CENTRUM DOPRAVNÍHO VÝZKUMU

DOPRAVA PRO BUDOUCNOST

Development of autonomous mobility in road transport

Projekt Systematizace neřidičských aktivit při řízení v autonomním módu (CK03000063)

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9 October 2024

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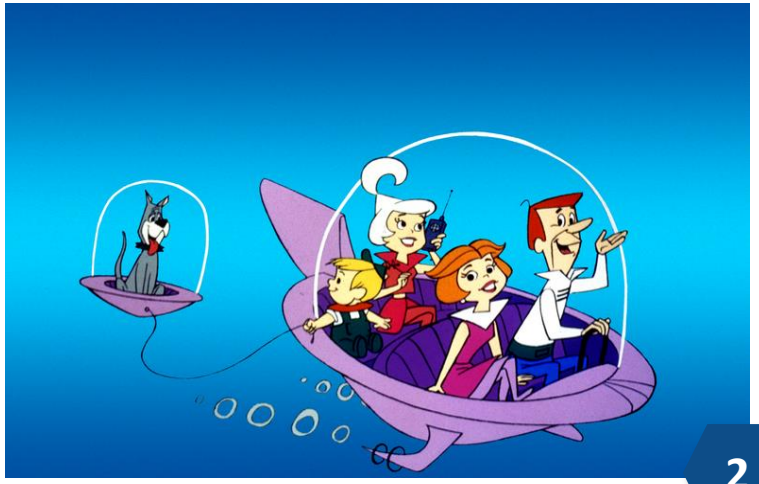
Tento projekt je spolufinancován se státní podporou Technologické agentury ČR a Ministerstva dopravy v rámci **Programu DOPRAVA 2020+.**

www.tacr.cz www.mdcr.cz

What will be the mobility of the future?

1



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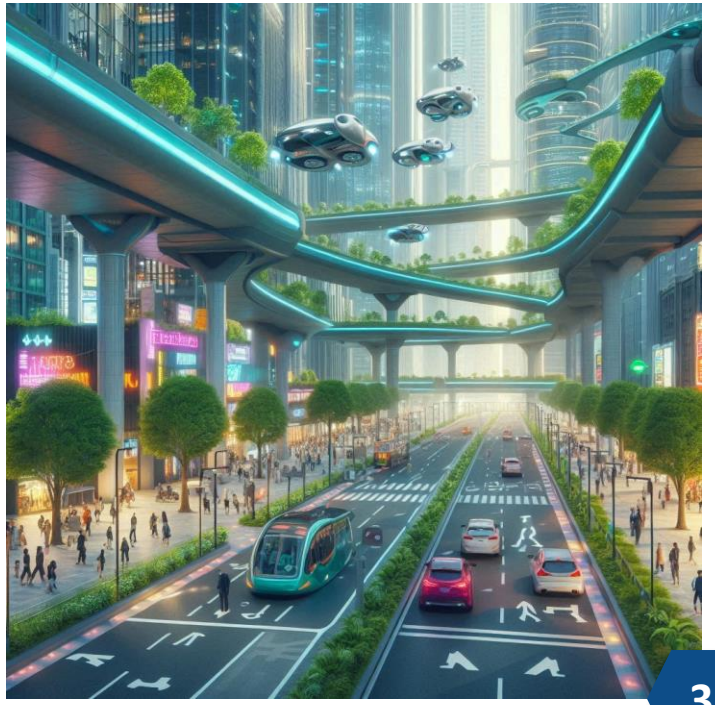

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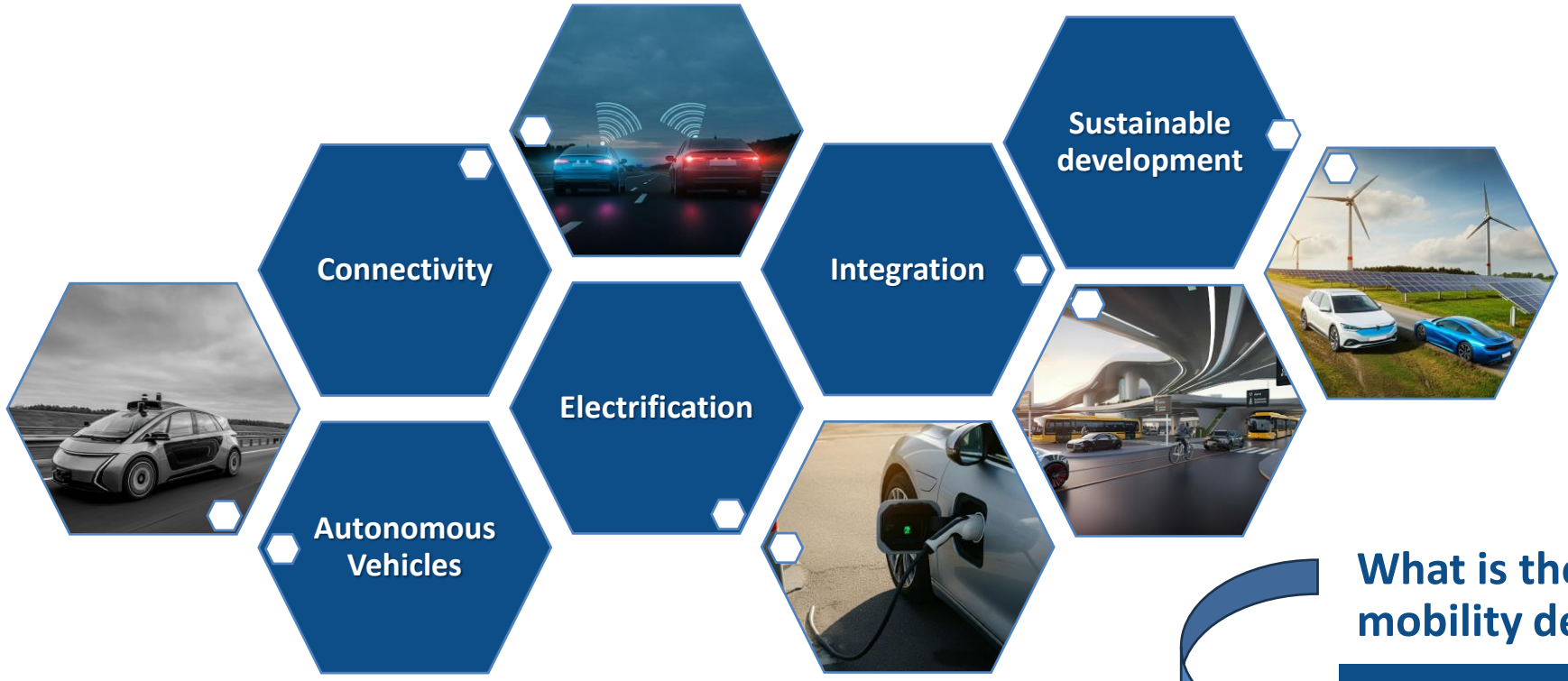


