TECHNOLOGY AND CONNECTIVITY SET TO TRANSFORM THE AUTO INDUSTRY

As the automobile industry continues to evolve, we look at its journey till now and the elements that continue to drive its evolution, all directed towards achieving the ultimate frontier of digitization – the autonomous car.

These are exciting times for the auto industry. Before we delve into emerging trends and what to expect in the future, let us take a quick ride through the history of the automobile industry.

Late 1800s to 1950

Auto manufacturers in Germany, France, and the US deliver 'easy mobility' by making lightweight, affordable cars. Growth of the auto industry spurs demand for steel and petroleum. Ancillary industries and feeder services emerge and thrive.

1950 to 2000

Japan becomes an auto leader and exports vehicles. But the proliferation of automobiles results in bumper-to-bumper traffic in cities. The socio-economic impact of easy access to personal motor vehicles comes into focus. Governments respond with standards for safety, emission control, and fuel efficiency

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as well as regulations to restrict usage, and even purchase. In Japan, motorists require a 'parking space certificate' to register the purchase of a new or used car. While some countries introduced curbs on movement and parking of vehicles in urban areas, others integrated bicycles in the public transit system.

Post-2000

Shifts in technology and demographics, and psychographic changes driven by the ubiquitous internet create a 'sharing economy.' Auto sales stagnate or decline in some regions – either due to an aging population or the popularity of apps such as Uber and Turo. Governments and consumers seek 'inclusive mobility.'

Digital convergence blurs the lines between industries, disrupts business models, and in extreme cases, upends businesses (a notable example being film-based photography). Retail, pharmaceutical, financial services, and oil and gas enterprises leverage digital technologies and social platforms to renew their business and explore new revenue streams. Similarly, new avenues open up for automakers as they can now combine technologies to create value and offer convenient choices to meet the aspirations of diverse customer segments.

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The business approach to every phase of the auto value chain is being redefined by collaboration as well as advanced technologies. Fashion designer Zachary E. Posen and Thom Browne, created exterior and interior designs for Nissan's 2014 Infiniti Q50 luxury sedan. Robots work alongside humans at assembly lines in Ford and BMW. Tesla sells directly to consumers. Most important, the car itself has become a Veblen commodity, a functional necessity, and a shareable asset, all at the same time.

The shape, form, and purpose of the car are rapidly changing, with machine-to-machine communication and artificial intelligence embedded in every component. But planned obsolescence and incremental tweaking of

product / production technology are not sustainable to achieving the ultimate frontier of digitization – the autonomous car. Auto manufacturers need to focus on critical aspects that define demand for automobiles, while ensuring a safer, more intuitive travel experience.

Utility, no longer limited

Cars are set to become an integral component of multi-modal, on-demand transportation systems. Leading auto brands embed connectivity systems for seamless mobility. Daimler launched 'car2go' in partnership with Europcar Autovermietung GmbH in 2011. Daimler's 'car2go' edition models incorporate advanced telematics, and serve more than one million users across 60 cities in eight countries. The BMW DriveNow car-sharing service is based on the 'pick up anywhere, drop off anywhere' principle. Electric cars are included in the DriveNow fleet. Passengers in San Francisco and select cities of Europe can locate cars using an app or find one on the road, use a chip in the driving license as the key, and leave the car anywhere. Users are billed based on the duration of travel, which includes fuel and parking charges.

The average number of miles driven by Americans has been declining since 2004, according to 'Millennials in Motion,' a report by U.S. PIRG, an independent consumer group. Industry research also indicates that millennials in America and Germany prefer alternatives to car ownership. Traffic logjam, environmental concerns, and the high average car idle time (almost 80%) may explain the emergence of pay-per-use models such as car-sharing, e-hailing, and peer-to-peer car rentals.

It is not yet known whether travelers in developing countries will follow suit. In these countries, regulators are implementing policies to restrict private vehicles even as car sales is robust, and rising income levels allow

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first-time as well as multiple car ownership. Automobile companies will need to better understand micro consumer segments and their attitudes toward car ownership and mobility to customize models for these markets.

Companies can collaborate with various stakeholders to provide mobility-as-a-service. Ford partners with Zipcar to offer car rental services in over 250 college campuses. "Today's students are thinking differently about driving and transportation than they have in the past. This program enables today's new drivers to experience our latest fuel-efficient vehicles, while helping them reduce their cost of living and help relieve congestion on campus. We're looking forward to making Ford a staple of their college experience," said Bill Ford, the executive chairman.

