

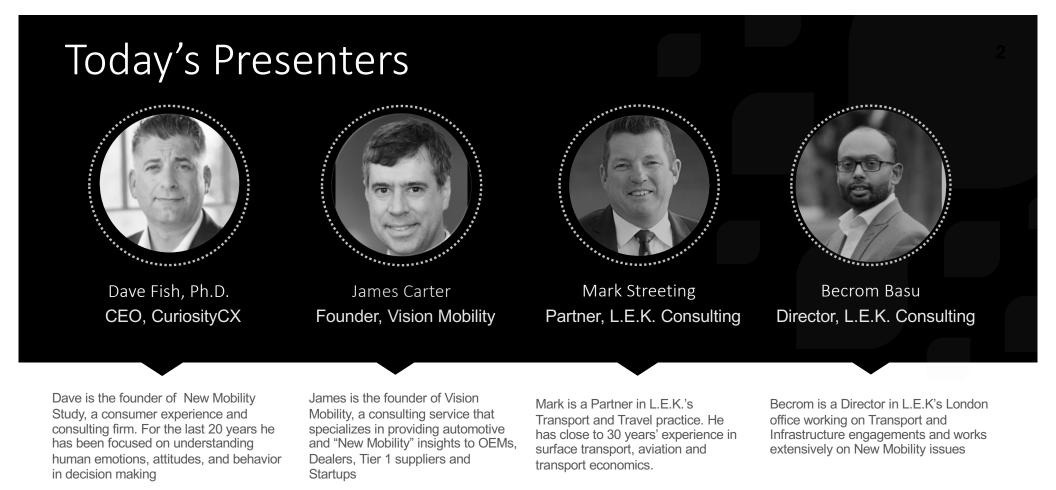
The Fourth Annual New Mobility Study How Consumer Preference will Reshape the Automotive Industry





December 4th, 2019 & December 5th, 2019

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Today's Presenters (Continued)



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Neha Katdare MSU Graduate Student, Market Reseacher at Blackboard

Rahima is currently pursuing PhD in IT-Based Logistics. She has more than 10 years' experience in the automotive industry in branches including IT, CASE (connected, autonomous, shared and electric), aftersales and finance at OEM. Neha is currently pursing her Master's in Marketing Research at Michigan State University. She is interning at Blackboard as Market Researcher to assist on the research and analytical side of the projects



Our goals

- Understand peoples' attitudes about mobility
- Discover peoples' needs and wants in mobility
- Better understand openness to new types of mobility options
- Identify the barriers to adoption
- Uncover new possibilities relevant to a new mobility future
- Global viewpoint to understand relative advances in each country
- Provide a sampling of our capabilities to assist you in the future



Our method



Primary Research



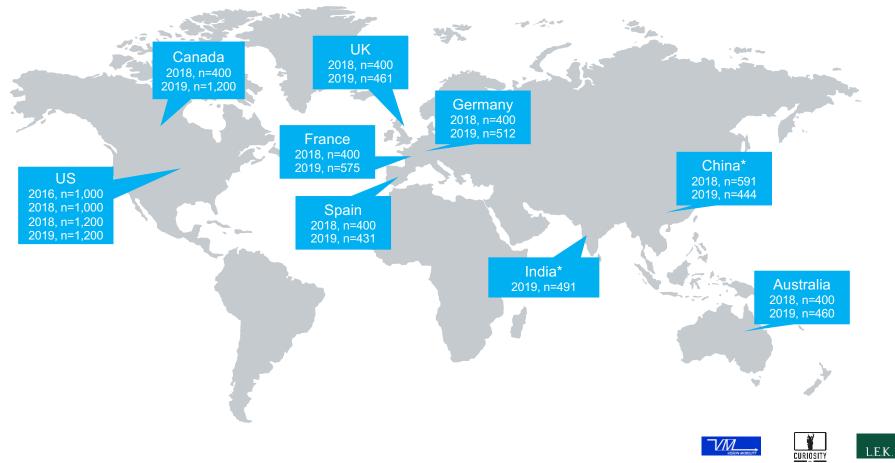
Secondary Research



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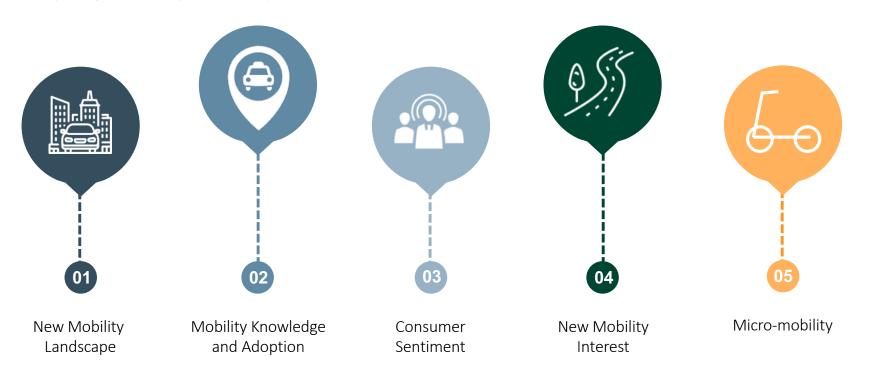


Our sample



Today's agenda

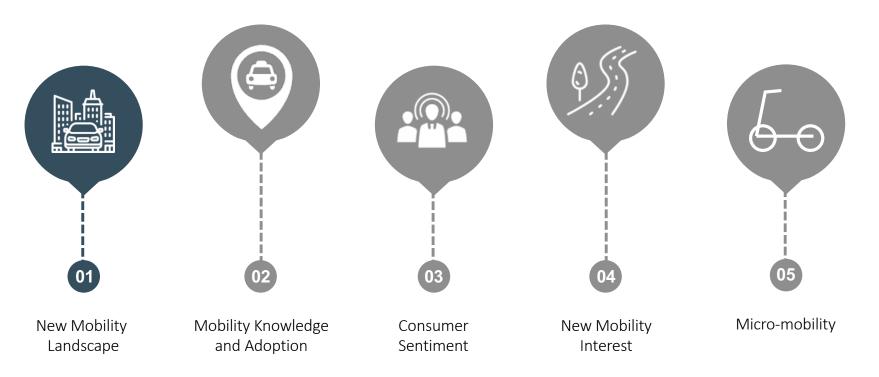
Key mobility insights shaping our industry



