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The future of interior in automotive

Understanding and preparing for cabin experience as a new opportunity for differentiation

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Imagine a world where affiliates of a vehicle brand are not waiting for the next SOP but the next OS update. Or where an OEM CEO introduces a new HMI system stand-alone to as much anticipation and fanfare as a new model. Or where car magazines discuss comfort levels rather than acceleration and horsepower. This is not a projection of the year 2050; it actually describes the automotive industry's emerging future!

The cabin experience is expected to take the spotlight away from automotive elements that have traditionally dominated headlines, including engine performance, exterior design, and—as electrification proliferates—powertrains. The rapidly evolving ACES[1] megatrends will create space for what is possible (or even required) in cabins, specifically:

— Autonomous driving will shift drivers' focus away from the road, opening them up to experiencing the car in totally new ways—for example, through allowing for super flexible interior layout with swivel seats and a living room atmosphere, as no one has to drive.

— Connectivity enables new ways—such as interior and comfort features on demand, over-the-air updates, and virtual assistants—to integrate the car into the users' digital ecosystem.

— Electrification makes engine power less relevant, creating an opportunity for interior as the new differentiator.

— Shared mobility will require new interior concepts—for example, durable enough to handle more usage and more users but still appealing with customizable options.

This emerging shift toward interior and in-car experience as a differentiator is also reflected in the results of various customer and expert surveys: 50 percent of customers perceive interior as very important, and 71 percent of automotive executives expect interior to become more important as opposed to only 38 percent who expect exterior to gain in importance.[2] In addition, 40 percent of global customers have a high interest in post-purchase feature activation, and 56 percent of Chinese customers would change their car brand for better connectivity.[3]

1 ACES: autonomous, connected, electrified, shared mobility.
2 McKinsey Future of Automotive Executive, Expert, and Consumer Surveys
3 McKinsey ACES 2020 Survey.

Addressing the key questions that arise in light of these developments, this article provides key insights in two main areas:

— **The future of interior as an opportunity for differentiation is dynamically evolving along five forces.** New vehicle types requiring adapted concepts, connectivity and HMI innovations changing the way passengers interact with the vehicle, next-level comfort features, increased demand for sustainability, and a focus on cost efficiency spending only where it matters most. When looking toward developments expected to happen by 2030, OEMs and suppliers will need to strategically address these five areas as markers of interior value.

— **Five strategic imperatives position OEMs and suppliers for successful interior differentiation.** Build substantial new knowledge on HMI technology, OTA, and future materials; rethink and speed up the journey from concept to cabin; reduce complexity to optimize costs and make customers' lives easier; make customer experience a top priority across the organization; and establish new forms of partnerships and cooperation to connect required capabilities in an increasingly complex cabin.

Text box 1: About the research

Insights for this article were generated from eight main sources:

— An analysis of interiors of over 50 current and concept vehicles, including both current car types such as volume-segment cars as well as future segments and form factors like premium autonomous vehicles, micropods and robotaxis, purpose-built ride-hailing vehicles

— Roundtable discussions on the future of interior and in-depth expert interviews with over 60 decision makers from 25 leading players

— 2020 ACES Survey with over 7,000 participants across the globe

— 2021 China Auto Consumer Survey with 2,396 consumers from 19 major Chinese cities

— Future Flex Pro Interior Materials Customer Survey with around 4,500 participants from Germany, China, and the United States

— Automotive expert panel discussions

— Design thinking methodology to uncover customer-segment-based mobility patterns and needs through typical mobility personas

— Insights from our work with clients on interior, connectivity, HMI, and customer experience

1. The opportunity and challenges of the vehicle interior as a key differentiator in automotive

The direct and indirect impacts of the ACES trends mean that a focus on interior is an absolute necessity for OEMs. Not only could the automotive interior and the in-car experience surpass the differentiation potential of more traditional features (for example, powertrain), the customer-segment angle in this arena is also quite different. Specifically, the importance of the interior for both premium OEM customers and volume OEM customers is equally high, and the details of that cabin experience are very similar across both customer segments. In McKinsey's global 2020 ACES Survey, premium and volume customers show an almost identical interest in on-demand features (39 percent of respondents) and indicate the same willingness to switch brands for superior connectivity (37 percent).

Given the shifting profit pools, it won't be enough to simply increase the sales value of a vehicle through the interior. By 2030, up to $400 billion in annual incremental value will be generated by monetizing car data over the life cycle of the vehicle.[4] To capture these new profit pools, new interior concepts with post-purchase feature activation are an important part of the strategy.

"A car in every garage" was a common visionary phrase in the United States in the early 20th century, but it is no longer a universal aspiration. Today the set of mobility models is more diverse than ever. While car ownership still meets the mobility needs of many customers, it is just one of a growing number of solutions. Car-sharing, e-hailing, and robotaxis are among the many applications for passenger vehicles, and customers are turning to all of them and in various combinations. Any successful focus on the vehicle interior has to accommodate all of these models and the dynamic ways in which customers move across all of them to fit their ever-changing needs. As shown in Text box 2, different personas with totally different mobility patterns and needs should be considered when designing a mobility journey.

We are already seeing examples of the interior as a differentiator, particularly from new OEMs:

— Chinese EV OEMs have introduced seamless, animated voice assistants, charging, and one-click aftermarket.