What is the key determinant of future mobility development?

“Safety is not everything, but everything without safety is nothing”

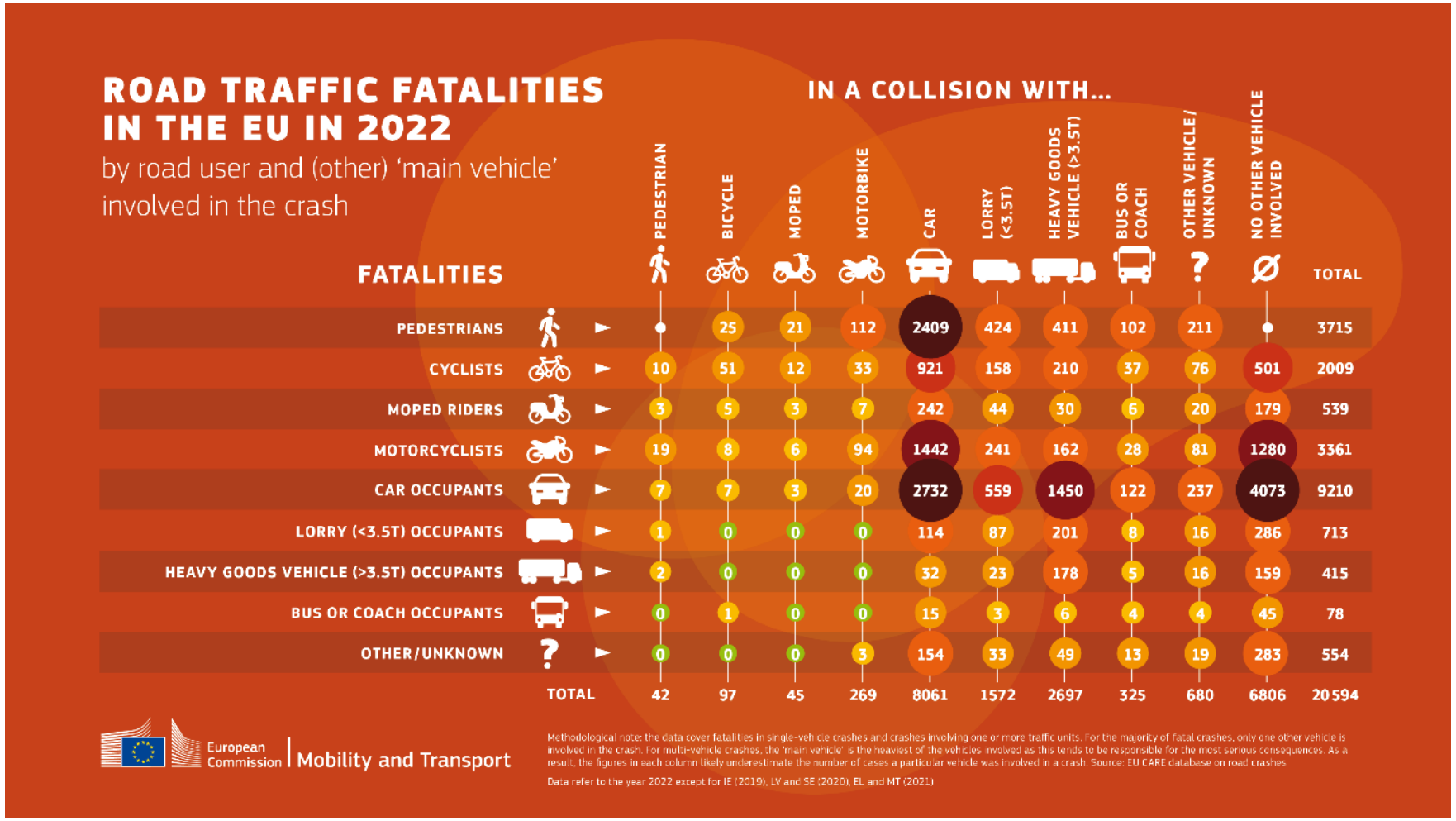
Using autonomous trucks in road transport - key benefits