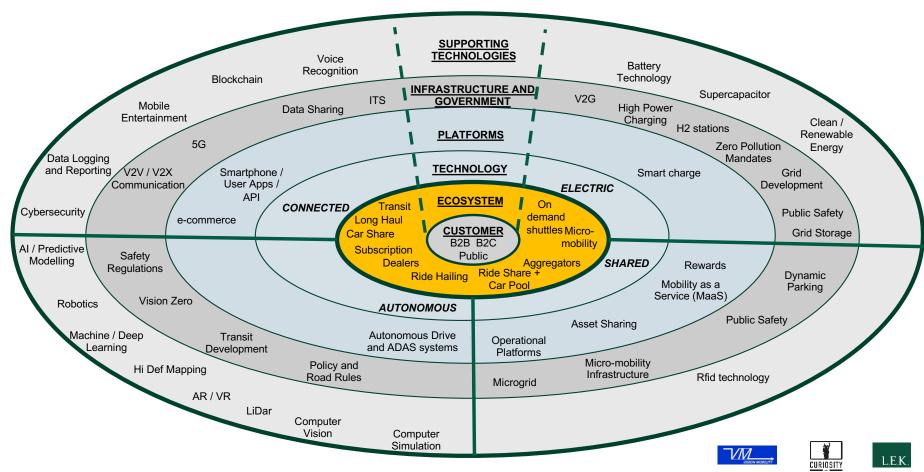


Today's agenda

Key mobility insights shaping our industry







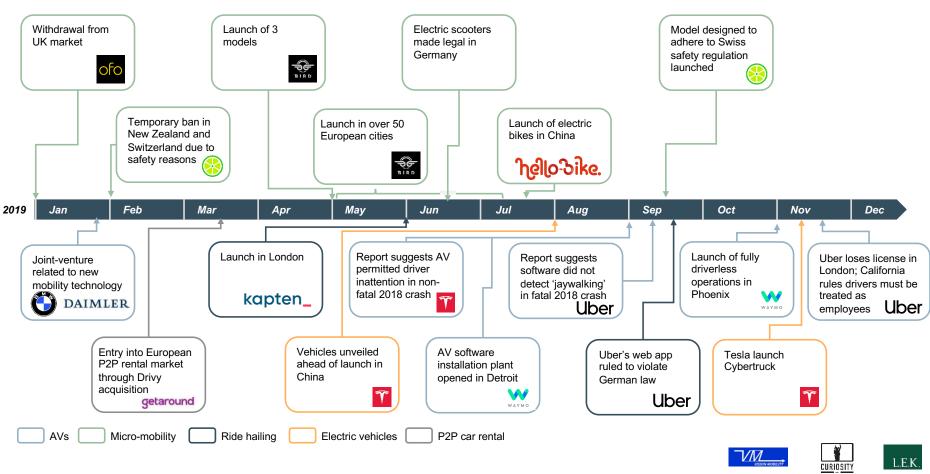
New mobility affects everything in our lives

Key themes in new mobility

- Growth of environmental CONCERN Greta factor
- Explosion of renewable energy
- Focus by cities on reducing pollution IC vehicle bans
- Move towards sharing and shared mobility
- Tightening regulations to lower CO₂ / improve fuel economy
- Battery technology costs way down, performance way up
- AV will take longer
- Everything is connected

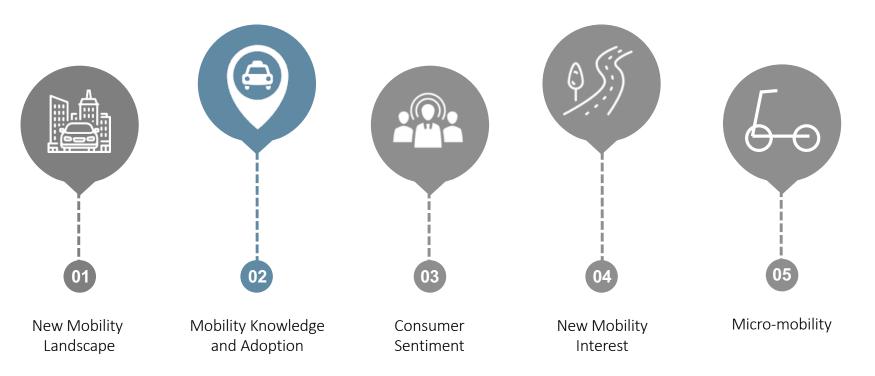


Key events in 2019 include the legalisation of e-scooters in Germany, the launch of Bird in Europe, the introduction of Tesla in China, and Waymo piloting full AVs



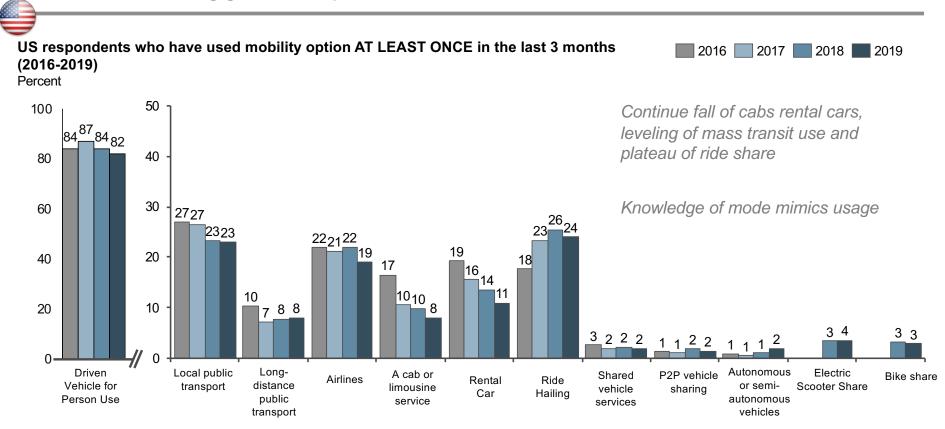
Today's agenda

Key mobility insights shaping our industry





Usage of cabs and rental cars has continued to decline in the US, mass transit use has stayed stable, and ride hailing growth has plateaued



Note: Option of electric scooter share and bike share not provided in earliest two studies Source: Annual Mobility Studies 2016-19



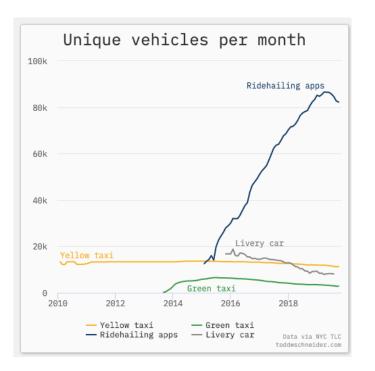
As ride hailing reaches maturity in the US, adoption starts to face headwinds due to regulation and competition

Trips per day 1,000k 800k Ridehailing apps 600k Yellow taxi 400k 200k Livery car Green taxi Θ 2012 2014 2016 2010 2018 — Yellow taxi — Green taxi Ridehailing apps — Livery car Data via NYC TLC toddwschneider.com

