

The Future of Automotive Mobility

*Uncertain drivers take global automotive markets to a
crossroads*

Global Automotive Mobility Study - 3rd Edition

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Arthur D Little

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Introduction

Arthur D. Little's third Global Automotive Mobility Study is our strategic, expert analysis of global automotive markets, including a global survey with responses from over 8,500 end customers.

Our previous study, in 2018, painted a picture of an industry taking its first steps towards electric, perhaps dreaming of autonomous mobility services, but primarily doing 'business as usual'.

That cannot be said two years on.

It is not that the sector is in turmoil, but rather that it is confused and somewhat unsure about where it is heading, as established trends meet new, emerging ones.

For instance, there has been a dramatic change in demand for cars and how people perceive ownership of them.

So, while cars are still playing an important role in our lives, particularly during the COVID-19 pandemic when the protection and independence they offer is of particular value, many of us are open to the idea of using new, alternative transport solutions. It seems that we want the utility of a vehicle rather than necessarily ownership of it.

And also very interestingly, we are observing an increasing bi-polarity in the market we have not seen before to any great extent, with Chinese car owners reacting differently compared with other parts of the world.

Is this 'bi-polarity' a sign of a divergence that will continue or will there be a coalescence of thinking and behavior in the future? The jury is still out, but it is a factor any global automotive player's strategy must take into account.

So, what can we say about the future of automotive mobility?



1. Car ownership - more important than ever?

There is no doubt: market and technology trends, combined with the economic consequences of the coronavirus pandemic have led us to adjust our mid-term outlook for annual sales of passenger cars, which we now think will be between 97m and 103m units worldwide by 2030.

This represents a market that is still growing but only at a compound rate of 2% - a slight increase on current figures, but a significant drop compared with recent prognoses and our forecast of two years ago.

Of course, 2020 has been an exceptional year for everyone. So, in the short-term, COVID-19 has influenced people's thinking about car ownership. Now, for instance, nearly half (48%) of all respondents globally think that owning a car is more important than it was before the pandemic. A probable result of the sense of security we get from being inside our own 'socially distanced transport bubble' rather than having to use public transport.

However, this overall figure conceals a wide variation. So, while half those in our study thought car ownership would in future be

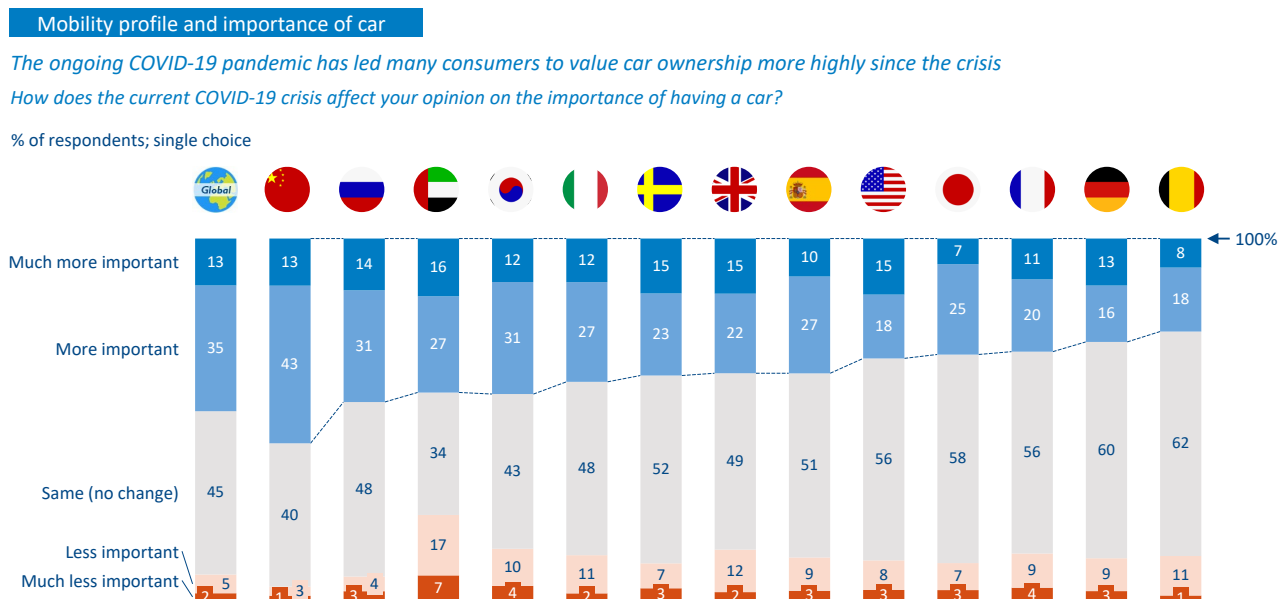
no more or less important than it is today, one-third did expect it to be more important. In China, that figure rose to almost 50%, putting it at odds with Europe, where only 30% shared this view.

The expectation is that as the pandemic recedes, these numbers will fall back somewhat, though the perceived importance of car ownership overall will remain high.

Irrespective of the importance they put on owning a car, many respondents admitted that they had or were planning to change their car purchase plans in the near future. So, of those who had planned to buy a car in 2020, 32% had postponed that decision, 14% planned to downgrade their vehicle ambitions, and at least 5% said they would cancel their purchase plans completely.

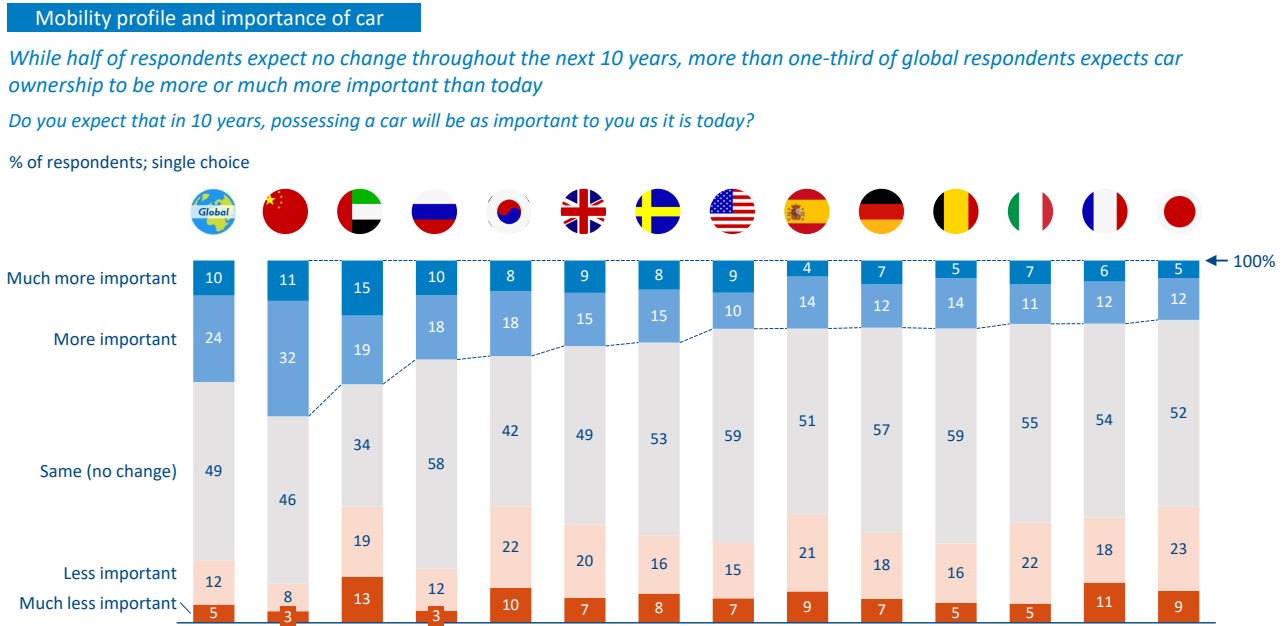
Such choices will further squeeze the mid-size segment of the car parc, something that may have a particular impact on the Chinese market, which has been the engine behind new car sales globally.

