CHAPTER 3

EVOULITION OF
TYRE TECHNOLOGY IN INDIA

3.1 INTRODUCTION

India has emerged as one of the world’s most competitive tyre markets due to vast availability of raw material (natural rubber) and ultramodern production facilities. However the FY 2009 was a quite disturbing period for the industry as the tyre demand-supply was severely hit by the recession. However, the effects did not last long and the industry posted a remarkable growth in FY 2010. According to our research report “Indian Tyre Industry Analysis”, the Indian tyre market has attracted global manufacturers on account of encouraging growth figures. These manufacturers are expected to invest huge amounts into the industry over the next few years, with a major proportion of this investment directed towards the Truck & Bus (T&B) radial tyre capacity expansion. As per the study, several greenfield plants are in pipeline to include new capacities. The implementation of brown-field projects is executed to cater to the growing demand. Greenfield units are expected to go on-stream in the coming years, just by the time when there will be an urgent need to bridge an increasing demand-supply gap in T&B radial tyre segment. India is known to be an appetizer of invention and implements new technologies and products, and tyre industry is no exception to this. The concept of ‘green tyres’ is becoming a paradigm of the country’s competitive edge. This new category of tyres is now being widely accepted in India, and it is expected that in the coming years, the demand for green tyres will outperform the overall passenger tyre demand in the country.

India’s market for radial tyres in commercial vehicles section is still an infant. The passenger car segment switched to radial tyres in a short period of time, with radial tyre penetration level for the category reaching 98%. Besides, the penetration level of radial tyre has also started to increase rapidly in the light commercial vehicles and truck & bus segment. This segment will be the largest growth area over the next few years. The report evaluates the future growth potential of India’s tyre industry, and provides statistics and information on
market structure, tyre production by segments, exports and imports trends. Tyre market projections, in value terms, have been provided for all prominent segments, including passenger cars, utility vehicles and multi-purpose vehicles. This will provide clients with cutting edge market intelligence and help them make sound investment decisions.

Table 3.1

Vehicle production in India- CAGR Growth

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<th>2010/11 to 2014/15</th>
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<td>Tractors</td>
<td>9.9</td>
<td>10.1</td>
<td>↔</td>
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</table>

Source: ATMA (automotive tyre manufacturer’s association)

In the above table indicates, Medium and Heavy Commercial vehicles shows a positive trends at same time passenger cars and three wheeler tyers shows negative trend. All major vehicle categories are showing double digit growth in CAGR over the 10-year period -2005/06 to 2014/15
Figure 3.1
Indian Tyre Industry Major Segments

INDIAN TYRE INDUSTRY

Commercial Vehicle Tyres
- Medium & Heavy Commercial Vehicles (MHCV) (Truck & Bus)
- Heavy Commercial Vehicles (HCV) (Jeep)
- Light Commercial Vehicles (LCV) Light truck

Passenger Vehicle Tyres
- Passenger Cars Tyres

Motor Cycle Tyres

Scooter Tyres

Others
- Farm Vehicles (ADV - Animal Drawn Vehicles)
- Off the Road (OTR) Vehicles
- Industrial Vehicles
3.2 HEAVY VEHICLE INDUSTRY IN INDIA

Heavy vehicles industry in India has reflected a steady growth over the last decade by constantly trying to upgrade their technology and production processes. Heavy vehicles in India are mostly made by companies like Tata motors and Ashok Leyland. Heavy Vehicles or (HCVs) however form an indispensable part of the Indian automobile industry. Over the years the Indian market has witnessed many new heavy vehicles on the Indian roads, the Volvo is one such example which is a luxury heavy vehicle. The demand for heavy vehicles in India is increasing by the day due to the expansion and the growth of the Indian economy as a whole. This demand for heavy vehicles has in turn resulted in the manufacture of a series of heavy vehicles by the heavy vehicle manufacturing companies.

Trucks

Trucks in India are the major commercial vehicles pertaining to transportation of goods. Trucks in India fall under the heavy vehicle segment and are considered the lifeline of all the major trade and commerce activities. Trucks are generally used for the purpose of transporting materials and goods in huge volumes. Trucks in India are considered very important for the growth and smooth flow of commercial activities. Trucks in India are divided into categories on the basis of their usage.

Truck classifications are typically based upon the maximum loaded weight of the truck (typically using the gross vehicle weight rating (GVWR) and sometimes also the gross trailer weight rating (GTWR)), and can vary from jurisdiction to jurisdiction.

Tractor unit

A tractor unit (prime mover or traction unit) is a characteristically heavy-duty towing engine that provides motive power for hauling allowed or trailed load. These fall into two categories: very heavy-duty
typically off-road capable, often 6×6, military and commercial tractor units, including ballast tractors, and heavy and medium duty military and commercial rear-wheel drive "semi tractors" used for hauling semi-trailers.