www.freepik.com

1. Increased road safety
2. Reduction of operating costs
3. Logistics optimization
4. Increased efficiency

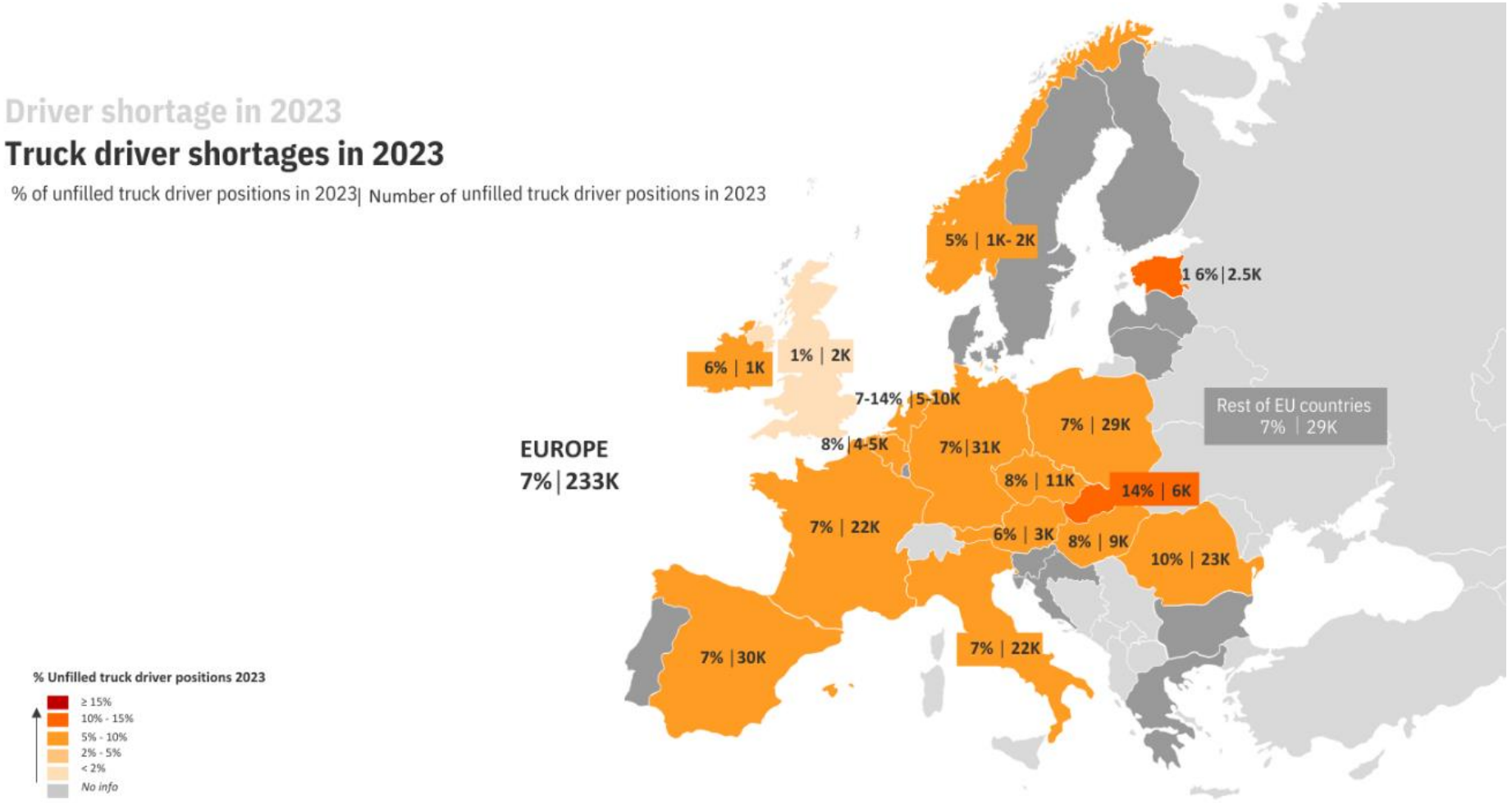
Let's check the specific data

Can autonomous trucks improve safety in freight transport?