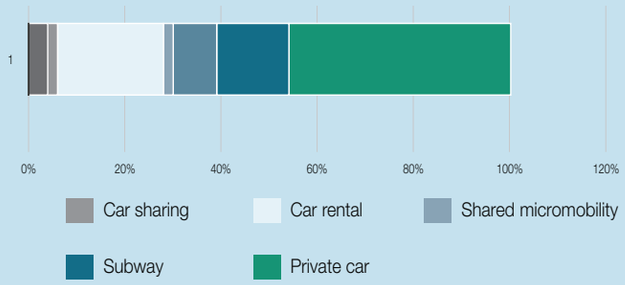
— A US EV OEM has made a single, center-mounted large screen with options for post-purchase activation a differentiating feature of its vehicles.

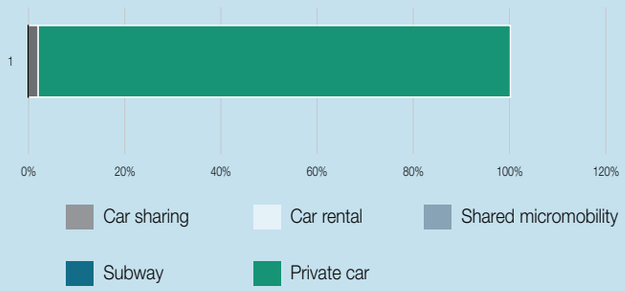
4 https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/unlocking-the-full-life-cycle-value-from-connected-car-data.

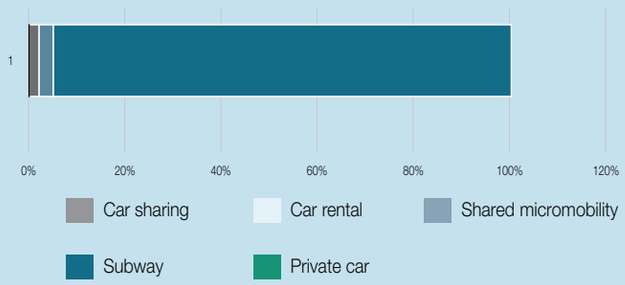
Text box 2:
Overview of different personas and their hugely varying mobility patterns

Different personas diverge in their mobility requirements and have varying needs for their future interior of vehicles (see Table 1 and Deep dive: Fabian and his cohort).

	Life and lifestyle	Main mobility modes and interior needs
Fabian 36 years old Entrepreneur Munich	Started his own highly successful tech company Married to a doctor who is currently on parental leave. Their son is 1 year old	Uses a wide range of mobility modes, from his private sports car to shared e-scooters. Focus on getting to his destination quickly and with fun Values cars that offer good experience and are fully digitally connected
Emily 39 years old Engineer on career break Suburban Minnesota	Lives with her husband and 3 kids in a home outside Minneapolis Very family oriented Worked as an engineer and wants to get back to work when kids are older	Mainly drives her own car due to poor alternatives in her suburb. Uses ride-hailing apps when needed and car rentals when on vacation Needs a practical, easy-to-clean interior for her kids. Limited interest in connectivity features
Wenting 26 years old Marketing professional Guangzhou	Lives in a shared apartment in Guangzhou Graduated from a prestigious university and now wants to focus on her career Has a big circle of friends and likes to meet them for dinner and karaoke	Goes to work by subway; often uses ride-hailing to go to the airport for work trips Often uses ride-hailing apps to see friends or attend events Uses all available digital features; connects her phone to listen to music and make phone calls







Rohit

46 years old
Senior manager
Mumbai

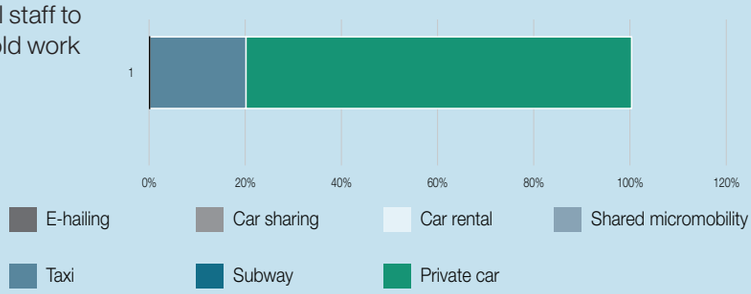
Lives with his wife and 4 children in a large house in Mumbai

Very ambitious and puts his career first

Employs several staff to handle household work

Chauffeured by his driver to business meetings, his office, and the airport in his private premium sedan

Values a spacious interior with quiet environment for work calls



Julian

22 years old
Student
Berlin

Lives in a shared apartment with some friends

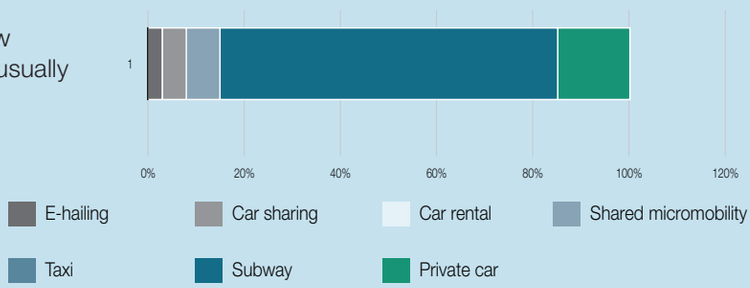
Outgoing and active, wants to be part of every event and party

Interested in new technology but usually short on money

Takes the subway or the bicycle to go to school

Takes a taxi to go home from clubs late at night

Price conscious but willing to pay a premium for mobility offerings with a great digital experience