Tractor units typically have large displacement diesel engines for power, durability, and economy, and several axles for maximum flexibility in gearing. The tractor-trailer combination distributes a load across multiple axles while being more maneuverable than an equivalently sized rigid truck. The most common trailer attachment system is a fifth wheel coupling, allowing rapid shift between trailers performing different functions, such as a bulk tipper and box trailer. Trailers containing differing cargos can be rapidly swapped between tractors, eliminating downtime while a trailer is unloaded or loaded. Drawbar couplings are also found, particularly in dedicated exceptionally heavy-duty ballast tractors.

Tractor trailers

Tractor trailers are ideal heavy vehicles to use for transporting cement, petrochemicals, fertilizers, food grains, timber and general cargo.

Off-road vehicle

An off-road vehicle is considered to be any type of vehicle which is capable of driving on and off paved or gravel surface. It is generally characterized by having large tires with deep, open treads, a flexible suspension, or even caterpillar tracks. Other vehicles that do not travel public streets or highways are generally termed off-highway vehicles, including tractors, forklifts, cranes, backhoes, bulldozers, and golf carts. Off-road vehicles have an enthusiastic following because of their many uses and versatility. Several types of motorsports involve racing off-road vehicles. The three largest "4-wheel vehicle" off-road types of competitions are Rally, Desert Racing, and Rock crawling. The three largest types of All Terrain Vehicle (ATV) / Motorcycle competitions are Motocross, Enduro, and also Desert Racing like Dakar Rallye and Baja 1000. The most common use of these vehicles is
for sight seeing in areas distant from pavement. The use of higher clearance and higher traction vehicles enables access on trails and forest roads that have rough and low traction surfaces.

**Light commercial vehicle**

A light commercial vehicle is the official term used within the European Union, Australia, New Zealand, and occasionally in both Canada and Ireland (where Commercial Van is more frequently used) for a commercial carrier vehicle with a gross vehicle weight of not more than 3.5 tonnes; the term light goods vehicle (LGV) may also be used by member countries which can be confused with Large goods vehicle (also 'LGV') which is the official EU term for a vehicle with a gross vehicle weight of over 3.5 tonnes.

Qualifying light commercial vehicles include pickup trucks, vans and three-wheelers all commercially based goods or passenger carrier. The LCV concept was created as a compact truck and is usually optimised to be ruggedly built, have low operating costs and powerful yet fuel efficient engines, and to be utilised in intra-city operations.

**Commercial & Passenger vehicle tyres**

As of 2012, India has the second-largest road network in the world with a road length of over 4.24 million km, and in the past few years, the country's government has been devoting increasing resources to improve the infrastructure of these roads. Since the early stages of these developments, urbanization and motorization has significantly burgeoned which in turn, has prompted a huge boom in the demand for commercial vehicles.

It is anticipated that the Commercial Vehicle Market in India will expand at a CAGR of 15.02 percent for the next four years, with much of this growth being attributed to one vendor: Tata Motors.
The commercial vehicle market in India as a whole is comprised a good handful of vendors, including Force Motors, Swaraj Mazda, Eicher Motors, and Ashok Leyland, however Tata Motors' in-depth market understanding, coupled with its dynamic expansion and acquisition plans, is making it difficult for other participants to compete with them. This is reflected by the company's dominance in the following segments:

a) Small Commercial Vehicle  
b) Light commercial vehicle (LCV) passenger carriers  
c) MCV commercial vehicle  
d) Heavy commercial vehicle (HCV) passenger carriers  

HCV goods carriers is the only segment that is dominated by another vendor (Ashok Leyland), and the differences between these two market leaders is extremely slim. So what's the key to market success for other vendors in the automotive industry of India. Well, there's no easy answer, but the main strategy adopted by Tata Motors thus far, has been satisfying customers through initiatives such as pan India workshops, service centers located every 50-70 km along major highways, 24x7 call centers, etc. to ensure profitability and gain market strength.  

This is not to say that this is the only tried, tested, and true rule for success. In fact, we at TechNavio have been monitoring with a keen eye some of the other trends being employed by commercial vehicle vendors, including mergers and acquisitions, government contracts, and product portfolio expansions. Overall, the Commercial Vehicle Market in India is an incredibly lucrative, and with plenty of opportunity for growth-especially when you consider the rapid rate at which the country's infrastructure is evolving. As the nation changes and grows, vendors must also follow suit and adapt their market strategies accordingly. Those who are able to do so, stand to see immeasurable opportunity for profit in the years to come.
Improved road infrastructure, coupled with government's curbs against overloading of trucks along the major freight corridors, is paving way for a structural shift in the country's tyre industry. The traditional cross-ply tyre for trucks and buses is losing its sheen and is being replaced by radial tyres. Companies like Apollo Tyres, JK Tyre & Industries, Birla Tyres, Ceat and MRF Tyres have lined up major investments in greenfield radial tyre plants with international tyre majors like Michelin, too, announcing plans to set up a Rs 4,000-crore radial tyre plant in Chennai. Apollo Tyres is expected to kick off commercial production of 6,000 tyres per day capacity at its greenfield plant in Chennai from next week, while Ceat is warming up to commence radial tyre production at its greenfield Rs 700-crore Halol plant in FY11. With new capacities being added and consumers slowly but gradually shifting towards radial tyres, tyre companies are expecting a 25% growth in radial tyres consumption in the next two to three years from the current 9%.

