



Disruptive Technology in Business

Autonomous Vehicles (AV)

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Overview



Chloé

■ Basic Introduction

■ Current State

■ Economic Perspective

Haozhe

■ Major Market and Development proponents

■ Developers? Users?
Innovators?

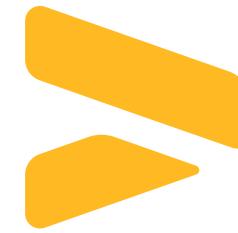
■ Current Development Trends

Yara

■ Possible application and future functionalities

■ Social, Political, Legal and Ethical questions

■ Open questions



What is it ?

Vehicles capable of moving and operating without direct human intervention

Sensors

- cameras, lidars, radars and ultrasonic sensors
- collect data on the vehicle's environment

Perception

- identify and classify objects and obstacles on the road
- generate digital representation of the vehicle's environment

Decision-Making

- analyze the different options and determine the appropriate actions

Control

- controls the vehicle's components to perform necessary actions

Connectivity

- exchange information with other vehicles, road infrastructure and control centers



Current State

Intermediate stage of development



Level of maturity where limited deployments are possible, but persistent issues still require further research and development



Main challenges :

- reliability and safety of autonomous systems
- regulatory and legislative aspects relating to liability, data confidentiality and security

The maturity of the industry sector varies from one player to another



Current economic perspective ?

Promising, with strong potential for disruption and growth in the automotive industry and mobility services

Market Share and Trends

By 2035, up to 25% of vehicles sold worldwide could be autonomous

Revenue Growth

The global autonomous vehicle market will reach a value of more than \$173 billion by 2030

Investment

Global investment in autonomous vehicle technologies reached nearly \$80 billion between 2014 and 2019

Industrial Ecosystem

The adoption of those could lead to significant changes in the mobility, logistics and road infrastructure industries



Major Market

PRECEDENCE
RESEARCH

AUTONOMOUS VEHICLE MARKET SIZE, 2020 TO 2030 (USD BILLION)



[https://www.precedenceresearch.com/autonomous-vehicle-market#:~:text=The%20global%20autonomous%20vehicle%20market,USD%2036.4%20billion%20in%202022.](https://www.precedenceresearch.com/autonomous-vehicle-market#:~:text=The%20global%20autonomous%20vehicle%20market,USD%2036.4%20billion%20in%202022)
<https://www.alixpartners.com/insights-impact/insights/2019-autonomous-vehicle-report/>

AUTONOMOUS VEHICLE MARKET SHARE, BY REGION, 2020 (%)