Kazuko

89 years old
Retired
Osaka

Lives alone in an apartment, husband passed away 20 years ago

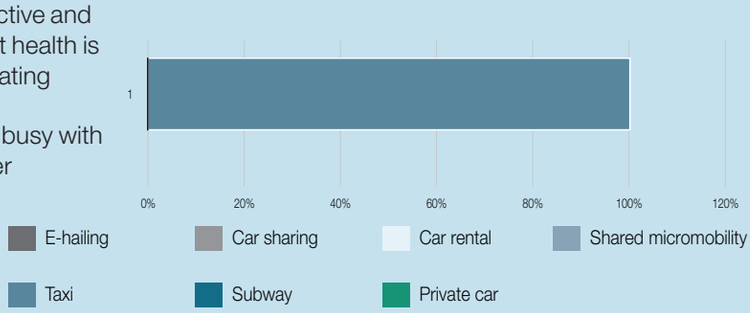
Still tries to be active and independent but health is steadily deteriorating

Her only child is busy with family and career

Mostly stays in her neighborhood due to impaired mobility

Takes the taxi to see family or specialist doctors

No interest in connectivity features but needs an interior that is easy to access



Deep dive: Fabian and his cohort

As a start-up founder, Fabian puts in long hours and values productivity. And, albeit minimal, he also values his time outside of the office. For him, time behind the wheel is also time to relax, be entertained, and even connect socially. To this end, his car's ability to connect him to the rest of his digital ecosystem is an important asset.

While he could certainly afford to place importance on prestige and outward-facing status markers, Fabian and many like him tend to value fun and functionality first. Public transportation, ride-sharing, and car rentals are equally important, and which one is chosen at any given time is largely determined by efficiency.

Fabian and his tech-savvy, high-earning peers use more mobility modes than any other segment. Traditional car rentals and commercial airlines are regular parts of business travel for them, and shared e-scooters and the subway are constant options for getting around town. Expense is not a barrier to the more costly modes, and digital complexity is not a barrier to the ones that are accessed by apps and smartphones. All of these mobility options are on top of private vehicle ownership as well.

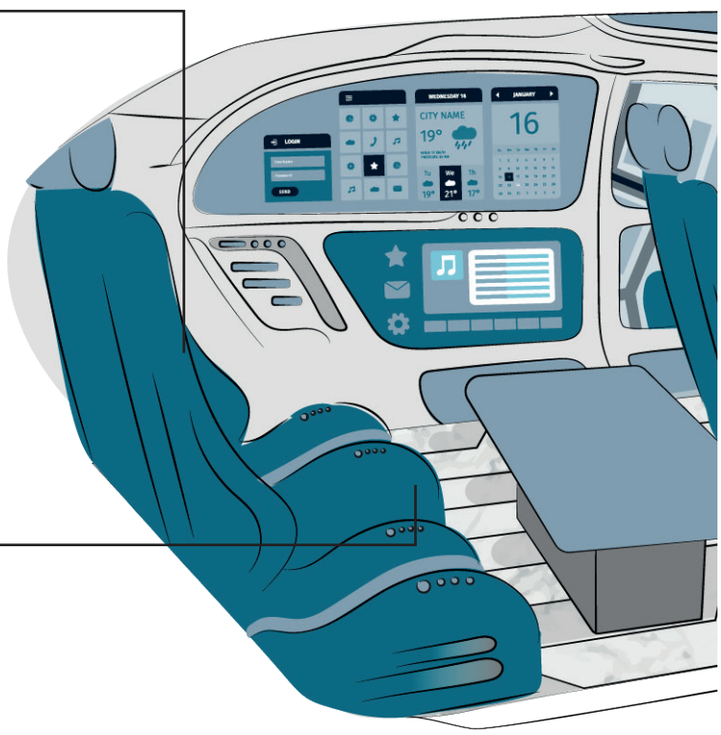
For Fabian, these various mobility modes help him successfully manage a very busy lifestyle, including the high demands of both his family and his business life.

Exhibit 1

5 driving forces can be expected to shape cabin experience through 2030

Cost efficiency

Amplitude of interior trends will increase cost pressure for non-visible/non-value-adding components



Sustainability

Green interior to contribute to ambitious decarbonization targets; increasingly asked for even by high-end customers

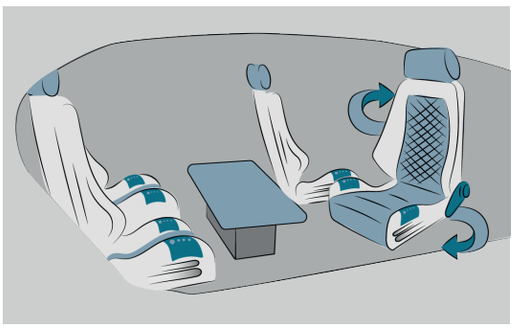
2. The “future of interior” is dynamically evolving along five driving forces

Based on surveys of and interviews with industry experts, we have identified five forces that will drive the evolution of the cabin experience over the coming decade (Exhibit 1).

