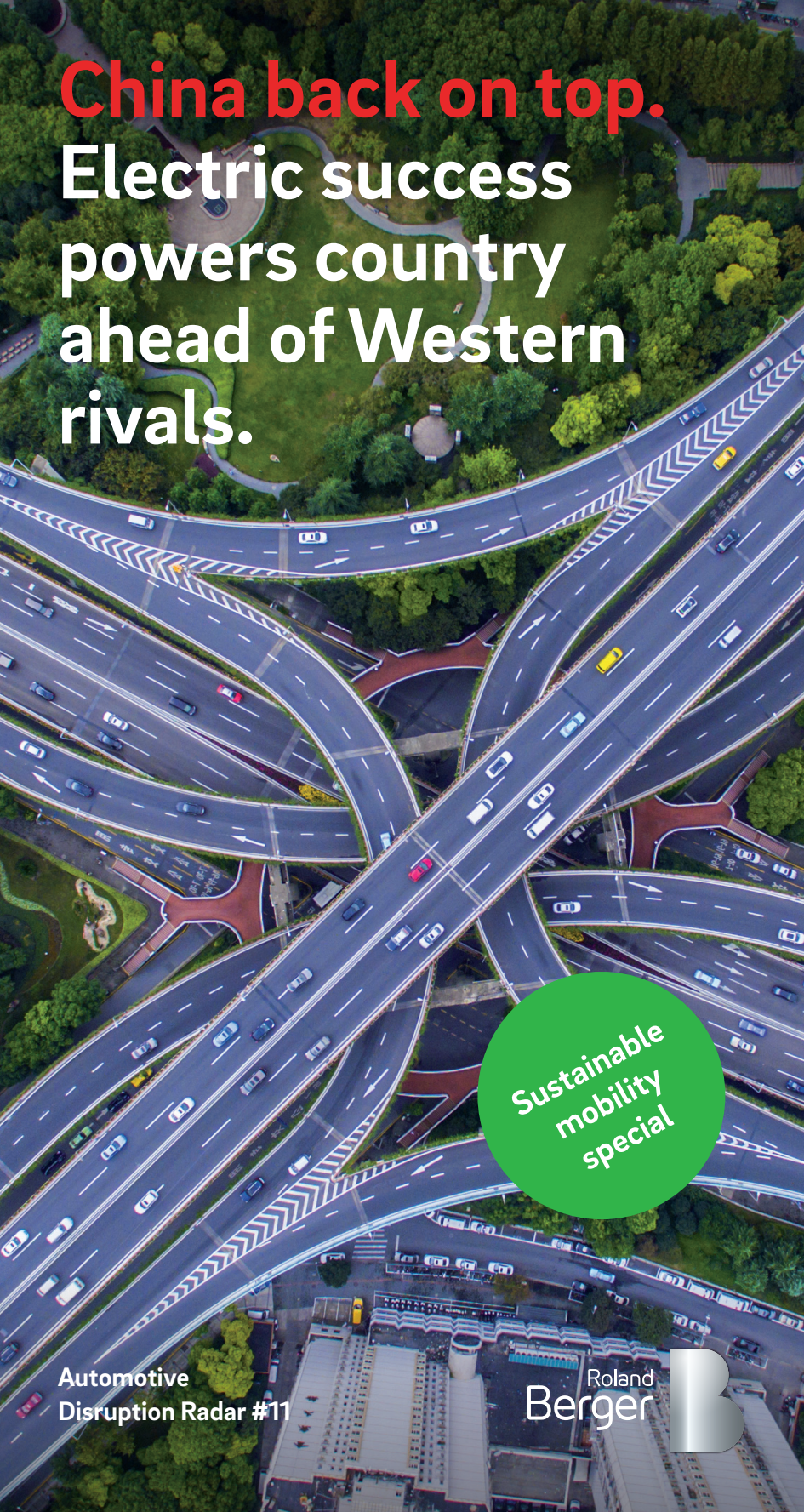

China back on top.
Electric success powers country ahead of Western rivals.
Sustainable mobility special
Automotive Disruption Radar #11
Roland Berger

After a gap of more than two years, China is once again the automotive market's disruptor-in-chief. Thanks to its leading electric vehicle (EV) industry, openness to new driving technologies and advanced mobile network capabilities, the country is back at the top of the rankings in the latest Automotive Disruption Radar (ADR), a twice-yearly survey and report that tracks 26 indicators across 23 countries.

For example, China leads the way in EV sales, with almost 3.4 million EVs and plug-in hybrid electric vehicles (PHEVs) sold in 2021. This compares with 691,000 in second-place Germany. Sales are boosted by the largest range of EV and PHEV models: 370 are currently on offer. Furthermore, a whopping 85% of potential car buyers are considering an EV as their next car. In addition, almost 500 million Chinese now have access to a 5G mobile network, a must-have for autonomous vehicles.

But while China scored highly in ADR11, so did the chasing pack. The Netherlands, which knocked China off the top spot in 2020 (ADR8), achieved a record score to place second. Singapore (3rd) and Norway and Sweden (joint 4th) are also snapping at China's heels.

In this booklet, we take a closer look at the top three's results, as well as those of some of the best improvers. And for this edition's in-depth focus we use results from all ADR editions to assess views on green automotive technology – and show why China, the great disruptor, might pose a threat to traditional automakers.

Cover photo Sino Images/Getty Images

Under the hood: Key findings

THE TOP THREE

China has been a strong performer in the ADR series since its inception in 2017, ranking first in editions 2-7 and always placing in the top three. Its leading tech companies, such as Baidu, Alibaba and Tencent, have been a strong pillar of its success, driving new technology such as 5G. But since 2020, the Chinese government has become concerned that these firms may become too powerful and placed them under special supervision. This crackdown is likely to hamper their growth, and it will be interesting to see how China pursues its technology leadership within the framework of these conditions.

The Netherlands and Singapore are ready to pounce should China wobble. They, too, have always been top ADR contenders, with the Netherlands finishing top in editions 1 and 7-10 (joint first with China in edition 7), and Singapore a regular second-place finisher.