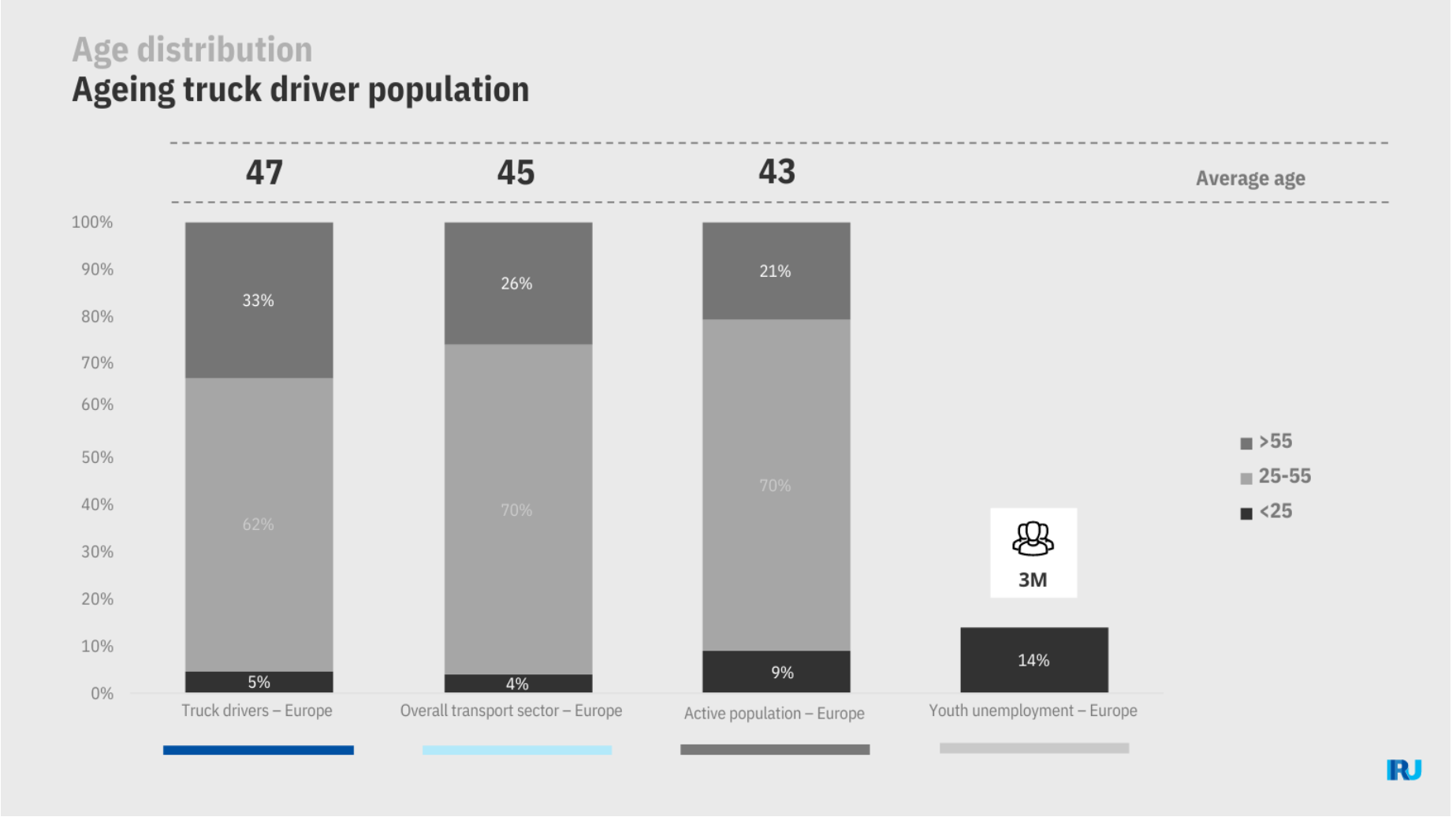
https://transport.ec.europa.eu/background/road-safety-statistics-2023_en

Will autonomous trucks transform the logistics system? (1/2)



https://www.iru.org/news-resources/newsroom/half-european-truck-operators-cant-expand-due-driver-shortages

Will autonomous trucks transform the logistics system? (2/2)



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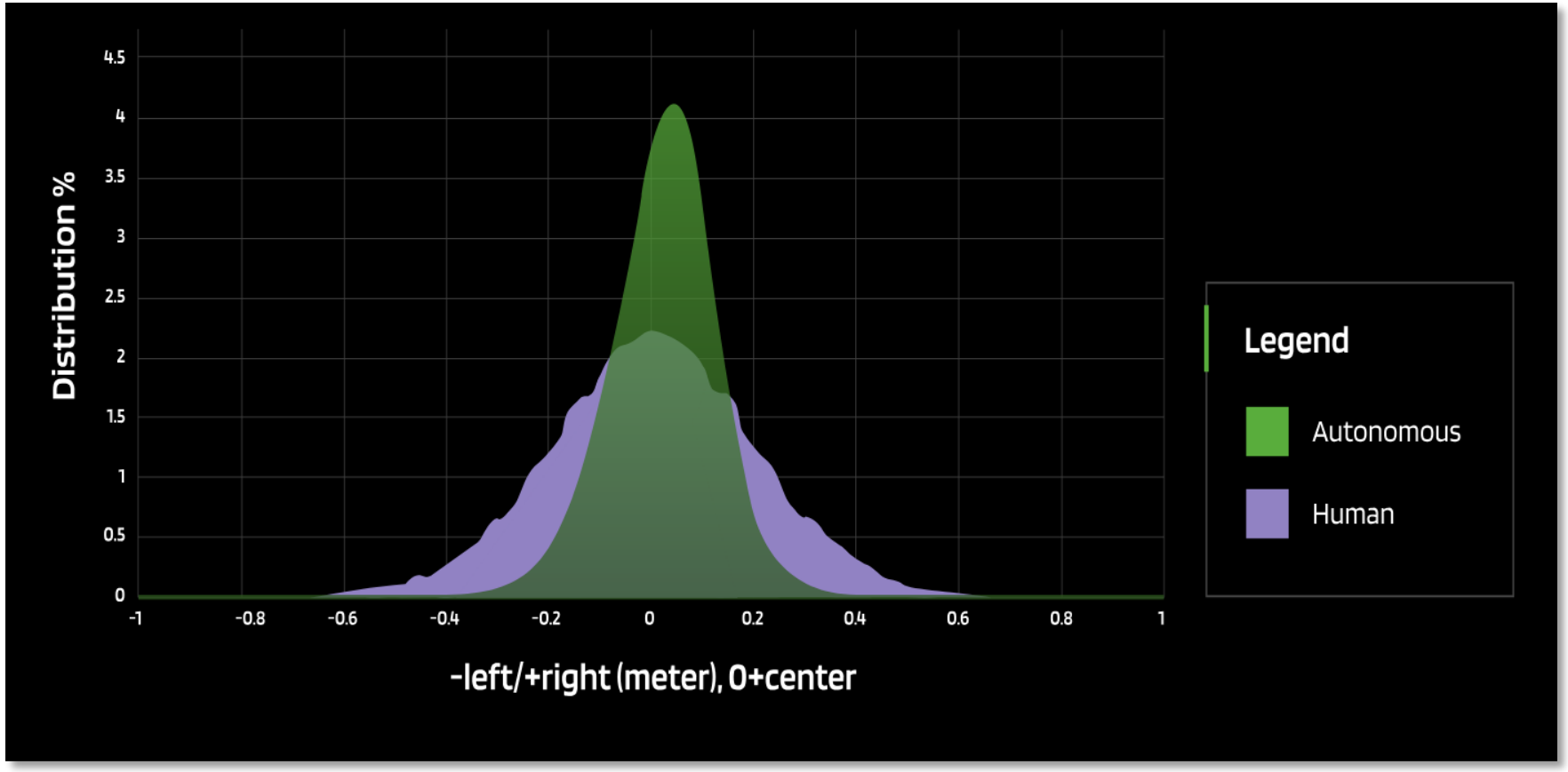
Can autonomous trucks really reduce company costs?



