

Driving Change:
**The Future of
Mobility**

Introduction

» Electrification

for electrification include tightening regulations

100 years. Emerging technologies such as artificial

» Vehicle connectivity

Key Trends

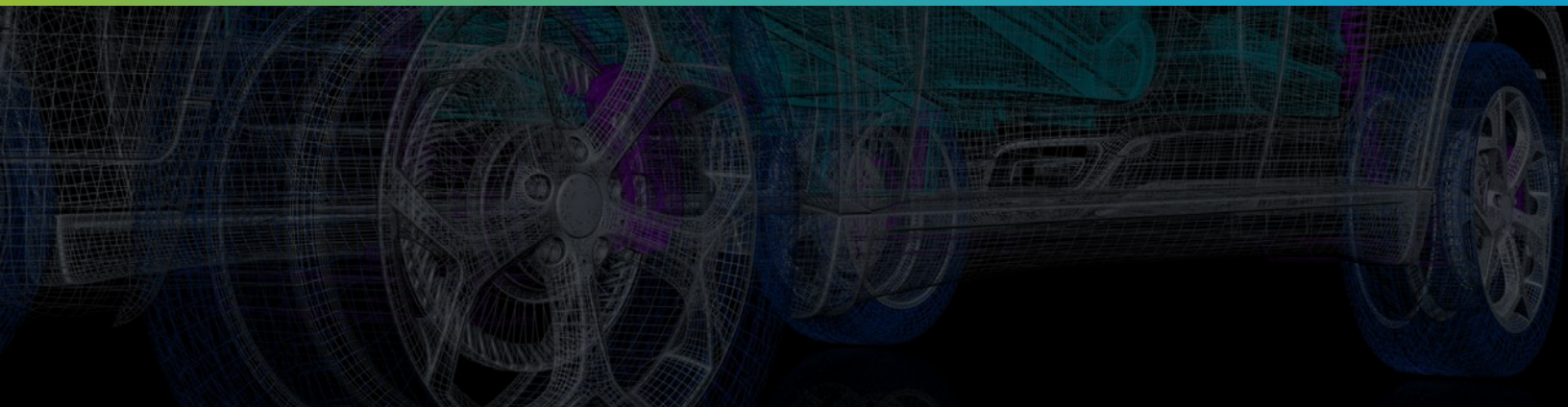
include driving automation, electrification, vehicle

» **Driving automation** is defined by 6 levels of

such as artificial intelligence (AI), machine

» Shared mobility

» Engineering talent requirements



Driving Automation

Driving automation could lead to breakthroughs in transportation safety and offer innovative mobility

Levels of Driving Automation

» Level 0

» Level 3

» Level 4

» Level 1

» Level 5

» Level 2

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
	Automation				
Human driver			Automated driving system		
None	Assisted Technology		Automated Technology		
Manually		Simultaneously together			
	OR	AND	Traffic	Driverless taxi	100% self driving

Autonomous Vehicle Technology

Driving Automation and Safety

Driving automation offers great benefits in safety with the opportunity to reduce traffic-related

94 percent

- » **LiDAR (light detection and ranging) technology**
- » **Camera technology**
- » **RADAR (radio detection and ranging) technology**
- » **Infrared sensor technology**
- » **INS (inertial navigation system) technology**
- » **DSRC (dedicated short-range communication) technology**
conditions, accidents, traffic volume.
- » **Prebuilt mapping technology**
predefined road maps to limit the available
- » **Ultrasonic sensor technology**
- » **GPS (global positioning system) technology**

Driving Automation and Mobility

different demographics and communities. This who currently do not have transportation flexibility.



Electrification

Electrification is happening and with it brings a brighter future where sustainability supersedes fossil-based fuels to promote environmentally friendly energy sources. This is specifically crucial for transport. Key drivers for electrification of transport include pressure from governmental agencies with tightening

vehicles (PHEV), and battery electric vehicles (BEV). Additional trends supporting electrification include

Government Regulations of Emissions

emissions respectively, seek to reduce their contribution of emissions between 2021-2026.

The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule

Regulation (EU) 2019/631

their responsive to meeting their electrification targets.



Sustainable Infrastructure

“Energy storer”

could fulfill their purpose without the help of a

“Energy Supplier”

smart grid which empowers electrification. The

The role of BMS in electrification is to help the

“Energy access point”

As important to the electrification as the smart

charging stations allow unprecedented flexibility.



Vehicle Connectivity

V2X communications encompasses 7 types of vehicle connectivity:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.

each subcategory has specific concerns, strengths,

the different technologies making the whole greater



Vehicle to network (V2N)

Vehicle to cloud (V2C)

to offer data exchange with the cloud. Some

Vehicle to infrastructure (V2I)

Vehicle to pedestrian (V2P)

different vulnerable road user (VRU) groups such as

This information includes vehicle-generated traffic

- » **Vehicles** - traffic data
- » **Road infrastructure** - cameras, traffic lights,
- » **Intelligent transportation system**

Vehicle to device (V2D)

Vehicle to vehicle (V2V)

Vehicle to grid (V2G)

360-degree representation of its surroundings.

grid to support electrification. The next-gen electric grid will be able to balance loads more efficiently

Shared Mobility

environmental pollution, and the efficient use of

Making Shared Mobility a Possibility

» **Telecommunications infrastructure**

» **Integrated mobility services**

all from a unified interface interconnecting all

» **Shared mobility modalities**



Shared Mobility and Transportation Methods

» Ridesourcing

provider's mobile app. Users have the flexibility

membership program that allows them to use a fleet

» Station-based (round-trip and one-way) model

» Free-floating (one-way) model

advantage of letting users dropping off the

maintains a fleet of vehicles available to members,

transport to adapt more efficiently to city hauling

and drop-off locations. Based on user reservations,
kinds of vehicles to specific locations for better

Engineering Talent Requirements

21% by 2030

cross-collaboration across employees with different education and professional experience. Current and

Mobility Engineering



Mobility Engineers

The shift from a pure mechanical engineer profile systems, or software engineer profile will make for

have a proficiency in a diversity of disciplines, such as

to design highly effective and highly integrated

» Business and financial analysis

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» Artificial intelligence and machine learning

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Conclusion

transportation safety. Electrification could completely shift dependency on fossil-fuels to sustainable energy

Shifting into a more sustainable and technologically advanced society will require a great deal of flexibility



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