Indian tyre manufacturers started dabbling in radial technology for commercial vehicles way back in the 1970s. "In the 90s, JK Tyre was the pioneer to introduce radial tyres in India, while others felt that these tyres are conducive for the Indian roads. But, by the turn of the century, tyre companies felt the need to introduce radial tyres. Radialisation of commercial vehicles, which now stands at around 9%, is expected to reach 25% within next three years. Radial tyre usage has some advantages as well. Typically, fuel efficiency of a radial tyre is 5% higher in case of new vehicles and 3% when it comes to old vehicles. The sidewall height as a function (or a percentage) of the section width is called the aspect ratio. While cross-ply tyres have an aspect ratio of 0.40, that for a radial tyre is 0.12. The lower aspect ratio leads to better manoeuvrability and steering capacity. Also, radial tyres can be retreaded thrice compared to twice in case of a cross-ply tyre. The annual cost of retreading radial tyres is higher by Rs 4,335, while the annual savings on account of its longer life is Rs 14,865. The savings on fuel cost is Rs 15,295. The total savings is Rs 25,824 in comparison to a vehicle
running on cross-ply tyres. The longevity of radial tyres is twice that of a cross-ply tyre.

The Rs 22,500-crore tyre industry manufactures 3,948 tonnes per day (tpd) of tyres. Of this, 9% accounts for radial tyres. Manufacturing radial tyres is far more capital intensive than the traditional cross-ply tyres. "It is around Rs 4.5 crore per tpd. But, the selling price of radial tyres is about 20% higher than cross-ply tyres. While the passenger car segment in India has almost migrated to radial tyres, radialisation in the commercial vehicle (truck and bus and LCV tyres) is yet to gather momentum. M&HCVs can also be classified into two categories depending on their usage as trucks and buses. Buses are passenger carriers. Trucks include goods carriers along with specialized vehicles like dumpers, tractor-trailers etc. The ICVs fall in the load category of 8 to 10 ton GVW and are often substituted for medium or heavy commercial vehicles in trunk routes and cities. Eicher Motors and Swaraj Mazda are two manufacturers operating in this segment.

The composition of truck sales as a total of HCV sales fluctuated between 67% and 80% in the nineties. This wide variation in composition of HCV sales is due to the cyclical nature of truck sales compared to steady sales witnessed by buses. Therefore, during a downturn in truck demand, the contribution from buses, though steady in volumes, increases in terms of percentage of total HCV sales. The contribution by bus sales to total M&HCV sales has increased from 18.5% in FY97 to 33.16% in FY2001. In terms of truck sales, Telco commands a leadership by cornering 77.1% of the total truck sales with the rest taken up by Ashok Leyland. Hindustan Motors also account for about 0.7% of total sales but it exports all its products. In the bus segment, Ashok Leyland had a market share of 48.3% in FY2000 with the rest being taken by Telco. As indicated in the table below, sales of LCVs kept pace with HCVs from FY94 to FY96. The volume differential between M&HCVs and LCVs has been widening since FY97. In FY2001 this gap has been on a decline as the LCV sales increased by 4.4% but the HCV sales dropped by 21.3%.
3.3 COMMERCIAL AND PASSENGER VEHICLE TYRE SEGMENT WILL GROW

In the early 2000s, though the Indian tyre industry observed low growth, Apollo managed to outpace the overall industry. The company had a turnover of approximately $400 million in 2004. That is when the senior management team met and set a target of achieving a turnover of $2 billion by 2010. Till then, the company was only a domestic player. However, with this target, we decided to move out and expand our global reach. As part of this growth strategy, Apollo Tyres acquired South Africa-based Dunlop Tires International in 2006, including the Dunlop brand rights for 32 countries in Africa. While this gave us an entry into a growing market like South Africa, it also served as a platform for expansion into other African countries. Though we sold Dunlop tyres from 2006 to 2013, we also introduced Apollo and Vredestein branded tyres in the geography using the existing sales and service network. While we continue to grow the Apollo and Vredestein brand across the globe, the scope with Dunlop was limited since we only had the brand rights for 32 African countries. As part of our global brand strategy, we sold the Dunlop brand rights in December, 2013 to focus on our two global brands - Apollo and Vredestein. Subsequently, we have been expanding the reach for these two brands and entering new territories.

With the growth in radialisation levels in India in the commercial vehicle segment, there has been a huge demand, especially for Apollo's truck-bus radials(TBR). This has led us to expand our TBR capacity in Chennai from 6,000 tyres per day currently to 8,900 tyres. This capacity expansion entails an investment of Rs. 1500 crores. Also, this product category also gives us the highest margins.