https://www.tusimple.com/technology/

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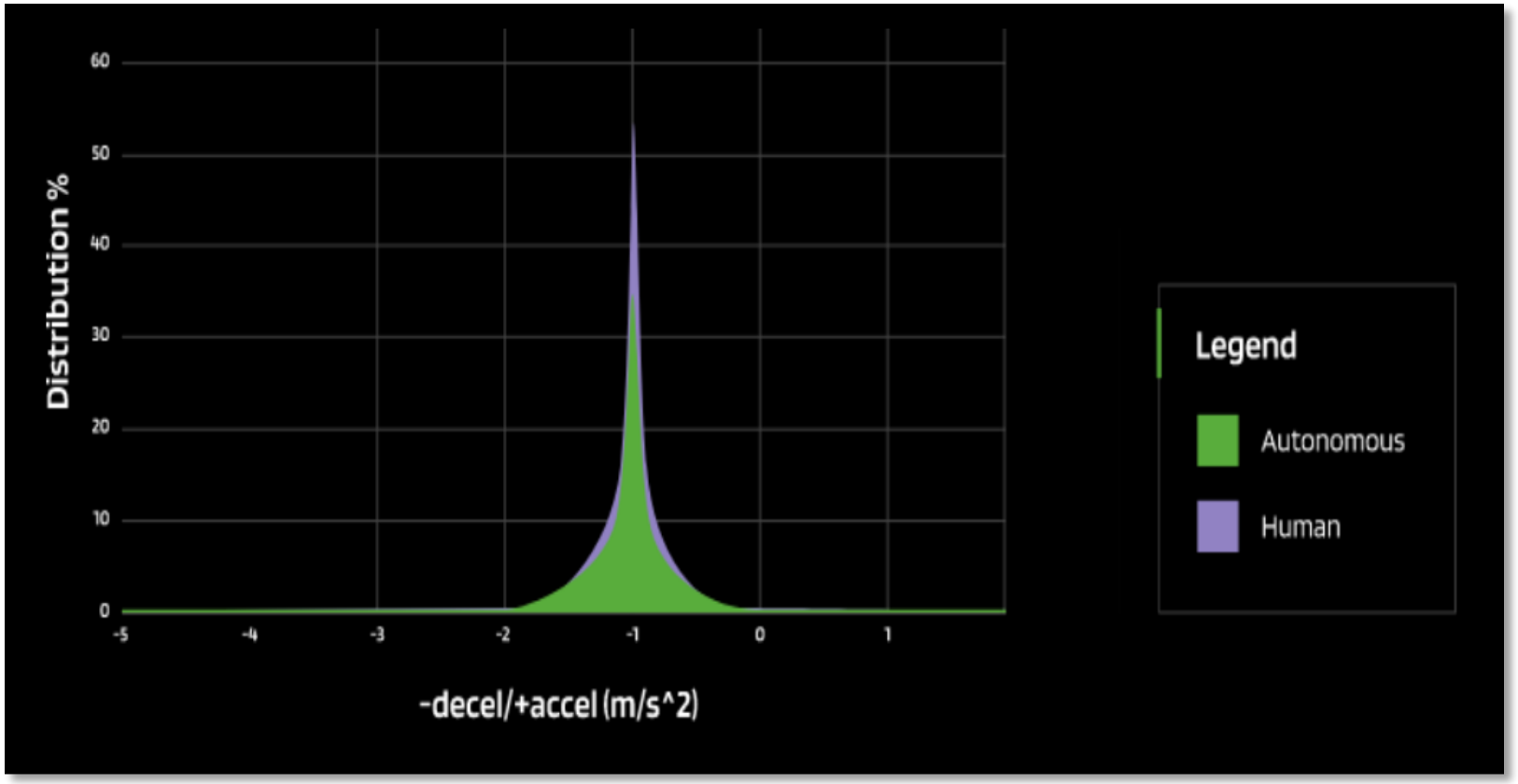