Figure 1: Car ownership importance now



Source: Arthur D. Little analysis
 Note: Global average weighted by population

Figure 2: Car ownership importance in the future



Source: Arthur D. Little analysis
 Note: Global average weighted by population

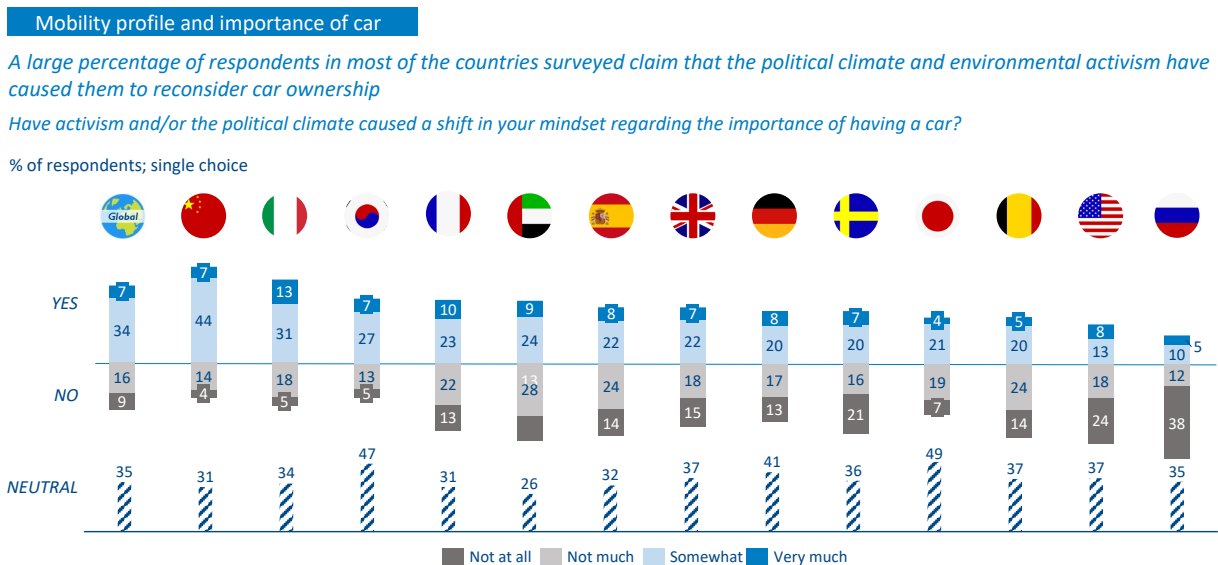
There will, of course, be the release of pent-up demand post-pandemic that will stimulate the market, however, it will be the overall state of the worldwide economy and how it recovers that will be the deciding factor when it comes to future sales growth.

As it is, many of us don't use our cars that much anyway — about 25% of car owners drive less than 2,000 km a year, suggesting that for the most part, their vehicles are spending much of their time parked up on the drive or street or in the garage.

Though enthusiasm for car ownership shows no real sign of abating generally, there may be clues that we could be adjusting our relationship slightly. Again, this could be a result of COVID-19 and the consequent rise in homeworking. Has the temporary demise of the daily commute had an influence? Perhaps.

So, are more of us willing to give up the comfort, convenience and flexibility we get from owning a car? Again, perhaps. In our survey, more people said they would consider giving up their primary car, while a similar percentage said they would be willing to relinquish their second vehicle.

Figure 3: Car ownership and the environment



Source: Arthur D. Little analysis
 Note: Global average weighted by population



2. Mobility services - a sleeping giant?

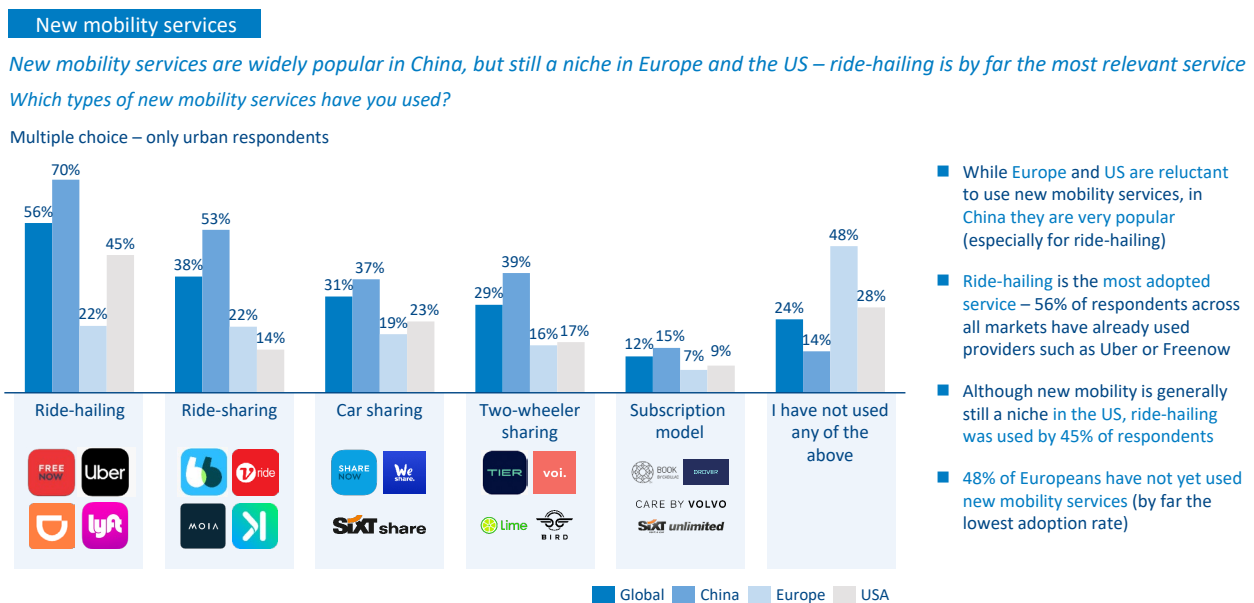
If people are willing to give up their cars, at least to some extent, perhaps they will be looking to switch to alternative mobility services, especially as our research indicates that many are increasingly concerned about the impact of their vehicle use on the environment and climate change.

Over four in ten respondents (43%) said they might use a service like a robo-taxi, however, this was a considerably lower figure than in our last study. It is hard to say how fears about COVID-19 may have impacted respondents' thinking.

So, is this being reflected in any significant behavioral changes?

Over two-thirds of those living in urban areas told us that they had used a ride-hailing service, while more than a third had experience of ride-sharing. But in rural areas, of course, these figures are obviously much lower given the scarcity of such services.