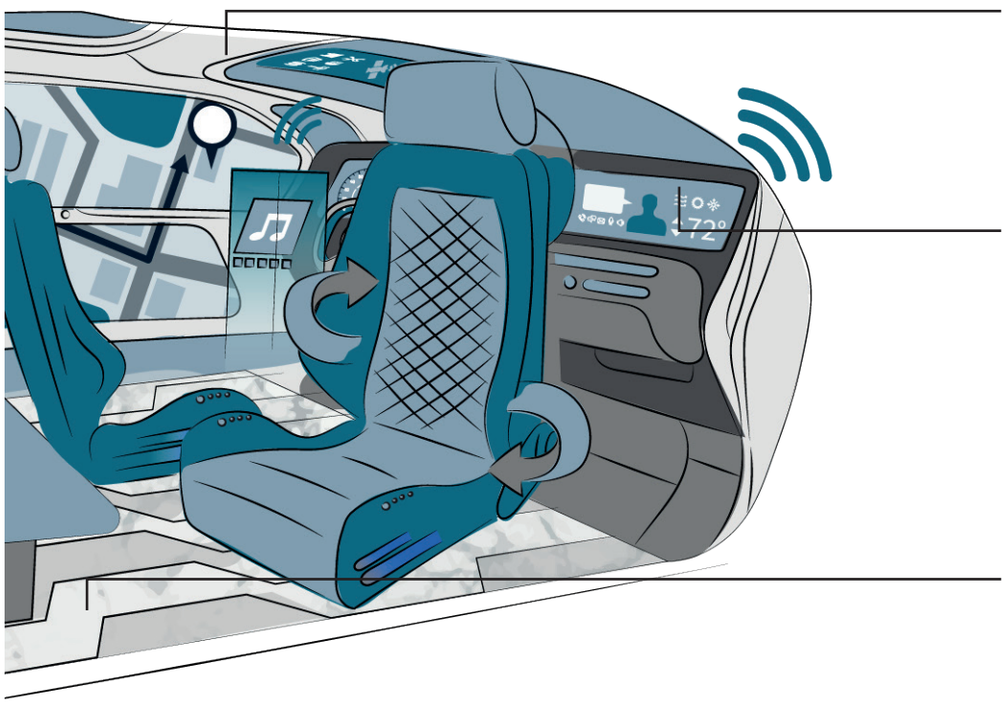
New vehicle types

What powers a vehicle, how it’s used, and how it’s guided has implications for its interior, leading to new vehicle types emerging through electrification, shared mobility, and autonomous driving. Interiors of these new vehicle types will be characterized by:

More space. The mechanics and architecture of a BEV’s powertrain allow for more interior space, much of which comes from flat floors and missing middle tunnels. That space can already be felt by passengers, but the opportunity for versatile usage and layouts—for example, lounge-like seating—has yet to be fully explored.



Electrification as well as shared and autonomous vehicles will have a massive impact on interior layout.



New vehicle types

Electrification, shared, and autonomous will have a massive impact on interior layout

Connectivity and HMI

Trend towards huge displays could be reversed, eg, through holographic systems

Voice may become the predominant input; rise of post-purchase features

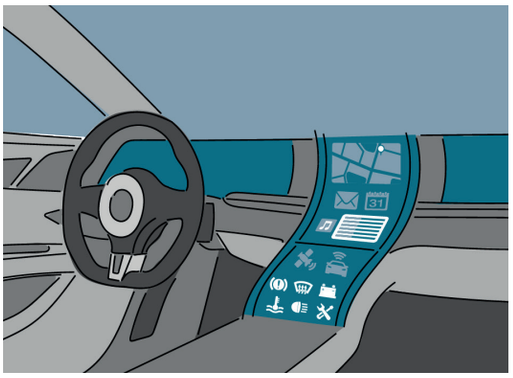
Comfort

Increasingly “homelike” trim and customizable cabin experience

Purpose-built interiors. Shared mobility makes features such as privacy, durability, and hygiene more important than they are for privately owned vehicles. These features can be further built on as autonomous vehicles and the mobility models they enable are scaled, for example, micropods and robotaxis.

Connectivity and HMI

We see four main technology features emerging that will shape vehicle interiors and there is reason to believe that these manifestations could further evolve by 2030.



Touchscreens hidden in seats and doors, surfaces, rollable and foldable displays

Display size and integration. Multiscreen layouts and multiuser content can be seen in vehicles today. There is already a clear design imperative to make these displays large for ease of use while keeping them as unobtrusive as possible. The year 2030 could see these touchscreens either fully integrated into existing interior services or foldable/retractable to make them even less obtrusive. Consequently, we forecast that the market for displays will increase by more than 4 percent annually.

Holographic systems. Small 3D projections are a feature in some vehicle cabins today. Holographic systems of the future could include gesture control as well.

Voice and facial recognition. Today's in-cabin digital assistants are voice enabled—some don't even require a wake-up word, and some are equipped with facial recognition. Future applications could enable refined proactive recommendations as well as increased assistant ability to react to multiple passengers and what is being said even without being directly addressed, for example, an automatic adjustment of the climate control system when a passenger complains, "I'm freezing back here!" The resulting increase in convenience will fuse an annual growth of up to 20 percent for the voice recognition market.

Over-the-air (OTA) capabilities. New features can be enabled and software updates can be installed via OTA technology. One leading Chinese EV disruptor reports that more than 350,000 OTA upgrades have already been conducted by its users.

By 2030, a broad ecosystem of post-purchase services could be accessible, including options for hardware upgrades. The popularity of these features might vary widely by region: McKinsey's 2020 ACES Consumer Survey shows that over 60 percent of Chinese respondents wanted to unlock features after purchase, compared with under 30 percent in France, Japan, and Switzerland.[5] The importance of OTA in China was confirmed by McKinsey's Auto Consumer Insights Survey 2021, which reveals that of over 60 percent of respondents that consider OTA an important way to upgrade vehicles, 62 percent are willing to pay for it, solidifying OTA's role in future revenue generation.[6]

5 https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/unlocking-the-full-life-cycle-value-from-connected-car-data.
6 https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/the-race-to-win-how-automakers-can-succeed-in-a-post-pandemic-china.