https://www.tusimple.com/technology/

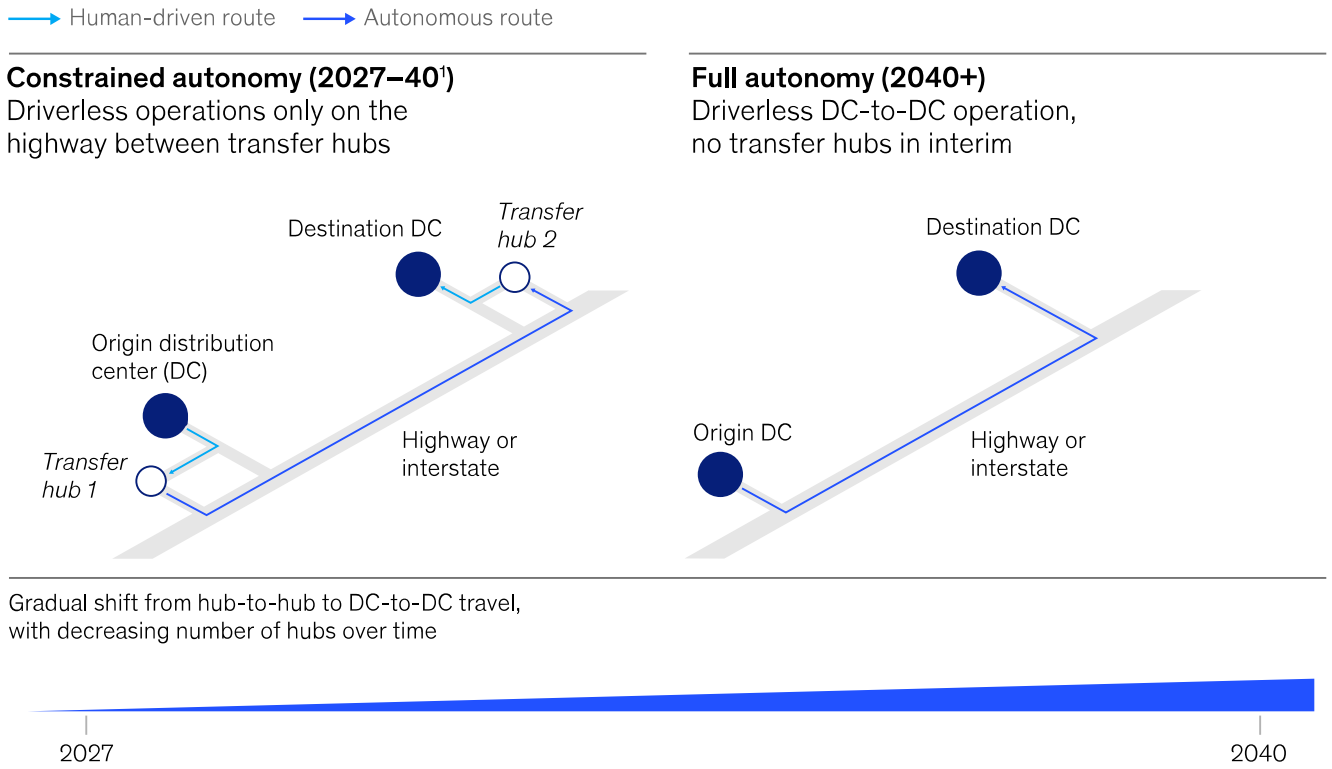
Can autonomous trucks really reduce company costs?

Speed (mph)	**0-30**	**30-40**	**40-50**	**50-60**
Autonomous (km/l)	3.49	5.43	5.91	5.56
Manual (km/l)	3.14	4.56	5.46	5.46
Difference	21%	17%	8%	3%

https://www.tusimple.com/technology/ (Research from the University of California San Diego)

Future or present?

Use cases for autonomous trucking



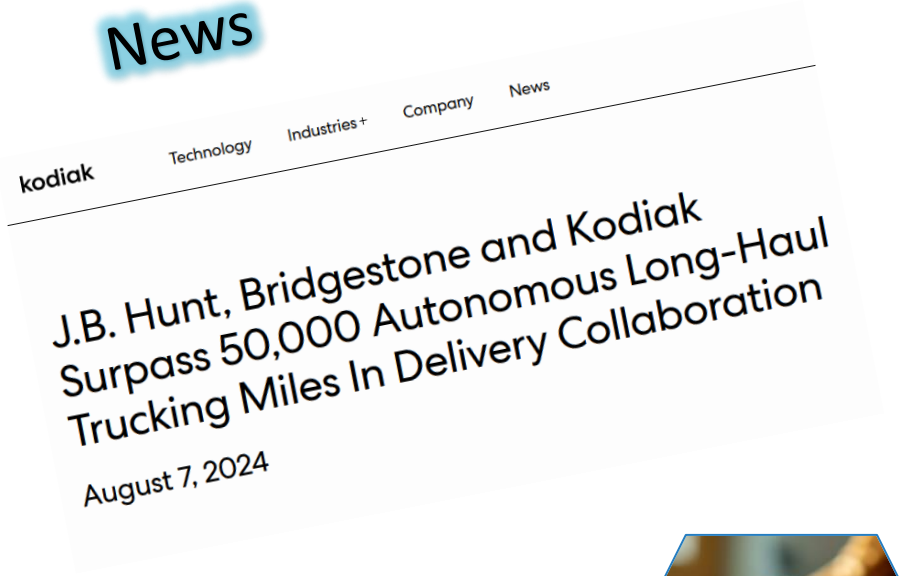
McKinsey & Company

https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/will-autonomy-usher-in-the-future-of-truck-freight-transportation

Autonomy will gradually shift hub-to-hub driverless operation in the short term to driverless operation between distribution centers in the long term.

Future or present?

Can autonomous trucks really reduce company costs?



"Kodiak autonomous trucks complete the long-haul stretch of the route from Atlanta to Kodiak's Lancaster, Texas facility. A two-person-team of Kodiak safety drivers oversee the seamless and continuous operation of the autonomous truck."