Uber and Lyft are placing a significant

downward force on Taxi services

But also are putting significantly more vehicles on the road

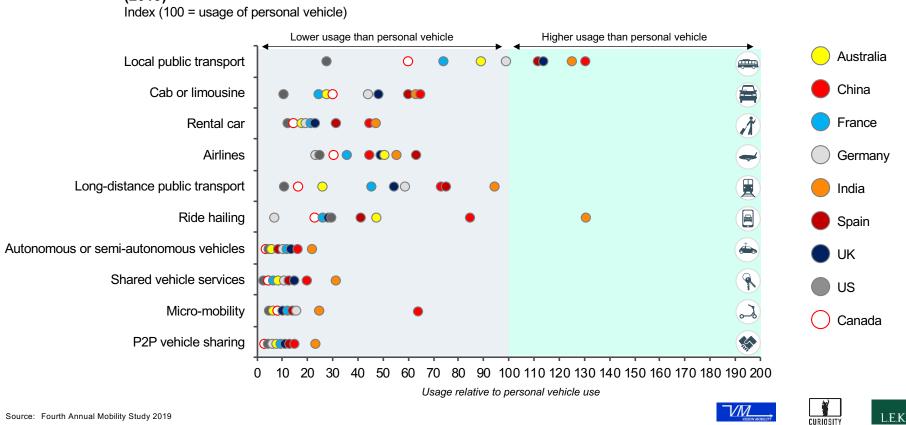




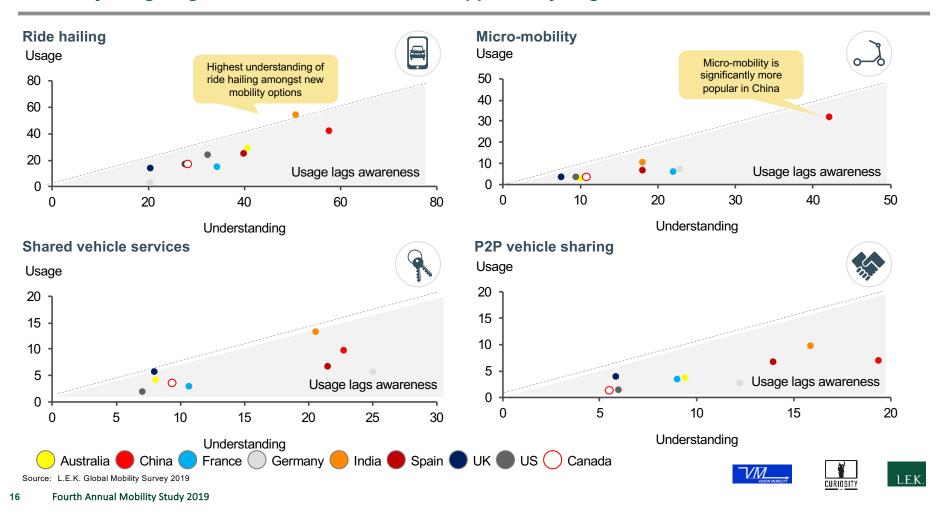
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Source: toddwschneider.com

In some countries, usage of ride hailing is on par with traditional transport options

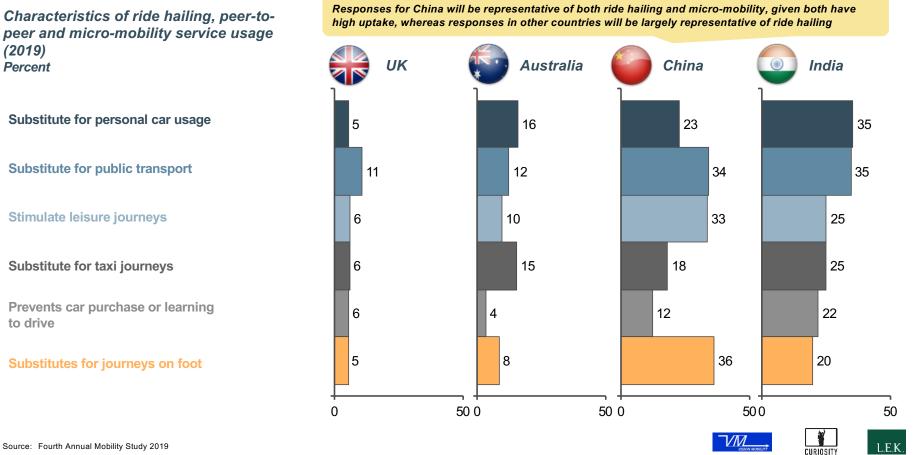


Respondents who have used transportation option in the last 3 months (2019)

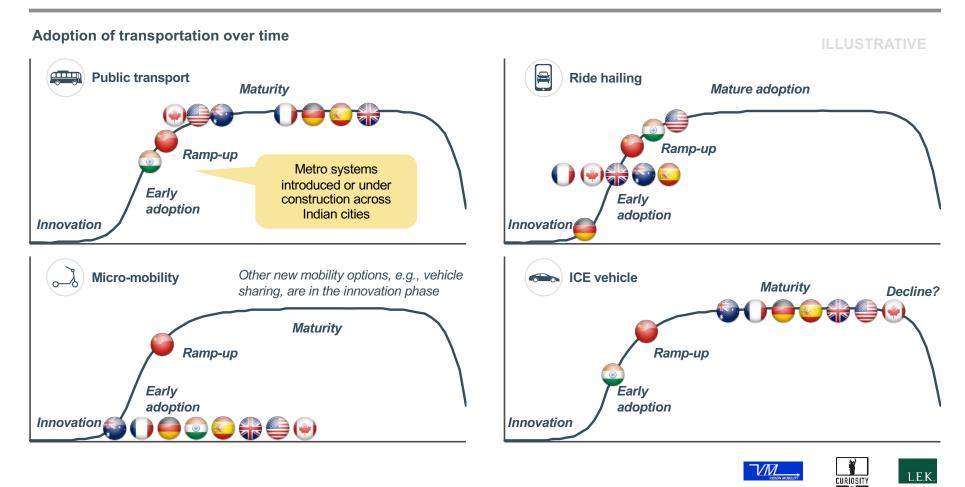


Generally usage lags awareness.... there is still opportunity to grow

New mobility in India and China has the potential to leapfrog ownership

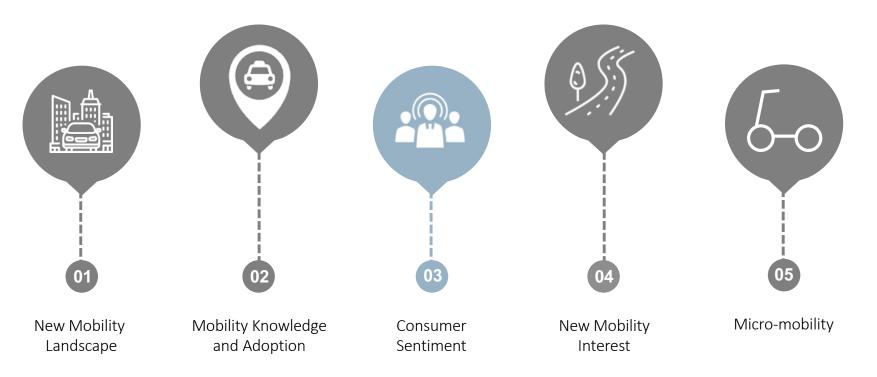


There maybe headwinds to overcome before mature adoption (e.g. regulation); ICE vehicles could be on the point of decline in some areas?



Today's agenda

Key mobility insights shaping our industry



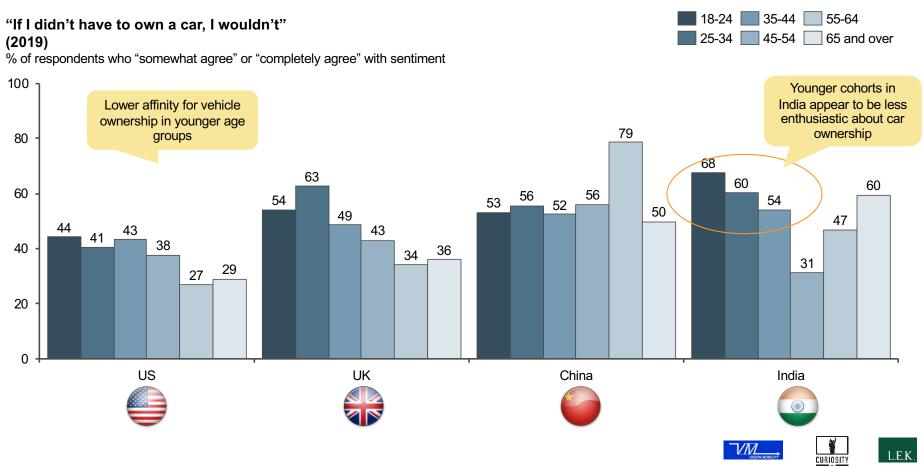


Percentage Americans who agreed with the statement "If I didn't have to own a car, I wouldn't"