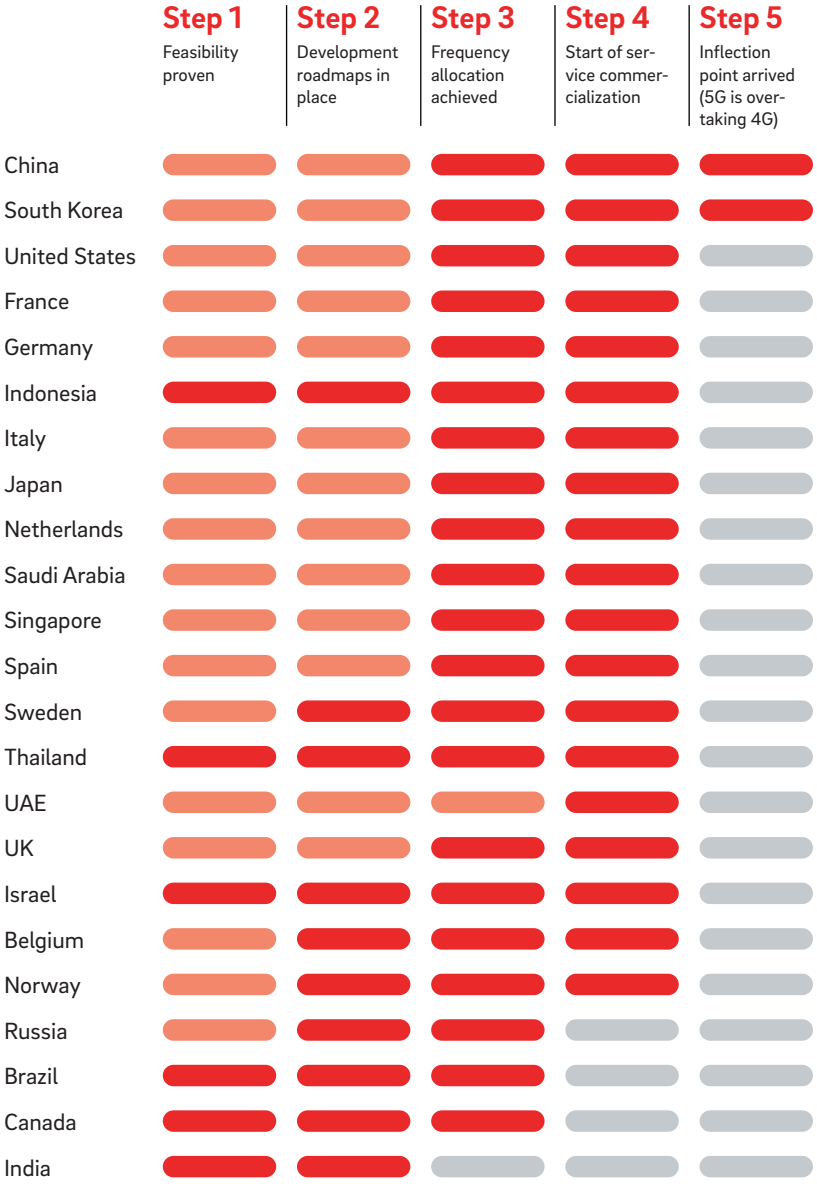
China rules: The country is back on top of the ADR rankings for the first time since edition 7

Overall score as percentage of maximum score

Source: Roland Berger

More bandwidth: China has made significant progress in 5G commercialization and has now reached the inflection point

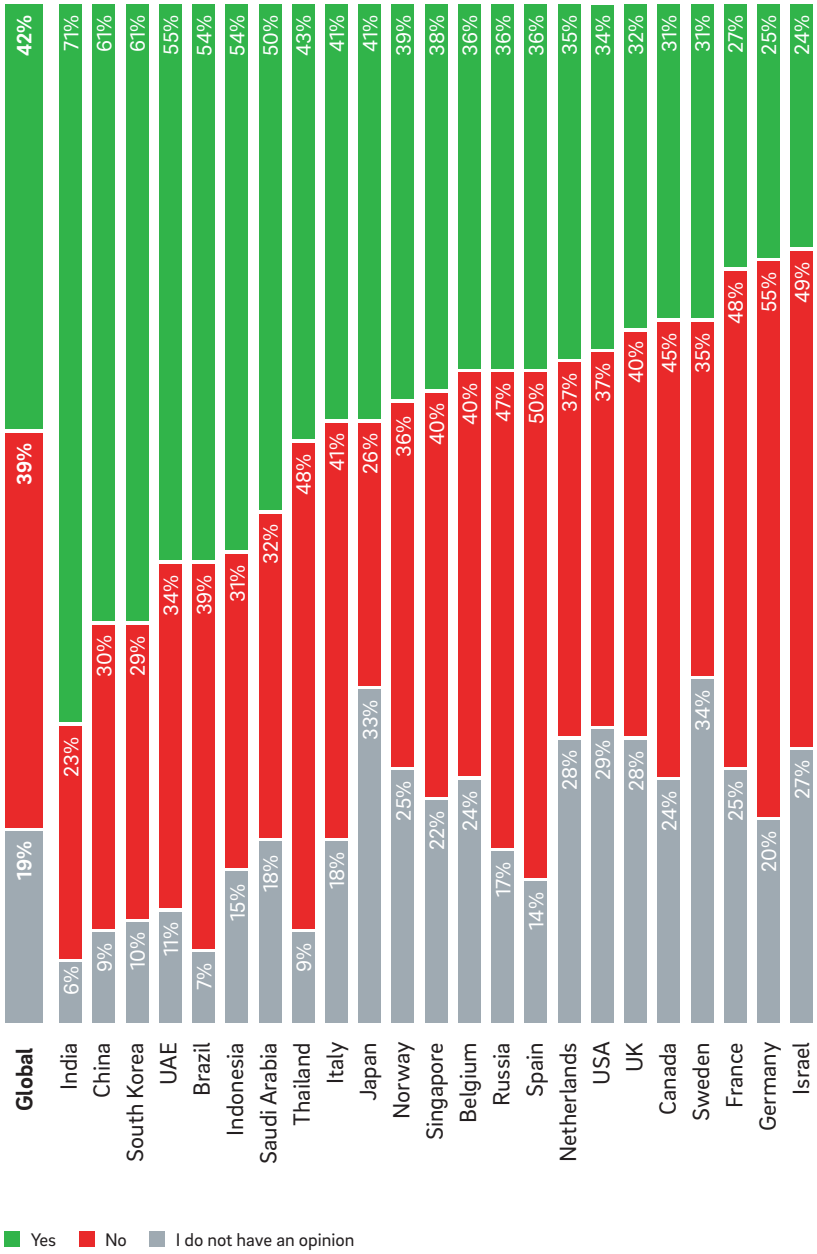
Evolution of 5G coverage roadmaps



Source: Automotive Disruption Radar – data points from Edition 1 to 11

Believe the hype: A majority of respondents think carmakers are taking the reduction of emissions seriously

Do you think the automotive industry is doing enough to reduce greenhouse gases?