Figure 4: Mobility



Source: Arthur D. Little analysis
 Note: Global and European values weighted by population of markets included

China again looks different, as here car owners are much more willing to embrace a wider range of mobility services than elsewhere.

Of course, the most significant impact on the take-up of any kind of mobility service is likely to be lack of availability, something that 45% in our survey saw as an issue, as was the potential cost of using them (42%).

At the moment, technical and infrastructure barriers remain a real impediment to the profitable implementation of these kinds of services, and that is likely to remain the case for the immediate future. Overcoming these challenges will be the catalyst for much wider and more rapid adoption.

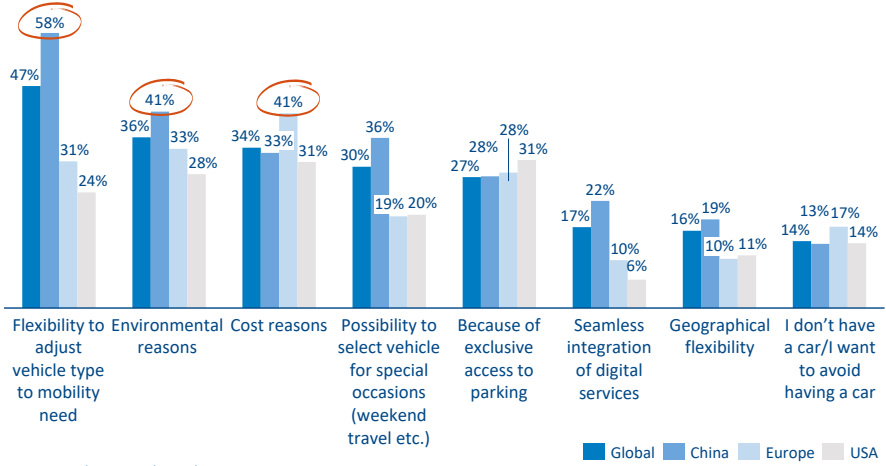
Figure 5: Mobility services issues

New mobility services

Different motivations explain differences in adoption rate of new mobility services rates – Chinese consumers are looking for high flexibility, Europeans desire a low-cost solution

What motivates your decision to use new mobility services?

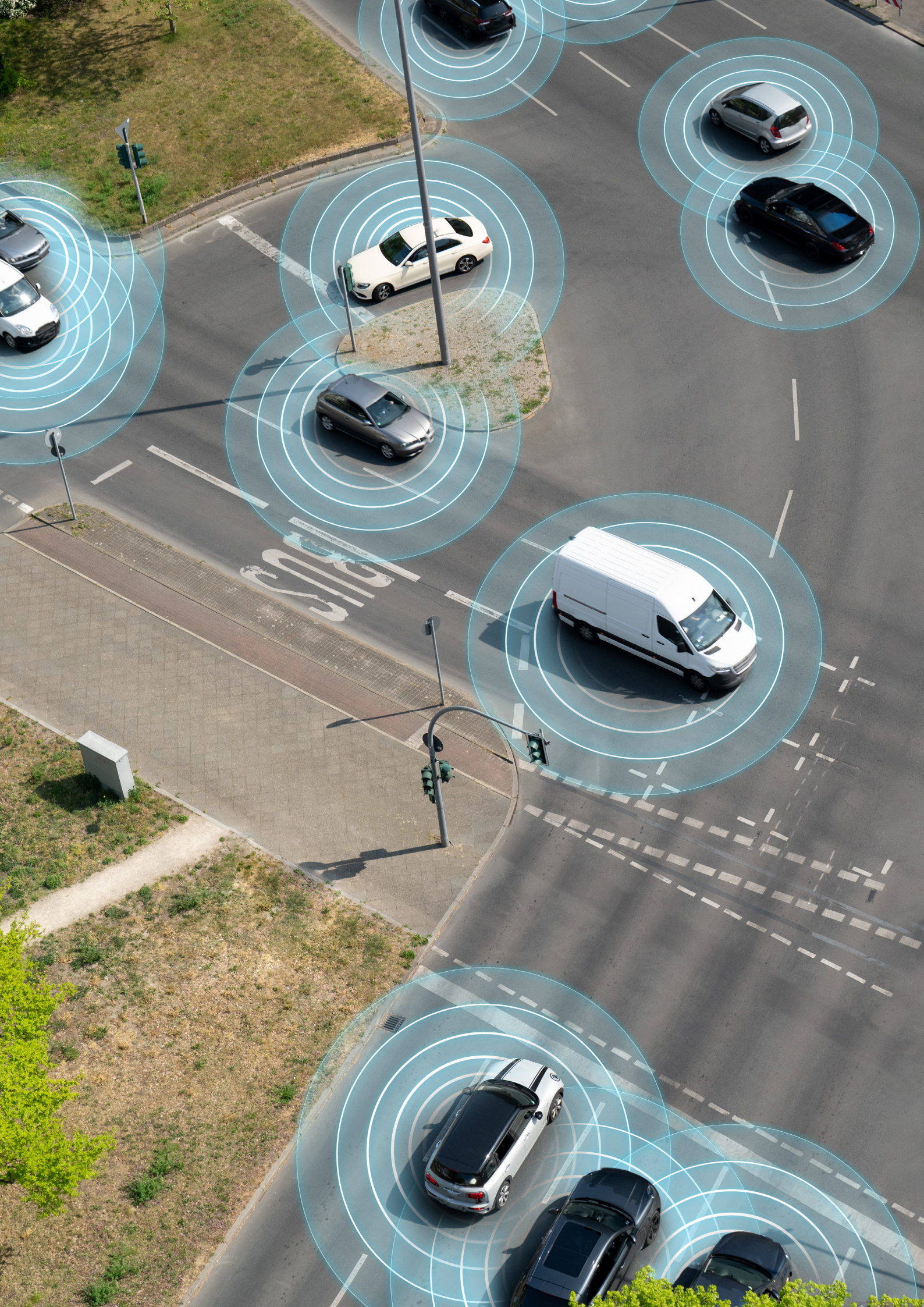
Multiple choice – only urban respondents



- In China, flexibility is a major driver for those using new mobility services
- Respondents from Europe clearly expect a low-cost solution
- Environmental reasons are more important in China – the second most important reason people use new mobility services
- Only a few say digital services integration and geographical flexibility would influence them to use new mobility services

