

A Study on Future Technology Trends in Automotive Industries

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Abstract: The automobile industry has undergone a number of sea changes in the past century. From four wheel drive to automatic gearbox, each change has been transformative in its own way and has made driving safer, more efficient, and more enjoyable. More than 100 years later, the industry is still as robust as ever and evolving in many ways in response to technological development and consumer behavior. Most are in the realm of safety, but some are pure convenience. Typically, innovative features from the manufacturers are offered on higher-end cars as options and eventually trickle down to less expensive vehicles as cost declines, awareness increases and demand grows. This paper presents Automobile, Automotive industry, Engineering, the future technology and trends in automobile and automotive industry that are likely to change the landscape of automotive industry in the coming years.

Keywords: Automobile, Industry 4.0, Future Technology Trends.

I. INTRODUCTION

The Automotive industry is a wide range of companies and organizations involved in the design, development, manufacturing, marketing, and selling of motor vehicles.^[1] It is one of the world's largest economic sectors by revenue. The automotive industry does not include industries dedicated to the maintenance of automobiles following delivery to the end-user, such as automobile repair shops and motor fuel filling stations. The word *automotive* is from the Greek *autos* (self), and Latin *motivus* (of motion) to refer to any form of self-powered vehicle. This term was proposed by Elmer Sperry.

II. AUTOMOBILE & AUTOMOTIVE

The word automotive comes into play very rarely as when talking about a particular product. We say that chain or clutch or engine is automotive products which simply mean that they are used in automobiles. The automobile means anything that moves on its own but in general it refers to a passenger vehicle that has wheels and is designed to run on road. The word automotive is used mainly in automotive engineering which is a branch of engineering that deals with designing, manufacture and operation of automobiles like cars, buses, trucks etc. There are some more differences between automobile and automotive that will be discussed in this article.

The phrase automotive industry encompasses not just all the cars and other passenger vehicles made all over the world by all other ancillary industries that are connected with, and supply parts and systems to car makers. In a broader sense, all repair and fuel stations also come under automotive industry. All sellers, marketers and manufacturers are also included in automotive industry. As automobile is anything that moves on its own on roads, all motorcycles get included in the umbrella term and also the scooters and mopeds that have their own engine and run on two wheels. Even three wheeler is referred to as an 'auto' in India is an automobile in this sense.

Automobile engineering focuses more on the cars, whereas automotive engineering can be defined as term to denote a branch that deals with all motor vehicles. Therefore, based on this subtle difference, one can differentiate the two Automotive Engineering is a sub-branch of vehicle engineering. It can also be considered as a sub-branch of mechanical engineering that has split from the main branch focusing on the study. Automobile engineering focuses on the cars. It specifically deals with the designing of cars, operations in production of cars, designing of engines and fuel management. Thus, automobile engineering can be considered as a sub branch of automotive engineering. However, generally both the branches are used interchangeably to denote a branch dealing with motor vehicles.

III. AUTOMOTIVE TECHNOLOGY CATEGORIES

The field of automotive technologies is so broad, it is broken down into several categories which includes

- In-Car,
- Engine and Drive Train, and
- Infrastructure Technologies.

3.1 In-Car - In-car connectivity refers to the technologies that you use when you are inside of your vehicle. This includes hands free, Bluetooth connectivity for mobile devices, navigation, and the vehicle's multimedia entertainment system.

3.2 Engine and Drive Train - Engine and drive train refers to the technologies that are used in the mechanics and propulsion of the vehicle. Integrating technologies into the engine and drive train has experienced tremendous growth over the past several decades and has even led to the creation of several new forms of automotive technologies:

- Self-Driving Autonomous
- Clean Diesel
- Electric
- Hybrid
- Hydrogen Fuel-Cell

3.3 Infrastructure - Infrastructure refers to the technologies used in automotive transportation, but are not necessarily tied to the vehicle itself. We have included several of the most prolific forms of infrastructure automotive technology:

- Ride-sharing apps such as Uber
- Electric Vehicle Charging Stations
- Smart Connected Cities

IV. The Future Technology and trends in Automobile and Automotive industry

Given here is a list of five trends that are likely to change the landscape of automotive industry in the coming years.