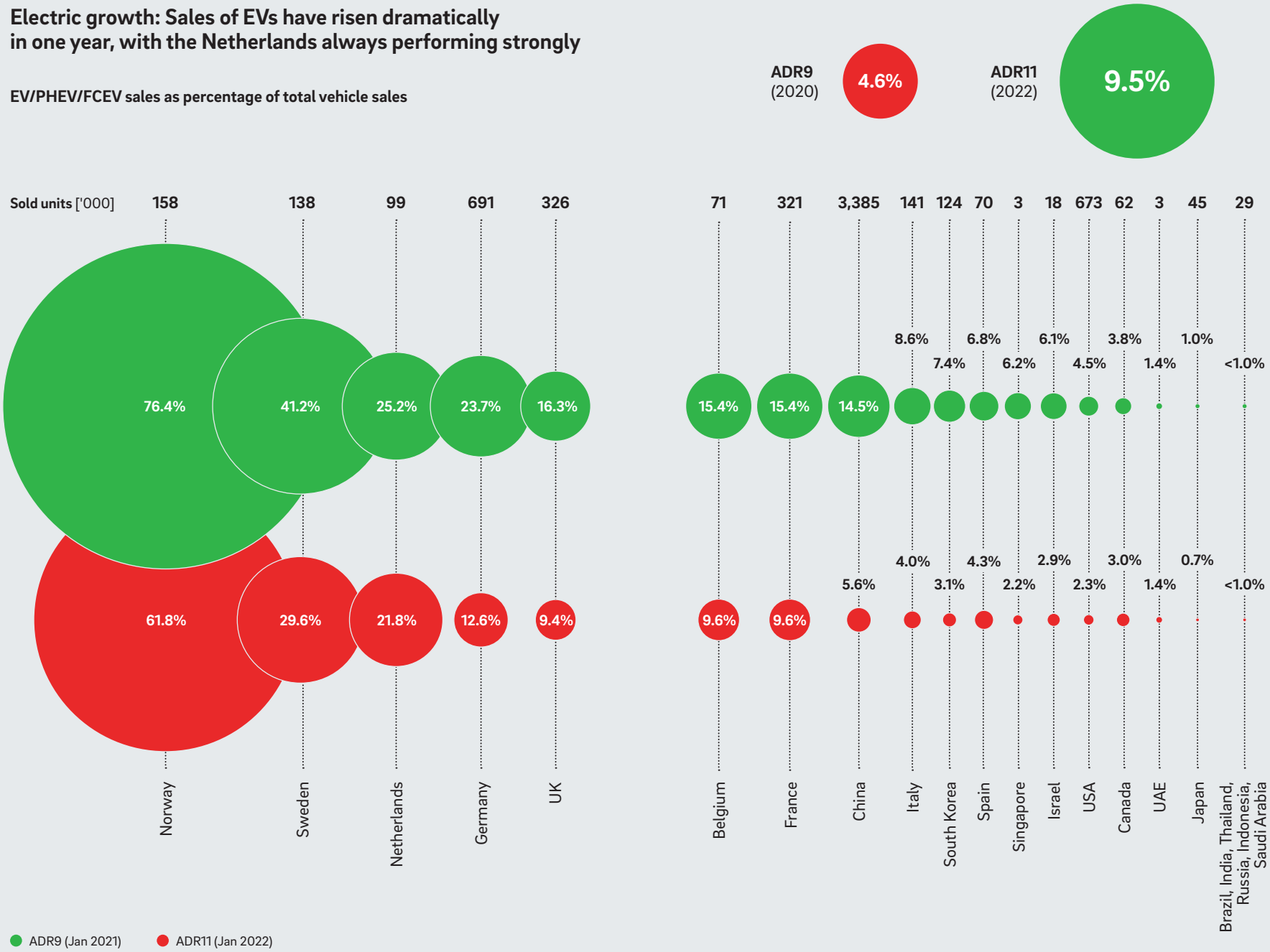


Source: RB online survey July 2021: 23,691 participants – Participants by country: Belgium (1,008); Brazil (1,010); Canada (1,020); China (1,014); France (1,014); Germany (1,005); India (1,003); Indonesia (1,016); Israel (1,381); Italy (1,015); Japan (1,018); Netherlands (1,011); Norway (1,053); Russia (1,005); Saudi Arabia (1,008); Singapore (1,018); South Korea (1,012); Spain (1,012); Sweden (1,017); Thailand (1,025); UAE (1,013); UK (1,000); USA (1,013)

The key to the Netherlands' success is its performance in the EV-related indicators. More than one in four cars sold in the country are EVs/PHEVs, a figure beaten only by Norway and Sweden. And charging density, measured by the number of charging stations per 100 km of road, is also high, at 37.5. Only South Korea has more (87.3). The country's decision to end the sale of conventional vehicles from 2030, one of the earliest announced dates among ADR countries, is another decisive factor.