Up from 36% in 2017

Source: 2016 - 2019 New Mobility Study by Vison Mobility and Curiosity

Affinity for vehicle ownership is highest in older age groups, particularly those the US and UK



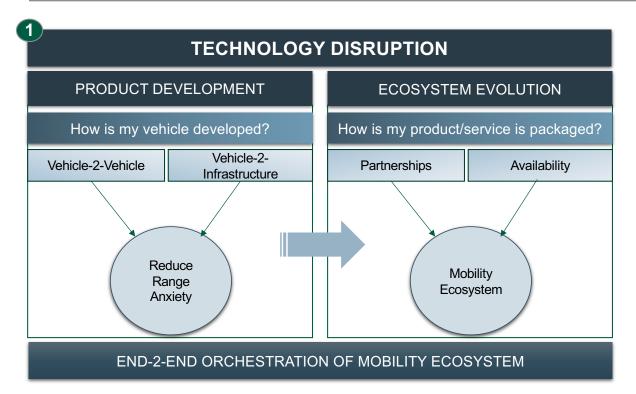
Changing mobility landscape – Key findings – What it means for OEMs?

- 1 With innovation at its early adoption stage and ICE vehicles reaching maturity level in all the countries could this lead to a possible increase in new vehicle technologies like electric vehicles and autonomous vehicles?
- 2 Customers prioritize in the order of cost, convenience, ease of use and travel time as the main considerations for transportation needs. Are socio-economic factors impacting customer mobility choices?
- On average, 48% are interested in hybrid (1% increase) and 45% are interested in electric (2% decline) in 2019. Could infrastructure and range anxiety be the reason behind the increase & decline?



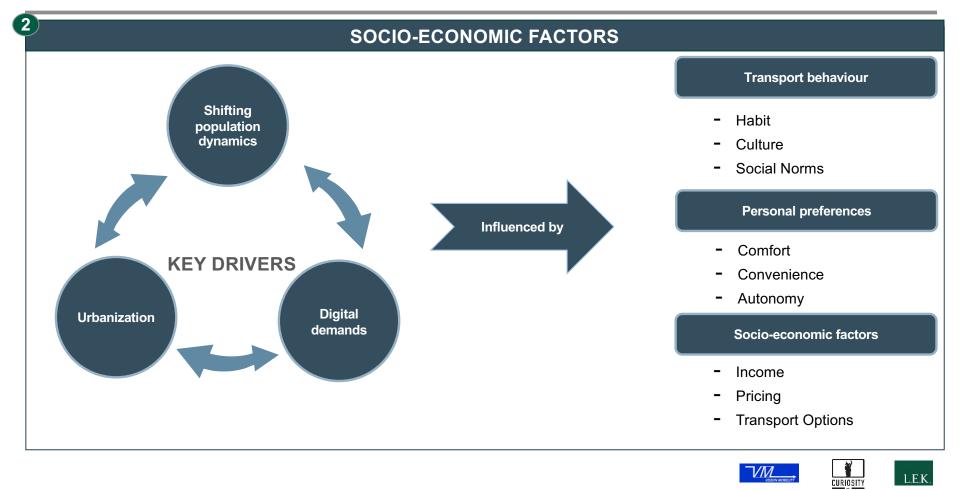


Technology disruption has led to new products, services and new players in the automotive industry leading to evolution of a new mobility ecosystem



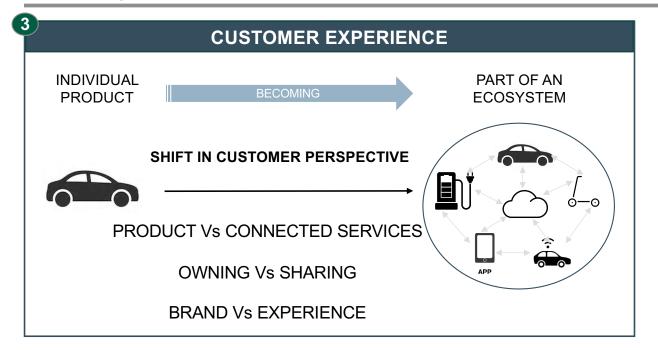
- Technology disruption has led to the development of EV and AV
- The right infrastructure is necessary to enable these new products in the market
- New service providers have entered the automotive industry as infrastructure & platform providers
- Entry of new suppliers, new products and new services has led to the evolution of a new mobility ecosystem
- End-to-end orchestration of not just the core business but also the complete ecosystem and its partners could result in a new outlook for the OEMs





Individual travel choices and vehicle preferences play a vital role in shaping the mobility landscape

Tendency for customers to view transportation as an end-to-end experience instead of an individual product or service has increased



- There is a shift in customer perspectives on how a product is perceived
- Customer buying power increases with increase mobility choices, the customer buying power has also increased.
- Customers have a choice between owning and sharing
- A vehicle when becomes part of a mobility ecosystem where what matters is the overall experience



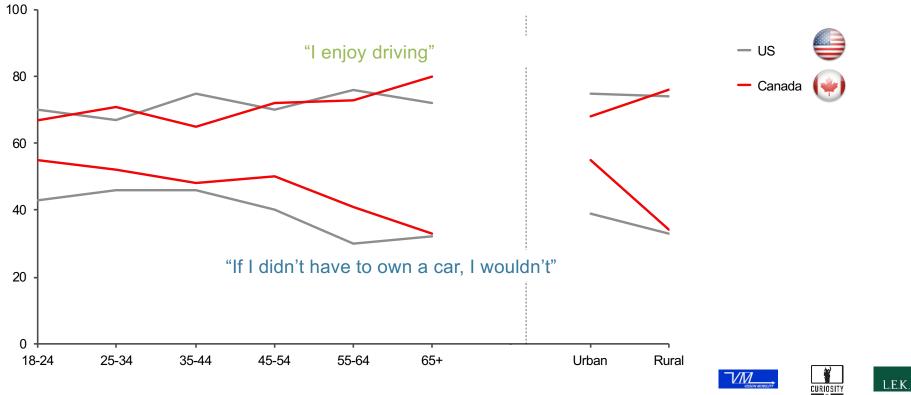
URBANISM AND OWNERSHIP



Sentiments related to driving and personal vehicle ownership

(2019)

% of US and Canada respondents who "somewhat agree" or "completely agree" with sentiment