Source: Arthur D. Little analysis

Note: Global and European values weighted by population of markets included



3. Autonomous cars - a step too far?

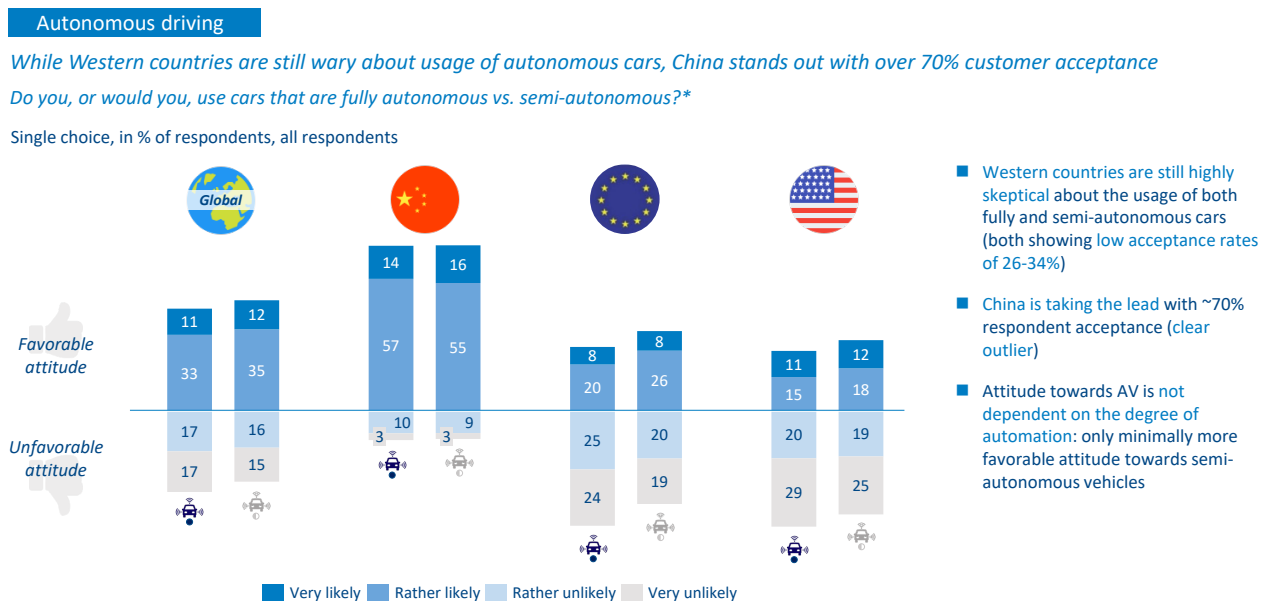
Of course, mobility services such as robo-taxis depend on the design and application of innovative technologies that underpin the development of autonomous vehicles, about which there was such great excitement not so long ago.

Now, however, they seem to have lost a little their fizz, with OEMs failing to convince the marketplace that they offer an acceptable mobility solution. In Europe 44-54% of people say they would not use fully autonomous vehicles, while in the US the figure is 49%.

However, while the sparkle may have gone out of some major markets, the picture is much more positive in China, where acceptance of autonomous driving technology has actually increased, with 71% of customers saying they are positive about it.

China aside, when only between 15% and 37% of licensed car drivers are in favor of fully autonomous driving technologies, it is obvious that manufacturers have some way to go to win the market round. Even when it comes to *semi*-autonomous driving (SAE level 4), over 50% of respondents in our survey were not convinced that this is the technology for them.

Figure 6: Autonomous vehicles acceptance



Source: Arthur D. Little analysis

Note: Global and EU average weighted by car sales

* Fully autonomous: car can drive on its own, driver has option to intervene; Semi autonomous: e.g., autonomous driving on highways

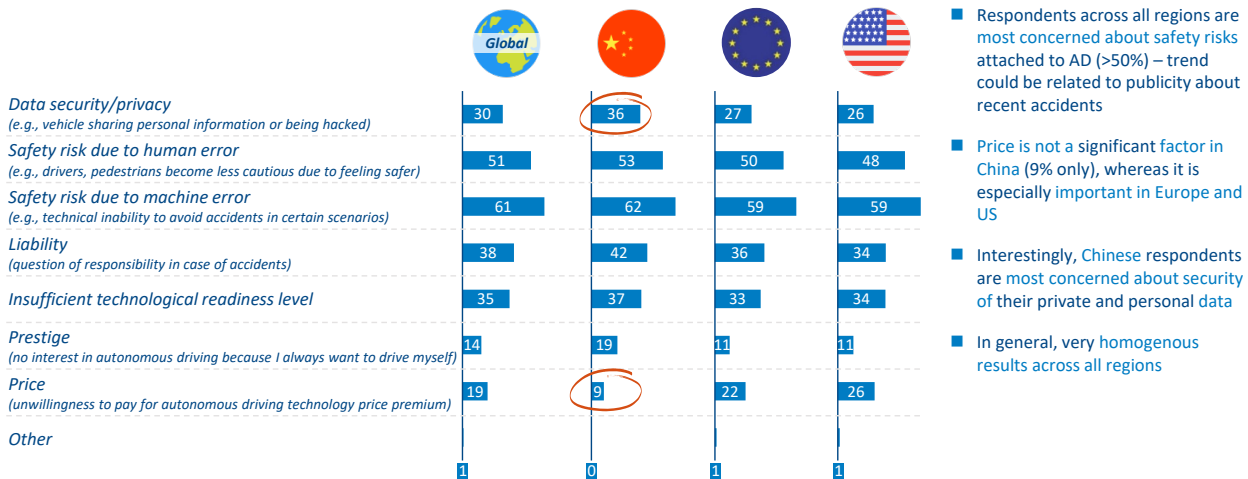
Figure 7: Autonomous vehicles safety

Autonomous driving

Respondents across all regions are currently most concerned about autonomous vehicle safety

What are your concerns regarding autonomous driving?

Multiple choice, hypothetical in %



Source: Arthur D. Little analysis

Note: Global and European values weighted by car sales of markets included

- Respondents across all regions are most concerned about safety risks attached to AD (>50%) – trend could be related to publicity about recent accidents
- Price is not a significant factor in China (9% only), whereas it is especially important in Europe and US
- Interestingly, Chinese respondents are most concerned about security of their private and personal data
- In general, very homogenous results across all regions

A major reason for this reluctance seems to come down to fears over safety, something 51% of respondents were worried about. Perhaps this is due to a series of well-publicized accidents around the world involving autonomous vehicles since our last survey that have done little to promote their cause.

But safety is not the only issue. Our respondents were also worried about their personal data and how well OEMs and mobility service providers would protect it. This is one topic on which China agrees with the 'rest of the world', with a slightly greater percentage (31%) citing it as a concern than car owners elsewhere.

But despite such widespread concerns, paradoxically, 77% of respondents globally said that if autonomous cars were available they would use them. Is this another indication that our thinking about the car is beginning to change and that while the car is still important to us, actually physically driving it will become less so?



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4. Time to switch on the ‘electric customer’?

While autonomous vehicles may currently be a step too far for many car owners, that does not mean they won't embrace other technologies in their cars. So, though over half (53%) of our respondents remain fans of the internal combustion engine (ICE), the fast-growing demand for alternative powertrains suggests that rapid change is in the air, with plug-in hybrids and all-electric vehicles very much on a steep upward trajectory.