With the increase in demand for TBR tyres, we are converting one of the bias facilities in Kalamassery, Kerala to off-highway tyres. This will entail an investment of Rs. 500 crores over the next 2-3 years.
As a growth oriented organisation, we are always on the lookout for opportunities to grow, organically or inorganically. The pre-requisite of any growth plan is that it should fit in strategically into our portfolio. We are currently investing in organic growth. In the past few years, we have tapped the growing ASEAN and Middle East region by setting up our regional sales and distribution hubs in these regions. We have also opened sales offices in Australia and Brazil.

Indian Tyre Industry hitherto is predominantly a cross ply/bias tyre manufacturing industry, particularly in the commercial vehicle segment (truck, bus, LCV) whereas in the developed countries radialization level is much higher. In comparison to normal (Bias) tyres, Radial tyres offer higher life/mileage, lower fuel consumption, improved safety and ride quality and several other benefits. However, the initial cost of a radial tyre is approx. 25% higher though on a cost per kilometer (CPK) basis, radial tyre gives higher benefits.

3.4 INDIA CATCHING UP IN RADIALISATION

The United States, the European Union and Japan have already achieved close to 100% radialisation level, while India is way behind in adopting radial tyres for commercial vehicles. China at 70% is fast catching up with the developed world. But explosive radialisation post-2010 in India is happening, which is being seized by tyre-makers who are putting additional capacity or coming up with new plants across the country. While India has been tardy in adopting radials for commercial vehicles, our research suggests that once an adoption level of 9%-11% is reached, which we are now close to, there is rapid growth in adoption of radials. Even though India has achieved over 95% radialisation in the Passenger car segment, the country remains largely a cross ply market because radial penetrations in the medium and heavy commercial vehicle (MHCV) segment which accounts for 65% (by weight) of the market, remains abysmal at 4%. There is no dispute over the economic benefits from radial tyre use among fleet operators. They are aware of their advantages in terms of fuel saving and retreadability. Radials offer significant operational and cost benefits as
compared to cross-ply. But truckers fight shy because of the poor quality of India’s road infrastructure.

Now there are several enabling factors that support the prediction of high growth potential. Investments under the National Highway Development Programme are expected to turn ‘radial worthy’ at least 25% of the road lengths when they become part of the National Highway (NH) by 2012. This is significant because NH accounts for about 40% of the total road traffic. Also, with stricter curbs on overloading of trucks along major freight corridors, the benefits of cross-ply tyres will wane. Another factor to consider is the increased containerisation of domestic road freight movement. This shall drive demand for multi-axle trailers, which have globally performed better with radial tyres. Indian fleet operators preferred cross-ply tyres due to price competitiveness and availability. However as customers’ expectations grow, they look forward to more vehicles that operate at higher speeds. There is also growing awareness about fuel economy and safety

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Source: ATMA (2011-12)
The following Figure shows total tyre production in India in 000’s indicates that tyre production starts from 42471 thousands in the year 2000-2001 and it increased up to one 1 laks 25000 units in 2011-2012

Figure 3.2
TOTAL TYRE PRODUCTION IN INDIA
### Table 3.3
**CATEGORY WISE TYRE PRODUCTION IN INDIA**

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*Source: Automotive Tyre Manufacturer’s Association (ATMA) 2011-2012*
The following Figure indicates that passenger car and motor cycle tyres are leading with the value of 15.04 and 15.3 respectively at the same time least amount of the production shown by truck and bus (5.8) and Jeep tyres (2.16) animal drawn vehicles tyres are the lowest segment which produces

**Figure 3.3**

**CATEGORY WISE TYRE PRODUCTION IN INDIA**

### PRODUCTION AND CONSUMPTION TREND LINE BY USING 'AVERAGE ANNUAL GROWTH RATE - AAG'

\[
\text{Annual growth rate of a year (AG)} = \frac{(\text{Value of the current year} - \text{Value of the previous year}) \times 100}{\text{Value of the previous year}}
\]

The average increase in the value of an individual investment or portfolio over the period of a year. It is calculated by taking the arithmetic mean of the growth rate over two annual periods. The average annual growth rate can be calculated for any investment, but will not include any measure of the investment's overall risk, as measured by its price volatility.

\[
\text{AAG} = \sum_{i=1}^{n} \frac{AG}{n}
\]
Table 3.4
Production trend of different types of tyres

<table>
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<th>CATEGORY</th>
<th>Truck &amp; Bus</th>
<th>Passenger Car</th>
<th>Jeep</th>
<th>Light Commercial Vehicle</th>
<th>Tractor front</th>
<th>rear</th>
<th>trailor</th>
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Source: Automotive Tyre Manufacturer’s Association (ATMA) 2011-2012
Production trend of different types of tyres are shown in following figure. Here we can see that the total amount of off the road vehicles are prevailing the top position, OTR (183.57), Tractor Trailer (159.14) and passenger car (154.94). The lowest position is of Jeep tyres (35.23) and truck and Bus tyres (65.99).