Electric growth: Sales of EVs have risen dramatically in one year, with the Netherlands always performing strongly

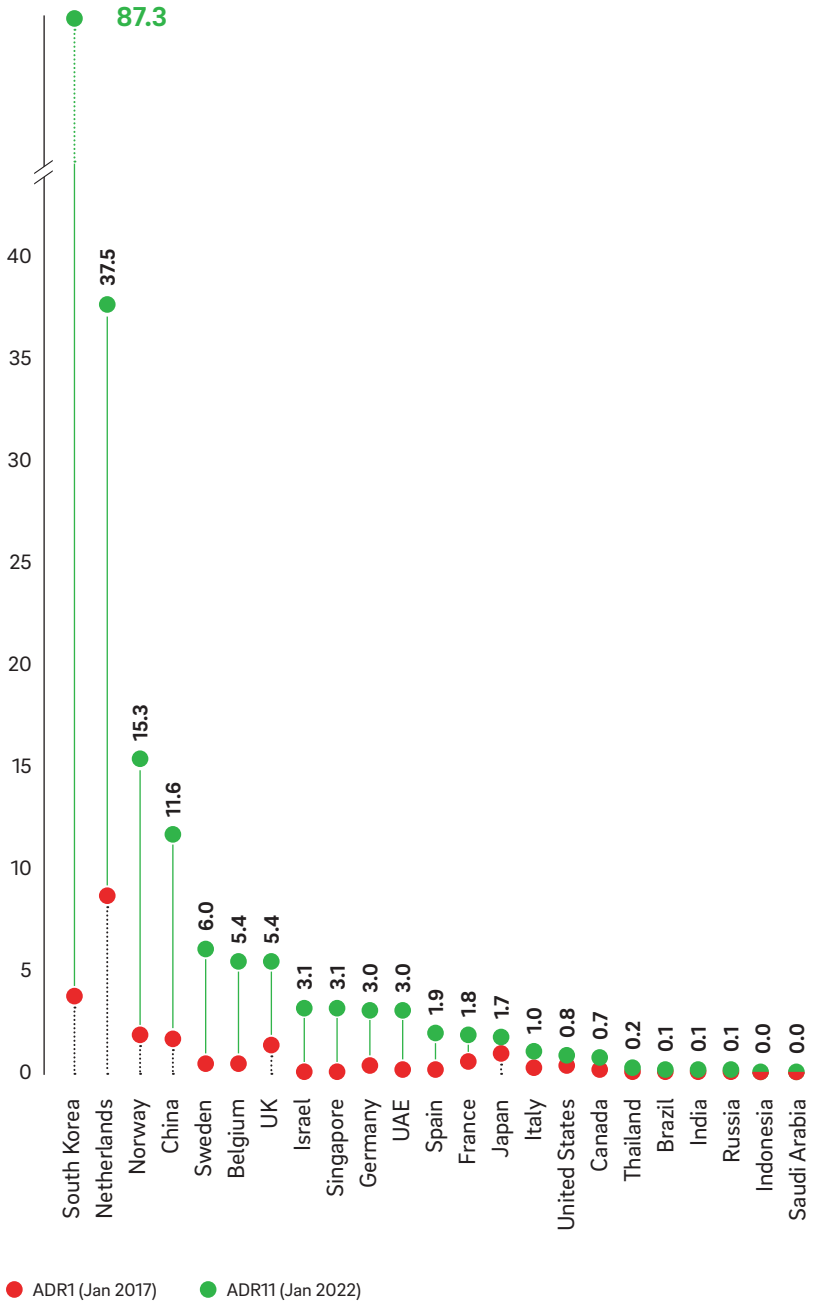
EV/PHEV/FCEV sales as percentage of total vehicle sales



Source: EV volumes, IHS, Roland Berger

Powering up: The Netherlands continues to be a leader in the rollout of charging stations, although growth is slowing

Number of charging locations per 100 km of roadway



Source: EV Volumes, desk research, Roland Berger

THE BEST OF THE REST

Several countries showed strong progress in ADR11. In Germany (7th place), a new law was passed allowing vehicles with level 4 autonomous driving capabilities (no human interaction required) on public roads. This is the most progressive national autonomous driving legislation to date.

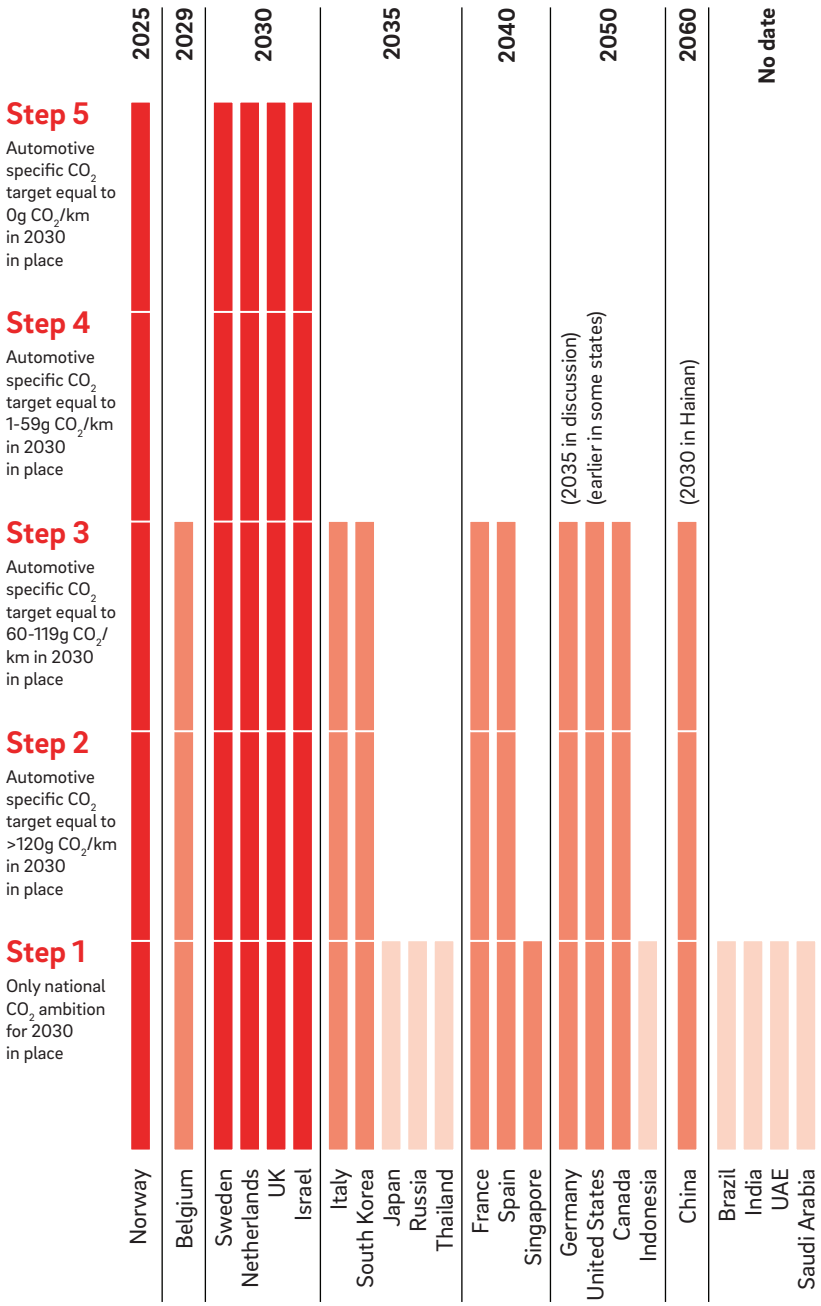
Norway is another legal trailblazer, this time in the area of zero emission mobility. Being the undisputed frontrunner in electric vehicle adoption, with already 76.4% of cars sold in the country in 2021 already being electrified and 70% of people considering buying an electric vehicle as their next car, far higher than the usual figure for Western countries (50%), the country's parliament has voted to ban the sale of combustion engine-powered cars and vans from 2025 – at least five years ahead of other zero emission vehicle frontrunners, such as the UK.