- Driverless Cars
- Internet of Things (IoT)
- Crossover Vehicles
- Shared Mobility
- High Performance Electric Cars

Today it's IoT, Telematics, and Block chain that represent both the current and the future of the automotive industry

- Smart cars,
- Mobile apps,
- Smart contracts,
- Traffic monitoring systems,
- Smart devices, and much more

The market may be slow but new technologies for vehicles are appearing at a blistering pace. Most are in the realm of safety, but some are pure convenience. Typically, innovative features from the manufacturers are offered on higher-end cars as options and eventually trickle down to less expensive vehicles as cost declines, awareness increases and demand grows. Equipment and features the public takes for granted today electric ignition, automatic windshield wipers, power steering, airbags, cruise control and many more.

The eight new car gadgets are:

- Rear-mounted radar.
- Night vision with pedestrian detection.
- Automatic high-beam control.
- Parental control.
- GPS vehicle tracking.
- Cameras.
- Driver capability.
- In-car Internet.

It is clear that manufacturers are working on removing the driver from car. This has been a drive for many years. This serves many benefits:

- Passengers can do other things while in transit.
- Computers can monitor the distance to the next car much faster than a human.
- Cars can be set at a specific speed, reducing congestion.

- Vehicles can be sent into hot spots, without endangering driver (drones).

The main future trends on the automotive industry are :

- **Big Data and Connectivity:** the more data you produce, the better decision you make. The better decisions you make, the more money you make. Join that to the fact that cars can communicate, it will decrease accidents exponentially.
- **Autonomy:** with the average of Artificial Intelligence and the rise of mobility as a service vs the car as product, people want to think of going from A to B in a safer and more convenient perspective.
- **Shared Mobility:** Millennials are increasingly less interested in owning assets, a lot of money is saved, with the popularity of companies like Airbnb and Uber make this a trend.
- **Electrification:** due to the decrease of battery prices, increase in range and reliability.

The increasing popularity of mobility growth will depend on how effectively the industry eliminates existing customer points. The industries are changing incredibly fast with following points which is,

- Urbanisation
- Sharing economy
- On demand
- Mobile technology

The automated with new technology and new services can maintain new business models. But nowadays emerging trends in mobility techniques, such as rise of ride hailing and car sharing services, have led many industry analytics to offer their views on how these trends will affect the automotive industry. The impact of new mobility service on the automotive industry. The most important impact that new mobility services will have on the automated industry will not be on the volume of vehicles sales, but rather it will be on how customer interact with vehicles, their expectation for vehicles, and their uses of these vehicles. The rising of new mobility services is a part of a mobility evolution, a bigger and long term evolution of transportation preferences, towards on demand shared mobility and multimodal system that is fewer cars centric. More users will choose to use new mobility services instead of, and have a great opportunity to make transportation more efficient and affordable. New mobility opportunities for the automated industry are:

- Services
- Vehicle concept
- Vehicle functionalities
- Ownership model
- Business partnership

Digital Transformation Trends in the Automotive Manufacturing & Automobile Industry

- IoT Automotive Mobility Solutions
- Augmented Reality in the automobile industry
- Automotive Intelligence software solution
- Automotive Business intelligence solution
- Virtual Reality for Automotive Solution

V. ADVANCED CAR TECHNOLOGIES BY 2020

The rate at which technology is changing personal transportation accelerates every year, which can make predicting the rate at which technology is changing personal transportation accelerates every year, which can make predicting the arrival of future car tech a dicey proposition. Even more compelling is the increasing priority we're seeing consumers place on automotive technology during their shopping process.

The top 10 advanced car technologies we'll see in showrooms by 2020 are:

1. Autonomous Vehicle - By 2020 we'll have cars capable of being fully autonomous in certain circumstances, most likely rural interstates with minimal variables Think early days of cruise control.