**Figure 3.4**

**Production trend of different types of tyres**

![Production trend of different types of tyres](image)
Table 3.5

Consumption Trend of Different Types of Tyres

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>Truck &amp; Bus</th>
<th>Passenger Car</th>
<th>Jeep</th>
<th>Light Commercial Vehicle</th>
<th>Tractor front</th>
<th>rear</th>
<th>trailer</th>
<th>Motor Cycle</th>
<th>ADV</th>
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Source: Automotive Tyre Manufacturer’s Association (ATMA) 2011-2012
The following figures denotes there has been positive trend seen about the tractor tyre and motorcycle tyres. at the same time Jeep tyres and Truck & Bus Tyres are consumed in very low level as 27.1 and 74.25 respectively.

Figure 3.5
Consumption trend of different types of tyres

2001-2012

<table>
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<tr>
<th>Year</th>
<th>Truck &amp; Bus</th>
<th>Passenger Car</th>
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<th>Jeep</th>
<th>Tractor front</th>
<th>Rear</th>
<th>Trailer</th>
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3.5 RADIAL ADVANTAGE

The way ahead remains radial unless there is some technological breakthrough in cross-ply. There is widespread acceptance among end-users that given quality road infrastructure, radial tyres offer significant operational and cost benefits as compared to cross-ply tyres. The total cost of ownership could be lower and better manoeuvrability is also a core benefit. Commercial vehicle makers are planning to introduce radial tyres for 30%-40% of new MHCV sales by 2010. As per current estimates, the overall demand for MHCV tyre is expected to reach about 14.5 million units by 2010-11. With radialisation levels breaching the 11% mark, the domestic demand for MHCV radials is expected to be 1.5 million. It is possible that the MHCV segment may achieve about 25% radialisation levels by 2015. This is expected to result in a whopping jump in annual MHCV radial tyre demand of up to 4.5 million tyres. However, the domestic players, who dominate the MHCV Tyre industry today, are sceptical about this explosive demand actually materialising. With planned capacities of only two million radial tyres coming up by 2010-11, their response has been cautious, which may leave the domestic tyre producers vulnerable in the years to come. OEM and other bulk buyers have expressed concerns over the ability of domestic tyre manufacturers to support the growing radialisation. Large trading organisations have already chalked out plans to market Chinese tyres by importing them in a big way.

One has to keep in mind that the consumer compares value for money – if a perception of lower quality or lifespan is more than compensated by the 10.15% lower price, the consumer may choose the cheaper product. There is a general negative quality perception regarding Chinese products in India, at least in part due to lower prices that the Chinese suppliers have been able to offer. In the specific case of tyres, Chinese producers enjoy a genuinely lower cost structure due to availability of rubber at cheaper rates, and economics of scale due to huge capacities. The Indian tyre industry is looking forward to the outcome of the recent discussions with the Indian government on the domestic
supply/demand situation for natural rubber and on the rubber import tariff levels. With increasing radialisation, there is likely to be a glut in cross-ply tyre capacity. This issue should be viewed seriously by Indian tyre makers.

The ‘zone of inflection’ that would mark perhaps the trigger-point for rapid expansion of radial tyre demand in India. On usage of radial tyres across various markets, radial adoption would remain modest till a radialisation level of 9% -11% is achieved. In the past, the demand for radials in other countries has exhibited accelerated growth, along an S-shaped curve, once this adoption level or ‘zone of inflection’ was breached.

The S-Curve will show the occurrence of a technological discontinuity when an innovative technology gets introduced, which rapidly creates massive gains in productivity. At the start of the curve, a significant effort will be needed, as in the case of radialisation efforts in India, to get an achievement. But once this basic learning has been gained, productivity could advance significantly with little effort. “Our research indicated a couple of years ago itself that India would enter this zone of inflection by 2010-11, after which domestic demand for MHCV radial tyres may emulate the experience of other countries and rise rapidly.

Earlier there were concerns that the capacity enhancements planned by domestic tyre makers might not be sufficient to meet the surge in demand and imports may fill in the gap. However, many Indian tyre manufacturers are now willing to expand local capacities and some are even acquiring plants in Southeast Asia and elsewhere. Global major believe growth of auto ancillaries will be driven by India and China. These tyre giants are setting up shop in India. It’s interesting to note that companies such as Michelin plan, to initially focus on radias for the truck market.
3.6 GREEN COST

Switching to green tyre would increase the cost of mobility as effectiveness of such initiatives would also require change in the production processes by tyre manufacturers and light-weighting of vehicles by auto makers. It is so because each new mobility technology costs more in absolute terms than the one it replaces. Compare a horse carriage to an automobile. This phenomenon can be expected to continue because automobiles are becoming more complex. If one were to only look at the future cost of tyres, it is likely that there will be some cost increases in achieving reduced RR of 10-25 percent. Much of this expected increase is attributed to use of materials, such as silica, in green tyres. The available estimates are for cost increase of US$5-$10 per tyre for RR decreases in a 10-25 per cent range. This is not the end of the story, however, since the progress achieved by the above will be relatively modest and more improvements will be needed in near future.