Away from Europe, three countries stood out. In Thailand (21st place), where EV sales only represent 0.3% of vehicles sold in 2021, the government also announced an end date for sales of combustion engine vehicles – 2035 – and continues to develop as an EV production hub. A clear expansion of the charging network has been initiated, from 176 stations in Jan 2020 to now more than 1,000, but this still only represents 0.2 stations per 100 km.

Brazil (19th place), meanwhile, is keen to do its own thing. A global leader in biofuel production, it has concluded that such technologies have a place in the drive for decarbonization alongside electric mobility. As a result, electric mobility will probably take more time to develop in Brazil, and EV adoption and charging facility numbers will remain below the global average.

Lastly, India (18th place): While most EV markets tend to be built around cars, the country is a good example of how electric mobility can evolve from two- and three-wheeled vehicles to buses and finally passenger cars. The electric two-wheeler market, for example, increased from 26,000 units sold in 2020 to 136,000 in 2021. Much more is to come: For instance, Indian EV producer Ola Electric is currently building the world's biggest e-scooter factory, with a planned first phase production capacity of 2 million units. The company had almost 100,000 pre-orders by the end of 2021. We will follow up on developments in the two-wheeler market over the coming issues.

Zero hour: Norway is ahead of the competition when it comes to CO_2 emissions targets and combustion engine bans



Source: Automotive Disruption Radar – data points from Edition 1 to 11

Sustainable electric mobility: Why traditional OEMs risk falling behind China

The evolution of all indicator scores across the 11 ADR editions points firmly in one direction – autonomous driving is coming, it's just a matter of when. By enabling new mobility concepts and potentially reducing the overall number of vehicles on the road, this new world will increase sustainability. So, in ADR11, we decided to take a deeper look at green automotive technology, assessing people's views on sustainability, potential winners and its impact on today's automotive industry.

In our survey, which is completed by 1,000 adults with driving licenses in each of the 23 ADR countries, we asked the different populations what they thought of the industry's efforts to lower greenhouse gas emissions. Overall, 42% of respondents said they believe the industry is doing enough to cut emissions. But an almost equal proportion – 39% – think it could be doing more. People in Asian countries were more positive than their European counterparts, with India, China, South Korea and the United Arab Emirates ranking highest.

BRANDS MATTER

Trust in carmakers' zero emissions promises was similarly balanced. A total of 43% of respondents believe in some or all net zero target announcements, while the same proportion does not believe the net zero announcements. Western European countries, including EV frontrunners such as the Netherlands, had the lowest trust levels. A related question revealed that more than half of potential car buyers (53%) are positively influenced by a brand's net zero target announcements and thus more likely to consider choosing this brand for their purchase. Asian countries, Brazil and the Middle East again led the way, while the average in Western countries barely reaches 40%. Interestingly, people living in rural areas are much less concerned with net zero announcements, with only 36% of them saying such an announcement would positively influence their choice of a brand.

Our survey also showed that the ability of new all-electric OEMs to position themselves as zero emission companies gives them a significant advantage over traditional OEMs, who still produce gas-guzzling vehicles. Only 12% of respondents said they would definitely stick with traditional OEMs, while 38% of them said they were very open to newly established electric manufacturers, and even said they would only buy their vehicle from them.

THE CHINESE CHALLENGE FOR OEMS

The survey findings on brands are especially relevant in China, where 42% of interviewees said they were very likely, and 39% likely, to consider a Chinese brand. This adds up to more than 80% in total.
The reason for this is simple: Chinese OEMs better cater to the Chinese market. While incumbent OEMs struggle with their inherited distributed E/E architecture and monolithic software approach, emerging Chinese car brands such as Nio, Xpeng and BYD already offer advanced E/E architectures, personalized cockpits, over-the-air updates and cloud-connected platforms. This suits the tastes of China's largely young and tech-savvy buyers, for whom connectivity and digital features are more important than they are to the average Western buyer.