Comfort

An increasingly homelike trim and customizable cabin experience can be expected to further evolve across three categories of features by 2030.

Interior scenarios automatically adjust based on driver mood, time of day, or driving conditions.

Lighting. Lighting is already being given as much attention for its aesthetic value as for its functional value. Interior lighting is a central element in vehicle cabins today and can be personalized in various ways, including a wide range of color options. The driving experience of the future will be characterized by adaptive lighting functions that are automatically controlled by smart algorithms. Interior illumination settings will be determined, in part, by the context/purpose of the trip, the driver's calendar, and the traffic situation. Smart interior features will also anticipate and respond to the driver's mood or level of alertness by, for example, creating a relaxing afterwork feeling, providing a bit of stimulation in the morning, or delivering corrective signals based on driving behavior.

Surfaces and trim. As lighting continues to become as aesthetic as it is functional, surfaces and trim are becoming as functional as they are aesthetic with both intelligent features and a superior look and feel. Wood surfaces are now embedded with adaptive controls, and glass elements include haptic feedback functionality. In the future, seating could look and feel more like the Eames chair in a living room than the bucket seats we've become accustomed to. These will likely remain niche applications in the next years, as indicated by our forecasted flat market development for seats and slight decline for interior trim.

Thermal features. Today heated armrests are a step above heated seats, bringing a differentiating level of comfort to some models. This development is backed by our survey results, which indicate that over 80 percent of consumers find surface heating/air conditioning interesting features of the door compartment.[7] Tomorrow's models could have features that recognize the passenger and their preferences and automatically adjust climate control settings accordingly.

Sustainability

Customers are increasingly demanding environmental sustainability, and this sensibility extends to vehicle interiors as well. Two features in this category are helping OEMs win over customers and reduce their environmental impacts.

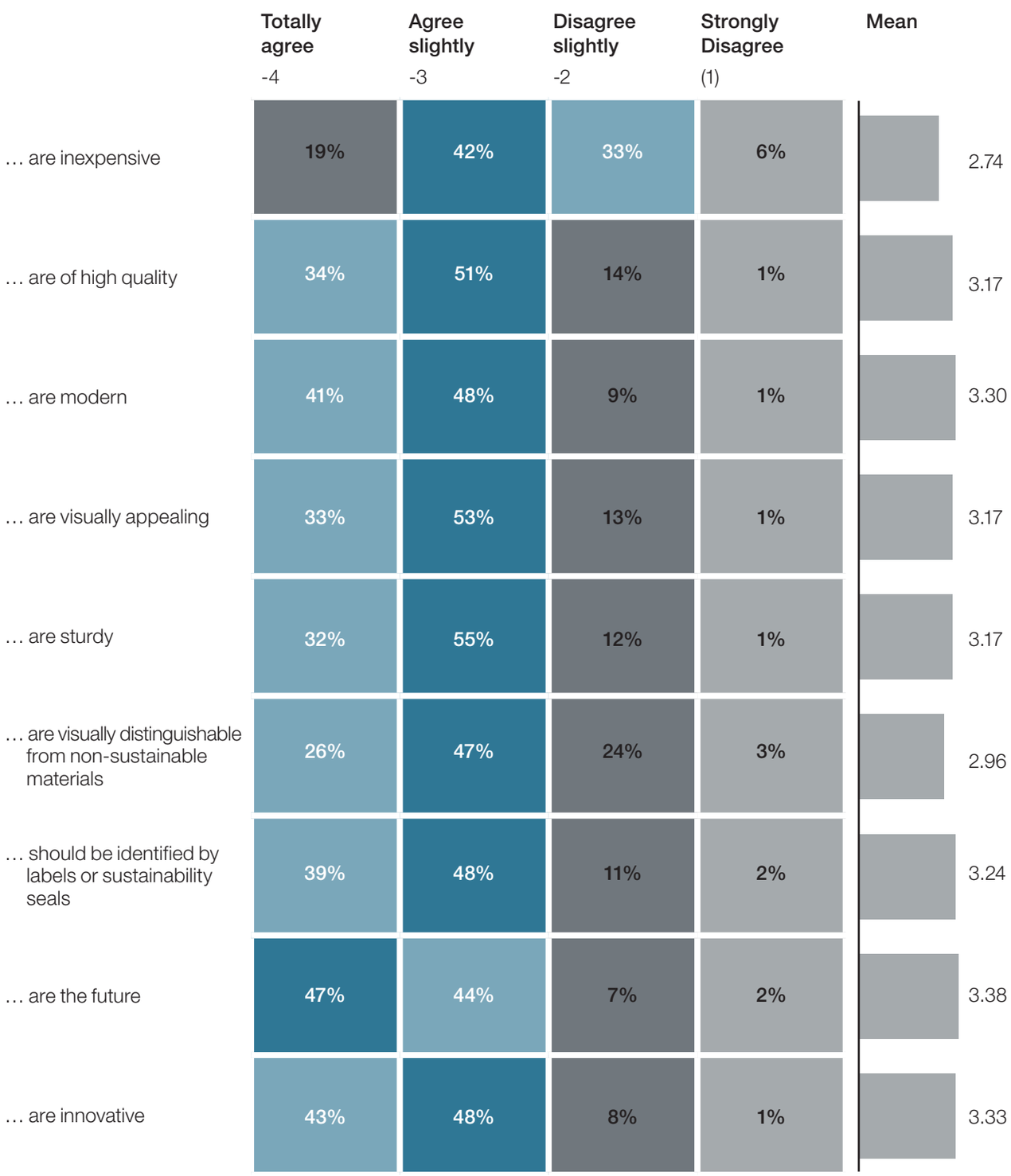
Novel, eco-friendly materials. Responsibly sourced materials already make up a significant share of vehicle interiors. The end of this decade could see cabins comprised of nearly 100 percent eco-friendly materials, which are also increasingly requested, even by high-end customers, to fit individual lifestyle choices (for example, vegan interior offered by luxury car OEMs).