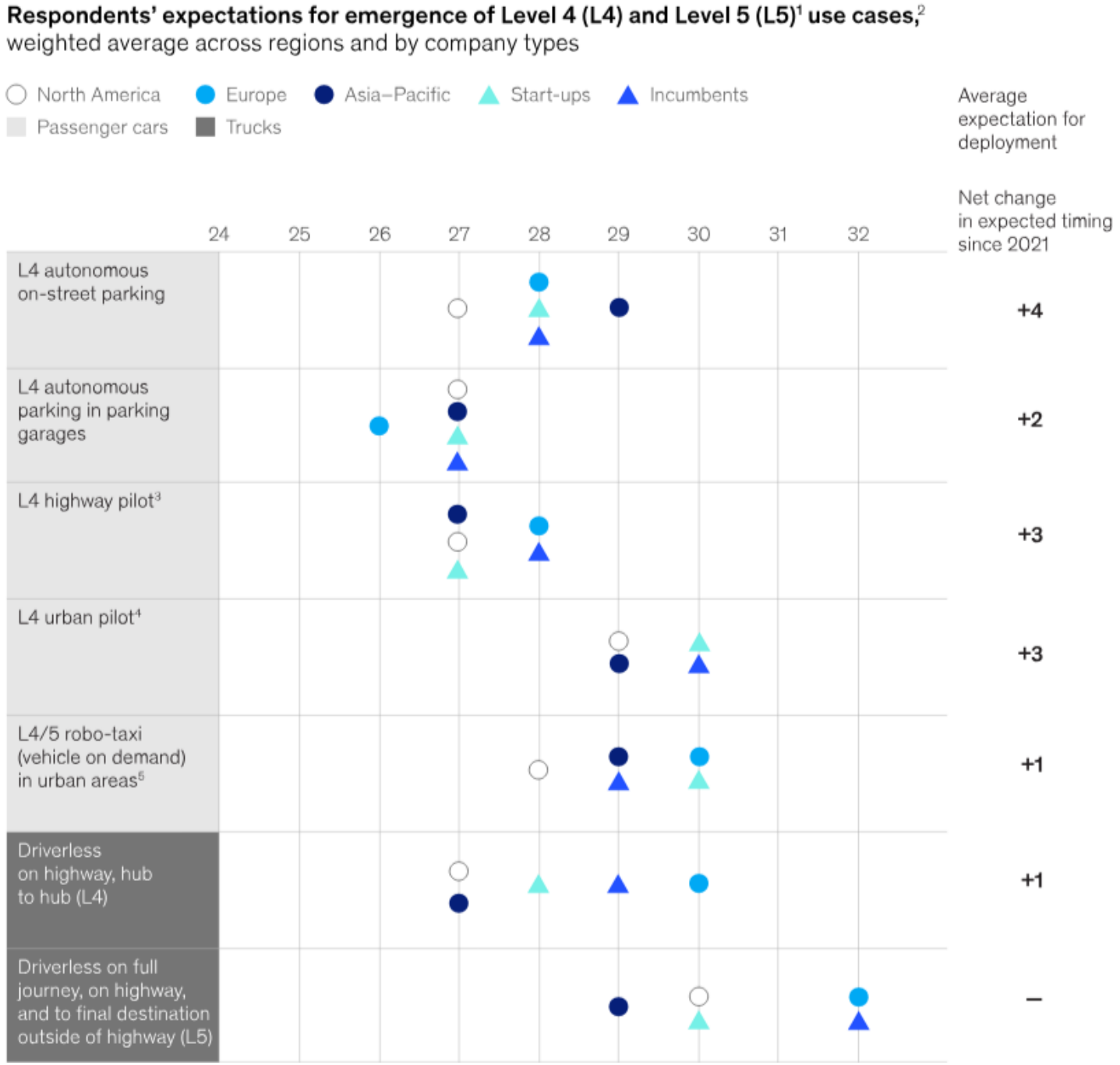
When will employee costs really be reduced?

When will the legislation be regulated?

Respondents' expectations for emergence of Level 4 and Level 5 use cases

https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/will-autonomy-usher-in-the-future-of-truck-freight-transportation

Source: McKinsey Center for Future Mobility survey of global decision makers, 2023 (n=86, 40 from North America, 37 from EU, 3 from China, 6 from other) and 2021 (n =75, 31 from North America, 33 from EU, 11 from Asia-Pacific)



How important is public acceptance? (1/2)

Germany, China, France, Japan, USA

1. 47% of respondents believe that autonomous trucks are likely in the near future (US 62% and China 92%).
2. Those who use their cars for longer distances (more than 100 kilometres) and younger people (up to 44 years of age) are significantly more open to the idea of autonomous trucks than short-distance drivers and older respondents.
3. Almost 60% see autonomous trucks as a way to combat the driver shortage in transport companies.
4. 47% believe that autonomous trucks will improve traffic flow on motorways and thus reduce traffic jams in the future.

https://www.continental.com/en/press/press-releases/germans-expect-fewer-traffic-jams-as-a-result-of-autonomous-trucks/

How important is public acceptance? (1/2)

Germany, China, France, Japan, USA

1. In Germany, France and the USA, between 60% and 65% of respondents have safety concerns, in Japan, over 70%.
2. There is less skepticism in China, where almost half of those surveyed have no concerns.
3. China is the only country where a majority of respondents (62%) attribute a higher level of safety to autonomous trucks than to those with drivers.

SOCIAL ACCEPTANCE

What is the relevance of ADAS?

https://www.continental.com

https://www.continental.com/en/press/press-releases/germans-expect-fewer-traffic-jams-as-a-result-of-autonomous-trucks/

EU Project (H2020)

What are the perspectives for the development of platooning?