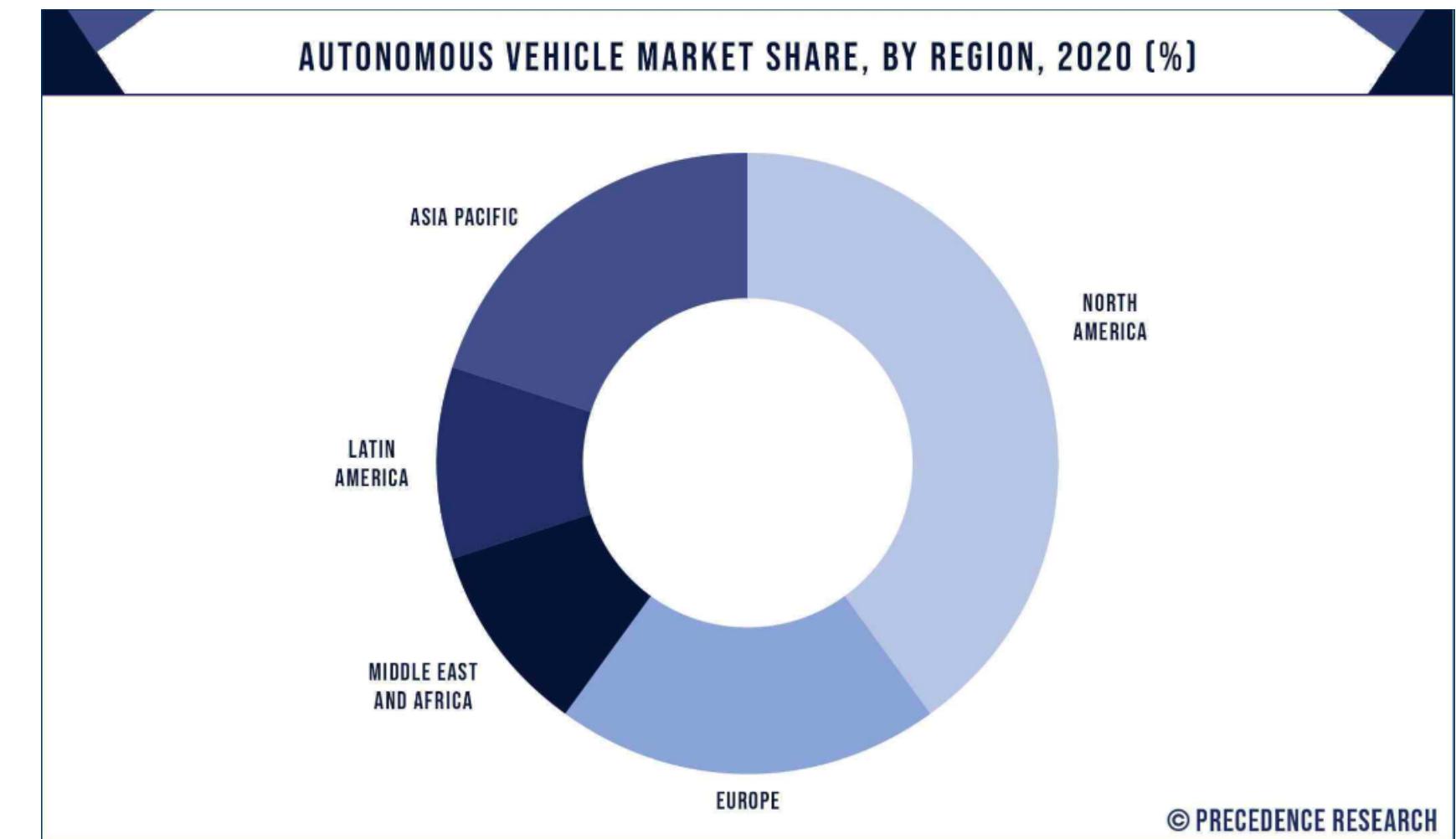
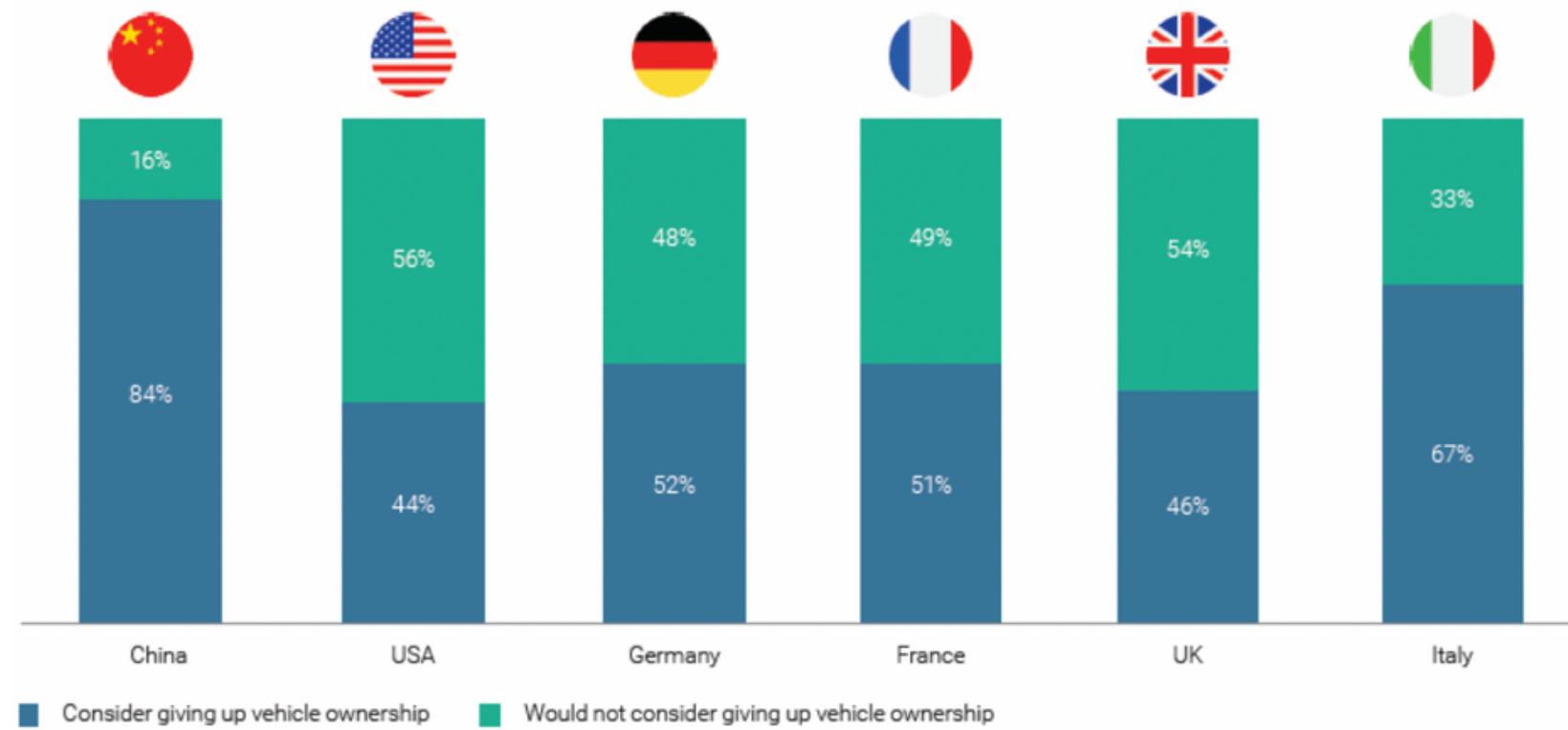


FIGURE 2: CONSUMER READINESS TO GIVE UP VEHICLE OWNERSHIP FOR ROBOTAXI SERVICES

Q: At what level cost difference (increase or decrease) per month would you consider switching from owning (or leasing) a car to robotaxi-based (autonomous self-driving taxi) ride-hailing?

