


BREAKING BOUNDARIES FOR ENERGY AND TRANSPORTATION INNOVATION: US AND INDIAN PERSPECTIVES

NASEO 2018 Annual Meeting

September 25, 2018

 Engineering a *better world.*



Tata Technologies is a young company in a very exciting line of business. A line of business that not only has its place in India, but all over the world. We decided that this company would not be all things to all people but would focus itself in the niche area of providing solutions to manufacturing companies. I would like to see Tata Technologies being acclaimed as one of the more innovative and successful design companies in the world. Your participation will be seen in the world over as a leader in the field we start.

– Ratan Tata

TATA GROUP

ONE OF INDIA'S OLDEST, LARGEST AND MOST RESPECTED BUSINESS ORGANIZATIONS



Founded in
1868

More than 145 years of commitment to business ethics and corporate social responsibility



Revenue
\$103Bn+

68 percent of which is generated in geographies outside India



Employment
695,000+

Spanning more than 100 operating companies, in 100 countries, on six continents

BUSINESS SECTORS



IT and
Communications



Steel and
Materials



Energy



Engineering
Services



Services and
Hospitality



Consumer
Products



Chemicals

OPERATIONAL SNAPSHOT

\$420+ MILLION

CONSOLIDATED REVENUE

8,500+

PROFESSIONALS

3 ACTIVE REGIONS

AROUND THE WORLD

12 LEGAL ENTITIES

INTERNATIONAL OPERATIONS

INDUSTRY STANDARDS

ISO 9001:2008 Certified (Quality Management) | AS 9100C Certified (Aviation, Space and Defense) | ISO 27001:2013 Certified (Information Security Management)

WORKS WITH



12

Aerospace
OEMs



11

Automotive
OEMs



15

Tier 1
Automotive
Suppliers



15

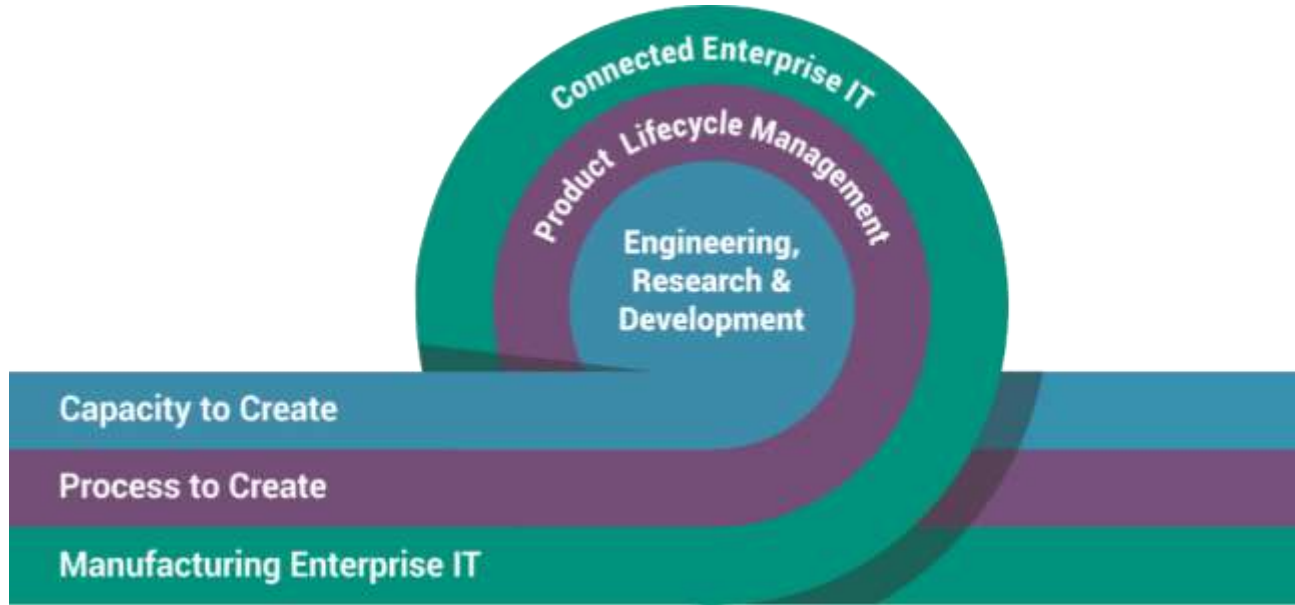
Industrial
Machinery
OEMs

INTERNAL QUALITY OPERATIONS

- Annually assessed under the Tata Business Excellence Model (TBEM), an assessment equivalent to the Malcolm Baldrige National Quality Award (MBNQA)
- Internally developed Global Engagement Module (GEM) for outsourcing engagement and delivery
- All employees are trained in and governed by the Tata Group Values, Code of Conduct, and "Leadership with Trust" mission