The possibilities for achieving that may include changes in the wheel rim design, changed cross-section of tyres, changes in the radial ply construction, etc. All these will incur additional cost in transforming the factory tools. The use of green tyres as they are currently understood (i.e. tyres with 10-25 percent reduction in RR) should not cause any increase in traffic accident. When TPMS is mandated as part of green tyre requirement, one can expect noticeable decrease in traffic accidents that are caused by tyre blowouts, tread separation, etc and vehicle loss of control. It is likely that larger amount of reduction in RR expected in green tyre will require fundamental changes in tyre design. It will provide opportunities to design tyres that are optimised for fuel efficiency as well as safety. Sustainable green mobility can be turned into reality only if new technologies are harnessed in a holistic way.
Many new research breakthroughs are reported by tyre and polymer scientists who work of new materials that could make the green tyre, whose demand is growing at double digit. Being fuel-efficient with high performance characteristics green tyre is becoming central to efforts by governments and the automobile industry to promote clean and green transportation. Tyres are the only parts of automobiles which make contact with the ground, and make possible the fundamental automotive operations of driving, rolling and stopping by transferring the drive force of the engine to the surface of the ground. Scientists are responding to the demands, for greater performance in fuel economy without losing other fundamental performance properties. This has been the most important challenge for tyre manufacturers. The aim of researchers is to develop green tyre that can reduce the environmental impact at manufacturing as well as overall service life of the tyre.

Energy-saving performance is achieved through a variety of improvements and innovations—from the fundamental structure of the tyre to various types of materials. Among these, the role played by the tread, which is the part coming into contact with the surface of the ground, is particularly important. Innovation in polymer materials that give energy saving performance and road-surface grip, which is related to safety is an area of major focus of manufacturers of polymers for tyres.

3.7 FILLER ROLE

From the standpoint of fuel-efficiency performance and wet-grip performance, use of silica as a filler is an indispensable technology for high-performance fuel-saving tyres. Silica due to its typical chemical nature, is however not well-accepted by the polymer. This has led to the development of coupling agents. With the introduction of the green tyre, development of new silance coupling agents has also accelerate. Another bread through research in the field of polymers is the multifunctional polymer. New compounding
materials and innovative construction materials are being widely experimented to improve the green performance of the tyre, while maintaining safety and driving comfort. Nano materials are also in use in tyre compounds to improve the thermal stability, which in turn helps to lower the fuel consumption and reduction in carbon dioxide emission. Greener” mobility is already in full swing towards the transition to a more sustainable growth worldwide. The increasing trend in fuel-efficiency with low emissions is a move towards sustainable mobility. Another new trend in the technology is light-weighting, which has become one of the basic prerequisites for new forms of green mobility.

Retread impact

The impact of retreaded tyres on the growth of Indian replacement market, that there is rising demand for remoulded, remanufactured or recapped tyres because these are cheaper. The retreaded tyres market currently holds a share of around 11-13% of the overall tyre market in India. The cost of the retreaded tyres is almost 40-50% cheaper than new tyres. This make them more attractive in the case of commercial vehicle segment. Because of overload and poor quality of roads, commercial vehicles frequently require tyre change and hence retreading holds out as an economically viable option for fleet owners. The increasing use of retreads also contributes to environmental sustainability.

Margin pressure

Despite the growing demand for tyres, the domestic tyre companies are facing pressure on margins because of high cost of inputs. The demand for tyres is increasing at a decent rate which surpassed 130 million units in 2011 due to increasing OEM sales, expanding replacement market and exports. However, fluctuating rubber prices and increasing labour costs are making it difficult for domestic tyre manufacturers to sustain the profit margins. The average natural rubber prices in Q4 2010 were recorded around Rs. 16,600 per 100kg but after March 2011 they touched Rs. 24,000, an increase of around 45%. Initially, the tyre companies had increased prices accordance with the rising input costs.
But they could not continue passing the burden on consumers and maintain the same growth pace due to global recession. The profit margins were squeezed down to almost 1-2%. The negative impact of volatility in the price and supply of natural rubber would get lessened as Indian tyre companies are now looking for alternative sources of supplies.

Apollo Tyres has already leased around 10,000 hectares in Laos, but it would take around 5-6 years to gain benefit out of the acquisition. The enhancement of synthetic rubber in tyre compounds would ease the pressure out to some extent. But heavy tyres need more of natural rubber which would again be an expensive proposition as natural rubber account for almost 50% of the cost of the tyre. Reliance Industries Ltd of Mukesh Ambani is reported to be foraying into the rubber plantations and allied processing sectors thus boosting NR Supplies in the coming next ten years. Many companies have also started taking interest in supplying synthetic rubber which is an emerging alternative in this current supply-restricted scenario.

3.8 TYRE INDUSTRY

Making an assessment of the growth prospects of the tyre industry and the after market segment in the context of auto sector growth, unlike other markets abroad, the Indian tyre industry is dominated by domestic participants, (excluding companies like Bridgestone and Goodyear) which cater to over 85% of the domestic market requirement.