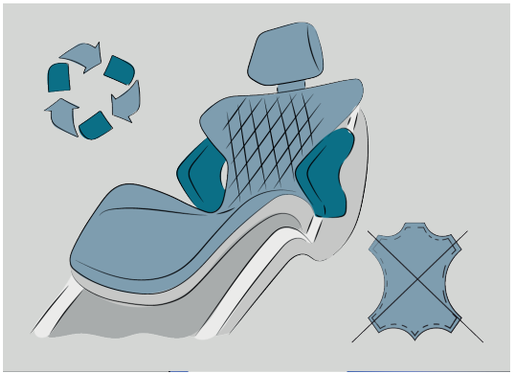
Our research[8] indicates that customers already perceive sustainable materials as the future of automotive interiors (91 percent). Specifically, sustainable materials are perceived

7 Future Flex Pro Interior Materials Customer Survey with around 4,500 participants from Germany, China, and the United States.
8 Future Flex Pro Interior Materials Customer Survey with around 4,500 participants from Germany, China, and the United States.

as high quality (85 percent agree or strongly agree), modern (90 percent), and visually appealing (86 percent). Eighty-seven percent of respondents would appreciate seals or labels that describe the materials used—an opportunity for OEMs and suppliers that already use sustainable materials.

Exhibit 2 **Sustainable materials in the interior ...**





Full eco-friendly interior over the life cycle also in high-end segment.

Lightweight materials. It's not just body frames where lightweight materials are being applied. New materials for the vehicle's interior are also a focus. Over the next several years, a growing share of interior materials could become lightweight to further support decarbonization efforts through lower consumption over the vehicle life cycle.

Cost efficiency

A more sophisticated understanding of which interior components bring value and which do not will be critical as differentiation is not free. Premium or excessive materials used in invisible or low-priority interior components are counterproductive to a smart interior strategy. A focus on two strategic areas will help ensure cost efficiency by reducing unnecessary spend.

Reduced complexity. Differentiation does not mean infinite personalization. Decreasing the number of variants means that the number of interior configurations today is actually lower than before. The successful interior of 2030 could, potentially, be the only interior available on a selected model, with all of the personalization coming from adaptive features based on passenger recognition realized on the same hardware.

Reduced content. Advances in technology have reduced the size/content-volume requirements of some components. When shifting gears, for example, actually required driver muscle, a large handle was necessary for adequate leverage. Nowadays this is largely electronic, so many OEMs are realizing that less is more (or at least that more is no longer necessary) when it comes to the size and makeup of the gearshift. In 2030, we could see this logic (and the accompanying cost savings) applied to steering wheels (where steer-by-wire might open new opportunities for both experience and cost savings). The number of displays might also be reduced, particularly in entry-level shared vehicles where users can utilize their personal devices instead.

Our research indicates that what consumers want OEMs to focus on in interior differs depending on region. For example, when asked about willingness to spend, respondents in Germany and the United States show the highest willingness to spend on surface heating. This feature is less relevant for Chinese customers (German respondents' willingness to spend was approximately 40 percent higher than Chinese respondents'). When looking at willingness to spend for smart surfaces (for example, gesture control, haptic feedback), Chinese consumers are willing to spend significantly more than both German consumers (44 percent more) and US consumers (35 percent more).[9]

9 Future Flex Pro Interior Materials Customer Survey with around 4,500 participants from Germany, China, and the United States.

3. Five strategic imperatives can position OEMs and suppliers for successful interior differentiation

While there certainly is no single, one-size-fits-all approach to preparing OEMs and suppliers for success on the new opportunity of interior as differentiation, our findings reveal five general but strategic imperatives that all automotive OEMs and suppliers might consider.

Build substantial new knowledge on HMI technology, OTA, and future materials
To set themselves up to capture the business potential of interior, OEMs and suppliers should consider three investment areas.

HMI technology. Our survey indicates that smart surfaces, holographic systems, and voice recognition might become the most important technical HMI features by 2030—even more important than new types of screens or passenger devices. For example, we have seen Chinese OEMs creating truly interactive avatar assistants—greeting passengers with a "Hi, Cutie" and a big smile from the car's avatar on the center dashboard and then suggesting a hip new restaurant after a short dialogue.

Investing in new technology can go as far as thinking of interior and in-car experience as key brand perception shapers (for example, via a unique voice assistant avatar).

OTA. In our expert survey, OTA was seen as the most impactful driver of future customer experience and profit over the life cycle of a vehicle by about 20 percent of the respondents, ranking second highest—only a customizable, integrated interior experience was described as the most impactful driver by more respondents. However, more than one-third of automotive leaders do not believe that their companies are ready for OTA—the highest value for any interior topic. Some premium OEMs are nonetheless starting to offer comfort and connectivity features on demand, such as steering wheel and seat heating, digital radio services, or lighting. To enable OTA and other connectivity features, OEMs will need to invest in E/E architecture with their customer-experience aspirations in mind.