Possible responses: Would not consider giving up car ownership; +20% (robotaxi more expensive); +10%; Same; -10%; -20%; -30%; -40%; greater than -40%



Development proponents



TECHNOLOGY AND SUPPORTS	COMPANIES
Computer Vision	Tesla
Automated Cruise Algorithms	Cruise
Speed Adjustment	NVIDIA
Intelligent Decision- making	Waymo
Computer Chips	Baidu



Developers & Users

DEVELOPERS	USERS
Traditional Automakers	Personal/Business users
Big Technology Companies	Transportation Network Companies
Startups	
Research Institutions and Universities	Public Transportation
Government Initiatives	

Current Development Trends



The universality of Robotaxi:
Company: Cruise, San Francisco
Time: October 2020
Reward: A riverless testing permit by California DMV.
Other companies: Baidu and Pony.ai (April. 2023)

Autonomous Trucks application
Company: TuSimple, Arizona
Time: December, 2022
Problem Dealt: shortage of truck drivers while there are more transportation needs
Effet: Half the delivery time for journeys over a certain distance.

The popularity of public transportsations

Applied: Shuttle bus, metro, some buses in the U.S.
In the future: bus, train, tram etc.

Internet of Vehicles (IoV)

Applications: V2V, V2I, V2N, V2P.
Connect vehicles using dedicated short-range communications (DSRC) or 5G for crash avoidance, platooning, and traffic flow optimization.

<https://www.idtechex.com/en/research-article/autonomous-vehicle-trends-and-milestones-in-2022-and-expectations-for-2023/28361>
<https://www.startus-insights.com/innovators-guide/autonomous-vehicle-trends/#vehicle-connectivity>

POSSIBLE APPLICATIONS AND FUTURE FUNCTIONALITIES

PERSONAL TRANSPORTATION

provide a hands-free and stress-free driving experience
help the elderly and disabled

RIDE SHARING

lessens the need for private automobile ownership and offers affordable transportation options.

PUBLIC TRANSPORTATION

autonomous shuttles and buses. They can optimize routes and ease traffic in cities.

LOGISTIC AND DISTRIBUTION OF GOODS

applied to warehouse operations, long-distance trucking, and last-mile deliveries

NEW BUSINESS MODELS AND SERVICES

Businesses may offer cutting-edge in-car experiences and services.

Limitations

SOCIAL

Concerns persist regarding their dependability and capacity to handle unexpected situations
Employment loss, Efforts should be made to support affected workers

POLITICAL

Liability in crashes involving autonomous vehicles raises difficult legal issues
Financial investments and coordinated planning among various levels of government are needed to accommodate autonomous vehicles

LEGAL

Updating legal frameworks and ensuring that the traffic laws keep pace with technical improvements is crucial to allow a smooth introduction of autonomous cars into the legal system.

ETHICAL

Programming the vehicles to determine whose safety to prioritize raises moral dilemmas.
Ethical considerations encompass data security and privacy.

- 1 WHAT ENVIRONMENTAL BENEFITS OR CHALLENGES MIGHT ARISE FROM THE WIDESPREAD ADOPTION OF AUTONOMOUS VEHICLES?
- 2 HOW CAN WE INVOLVE THE PUBLIC IN SHAPING THE FUTURE OF AUTONOMOUS VEHICLES AND ADDRESS THEIR CONCERNS AND PREFERENCES?

Open questions

Ressources

<https://www.youtube.com/watch?v=vmw7w97a6LA>

https://www.researchgate.net/publication/353417705_A_survey_of_Autonomous_Vehicle_Technology_and_Security
https://www.researchgate.net/publication/353417705_A_survey_of_Autonomous_Vehicle_Technology_and_Security

<https://www.bcg.com/publications/2015/automotive-consumer-insight-revolution-drivers-seat-road-autonomous-vehicles> <https://store.frost.com/global-autonomous-driving-industry-outlook-2020.html>
<https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/ten-ways-autonomous-driving-could-redefine-the-automotive-world>

<https://link.springer.com/article/10.1007/s40534-016-0117-3>

<https://infomineo.com/navigating-the-future-of-autonomous-vehicles/>

<https://www.sciencedirect.com/book/9780128176962/autonomous-vehicles-and-future-mobility>

Thank you !

Do you have any questions?