Choosing Chinese: Chinese brands are highly popular in their domestic market and Asia, but still growing in Europe

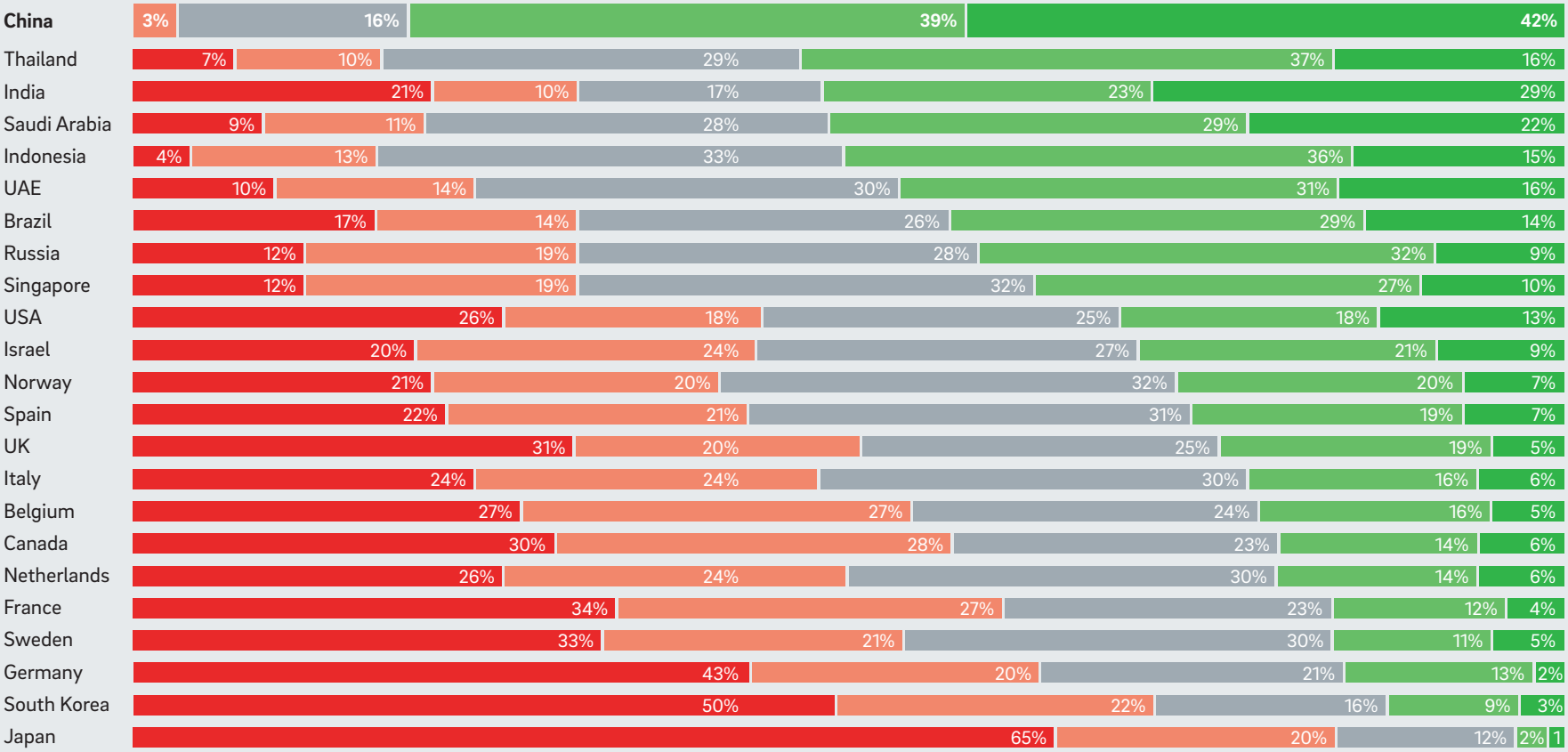
How likely are you to consider Chinese car brands from among the set of potential electric vehicles available to purchase?

3.4 M
China 2021 EV sales

23.4 M
China 2021 total car sales

8.3 M
China 2025 EV sales forecast (BEV+PHEV)

Source: EV Volumes, IHS, RB forecast



Source: RB online survey January 2022: 21,245 people considering Chinese car brands from among the set of potential electric vehicles available to purchase – Participants by country: Belgium (799); Brazil (923); Canada (828); China (926); France (789); Germany (738); India (998); Indonesia (974); Israel (867); Italy (934); Japan (727); Netherlands (897); Norway (894); Russia (875); Saudi Arabia (989); Singapore (962); South Korea (1,108); Spain (1,140); Sweden (861); Thailand (1,197); UAE (1,103); UK (852); USA (864)

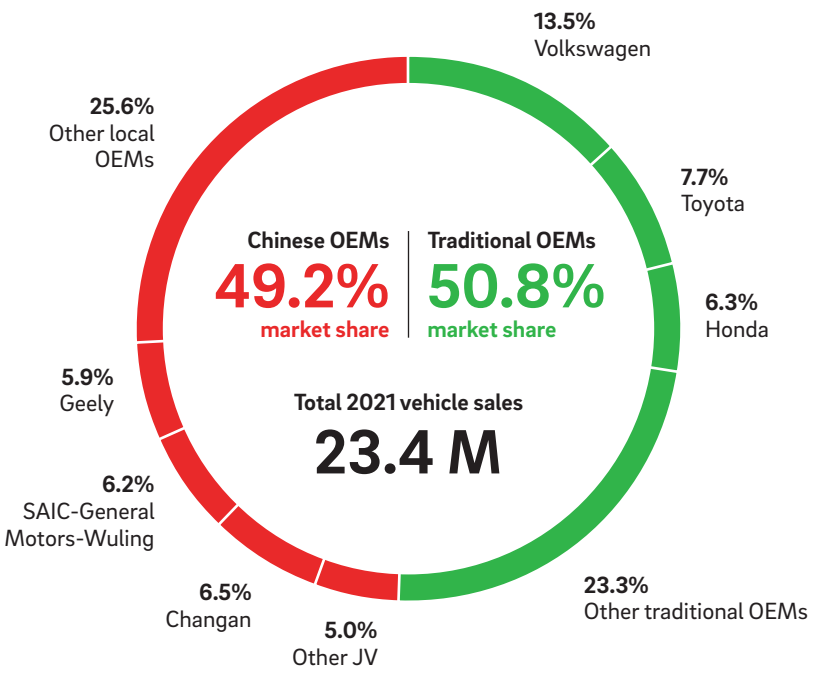
For example, the new G9 from Xpeng comes with a fast central processing unit, integrated LIDAR (remote sensing) systems and a 5G module for fast data transmission. This enables the vehicle for a wealth of autonomous driving applications. The Neta S from Hozon goes even further, combining an even faster central processing unit with its own operating system.