1 in 4

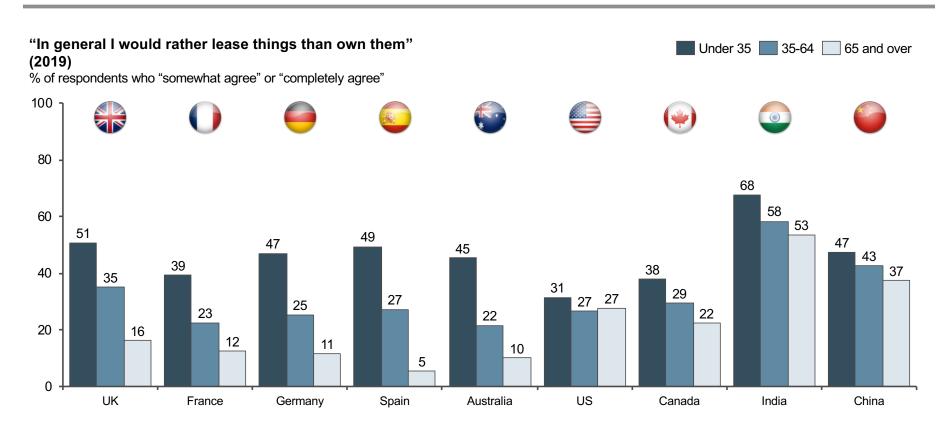
Americans who agreed with the statement "In general, I would rather rent or lease expensive things than own them"

1 in 3

respondents agreed globally

Source: 2018 New Mobility Study by Vison Mobility and CuriosityCX

Younger people show more inclination towards leasing or renting

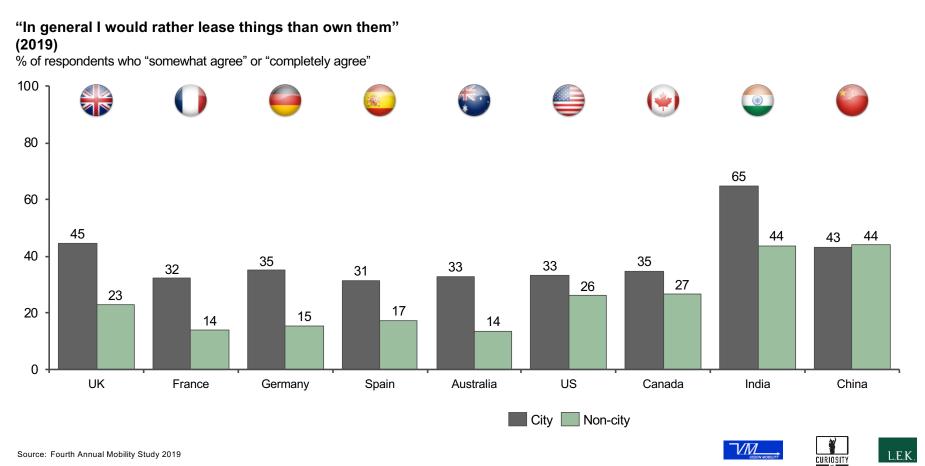


Source: Fourth Annual Mobility Study 2019



CURIOSITY

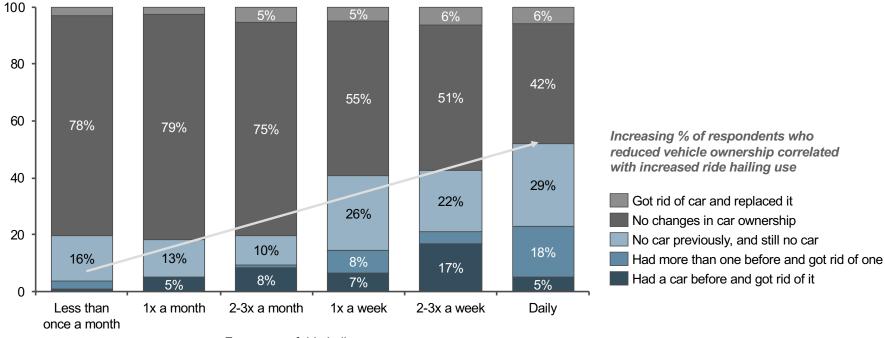
Those in urban areas show more inclination towards leasing or renting



Source: Fourth Annual Mobility Study 2019

Are people ditching their cars? As ride hailing increases, it substitutes personal vehicle usage

Changes in personal vehicle ownership by frequency of ride hailing Percent



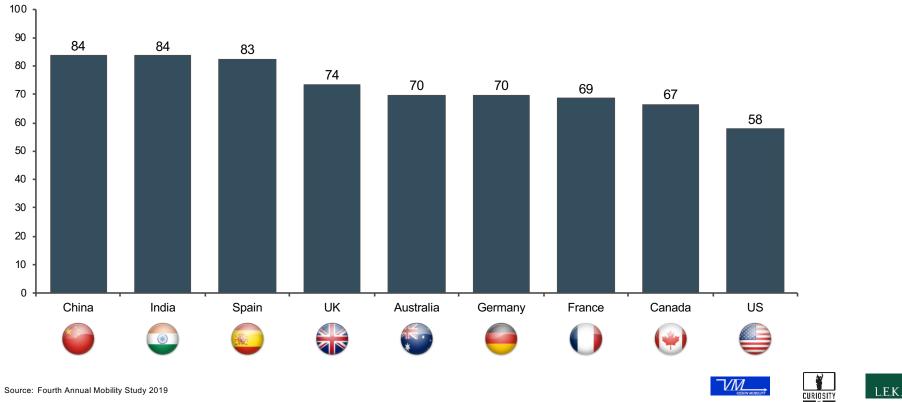
Frequency of ride hail use

Source: Clewlow, R.R., and Mishra, G.S. (2018). Disruptive Transportation: The Adoption, Utilization and Impacts of Ride Hailing in the United States. UC Davis Institution of Transportation Studies.



If available, most would use public transport more – this typically requires subsidised investment

"If it was convenient, I would use public transport more often" (2019)

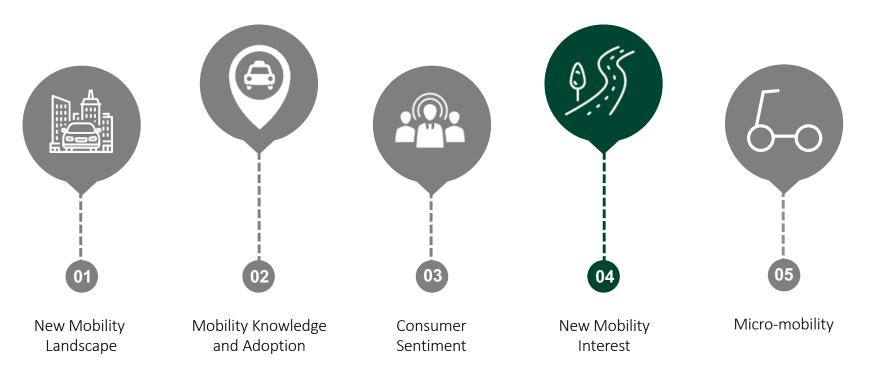


% of respondents who "somewhat agree" or "completely agree"