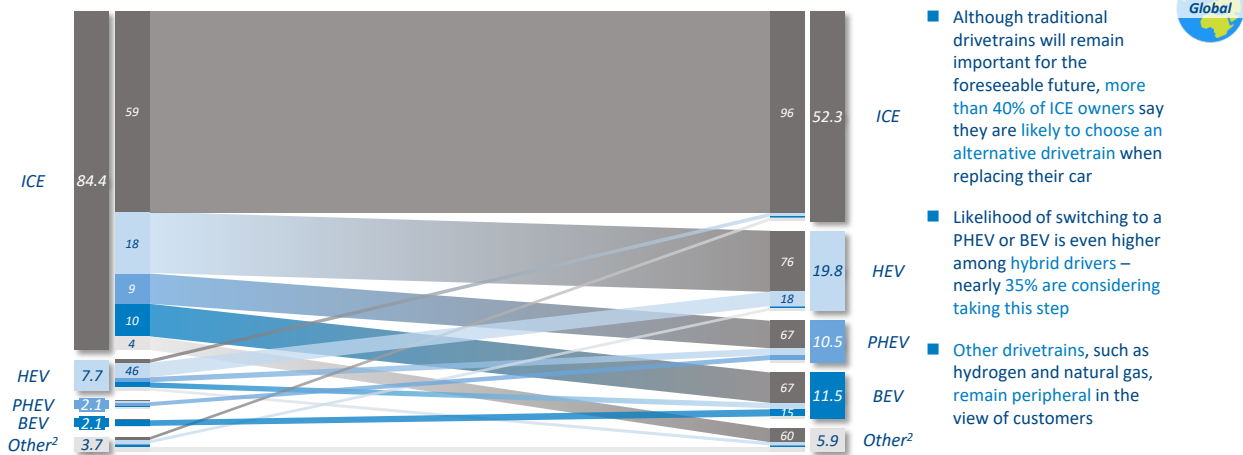
The hybrid powertrain boom was something we predicted back in 2018 and is confirmed by this latest survey, with 29% of respondents now anticipating that their next vehicle will have a hybrid powertrain. Another 12% said they would consider buying a BEV next time around.

The ICE may soon be about to lose its crown, but market growth is being hampered by the limited range of models currently available, something that has undoubtedly impacted on the rate of adoption.

Figure 8: Alternative drivetrains split

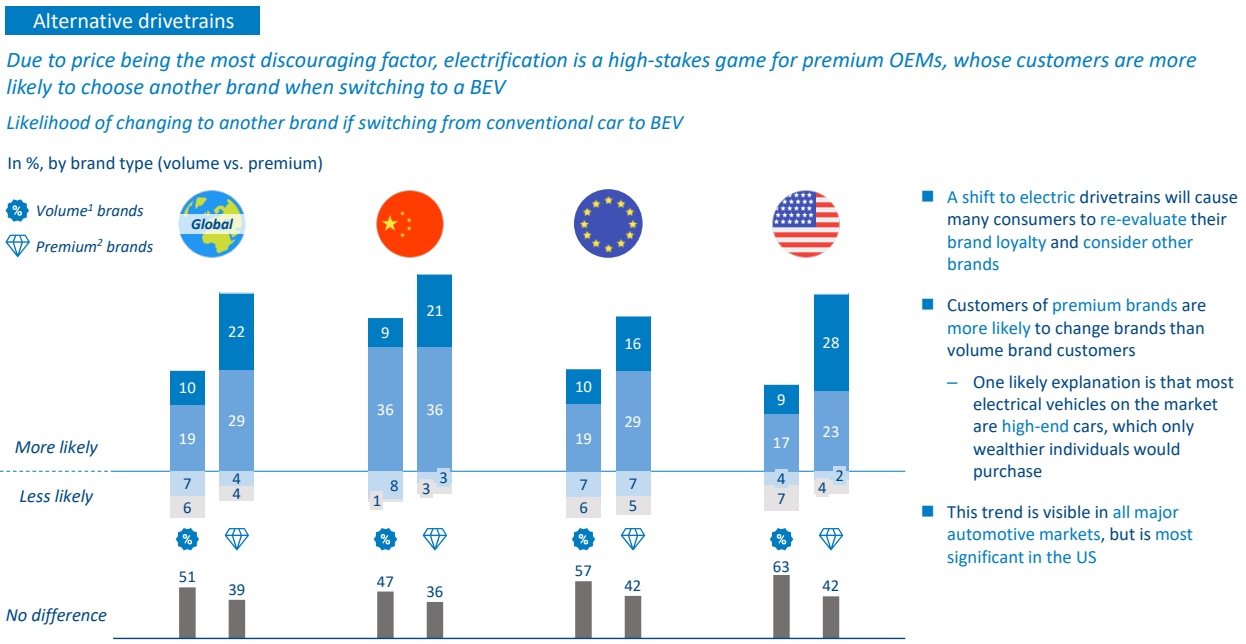
Alternative drivetrains
 Although traditional combustion engines will remain important, plug-in hybrids and all-electric alternatives are on a growth trajectory that goes far beyond first movers and early adopters
 Replacement trend, based on respondents' likely drivetrain selection for next car

In %, global¹



Source: Arthur D. Little analysis
 Note: 1) Weighted according to car sales; 2) Other includes natural gas & hydrogen

Figure 9: Alternative drivetrains loyalty



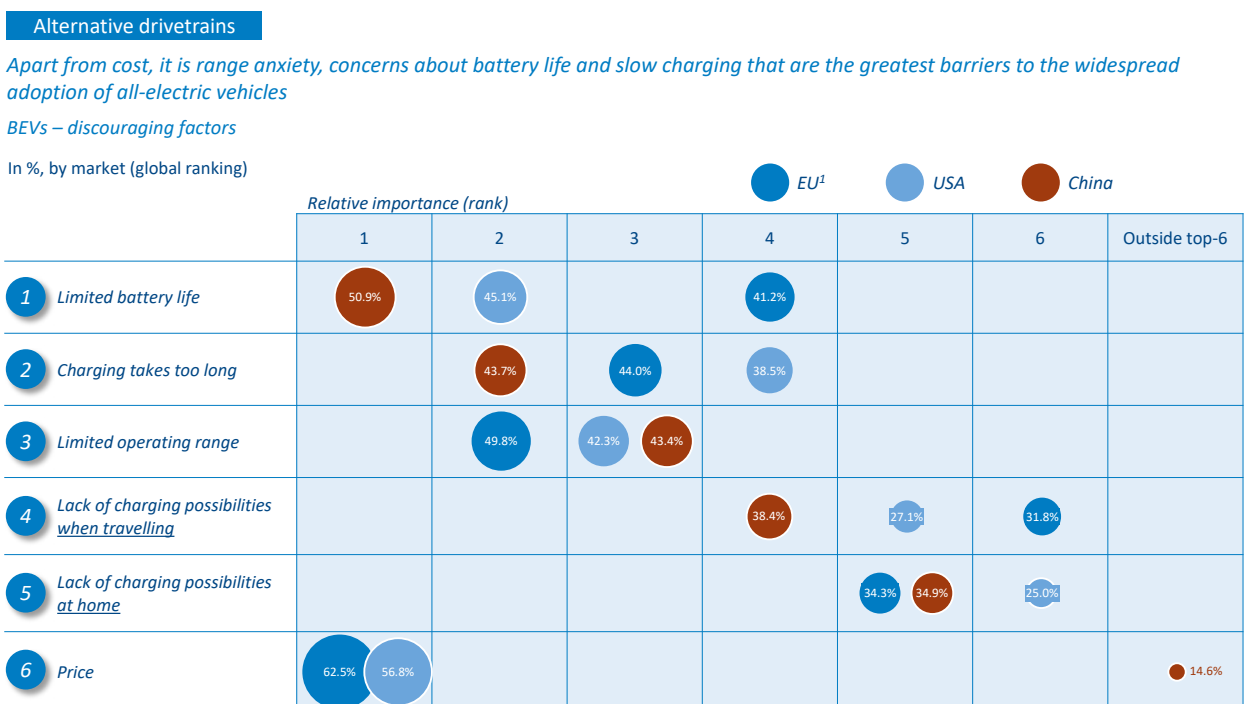
Source: Arthur D. Little analysis
 Notes: Global and European values weighted by car sales of markets included; 1) Proxy brands: Citroen, Fiat, Ford, Hyundai, Kia, Nissan, Opel, Peugeot, Renault, SEAT, Skoda, Toyota & Volkswagen; 2) Proxy brands: Audi, BMW, Jaguar, Land Rover, Mercedes-Benz & Volvo

With customer sentiment moving towards electric, the unwillingness or inability of established car brands to fill this gap could see many once-loyal customers migrating to new and emergent manufacturers with a more exciting offering. As it is, 51% of premium brand customers say that when they buy an electric vehicle they expect to have to buy a different brand.