Failing to win over Chinese buyers will have major business implications for traditional OEMs. It significantly narrows their market and makes it more difficult to defend their position in the country, which currently stands at a 51% market share.

If we assume that the 42% of people who said they were very likely to consider a Chinese brand would never choose an incumbent brand, European and North American OEMs would see a decline in their addressable market of more than 22% by 2028. While this is a worst-case scenario, it demonstrates the importance of adapting to the Chinese market and its demands, as well as investing in new technologies.

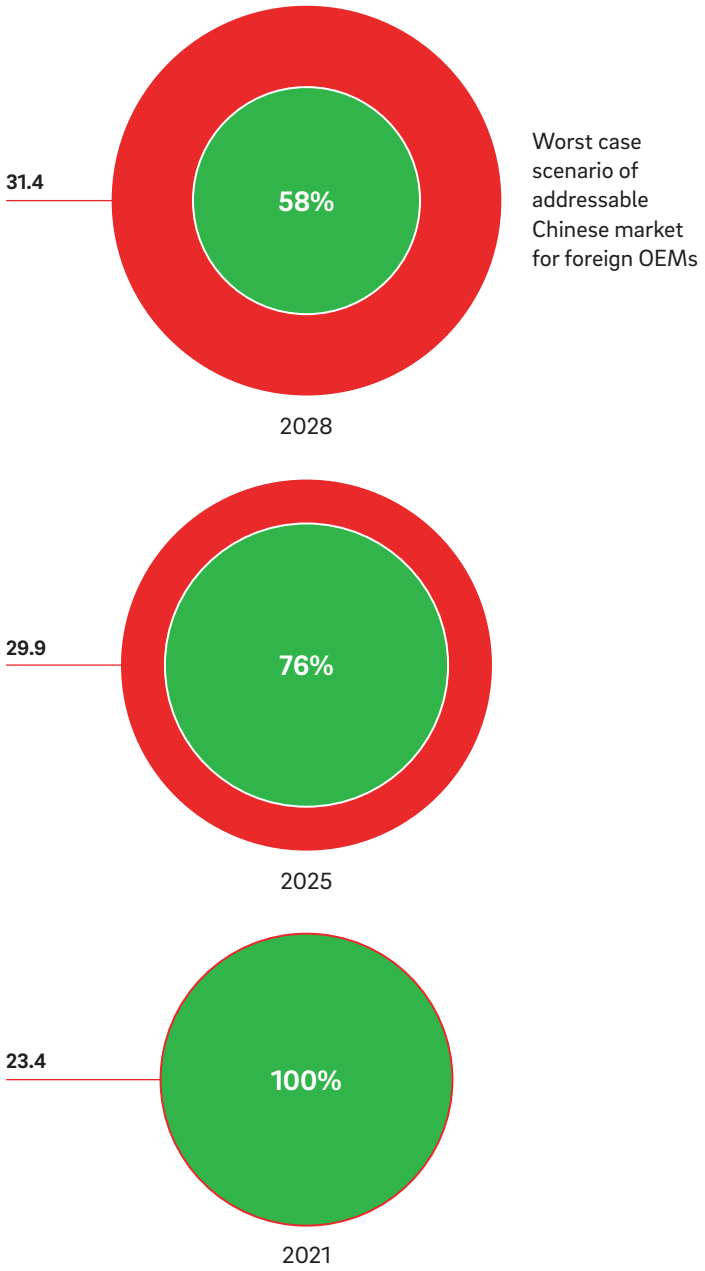
China vs. the incumbents: Traditional OEMs currently sell more cars in China than domestic brands, but only just

Market share of Chinese and traditional OEMs in China



Source: IHS, January 2022

Shrinking market: If traditional OEMs don't adapt to Chinese tastes, they risk seeing their addressable market fall by 3.5% per annum through 2028



Source: IHS, Roland Berger

Cover photo Daniel Hu/Getty Images

To halt the slide and recapture this revenue, traditional car manufacturers must more aggressively shift their business models from selling vehicles to selling localized, digital, connected vehicles. We see two broad solutions. First, traditional car manufacturers could develop vehicles tailor-made for the Chinese market. This would involve cutting links with their home market ranges and creating entirely new models. Second, they could increase their focus on revenue streams such as functions on demand to better fulfill Chinese demands. This requires advanced electronic and electric architectures, microservices and agile software development features that may currently be outside their core competencies.

No matter what they choose to do, one thing is clear: If traditional car manufacturers do not transform, it will not only be Tesla that is bearing down on their market share – it will be emerging Chinese automakers, too.

This example shows: Further disruption requires incumbent OEMs to adapt to the new situation and changes both the technical and the commercial sides of their business. A one-size-fits-all solution (or one vehicle for the global market) does not work anymore. Incumbent OEMs need to prepare for the fact that the world's markets are diverging and require tailor-made strategies for each region.