Source: Fourth Annual Mobility Study 2019

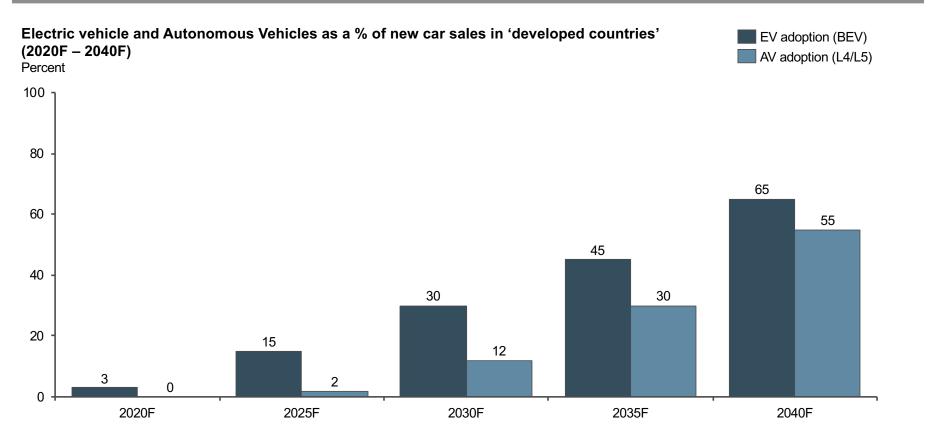
Today's agenda

Key mobility insights shaping our industry

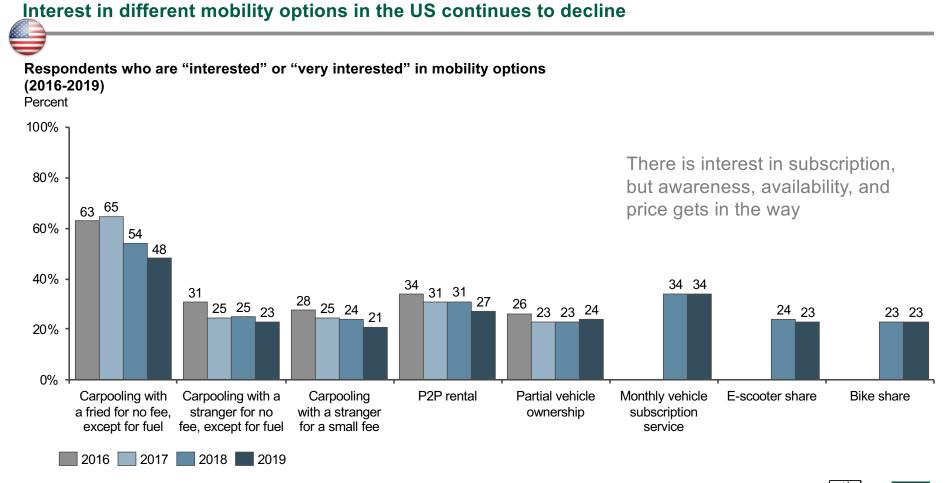




Electric and Autonomous Vehicle ramp up – Vision Mobility forecast



Note: Autonomous Vehicles are expected to also be electric. Source: Vision Mobility 2018 forecast LE.K.



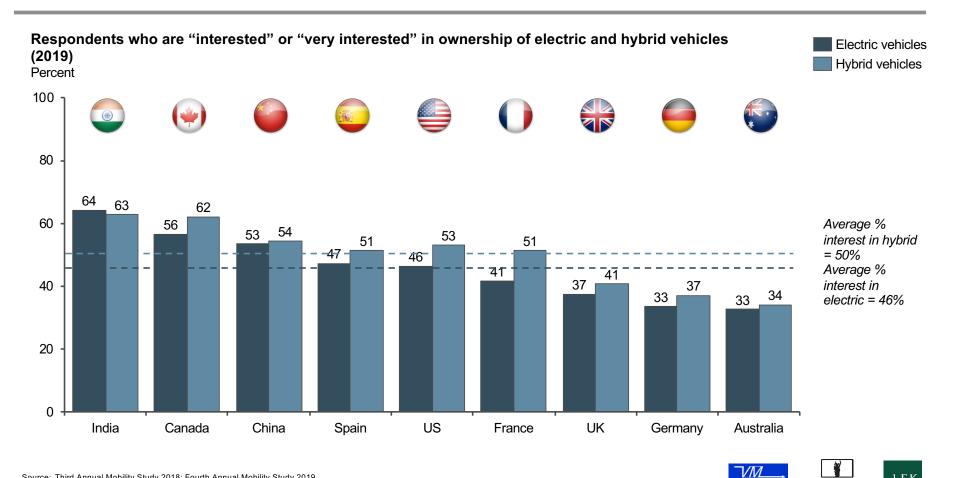
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CURIOSITY

Note: Option of monthly vehicle subscription, electric scooter share and bike share not provided in earliest two studies Source: Annual Mobility Studies 2016-19

c.45% of people are interested in hybrid and electric vehicles across countries. Interest appears to have risen in China in the last year

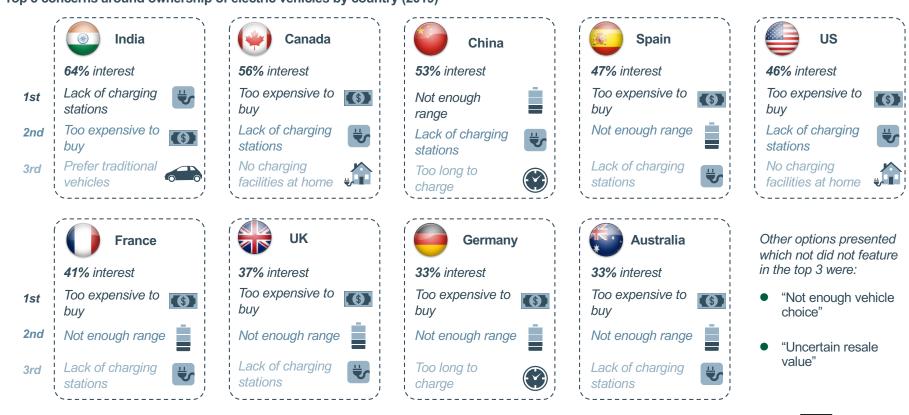


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Source: Third Annual Mobility Study 2018; Fourth Annual Mobility Study 2019

The key concerns around ownership of electric vehicles are related to vehicle cost, range and lack of charging infrastructure



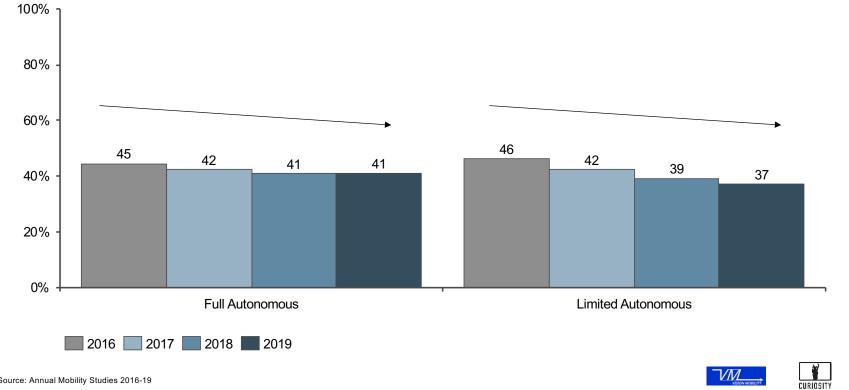
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Top 3 concerns around ownership of electric vehicles by country (2019)

Source: Fourth Annual Mobility Study 2019



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Interest in autonomous vehicles has stabilized in the US