Project ENSEMBLE:
ENabling **S**af**E** **M**ulti-**B**rand p**L**atooning for **E**urope

Two platooning functions

1. Platooning as a Support Function (PSF) → "should be quickly deployable"
2. Platooning as an Autonomous Function (PAF) → "for the future"

Kye conclusions

- At least 15% of all trucks could already benefit from platooning without having to change their behaviour.
- PSF: increase traffic safety, driver comfort and road capacity.
- PAF: expected impact on driver efficiency costs.
- The positive effect of truck platooning on road capacity increases when the percentage of trucks in the total traffic flow is high (around 20%).
- The PSF does not show an improvement in fuel consumption and emissions.

https://platooningensemble.eu/
https://www.connectedautomateddriving.eu/blog/platooning-becomes-a-reality-in-europe/

EU Project

Autonomy not only in transport, but in all logistics!

Project AWARD: All **W**eather **A**utonomous **R**eal logistics operations and **D**emonstrations

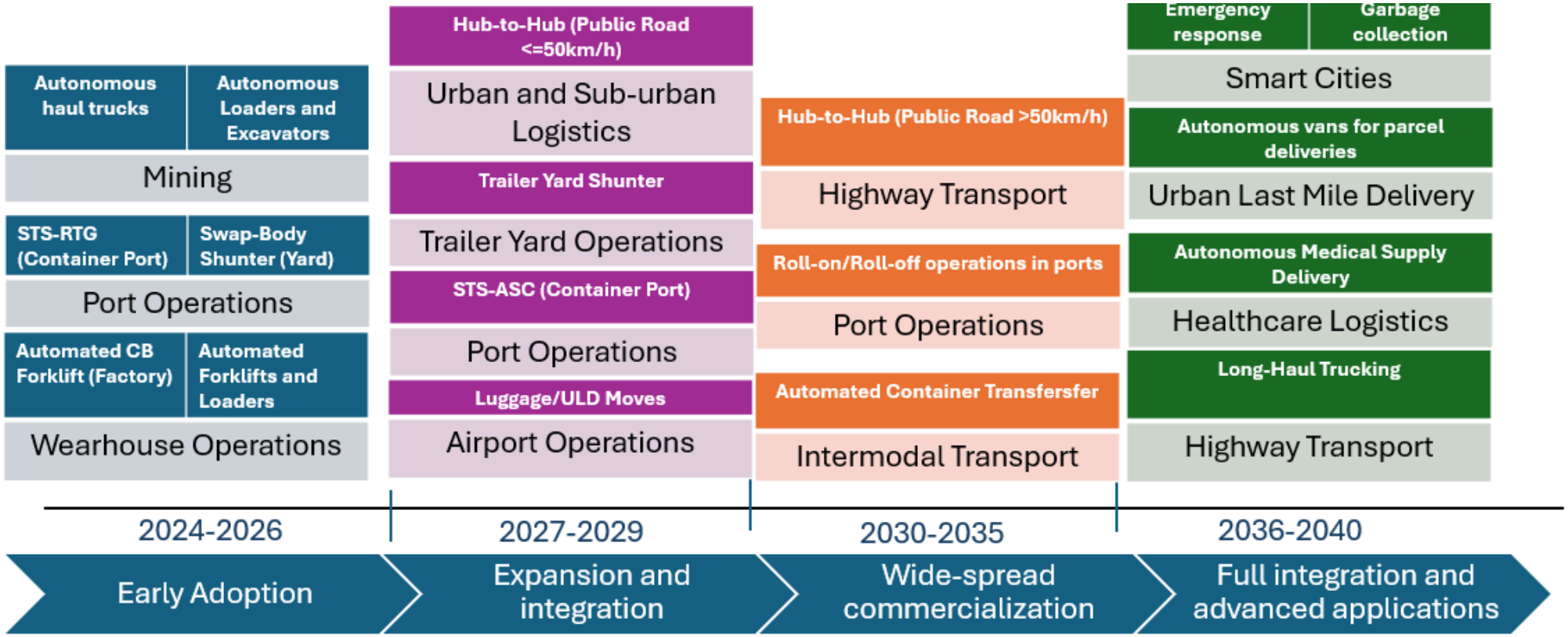
Transforming the logistics sector – key recommendation for the European Union:

- Regulations
- Raising Awareness
- Standards
- Infrastructures
- Others

https://www.ccam.eu/wp-content/uploads/2024/09/101006817_Deliverable_46_Roadmap-towards-connected-and-automated-heavy-duty-vehicles-for-logistics-operations.pdf

Autonomy not only in transport, but in all logistics!

Project AWARD: Phased Roadmap of the Adoption of Autonomous Heavy-Duty Vehicles in Logistics (2024-2040)



https://www.ccam.eu/wp-content/uploads/2024/09/101006817_Deliverable_46_Roadmap-towards-connected-and-automated-heavy-duty-vehicles-for-logistics-operations.pdf

Autonomy not only for business…

https://www.textronsystems.com/our-company/news-events/articles/press-release/textron-systems-and-kodiak-integrate-textron-0

Textron Systems and Kodiak collaboration

Rugged and reliable uncrewed robotic ground vehicle designed to keep service members out of harm's way while meeting the mission of today's military.

The RIPSAW M3 vehicle, equipped with the Kodiak Driver:

- Wide range of high-risk military missions.
- Wide range of terrain types (from highways to dirt roads to fully cross-country).
- DefensePods can be easily swappable in the field in 10 minutes or less.

CENTRUM DOPRAVNÍHO VÝZKUMU

Thank you

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