacturers, and customers) time to adjust to the change taking place.

References
environmental attitudes in low-cost and high-cost situations. Ration Soc 15:441–472