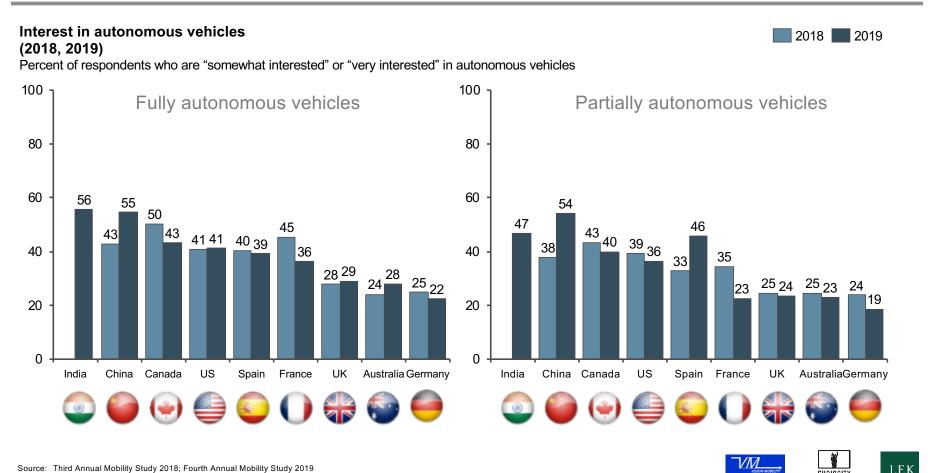
Interest in autonomous vehicles

(2016-2019)

Percent of respondents who are "somewhat interested" or "very interested" in autonomous vehicles

Source: Annual Mobility Studies 2016-19

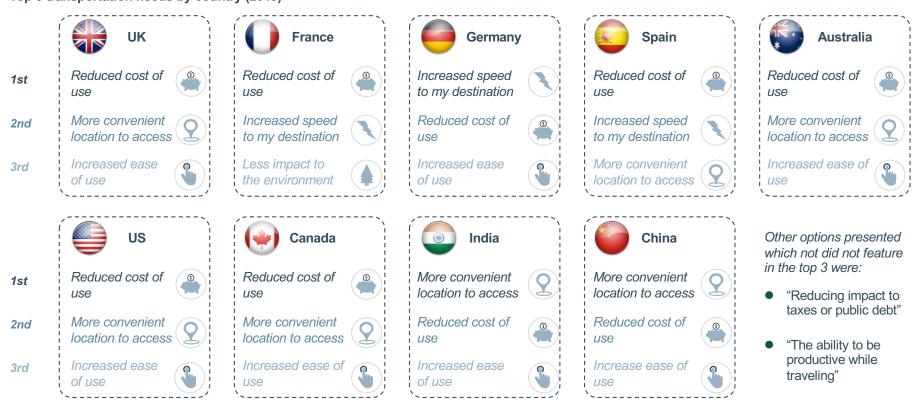
Interest in autonomous vehicles has stayed stable in most countries and risen in China



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Source: Third Annual Mobility Study 2018; Fourth Annual Mobility Study 2019

Customers prioritize cost, convenience, ease of use and travel time over other considerations



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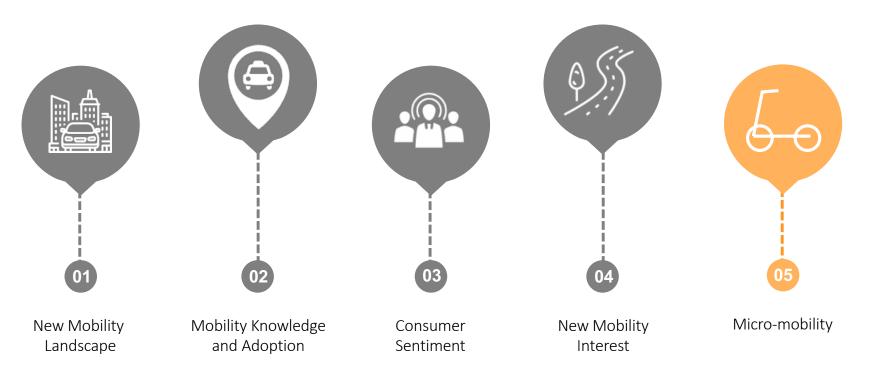
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Top 3 transportation needs by country (2019)

Source: Fourth Annual Mobility Study 2019

Today's agenda

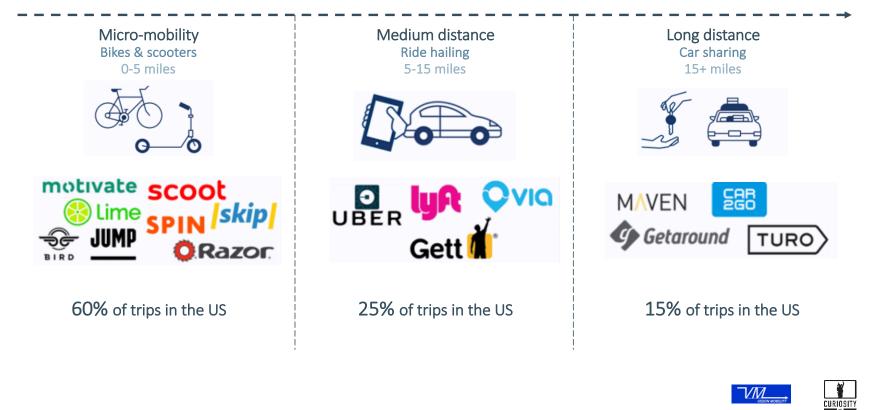
Key mobility insights shaping our industry





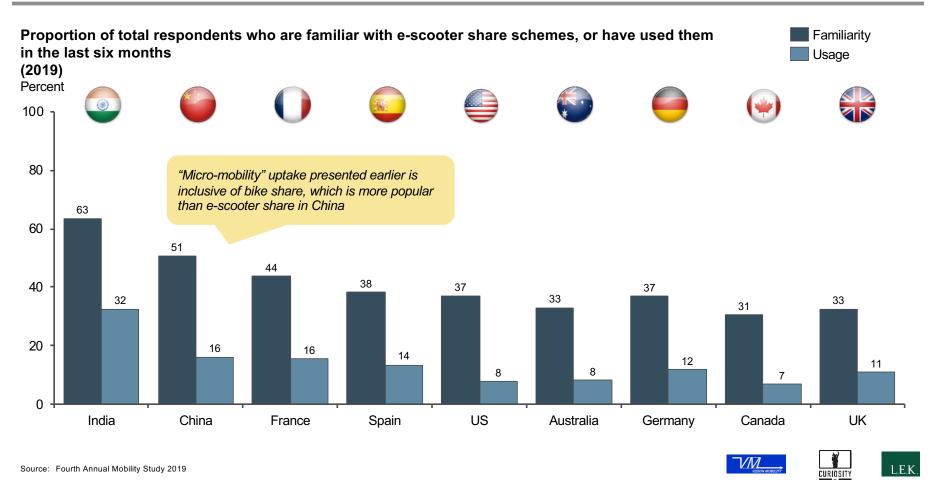
The market for micro-mobility continues to expand