LINES OF BUSINESS

End-to-end solutions for the product realization lifecycle



ADDITIONAL SERVICES



Technical Workforce Solutions



Instructor Led Training



Self-paced Online Training (i GET IT)

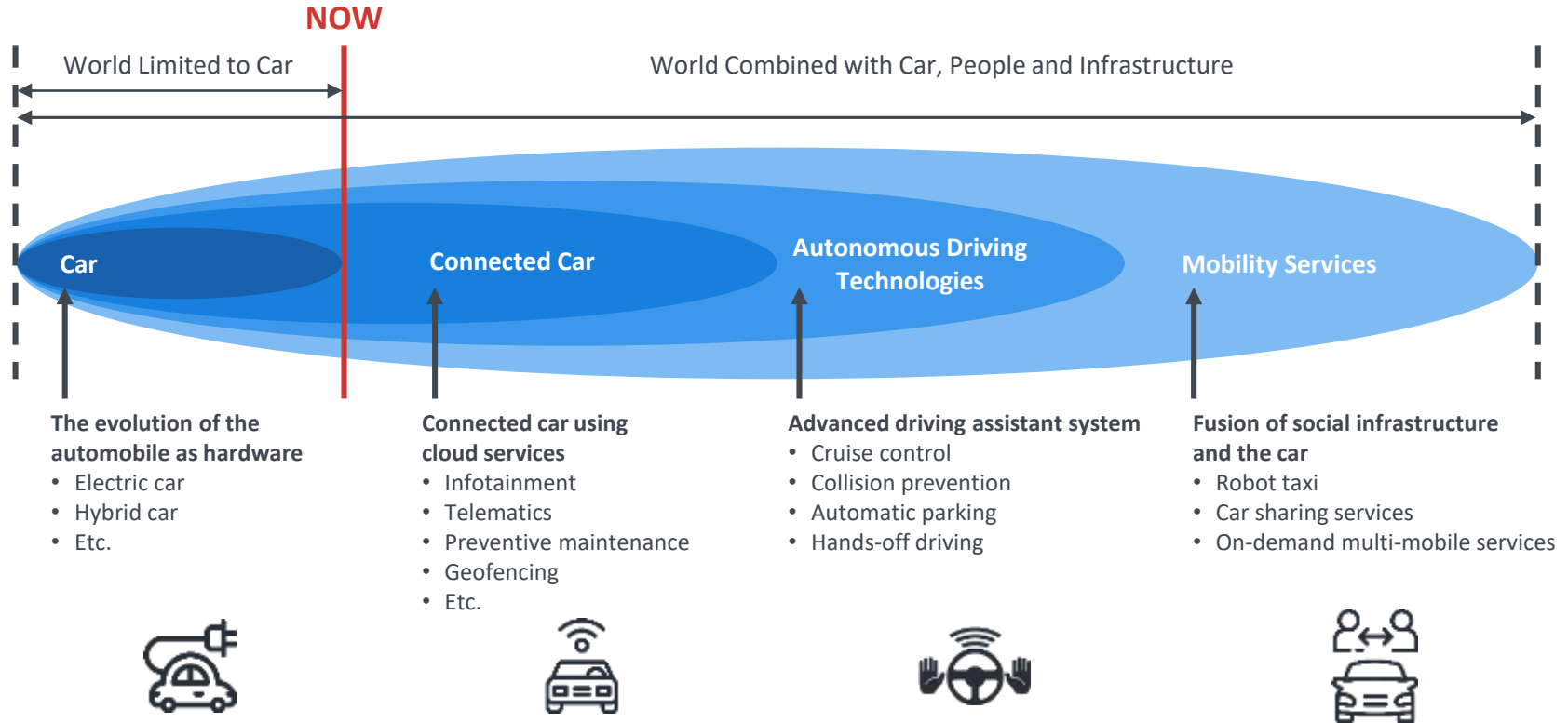


PLM Analytics Portfolio



Digital Engineering Applications

THE AUTO INDUSTRY IS AT AN INFLECTION POINT



COMPETENCY ADVANTAGE | ELECTRIC VEHICLES

Competencies

- **Integration**
 - Body Electronics
 - Mechatronics
 - Control Systems
- **Components**
 - Embedded Software
 - Electronics Hardware
- **Lightweighting**
 - 5R Rightweighting Methodology



Tata Technologies' Advantage

- Matured GDEM to design and develop new product in EV segment
- Full VPD experience with prominent clients in China, Japan, US, and India
- Market-leading expertise in connected, hybrid and electric vehicles