This means that alternative powertrains could be a hidden market disruptor.

One thing that would lead to further significant changes in the marketplace would be any regulatory changes that encouraged greater adoption, as is being seen already in countries like the UK.

Figure 10: Alternative drivetrains issues

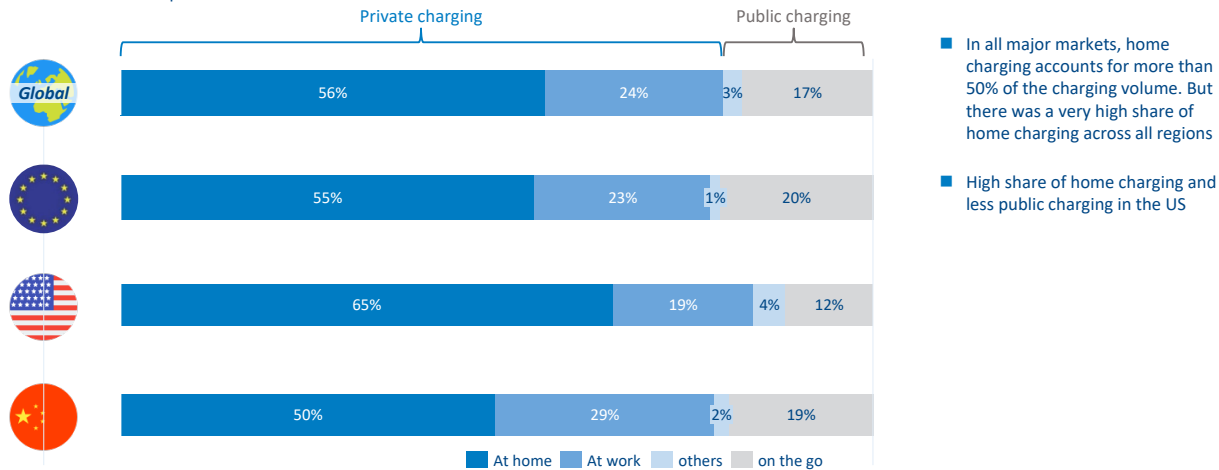


Source: Arthur D. Little analysis
 Notes: 1) Weighted according to car sales; 2) Other includes natural gas & hydrogen

Figure 11: Electric vehicle charging

Electric vehicles
 Home charging is the most widespread option globally and in all major markets – high share of workplace charging in China and very low share of public charging in the USA
 Where do you usually charge your EV?

Numbers must add up to 100%



Source: Arthur D. Little analysis
 Note: Global and European values weighted by car sales of markets included

- In all major markets, home charging accounts for more than 50% of the charging volume. But there was a very high share of home charging across all regions
- High share of home charging and less public charging in the US

However, while there may be a widespread and growing desire to switch to electric vehicles, there remain practical issues for many in doing so, given the lack of supporting infrastructure.

Though dense networks of petrol stations are in place to ensure ICE vehicles can be driven long distances with little interruption, the same cannot be said for electric vehicles that need charging much longer than a couple of minutes at a petrol pump.

As our survey responses show, if car owners are to embrace electric vehicles, they are looking for a vehicle that can do more than short urban hops. They want one with the power to do much longer ‘road trips’. In China, for instance, drivers are looking for a range of at least 500km, while in Europe that’s 600-700km and in the US it’s 700km plus.

At the moment, most drivers of EVs are charging their vehicles at work or close to where they live, with four out of five relying primarily on their ‘at home’ charging solution.

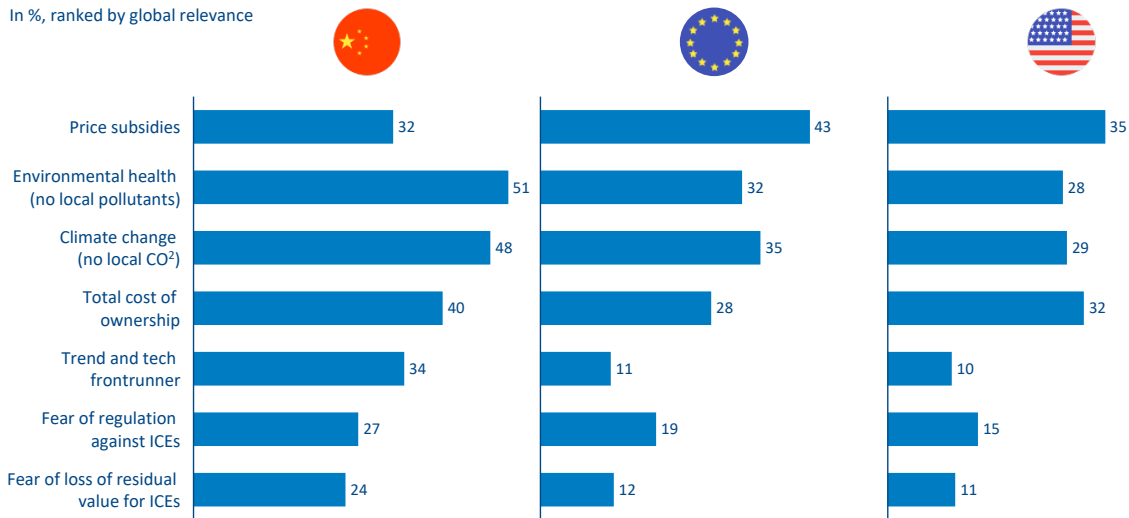
They certainly won’t want to find themselves in the middle of nowhere with no means to get power into their vehicle. An unspoken worry among many and something that may be holding back the market?

Not surprisingly perhaps, availability of public charging points is seen as key and is something that 43% of respondents consider of greater importance than charging speed (20%), ease of use (18%) or energy price (10%).

But despite its limitations, after choosing this new powertrain technology, EV drivers seem to be broadly happy with the existing infrastructure, at least for now, with fewer than 20% not fully satisfied with network density, tariff transparency, app functionality or cost of charging.

Figure 12: Alternative drivetrains positive factors

Alternative drivetrains
 There are plenty of factors encouraging customers to go electric – mainly a combination of monetary and environmental factors, but these vary between markets
 BEVs – encouraging factors
 In %, ranked by global relevance



Source: Arthur D. Little analysis
 Note: European values weighted by car sales

Further evidence that EVs are increasingly being seen as everyday vehicles is that customers are now much less willing to pay a premium for BEVs. Only 26% say they would be willing to pay more for battery vehicles, so it looks like manufacturers will have to sharpen their pricing.

And once car owners become BEV owners, they are highly likely to stick with that same drivetrain when choosing their next vehicle. Yet more evidence that the future is electric.