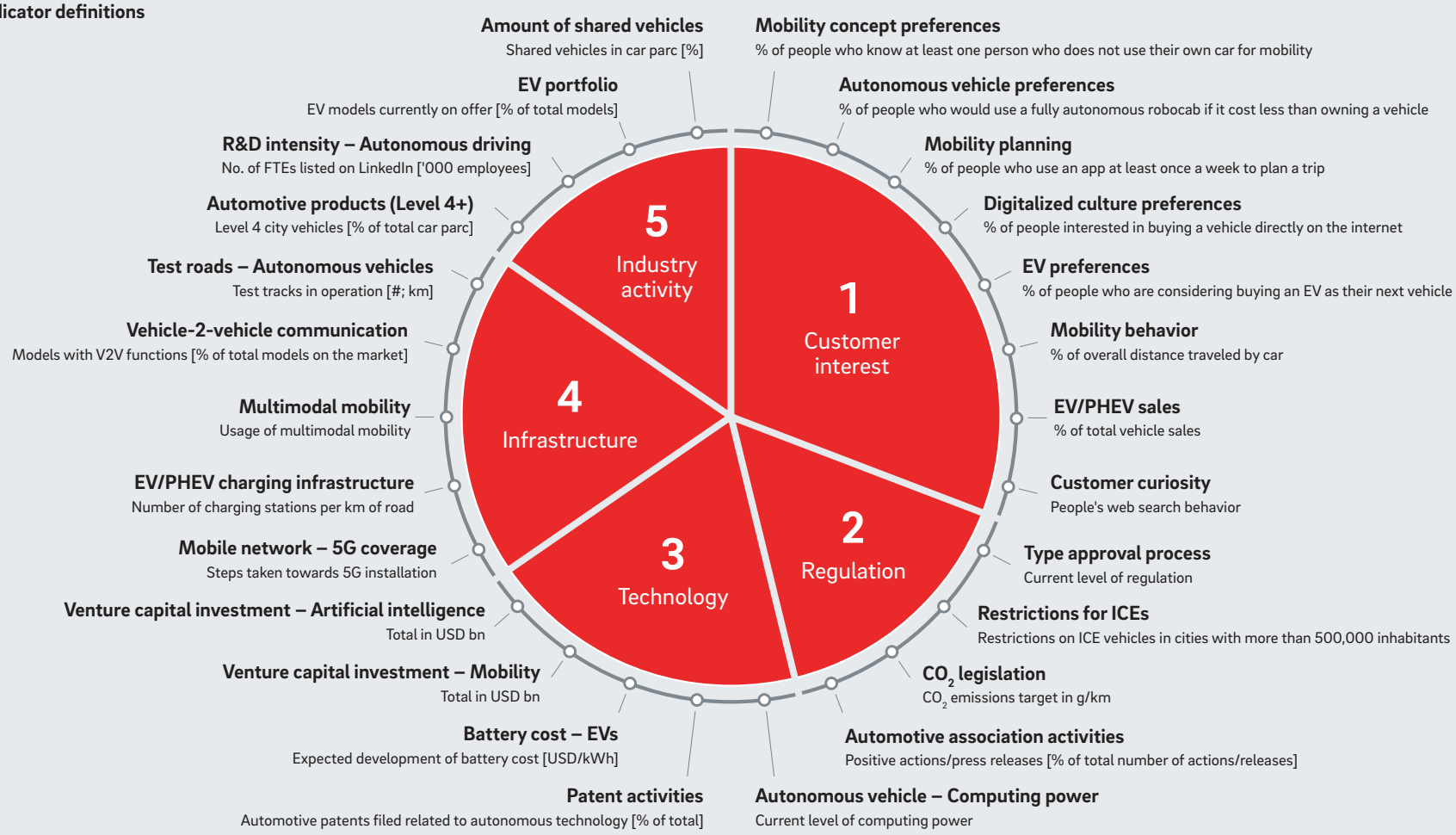
What is the Automotive Disruption Radar?

The Automotive Disruption Radar is a biannual analysis of market trends related to disruption in the global automotive industry, first undertaken in January 2017. Its latest findings are based on field research and a survey of 23,000+ car users across 23 markets (Belgium, Brazil, Canada, China, France, Germany, India, Indonesia, Israel, Italy, Japan, the Netherlands, Norway, Russia, Saudi Arabia, Singapore, South Korea, Spain, Sweden, Thailand, UAE, UK, USA). Information is also drawn from external sources, such as leading mobility experts and major industry reports. Each nation is scored along 26 indicators, grouped into five dimensions.

The ADR aims to answer key questions such as: which factors are driving change in automotive ecosystems; how do these factors evolve over time; and what can decision makers do to best manage disruption? Ultimately, the ADR is a go-to decision-making tool for senior executives in the mobility sector.

360-degree coverage: The Automotive Disruption Radar is based on the permanent screening of 26 indicators along five dimensions

Indicator definitions



Source: Roland Berger

Contacts

Dr. Wolfgang Bernhart
Senior Partner
Löffelstraße 46
70597 Stuttgart
Wolfgang.Bernhart@rolandberger.com
+49 711 3275-7421

Stefan Riederle
Partner
Sederanger 1
80538 Munich
Stefan.Riederle@rolandberger.com
+49 89 9230-8169

What is the Automotive Disruption Radar Community?

Roland Berger's Automotive Disruption Radar (ADR) website is a one-stop shop for automotive industry data and analyses. It offers free access to data from the **Roland Berger Automotive Disruption Radar**. Via the platform, users can navigate past and current data, customize and download charts and even configure their own radar. In addition, the ADR website features curated thought-leadership articles by third-party contributors, often presenting alternative views, different angles and fresh insights. Visitors to the site can also access links to publications and videos produced by Roland Berger investigating a wide range of current topics in the automotive industry.

→ Visit http://automotive-disruption-radar.com

Photos Roland Berger GmbH

All Icons from Noun Project

The ADR community gathers insights from recognized experts in the disruption fields – beyond Roland Berger, it currently includes:

Automotive World is a leading B2B publication for the mobility sector

Carbometrix's mission is to make companies' carbon performance data accessible and comparable

Charging Radar is the leading data analytics platform for public EV charging infrastructure

CoMotion is a global platform where leaders & policymakers meet to share ideas, do business and plan the new mobility future

fka is a research partner to the automotive industry since 1981

Springer Fachmedien is part of the Professional Group within Springer Nature – one of the world's leading science and professional publishers

→ **Read more about our community:** About – Automotive Disruption Radar (automotive-disruption-radar.com)

ADR members can navigate through the ADR data, customize and download relevant charts, read experts insights and more – free of charge

Publisher

Roland Berger GmbH
Sederanger 1
80538 Munich
Germany
+49 89 9230-0

Roland Berger is the only management consultancy of European heritage with a strong international footprint. As an independent firm, solely owned by our Partners, we operate 50 offices in all major markets. Our 2400 employees offer a unique combination of an analytical approach and an empathic attitude. Driven by our values of entrepreneurship, excellence and empathy, we at Roland Berger are convinced that the world needs a new sustainable paradigm that takes the entire value cycle into account. Working in cross-competence teams across all relevant industries and business functions, we provide the best expertise to meet the profound challenges of today and tomorrow.

22_2051_FLY_ADR11