Tyres from premium manufacturers have had little success owing to price sensitivity among Indians, bad road conditions and less importance given to issues such as emission norms and safety. Latest tyre company figures show that although only one among India’s eight had made a marginal net profit last financial year, all of them have reasons to be optimistic following the project growth prospects of the auto industry.
The tyre makers had suffered losses during the third quarter of the last financial year with a net loss of Rs.320.6 million against a net profit of Rs.1788 million in Q3 of FY11 mostly because of unprecedented rise in rubber prices. Latest figures from the Automotive Tyre Manufacturers Association (ATMA) show that tyre production in the April-February period of the last financial year had touched 114 million as against 98 million in the same period of 2010-11 a growth of 14%. Passenger car tyre production crossed 25 million, while 14 million truck/bus tyres were produced. The Indian tyre companies performed well on the export front with cumulative exports in all categories surging 20%, with a 29% increase in the passenger car segment. A 340% jump was recorded in scooter (two wheeler and moped) segment

**Labelling Benefits**

When asked how mandatory tyre labeling will boost demand for Nd-PBR, it is being driven by the megatrend mobility as well as motorists calling for higher environmental and safety standards in performance tyres. In addition, demand is being accelerated by European Union legislation. As of November 2012, all new tyres sold in Europe have to be labelled for fuel efficiency, wet grip and external rolling noise. South Korea too will be implementing tyre labeling for passenger cars and light trucks as of Dec. 1, 2012. Japanese tyre manufacturers voluntarily introduced labeling at the start of 2010. Because of the EU tyre labeling initiative, the market share of green tyres made of high performance rubber will increase from its parent 35% to around 50% of the overall tyre market.

**Energy saving**

With the dissemination of energy-saving tyres, terms such as low fuel consumption and rolling resistance, which were technical terms have come to be recognized by the general public. In addition, there have been requirements for energy saving performance in tyres not only for passenger cars, but also for large vehicles such as trucks and buses in recent years. Energy saving performance is
achieved through a variety of improvements and innovations from the fundamental structure of the tyre to various types of materials, but among these the role played by the tread, which is the part coming into contact with the surface of the ground, is particularly important. This means providing polymer materials that give energy saving performance and road surface grip, which is related to safety, in the trade-off between these two properties. And this is an area where the most is expected of the manufacturers of polymers for tyres.

The need for reducing fuel consumption leading the market is to be more and more demanding for the performances improvements, which cannot be achieved with E-SBR, making an inevitable gradual trend towards the use of S-SBR. New generation Soslsution Polymerisation SBR, S-SBR, synthesized by living anionic polymerisation has polar functional groups in the polymer backbone, aimed at developing new silica compound grades. By introducing polar functional groups and increasing the polarisation of the polymer itself, we can expect to have a good direct effect on the affinity for the hydrophilic silica. With silica compounding, we cannot expect physical binding as is seen between carbon and rubber components. Therefore, the introduction of polar functional groups to the polymer chain is even more important, as are silane coupling agents. With these developments, future years are for the S-SBR and Silica compound in tyre tread application.

The global economic turbulence is forcing every industry to revamp its business dynamics. The Indian tyre industry is on exception. The industry, which is being squeezed from both sides—rising raw materials costs and a slowdown due to weakening auto demand—needs to focus more on R&D activities to find alternative sources for raw materials and to revise business strategies so as survive in tough market conditions. Like other auto ancillaries, the tyre industry too depends largely on the growth of automobile industry. The year 2011 had been a tough period for auto industry in India thanks to suborn inflation, rising fuel prices and higher interest rates. The tyre industry naturally had to bear the heat of this slowdown.
Unfortunately, the tyre industry cannot influence end-user demand. It has to wait and watch to see how the auto industry fares. Tyre demand is a derived demand—you cannot sell only tyres. You can sell a tyre to somebody who has a vehicle. You cannot create desire to have a tyre. So it’s a derived demand where you have to going the direction of vehicle sales. The domestic sales of all vehicles in India had grown from 10.1 million units in FY 2007 to 17.3 million units in FY 12, demonstrating an annual growth rate of 11.3-11.4%. In the same duration, domestic tyre sales (by units) has grown at an annual rate of 10.8-11.0% thereby proving that tyre demand has very high positive correlation with the demand for automobiles. Last year the Indian tyre industry, like its global peers, was mainly affected by record-level raw material prices. Natural rubber prices soared last year owing to scarcity and it forced tyre companies to take a toll on their profit margins.

Additionally, the Indian tyre industry does not seem to be much active on R&D front to develop substitutes for natural rubber. In general, research investments in new technologies are driven after certain psychological commodities. Though the industry is looking for the substitutes such as synthetic rubber, guayule and other, Not enough emphasis on R&D front for alternative resources for natural rubber/ Pressure from raw materials side, particularly natural rubber, will continue in future until an alternative resource for natural rubber will be available sufficiently. Efforts to reduce weight of tyres have emerged as a major development in the global tyre industry in recent times. However, both Indian tyre companies and tyre buyers look reluctant to adopt lightweight tyres. In term of weight reduction in tyres I am not seeing much work on it, nor is it being highlighted in any advertisement.