5. Are we ready for the online car lot?

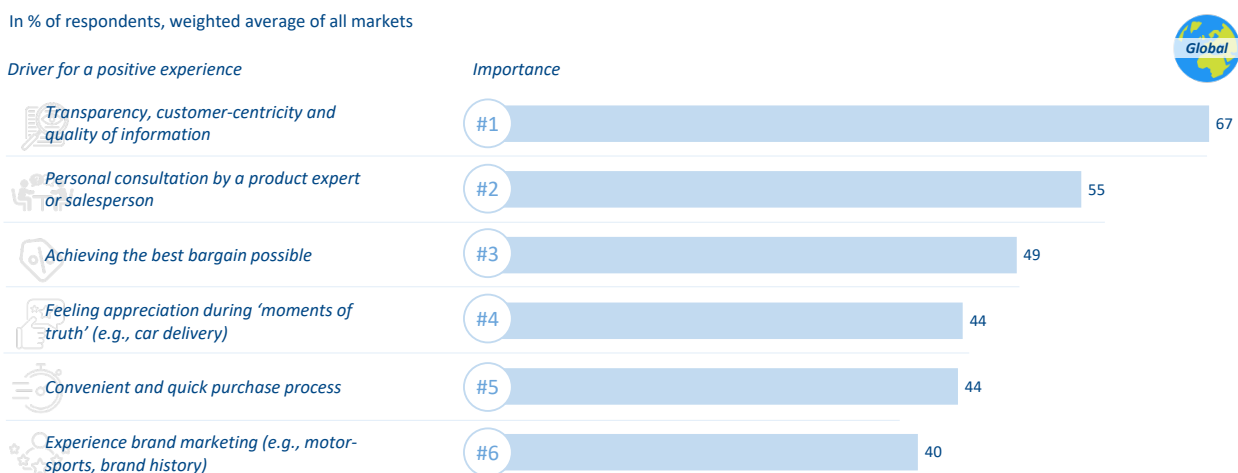
Whatever the vehicle type, buying a car remains a significant and highly personal experience. That's borne out by the fact that over two-thirds (68%) of those in our survey said they were looking for a sales process that was very 'customer-centric'.

So, even with the restrictions caused by the pandemic, most people (55%) didn't buy their car without having had at least one personal or face-to-face consultation with a traditional dealer. In fact, on average globally it took 2.4 such visits before a contract was signed. And contrary to what might be expected, younger customers visited car dealerships even more often than their older counterparts.

However, while physical dealerships are still the pre-eminent purchasing channel, the automotive sales process is going through a quiet revolution, with an increasing acceptance of innovative retail formats. China is at the forefront of this, with 71% of customers saying they would be willing to buy their next car fully online, as against just 35% in Europe and 42% in the US.

Figure 13: New sales models – what matters?

New sales models
In car sales, transparency and customer-centricity rank as the top drivers of a positive customer experience during the car purchasing journey, followed by personal consultation
What are the three most important drivers for a positive customer experience during the car purchase journey?

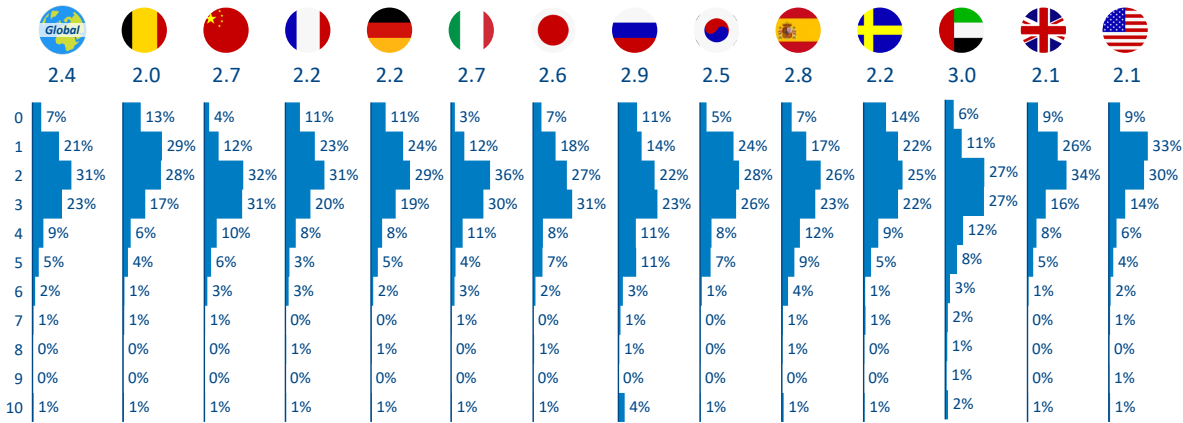


Source: Arthur D. Little analysis
 Note: Values weighted according to car sales of markets included

Figure 14: New sales models – dealership visits

New sales models
 Customers visited 'traditional' car dealerships 2.4 times on average before signing their contract – most visits in UAE and Spain, least visits in US, UK and Belgium
 During your last car purchase, how often did you visit a 'traditional' car dealership before closing the deal?

Multiple choice, all respondents



Source: Arthur D. Little analysis
 Note: Global values weighted according to car sales

While there is overall reticence about committing to a wholly digital car purchase, many are willing to go online for at least parts of the buying process, such as initial information gathering and vehicle configuration. There is also a general appreciation of the price transparency offered by digital channels and potentially a cheaper deal — 65% of customers globally say they would expect to receive a lower price online than from a traditional car dealer.

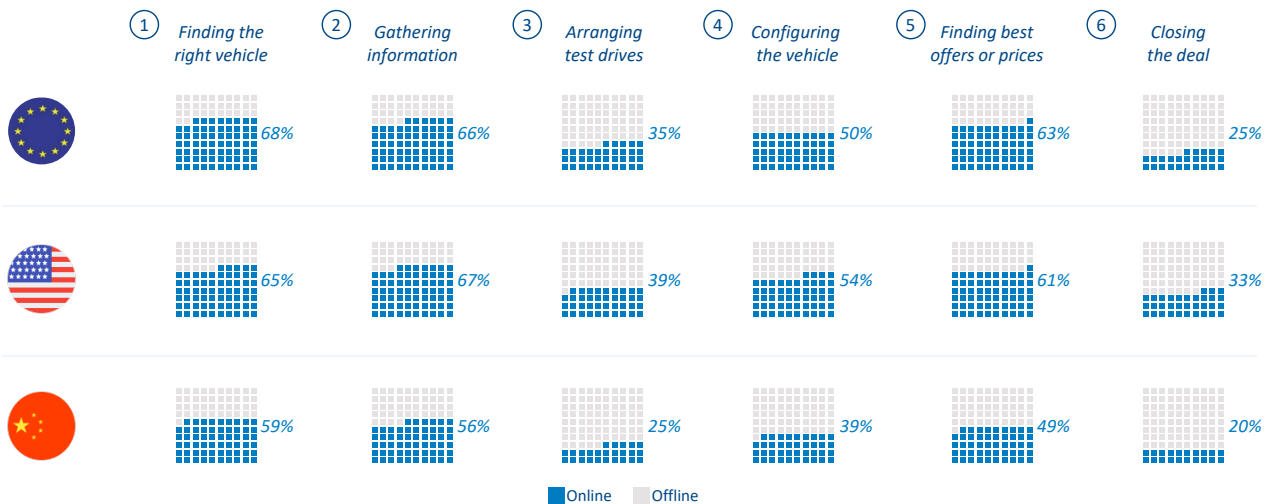
However, when it comes to arranging test drives and closing the deal itself, more than two-thirds prefer person-to-person interaction. Perhaps because bargaining over a deal is something that's important to nearly half (48%) of respondents.