2. Driver Override Systems - This relates to autonomous technology, but it's different because it's the car actively disregarding your commands and making its own decisions. We've already got cars that will stop if you fail to apply the brakes. But by 2020 cars will apply the brakes even if the driver has the gas pedal floored. The rapid increase in sensor technology will force a shift in priority.

3. Biometric Vehicle Access - The switch we've seen in recent years from keys to keyless entry and start will be followed by a switch to key-fob-less entry and start. You'll be able to unlock and start your car without anything more than your fingerprint. The same concept like the latest form of cell phone security.

4. Comprehensive Vehicle Tracking - Insurance companies, and some state governments, are already talking about fees based on how many miles a person drives. By 2020 insurance companies will offer a reduced rate for drivers that agree to full tracking of their behavior. I'm hopeful this technology remains voluntary.

5. Active Window Displays - Head-Up Display (HUD) technology has come a long way from the dim, washed out green digits some cars projected on their windshields 20 years ago. But as good as HUD is in 2015, by 2020 we'll see active glass capable of displaying vibrant images. Imagine a navigation system that actually highlights the next turn (as seen from your perspective, through the windshield) as you approach it.

6. Remote Vehicle Shutdown - This technology already exists, with On Star leveraging it regularly. In recent years the telematics company has shut down hundreds of stolen cars, ending police chases quickly and with little drama (though most drivers still don't know it can be done, even drivers with OnStar.). By 2020 remote vehicle shutdown will enter the social consciousness, negatively impacting nightly news ratings everywhere.

7. Active Health Monitoring - Ford Motor Company has previewed the idea of seatbelt or steering wheel sensors that track vital statistics, though the rapid development of wearable technology means most cars will just wirelessly pair with these devices (think cell phone for your body). Combine this with basic autonomous technology and you've got a car that can pull over and call paramedics when the driver has a heart attack.

8. Four-Cylinder Supercar - Ford just showed an all-new GT supercar using a twin-turbo V6. While it may rub traditional performance enthusiasts the wrong way, a lightweight V6 making over 600 horsepower will offer world-beating performance, especially if it's got a light, carbon-fiber body to pull around. By 2020 we'll see the first full-fledged, 200-plus mph supercar with a four-cylinder engine (cubic inches be damned).

9. Smart/Personalized In-Car Marketing - we're already getting Facebook, Twitter and Gmail ads based on our behavior. By 2020 the average car will be fully connected to the internet, meaning your vehicle will provide marketers with a powerful set of metrics to customize their message. Hopefully these will manifest as an opt-in feature, but get ready for personalized, location-based ads in your car's display.

10. Reconfigurable Body Panels - The small SUV category is seeing increased demand these days, while truck sales grow by leaps and bounds. What if you could have both vehicle types in one car? Imagine an SUV with lightweight body panels and advanced motors that retract the roof and side glass into the lower body panels. Now throw in Chrysler minivan stow-and-go seat design and BAM A truck and SUV in one vehicle.

VI. CONCLUSION

New manufacturers such as Google and Apple will supplant traditional mass automobile manufacturers like General Motors, Ford, Honda, and Volkswagen with their head start on new technology. Foresight analysis for the next decade of innovation automotive can be summarized as follows

- **Sophisticated consumers:** Consumers in 2020 will be very well informed and will have a new, radically different preference. Information will allow for greater transparency throughout the chain of creation, production and use of cars.
- **Intelligent vehicle:** Today, automotive innovations require different configurations of cars, increase performance, reliability, security, economics, etc. Vehicles in the near future will compete in "intelligence".
- **Dynamic operation:** In 2020, the complex will require innovative approaches in technology, human resources development and environmental issues. The newly defined business strategy will be extended to active flexibility and agility.
- **Integrated business:** It will seek to meet the sophisticated consumer, develop and produce intelligent vehicles in their transition to dynamic sites. There will be new identity
- **Ecosystem:** Consumers, regulatory and environmental requirements are forcing the automotive industry to expand into new dimensions, which representatives of the electrical mobility.

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