Customer & Projects



European
OEM

China
OEM

China
OEM

China
OEM

China
OEM

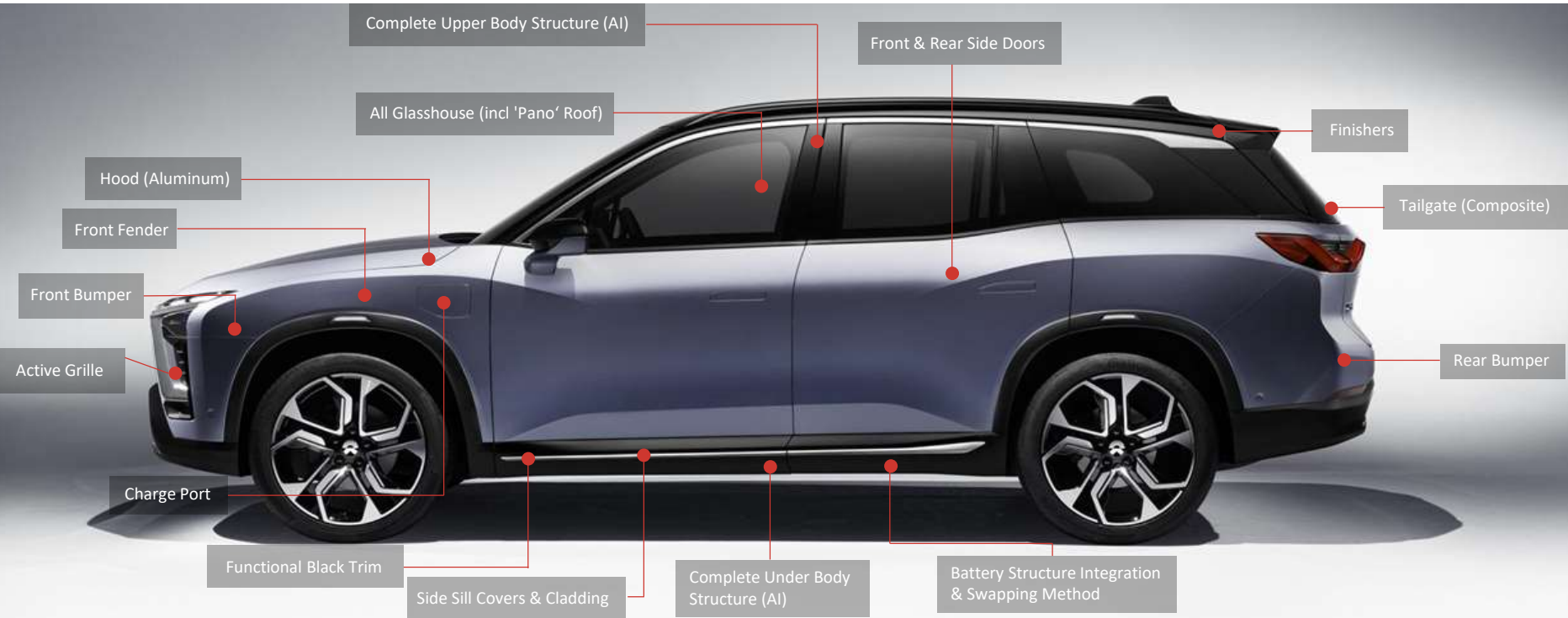
Next Steps

- **Connected Vehicles**
 - Vehicle to Vehicle (V2V)
 - Vehicle to Infra (V2I)
 - Vehicle to User (V2U)
- **Energy**
 - Delivery
 - Storage
 - Distribution



NIO ES8

Full Vehicle Engineering Partner



EV MARKET TRENDS

TOP AUTOMOTIVE OEMS GLOBALLY (2017)		
Position	Group	Country
1	Volkswagen	Germany
2	Toyota	Japan
3	Renault Nissan	France
4	General Motors	USA
5	Hyundai	Korea
6	Ford	USA
7	Honda	Japan
8	Fiat Chrysler	Italy
9	Suzuki	Japan
10	Daimler	Germany
11	Group PSA	France
12	SAIC	China
13	BMW	Germany
14	Changan	China
15	Mazda	Japan

TOP EV OEMS GLOBALLY (2017)		
Position	Group	Country
1	BYD	China
2	BJEV	China
3	Tesla	USA
4	BMW	Germany
5	Renault Nissan	France
6	GM	USA
7	Chevrolet	USA
8	Toyota	Japan
9	SAIC	China
10	Volkswagen	Germany
11	Zhidou	China
12	Zotye	China
13	Chery	China
14	JMC	China
15	Geely	China

China OEMs dominate the EV play and are expected to continue to play a critical role as they demonstrate more successful mass market EV products

NASEO PERSPECTIVES

- Zero emission vehicle (ZEV) incentives accelerating investments in China and Scandinavia
- Center of gravity of electric vehicle development moving from West Coast to China
- Public procurement programs in India setting policy direction, but regulatory framework still embryonic
- Revision of emission standards in the US will likely reduce uptake in electric vehicles



Engineering a ***better world.***

For more information about Tata Technologies
and what we can do to help create better
products for your customers, visit:

www.tatatechnologies.com