There seems little difference in the sales process preferences between buyers of premium or volume brands, however, there is an observable regional variation which OEMs and dealers may need to reflect on.

Figure 15: New sales models – online purchase

New sales models
 Most respondents are happy to complete some steps of the car purchase process online, but not arranging test drives or closing the deal
 Along the car purchase journey, which steps do you prefer to complete online and which offline?

In %, by region and purchase journey



Source: Arthur D. Little analysis
 Note: European values weighted according to car sales

6. The China phenomenon

In the introduction, we commented on what we saw as a bi-polarity in the global automotive marketplace, with our respondents' answers showing a clear and obvious division between attitudes in China and what many might regard as 'the West'.

In fact, China can be seen as something of a 'special case' in many ways which, given the size of its domestic market, has significant implications for the global automotive industry.

As yet, it is impossible to know whether China is simply an anomaly, but certainly the enthusiastic willingness of customers there to embrace new solutions sets it apart.

Consequently, while new mobility services remain something of a niche sector in Europe and the US, many Chinese respondents told us they have used ride-hailing (70%) and ride-sharing (53%) services.

There is also an evident difference when it comes to alternative drivetrains. Only 41% of Chinese respondents, for instance, thought their next car would have an internal combustion engine compared to 50% in the EU and 70% in the US.

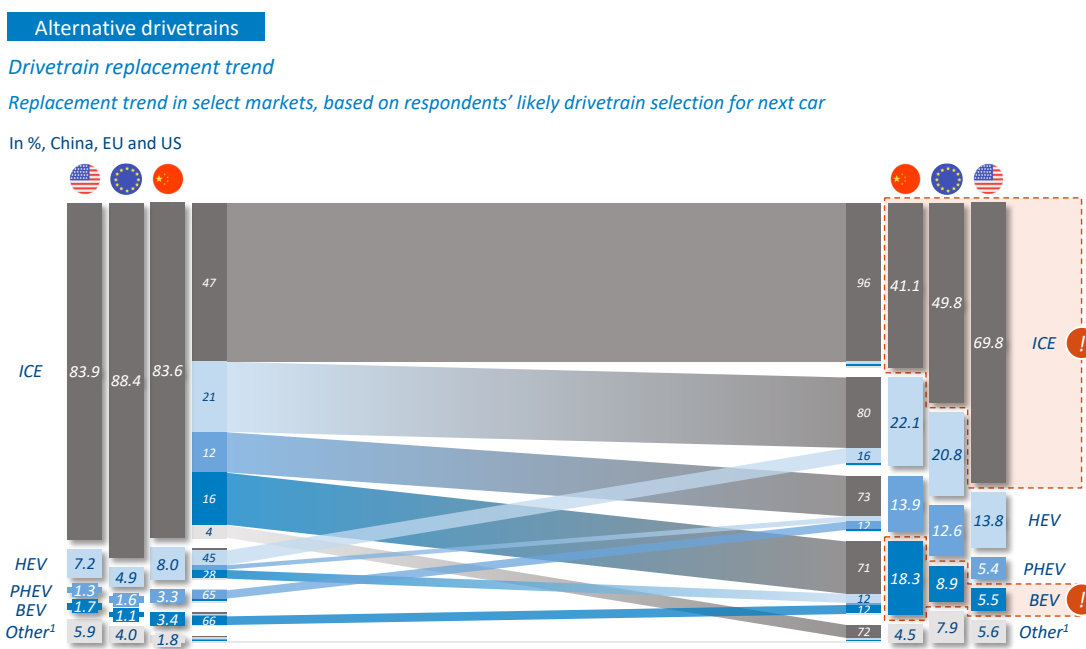
Significant differences are also observable in how vehicles are marketed and sold. Buyers in China are much more positive about buying a car online, something which over 70% of respondents would contemplate. And this enthusiasm is not confined to the young, with many over 45s also ready for online car purchasing.

Again, the acceptance of autonomous driving is much higher in China than elsewhere. In fact, it is the only market where the majority of customers are in favor of fully autonomous vehicles.

Having been hit early by COVID-19, and reacted differently to it compared with other countries, China is now well into a significant post-pandemic recovery. This leaves its automotive sector much better positioned than in the US or Europe and should see it enjoying a 'V-shaped' rebound.

Further cementing its status as the world's automotive powerhouse is China's growing interest in car ownership, with a higher percentage than elsewhere thinking that owning a car will be more important in 10 years

Figure 16: Drivetrain replacement trend



Source: Arthur D. Little analysis
 Note: 1) Other includes natural gas & hydrogen

7. Drawing conclusions for the future of automotive mobility

Given this rather confused, contradictory environment, we see that the automotive industry faces four primary challenges.

One: how to become better at anticipating changes in demand and ownership profile, then adjust their vehicle and services offering, as well as capacity and footprint, accordingly. This will entail optimizing product portfolios on a region-by-region basis, given the degree of difference between them, and developing retention solutions for downgrading or exiting existing customers.

Two: how to better exploit electric's potential. At the moment, the limited range of models available means that OEMs aren't capitalizing on the pent-up demand for hybrid models. But if they could aggressively fill this 'choice gap', they would be able to reap the rewards through upscaling and reinforcing brand messages about their green credentials to customers who are looking for more eco-friendly vehicles. Until they do this, manufacturers will be reliant on making the most of ICE cost structures so they can dominate in markets where electric infrastructure is lagging.

Three: how to grow the mobility services segment. The development of a true autonomous ecosystem will not happen overnight, which means accepting that effective monetization is quite literally some way down the road. But a larger portion of stakes in that future value chain is distributed now and playing that card will be a trade-off between positioning and profit requirements. In the meantime, OEMs should ensure that any autonomous features on self-owned vehicles offer clear and demonstrable value to the driver, so that when technology and regulation converge, they have prepared the market for any 'hockey stick' take off.

Four: how to optimize the 'new' value chain. OEMs can do this by creating high-performance ecosystem networks for electric charging, through partnership building with 'old-style' physical dealerships. They can then leverage this relationship to drive perceptions about new mobility options, and to provide integrated solutions that give customers benefit all along the value chain.

In future, market share and profitability will increasingly involve a trade-off between smart current investment and a commercial calculation about how markets and value chain might look in 10 years' time. For those who play their cards right, there will be a significant opportunity to capture a larger piece of the future profit pool.

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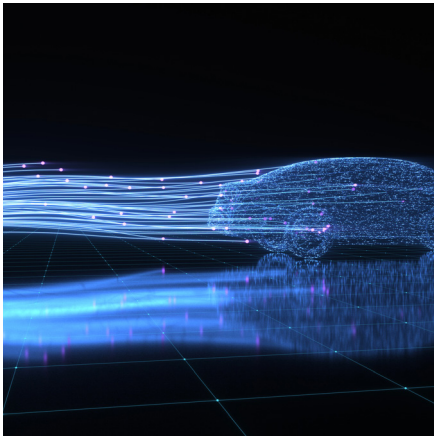
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The Future of Automotive Mobility

Uncertain drivers take global automotive markets to a crossroads

Global Automotive Mobility Study - 3rd Edition

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