CHALLENGES FACING THE TYRE INDUSTRY

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GLOBAL ISSUE & CHALLENGES
AUTOMOTIVE AND RUBBER INDUSTRY

Environment Challenges
- Impact of climate change is significant
  - Climate protection
  - Scarcity of Natural resources

Economic Challenges
- Shortage of resources
- Rising prices for fossil fuels

Growing Population & Mobility
- Among the growing middle class in emerging economies

Urbanization
- Almost 60% of the world's population will live in cities by 2030
- Greater traffic density leads to increased noise emissions

Changing Consumer demands
- Trend toward a sustainable lifestyle
- Societal demand for environmental stewardship

Policies
More stringent legislation
- to protect the environment
- to reduce emissions and fossil fuel dependency

Source: United Nations, Department of Economic and Social Affairs
CHALLENGES - RUBBER INDUSTRY

- Economic (Volatility, Uncertainty, Complexity & Ambiguity)
- Sustainability
- Digitization
- Technology and R&D
- Threat from China
  ... Low cost import
- Higher manpower cost vis-à-vis Developing nation
- Govt. Policy & Reforms
- Ease of doing business
- Infrastructure
- Economy of scale
  Operational Excellence
  (Quality, Productivity, Cost, Delivery)
- People (skill development)
• OECD forecast – India is expected to become the fastest-growing major economy over the next two years.

• IMF chief Christine Lagarde described India as a “bright spot” on cloudy global horizon.

• India could grow at a potential of 8% on an avg. from fiscal 2016 to 2020 powered by greater access to banking, technology adoption, urbanisation & other structural reforms (Goldman Sachs report-Sept ’15)
V = Volatility.
- The nature & dynamics of change
- The nature & speed of change forces
- Change catalysts.

U = Uncertainty.
- The lack of predictability,
- The prospects for surprise
- The sense of awareness & the understanding of issues and events.

C = Complexity.
- The multiplex of forces
- The confounding of issues
- The chaos & confusion that surround an organization.

A = Ambiguity.
- The haziness of reality
- The potential for misreads,
- The mixed meanings of conditions
- Cause-and-effect confusion

VOLATILITY, UNCERTAINTY, COMPLEXITY & AMBIGUITY
SUSTAINABILITY CHALLENGES

Safe & Durable

High Mileage
Noise
Bio Materials
Bio Degradable
Reuse of Materials
Rolling Resistance
Minimize Energy Consumption during Production

Affordable for Everyone

Equitable

Sustainable

Social
Economic
Environment
Viable

Minimize Waste During Production
Recycling
Isolation of the causal correlation between:
- population increase / economic growth
- resource consumption / environmental impact
It is possible to produce a tire with > 95 % non-crude oil base. However, the application range today is still limited.
Managing and Optimizing the information flow by system integration of components
DIGITIZATION ENABLERS

TYRE/INTEGRATED SENSOR

MANUFACTURING/INTEGRATED SENSOR

DESIGN/INTEGRATED SENSOR
TECHNOLOGY SCENARIO

India's Share of GDP Spent in R&D is Lower than Peers and Private Sector's Contribution is Limited

### Overall R&D spending is below international peers

<table>
<thead>
<tr>
<th>Country</th>
<th>R&amp;D spend as share of country GDP (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>3.4%</td>
</tr>
<tr>
<td>Germany</td>
<td>2.9%</td>
</tr>
<tr>
<td>US</td>
<td>2.8%</td>
</tr>
<tr>
<td>China</td>
<td>1.8%</td>
</tr>
<tr>
<td>UK</td>
<td>1.8%</td>
</tr>
<tr>
<td>Brazil</td>
<td>1.2%</td>
</tr>
<tr>
<td>Russia</td>
<td>1.1%</td>
</tr>
<tr>
<td>Malaysia</td>
<td>1.1%</td>
</tr>
<tr>
<td>Turkey</td>
<td>0.9%</td>
</tr>
<tr>
<td>India</td>
<td>0.8%</td>
</tr>
<tr>
<td>Mexico</td>
<td>0.4%</td>
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</tbody>
</table>

### Private sector contributes to less than 40% of total R&D in India

<table>
<thead>
<tr>
<th>Country</th>
<th>Share of R&amp;D spend (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>4%</td>
</tr>
<tr>
<td>US</td>
<td>3%</td>
</tr>
<tr>
<td>Japan</td>
<td>20%</td>
</tr>
<tr>
<td>Germany</td>
<td>18%</td>
</tr>
<tr>
<td>UK</td>
<td>28%</td>
</tr>
<tr>
<td>China</td>
<td>8%</td>
</tr>
</tbody>
</table>

**Sources:** World Bank, Batelle report on Global R&D Expenditure 2012, Eurostat by European Commission–Report on R&D expenditure, Statistical Bureau of Japan Website, National Science Foundation website, Dept. of Statistics–Singapore website; GDP values from EIU database; BCG analysis.

**Note:** Values for R&D expenditure are at real values 2011.
TECHNOLOGY CHALLENGES

1 - New Concept Development
• Dematerialisation
• Shared used of the product
• Integration of functions
• Functional optimisation of products & components

2 - Selection of low impact materials
• Non-hazardous materials
• Non-exhaustable materials
• Low energy content materials
• Recycled materials
• Recyclable materials

3 - Reduction of material
• Reduction in weight
• Reduction in volume

4 - Optimization of production techniques
• Fewer production processes
• Low/clean energy consumption
• Low generation of waste
• Few/clean production consumables

5 - Efficient distribution system
• Less/clean packaging
• Efficient transport mode
• Efficient logistics

6 - Reduction of the environmental impact in the user stage
• Low energy consumption
• Clean energy source
• Few consumables needed during use
• Clean consumables during use
• No energy/auxiliary material use

7 - Optimization of initial life time
• Reliability and durability
• Easy maintenance and repair
• Modular product structure
• Classic design
• User taking care of product

8 - Optimization of end-of-life system
• Reuse of product
• Re-mfg./refurbishing
• Recycling of materials
• Clean incineration

DESIGN FOR ENVIRONMENT
LEGISLATIONS & REGULATIONS

Growth of tyre related legislations around the world:

• **TREAD Act:**
  - Transportation, Recall Enhancement, Accountability and Documentation Act

• **REACH:**
  - Registration, Evaluation, Authorization and restriction of Chemical

• **End of Life Vehicles – EU legislation**

• **Labeling of Tyres – EU legislation**

• **Uniform Tire Quality Grade (UTQG) Standards**

• **Global Technical Regulation on Tyres – under consideration**

These stringent global regulations throw up challenges of adherence and... ...optimizing various product performance goal conflicts...
Strategic Capability to be built to overcome various Challenges:

Market back Innovation Excellence

• Evolve from Manufacturing Company to a consumer centric Company
• Cost Efficient R&D
• Speed of Delivery
• Value proposition to Customers
• Digitization

Operational Excellence

• Driving Efficiency (Quality, Productivity, Cost, Delivery & Safety)
• Customer Service
• Environmental Concerns
• People Skill Development

DON’T LIMIT YOUR CHALLENGES, CHALLENGE YOUR LIMITS