**False Argument**

It is a false argument that cheap imports of tyres and flooding of the market with such tyres can negatively impact tyre manufacturers. The import of tyres is a legal business activity and overseas tyres are fair priced as against the
domestic tyres being high over priced due to price rigging indulged into by
domestic tyre makers. Hence, the so called cheap import or so called flooding of
market with such tyres is a misnomer. Even today only 15% of the commercial
vehicle tyres are radials in India as against 60%-90% usage of modern radial
tyres that is in practice in most of the prominent Asian countries over the past
more than a decade. Hence, there is for all practical purposes a shortage of high
quality world class radials in India. This situation is supporting the domestic tyre
majors to push outdated nylon fabric cross ply tyres. The misleading media
campaign about so called ‘cheap radial tyres’ imported from China, Korea,
Thailand etc. is a myth and this requires to be exploded. Being closer to the end
customers than tyre manufacturers, the AITDF has a ring side perspective of the
industry.

It is a matter of record that leading transport unions in the country at
centre and state levels have continuously being criticising the domestic tyre
majors on account of price, quality and trade practices. The tyre dealers, except
for a creamy layer, have no option but to work in the present stifled market
situation to make their livelihood despite heavy investment in their business.
There is urgent need on the part of domestic tyre majors to do introspection and
respect the channel partners and end consumers in its true letter and spirit.
Today, there is yawning gap between practice and preaching of domestic tyre
manufacturers.

3.9 MARKET CHALLENGES

Brand loyalty and buying priorities may be passed down from one
generation to another in some cases, while some others may completely reject
their parents’ habits. For peers, it works differently, but culture still plays a part
in whether one wants to be different or the same as everyone else. For marketers
who are challenged to bring back to his product the luster it lost and then take it
to chartbuster status. Dr. Iyengar has some interesting comments to
offer. Sometimes a product needs some minor changes so that marketers can
overhaul how it is branded to consumers. Considering the entire science of choice, including whether the target consumers are collectivists or individualists as well as how many other products they can choose from, is crucial in this process.

The choice of tyres in the replacement market, is made under the influence of friends and close associates. Most people do not know a lot about replacement tyres, so in this case people may feel that their only choices are those that their friends and close associates have used. Moreover, in an investment that affects our safety but does not say much about us personally, like tyres,. Perhaps we are more comfortable copying the choices of those we trust on a personal level. Advertisement has a critical impact on choice in a defining way. Advertisements impact our choices both consciously and subconsciously. One interesting point of consumer choice that comes through the book is that having fewer of no choice is not always bad and having lots of choices is not always good.

**Improved Tyres**

Radial truck tyres, which are yet to see increased market share in India, show up to 30% lower rolling resistance compared with bias designed tyres. Even radials with dual tread design –cap compound with improved tread wear and the base compound with low hysteresis –would improve rolling resistance by about 5% over radials with single compound. Tyres with higher outer diameter and the low aspect ratio also improve rolling resistance significantly. Although natural rubber is the first choice of radial truck tyre-makers because of its outstanding physical-mechanical properties and adhesion with steel cord, solution styrene-butadiene rubber (S-SBR) is being extensively used in passenger car radial tyres to improve rolling resistance and we grip.

Apart from undertaking tyre testing, certification, training, consultancy etc. IRMRA has developed many critical products for the Defence establishments and alsofor the Bhabha Atomic Research Centre, the Railways,
Hindustan Aeronautics Ltd and Indian Space Research Organisation (ISRO). Product development, especially for Defence and atomic research applications, requires extensive literature search, product and process design, development of compounds, testing of material at various stages and validation of products under service conditions.

We are in discussion with national and international tyre manufacturers for carrying out collaborative research to develop compounds and reinforcing materials for tyres which can work well in Indian road and off-the-road conditions. With the addition of more testing equipment and research facilities, IRMRA hopes to do more work in tyre development in the coming years. IRMRA is also involved in the development of the green tyre that contributes to sustainable mobility. Such tyres are made to a large extent with NR. Trials with the deoxidized natural rubber have shown to be promising as it gives optimum traction with substantial reduction in rolling resistance, which gives improved fuel economy and reduction in carbon dioxide emissions.

Apart from rubber, the reinforcement in green tyres is made with eco-friendly materials. Carbon black is being replaced with nano silica fillers which petroleum-based textile is being substituted with natural resources-based fibres like rayon, silk, glass fibre, steel cord with recycled steel. Fossil fuel-based plasticisers are replaced with vegetable oils and even the rubber chemical content is substantially reduced. Since India produces natural rubber and natural fibers, vegetable oils etc. the domestic tyre manufacturers must focus more on green tyre research and development activities. The Indian tyre-makers should aim at using indigenously available natural resource-based materials for sustainable growth in order to protect the environment.