Safety, of paramount importance

Radars, cameras, scanners, and sensors fitted within and outside a car ensure the safety of passengers as well as pedestrians. A majority of car manufacturers have adopted semiautonomous technology in their fleet. Adaptive cruise control, automatic parking, and collision warning systems transform the driving experience. Real-time data from vehicle-to-vehicle and vehicle-to-infrastructure communication systems helps

minimize accidents. In addition, it enables traffic control centers to predict traffic conditions and avoid congestion by rerouting flow. An intelligent transportation system ensures better response in case of emergencies.

Optimized driving reduces greenhouse gas emissions significantly. Until autonomous driving becomes a reality, automakers should improve driver assistance systems in vehicles and invest in technologies to minimize the carbon footprint. Climate control systems monitor and analyze air pollution and UV radiation, and automatically calibrate the ambient conditions within the car. Tesla's Model X features a medical-grade high-efficiency particulate arrestanc (HEPA) air purifier.

Manufacturers need to accelerate investment in electric and hybrid vehicles, including the infrastructure ecosystem. The Uber Advanced Technologies Center is collaborating with Carnegie Mellon University to create fully autonomous cars for its e-hailing service. Toyota is experimenting to attain 'zero emissions' across brands by 2050. The company's Mirai uses hydrogen as a power source, and a Lexus fuel cell vehicle will be launched by 2020. Tesla is building a 'Supercharger network' across North America, Europe, and Asia, including wall chargers

at hotels and parking areas, for convenient access to clean electricity.

Flexibility in production and supply chain, a key requisite

Japan sustained its leadership in automobile production and exports for decades due to innovations in quality as well as logistics processes. Japanese carmakers invested in global distribution networks and production infrastructure to minimize costs and mitigate risks. Nissan, Toyota, Honda, and Mazda automated logistics – inbound, intra-enterprise, and outbound – to leverage smart distribution technologies. A lean supply chain helps the companies address demand in any region.

Trade agreements between countries and trade barriers drive vehicle production and sales. Manufacturers in Brazil are protected by high customs duties. However, they can serve only the local market. Mexico, on the other hand, is a member of the North American Free Trade Agreement (NAFTA) and Latin American Integration Association (ALADI). It has boosted the auto industry in the country.

Kia Motors, Nissan, BMW, and Mercedes-Benz are establishing manufacturing facilities in Mexico. In addition, the free trade agreement with the European Union (MEFTA) is helping auto as well as auto parts manufacturers grow.

As more and more proprietary systems are embedded for autonomous driving, original equipment manufacturers (OEMs) can expect growing demand for parts and after-sales service. Third-party service providers may be unable to maintain or repair critical safety systems. Moreover, OEMs will be responsible for intuitive recommendations in their smart cars and technical failures. Car sharing, whether in partnership with the OEM or otherwise, will lead to increased usage and faster wear and tear. While it is an opportunity to increase revenue, automakers will need a flexible supply chain for sustainable operations.

Cars of the future need to provide more than mobility. Vehicles should combine computer-aided design, engineering finesse, and functional gadgetry to address safety, pollution, and traffic congestion.

PERSONAL CONCIERGE
Syncs appointments with daily schedules, detects fatigue, and health parameters.

CONNECTED LIVING
Integrates smartphones, home appliances, social networks, and traffic signals.

CARS IN THE FUTURE – DRIVEN BY IMAGINATION AND CREATIVITY

INFRASTRUCTURE ON WHEELS
Combines infotainment, safety alerts, driver assistance, and disaster and emergency management, where cars (in thousands) can become nodes.

DATA MART
Supports ancillary sectors like insurance, advertising, healthcare, vehicle maintenance services, and telecom service providers.

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Nitesh is responsible for managing and growing client relationships globally with manufacturing companies across aerospace, automotive, and industrial and discrete sectors. He has been instrumental in establishing the presence of Infosys across Europe. Throughout his journey with Infosys, starting in 1998, he has pioneered the expansion of integrated service offerings around applications, infrastructure, and BPO. Advising clients on large transformation objectives with global scope has been an area of keen interest for him.

Nitesh has been part of the President of India delegations, with former president, Pratibha Patil, for bilateral talks with Switzerland and Cyprus. He has also represented the Indian IT industry in Slovenia and Austria. He has been a member of the jury for several internal and external awards, most notably the European Business Awards. He is a recipient of several Infosys excellence awards in areas including sales management, client relationship, unit management, and people development.

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