Future materials. In addition, new surface materials are required to generate durable and attractive surfaces for a true "living room on wheels" experience. Leather—formerly the ultimate seating-material differentiator—is becoming increasingly unpopular. Consumers in China don't like the smell, and eco-friendly and ethically sourced materials are growing considerations for customers.

New materials such as novel fabrics and artificial leathers are well accepted. Not only are they replacing leather seating areas, they are also replacing, in part, high-end trim such as wood applications. Even high-end luxury manufacturers are experimenting with vegan leathers made from grapes.

Reduce complexity to optimize costs and make customers' lives easier
Although interior is a new opportunity for differentiation and experts expect an 11 percent increase in content per vehicle, there are levers to reduce costs. The single most effective lever in this respect is complexity reduction. For example, while a typical European

premium OEM easily has over 100 different interior configurations, one US EV OEM offers only two different configurations in its newest vehicle. What is more, volume OEMs facing high cost pressure can consider stepping out of their own developed HMI and instead utilize a docking station for users' mobile devices or solutions from mobile ecosystem companies offering a bundled set of services known from mobile phones in a single in-car system. Importantly, this complexity reduction might not only lower costs but even be more attractive to many customers as they may be pleased with the option of accessing a vehicle interface that is similar to the interface they use on their phone.

Make customer experience a top priority across the organization

Interior is one of the main drivers of customer experience. The automotive industry is still lagging behind other industries in this area—as we saw from an in-depth analysis of the HMIs of ten premium SUVs, none of which fully satisfied customer needs.

However, customers do not only focus on the time they actually spend in the vehicle when evaluating their experience. Instead, they look holistically at their entire journey—including buying the car, getting insurance, driving and charging it, connecting it to their digital ecosystem, and reselling it.

Therefore, customer experience should not be seen as a stand-alone program but treated as a top priority fundamental to and across all departments. CEOs should state a clear customer and product vision and build a cross-functional team led by a chief experience officer. This team can build a seamless end-to-end customer journey across all steps and channels.

OEMs can learn from best-practice examples: a new Chinese EV OEM puts customer experience at the center of its organization, leading to lighthouse interior and HMI features (for example, highly recognizable assistant and avatar) as well as the introduction of new services such as battery swapping and pickup services for maintenance. Customer experience is evaluated holistically by combining data from all sources.

Rethink and speed up the journey from concept to cabin

The journey from concept to cabin has to be quicker. A traditional, sequential approach to product development is costly not just in terms of time and money but also in competitive advantage as customer feedback also comes too late in the development process, limiting the time to react before SOP. Spending less time guessing what consumers want is critical. To this end, OEMs and suppliers can commit to getting a better and earlier sense of what customers actually want by co-creating products and features with customers. They will also benefit by making rapid prototyping and customer testing (potentially in labs, see Text box 3) a fundamental part of R&D in interior. This co-creation should be accompanied by especially rethinking the development release plan logic of the digital part of the interior. As OTA updates become the norm rather than the exception, a release logic for development—rather than a traditional three- to four-year refresh or a development cycle tied to the model year—is starting to be established in the industry and may become the new norm and expected by customers.

Establish new forms of partnerships and cooperation to connect required capabilities
For at least three reasons, there is an increasing need for OEMs and suppliers to partner up and connect capabilities in order to successfully compete for the new opportunity in interior.

Increased complexity in physical interior. With the increased complexity and specialization of interior components, it is getting even harder for suppliers to master it all. For example, as trim is increasingly intertwined with digital UX (for example, touch-sensitive interior trim sections), the line is blurring between components that were once in distinctly different categories, and this requires different technologies to be integrated. Partnering with others with complementary capability profiles is increasingly needed to deliver future interior solutions.

Physical and digital as integrated experience. The integration task of providing a seamless user experience across physical interior and HMI and digital in-car offerings requires new capabilities to live up to digital native customers' expectations. In China we see that OEMs typically do not own the ecosystem services customers are used to, so forming partnerships to create deeply integrated digital ecosystem experiences becomes paramount (for example, for integrating digital payment services, which over 45 percent of Chinese auto consumers consider important).[10] Collaboration models can go from more supplier-type relationships with technology ecosystem players providing integrated infotainment systems up to true partnerships in which new solutions are explored collaboratively and co-developed.

Seamless in-car and out-of-car experience. Beyond an integrated in-car experience, customers are increasingly expecting a seamless in-car and out-of-car experience (for example, smart home device controls connected to car infotainment and usage), forcing integration beyond the OEM/supplier scope and requiring partnerships. In China, for example, we see highly connected in-car and out-of-car experience use cases being pioneered by disruptive NEV OEMs—for example, valet charging services allowing a digital access code to be sent via phone to the service representative that picks up the car, charges it, and returns it to the parking lot.

To address these challenges, we see two directions of partnership models that OEMs and suppliers take with regards to interior.

Horizontal partnerships. These partnerships aim at combining capabilities required for the future of interior and HMI concepts through partnering within the same step of the value chain. For example, a tier-one lighting supplier partnered with a tier-one plastic trim supplier to benefit from trends around integration of light into the hardware ("light is the new chrome"). What is more, another tier-one supplier is setting up a "cockpit of the future" platform with strategic partnerships between different suppliers for interior and HMI.