Disrupting the car Alternatives to car ownership by trip length



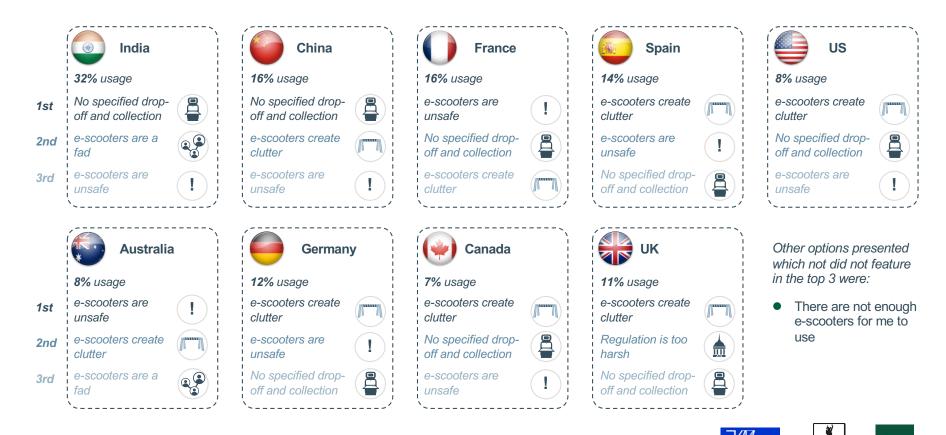
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c. 1/3rd of those who are familiar with e-scooters have tried using them across countries



Source: Fourth Annual Mobility Study 2019

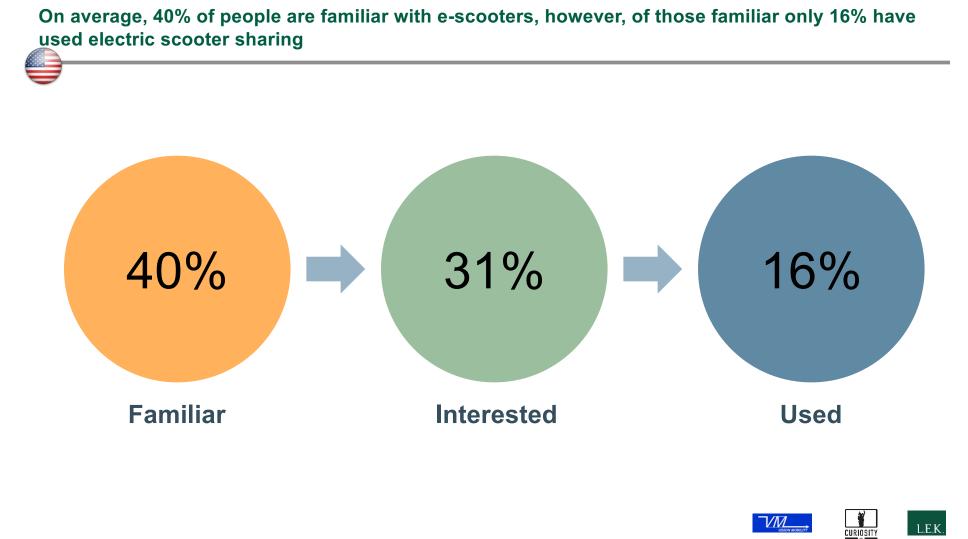
The largest concerns related to e-scooter share schemes are a lack of designated drop-off points and resulting clutter, and the safety threat



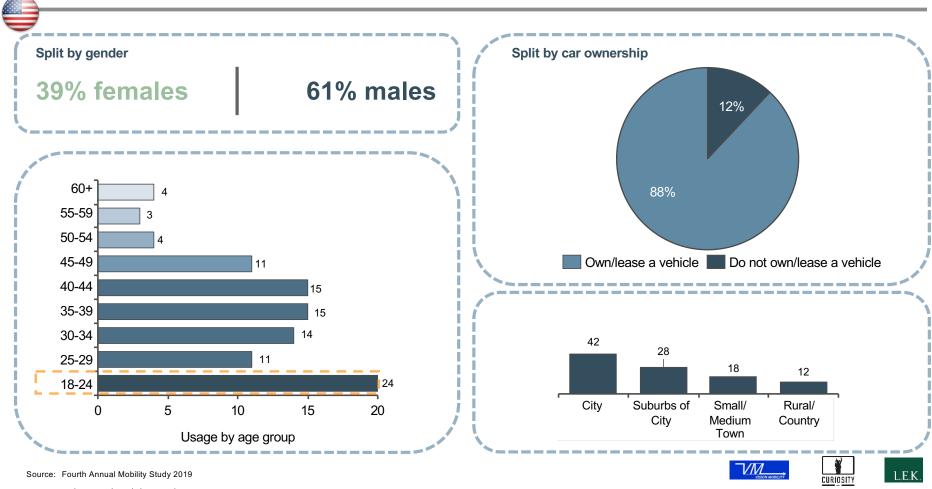
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Source: Fourth Annual Mobility Study 2019



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Typical user profile for e-scooter share scheme in the last six months



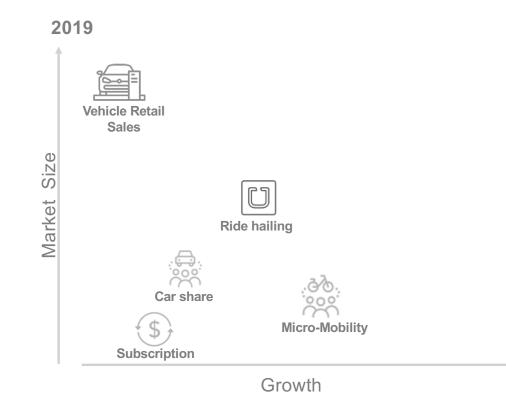
Reasons for using a e-scooter include affordability, environmental friendliness and time savings over short distances





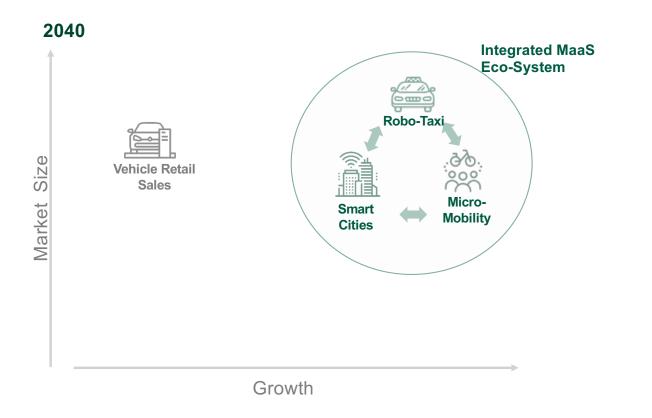
THE FUTURE OF MOBILITY

Mobility landscape transformation – today's View





Mobility landscape transformation – future outlook





Summary



CASE (Connected, Autonomous, Shared, Electric) technologies continue to progress rapidly, even as consumer interest continues to slow for Autonomous



Ride Hailing has become so ubiquitous that it is almost on par with traditional transportation options in terms of consumer usage and knowledge

- 3 Though other shared mobility technologies are showing plateauing or declines in consumer interest, usage is still well behind awareness, suggesting potential strong upside to come.
- Pushback on car ownership continues to increase fueled by millennials, Gen Z and urban residents and compounded by a shift away from owning large purchases by young people



Summary

- 5 China and India have very different new mobility users, requirements and usage patterns. There is potential for usage to leapfrog Western levels and substitute car ownership
- 6 Consumers continue to prioritize reduced cost, increased speed to destination and convenience in their mobility considerations
- 7 Micro-mobility continues to rapidly expand as a fun, convenient transportation solution, however consumers are very aware of the problems that go with roll out, such as safety, street clutter and other issues.
- ⁸ Electric Vehicles have progressed a long way in the last year, with new product launches, infrastructure roll outs and movement into heavy duty and machinery. EV interest is highest in India, Canada and China, with cost of ownership, range and charging infrastructure remaining as barriers.





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