10 McKinsey 2021 China Auto Consumer Survey.

Vertical partnerships. These partnerships are seeking benefits in combining capabilities across value chain steps, including those beyond the traditional automotive ecosystem (for example, into the service and application layer). For example, an OEM partnered with a US tech giant to fully integrate their operating system into the vehicle. Another example is a Chinese OEM partnering with a Chinese tech company to fully integrate consumer product AI into the vehicle, going as far as launching a co-branded car under one of the OEM's brands with the tech company sub-brand name associated with the model name. A further tier-one supplier and a Chinese tech company partnered up on R&D to develop an integrated cockpit solution for a Chinese OEM's EVs.

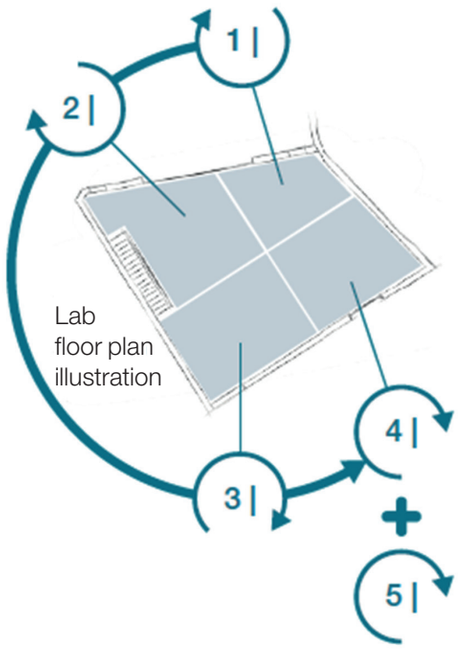
Text box 3:
How MXT Lab in Stuttgart helps to connect automotive players

Fraunhofer IAO and the McKinsey Center for Future Mobility joined forces in 2018 and set up the Mobility Experience and Technology (MXT) Lab in Stuttgart. The lab connects players and conducts applied research on interior and connectivity with the aim of helping players from the automotive sector and beyond navigate their way through crucial aspects of the mobility experience (MX).

The MXT Lab is a place for creativity and experiments, where early-stage MX ideas can be rapidly prototyped and tested toward do-or-don't decisions. At the core of the MXT Lab is a highly flexible MX demonstrator that allows for immersive but fast-to-realize customer research on, for example, use cases customers will demand in autonomous vehicles. The MXT Lab's mission is to accelerate our partners' early innovation process along all stages (see below). A main aspect of the lab and its general approach is the fast realization of ideas as prototypes or Wizard-of-Oz functions, which allows decision makers to evaluate their ideas based on both their own impressions and real-world experiences.

In addition to the lab itself, creating a forum for an interdisciplinary exchange to discuss and evaluate ideas is an important aspect of the MXT Lab. We bring together players from automotive, such as leading OEMs and suppliers, as well as other stakeholders, such as tech start-ups, media content providers, and mobility service providers, for whom new mobility offerings are becoming increasingly important. What is more, we regularly host roundtables to discuss and generate fresh insights on key topics, such as the future of interior, on which we held a virtual event in April 2021 with over 60 decision makers from 25 leading automotive players.

Exhibit 3 **The MXT Lab is a place for experiments, where early-stage MX ideas can be rapidly tested towards do-or don't decisions**

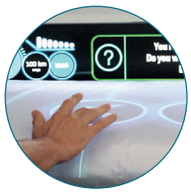


1 I Ideation

Room for analysis of future business models and mobility visions together with our experts, space for demo-meetings with potential partners

2 I Creation

Place for ideation workshops, make-athons, and meetings with tech players, content providers, and start-ups

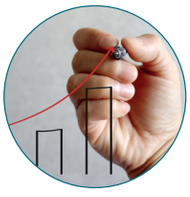


3 I Evaluation

Lab for testing and quantifying customer perception of future MX offerings in our highly flexible demonstrator and fast research ecosystem

4 I Conceptualization

Prototyping garage for rapid development of MVPs and digital applications in hackathons and design sprints, potentially together with our design partners Veryday and Lunar



5 I Quantification

Selective quantification and strategizing of promising ideas for MX offerings connected to our partners' research and development

Outlook: OEMs and suppliers should act now

As the five forces of new vehicle types, connectivity and HMI, comfort, sustainability, and cost efficiency shape interior as the future opportunity for differentiation, OEMs and suppliers need to decide on how to position themselves for future success.

With new players catching up or even leading in connectivity and interior experience, established players cannot rely on an image from the past but need to make a clear statement about their vision for the future. Key strategic questions to answer will be:

— **As a supplier:** How can we support an OEM with innovations—are we a component, systems, or solutions player? What is the most promising positioning for us in a changing value chain?

— **As an OEM:** How do we best understand our users' needs and put them at the center of an ecosystem we can only partly shape? How can we best work together with managed services providers (MSP) such as DiDi that end up designing the cars or with mobility service providers that will demand purpose-built interiors and, at the same time, are working on the development of a new vehicle of their own?

— **As a content provider:** How can a video be optimized for the interplay of various displays? How can the impact of advertisement/promotions be increased in a next-generation vehicle without distracting the driver?

The specific approach that an OEM or supplier will take depends significantly on the company's current capabilities and competitive position as well as its aspirations for the future. To some degree, however, every company with a stake in automotive interiors will at least need to consider taking action in the areas mentioned above. In one way or another, the previously described strategies speak to capacity (investments and partnerships) or efficiency (agile processes and complexity reduction) and the OEMs and suppliers that get it right in these areas will be best positioned to reap the value of differentiation in the area of vehicle interiors.

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