



Your Roadmap to the Future of In-Car Entertainment

TAKE A DEEP-DIVE WITH OUR INFORMATIVE WHITE PAPER TO FIND OUT MORE ABOUT WHAT IS DRIVING THE PURCHASE DECISIONS OF TODAY'S CONSUMERS AS WELL AS A LOOK AT WHERE IN-CAR ENTERTAINMENT IS HEADED NEXT.

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Put Buyers in the Driver's Seat with High-Quality In-Car Entertainment

The automotive industry has changed dramatically in the last decade. Consider, for example, the rise of new vehicle technologies, such as electric vehicles (EVs), hybrid vehicles, autonomous vehicles, and the growth of new competitors in emerging markets. In these dynamic conditions, vehicle manufacturers (also known as original equipment manufacturers, or OEMs) must find ways to innovate, remain attractive to consumers, and meet business goals.

Despite reports to the contrary, Millennials and Gen Z are continuing to drive, though they may be coming to it later and have different patterns of usage. As EV's become more prevalent, entertainment features are rising in demand.¹ EVs and their need for periodic recharging have changed the rhythm of road trips, while autonomous vehicles raise the possibility of a cinema or concert hall on the go.

As new technologies have been altering vehicles, consumers have also seen a change in entertainment technology. This includes music and video streaming and always-available entertainment offerings over telco networks and WiFi. These offerings have changed the ways in which people can experience entertainment. Whether it's streaming a movie at lunch, enjoying a podcast while working out, or listening to music during a commute, entertainment is ubiquitous.

Enhanced in-car entertainment offers OEMs the opportunity to meet consumer expectations and enhance revenues – both from initial purchases, and from subscriptions and in-app purchases.

Research shows Premium In-Car Entertainment Appeals to Consumers

In-car entertainment includes both audio and video delivered through head units either natively or via mobile phone connection using services such as Google's Android Auto and Apple's CarPlay. These services can connect to user accounts, storing playlists and preferences across devices, and offering a seamless experience at home, on mobile devices, and in vehicle. To find out how the availability of in-car entertainment affects consumer preferences in both vehicle selection and the purchase of premium entertainment systems, Dolby conducted research with a sample of prospective car buyers.

The survey was conducted online with 1,000 potential car buyers in the United States. Respondent qualifications were:

- Ages 25-65
- 50/50 gender mix
- Nationally representative of US regions
- Combined household incomes before taxes of \$100,000+
- Consider music a favorite activity and listen to music in car
- Decision-maker of car purchases
- Considering purchasing/leasing a car in the next six months and with a budget of \$40,000+
- Looking to upgrade to a premium audio system from the OEM (not aftermarket)

The Dolby survey was conducted online among 1,000 American consumers considering a car purchase or lease with a budget of \$40,000.

¹ Marketing Auto to Gen Z & Millennials - US - 2023 : Consumer Market Research Report | Mintel.Com. <https://store.mintel.com/report/us-marketing-auto-to-gen-z-millennials-market-report>. Accessed 11 Dec. 2023.

The research revealed that, while in-car audio is not the primary driver of car purchases, there are certain groups for whom it is more relevant than others. Those groups are made up of people who spend more time driving, those who drive with others in the vehicle, are under 55 years of age, and men. These groups – as well as luxury car buyers – are most willing to spend more on premium sound upgrades.

When it comes to paying for premium sound, 58 percent of total respondents say they are willing to pay \$1,000 or more to upgrade car audio. An additional 27 percent said they would pay between \$500 and \$1,000 extra. Clearly, there is value to OEMs offering premium entertainment options, because those with the money and intent to purchase a vehicle are also willing to pay for premium audio.

OEMs should consider what buyers value when buying premium in-car audio. Consumers associate premium in-car audio with immersion and clarity². When asked to describe a premium audio experience survey respondents mentioned, “rich bass,” “excellent treble,” “crisp and distinct sounds,” “sound [that] fully surrounds me,” and “[audio that] immerses me in the content.”

The message for OEMs is clear: survey respondents value a high-quality audio experience, whatever level of entertainment system they opt for. And they are willing to spend money on premium audio if it delivers a quality experience.

To expand beyond the research, Dolby spoke with leaders in various aspects of in-car entertainment about the current and future developments that are shaping in-car entertainment.

Bringing the Living Room onto the Road

“The entire automotive world is undergoing a huge transformation,” says Benjamin Bastians, IoT Sales Leader for Automotive & International at Deutsche Telekom. “Improved autonomous driving capabilities could see the car becoming a second living room. And just like your first living room, you’ll want to listen to your favorite music or watch your favorite videos.”

Even without full self-driving capabilities, new technology in cars is changing both how consumers use their vehicles and what they expect from them. Sophisticated infotainment systems are enabling people to interact with and customize their in-car experiences. “What we’ve seen is the consumerization of the vehicle,” says a Director of Engineering and Director of Software Product Line at a multinational audio manufacturer. “Consumers are increasingly looking at vehicles like their smartphones. They expect their vehicles to keep up with their lifestyles, get regular updates, support the apps they use, and give them the same entertainment options.”

Bringing Dolby Atmos into vehicle entertainment systems allows OEMs to enhance the in-car entertainment experience of drivers and passengers. Dolby Atmos allows content creators to place audio elements precisely around the listener in multiple dimensions, meaning what the listener hears in their car is exactly as it was intended in the studio – providing greater details, clarity, and sound separation. It’s great for music and also enhances watching videos or playing games. So when a family has to, for example, stop on a trip to recharge an EV, that 20 minutes spent at the charging station can deliver rich entertainment, similar to what they enjoy at home.

² Branded Car Audio Consumer Research. Quantitative Study, Dolby Laboratories, July 2022.

"A car interior is a great way to experience Dolby Atmos music," says Curt Behlmer, Technology Consultant at Universal Music Group. "During the COVID-19 pandemic, when people weren't able to come to the studio, we took cars set up for Dolby Atmos to artists and managers for mix approvals, allowing them to hear the mixes the way they were meant to be heard."

And when the vehicle is in motion – or stuck in a traffic jam – a great entertainment experience can help ease the stresses of the road. A Brand Partnership Director for a music label in China says that her organization has explored ways to promote its music to drivers. One idea is creating playlists for different situations. "If you're driving down a road in the country, you can enjoy upbeat music. If you get stuck in a traffic jam, push a button and you can have a more calming playlist to help reduce the pressure." She also said that she has heard some drivers like to use the car to unwind a bit when they get home. "They stay in the car, relaxing for 15 or 20 minutes, so they have a clear and happy mindset when they go inside to their families."

Why Good Entertainment is Good Business

"You make money by giving people something unique," says a Senior Manager for Automotive with a leading audio equipment company. "That can be a unique experience with a mass-produced product like a vehicle. Personalized audio, on-demand purchases, subscriptions to services – these are all ways to create something that consumers value, and that they will pay for."

Collaborations are a way to offer those unique experiences. In decades past, it was common for automakers to manufacture their own radios. That has changed, with most OEMs now bringing established brands such as Bose, Harman Kardon, Bang & Olufsen, JBL, Meridian, and others into the vehicle to offer high-quality experiences. This makes sense, says a Director of Operations and Customer Experience with experience in both the technology and automotive sectors. "Automakers have realized that consumers see that their expertise is in making vehicles, not necessarily in enhanced audio. The value they have in their brand will be enhanced if they offer a good entertainment experience. A bad one will diminish it."

Music matters. It draws out emotions and can bring back memories. The Dolby survey results found 94% of the 1,000 respondents said that "feeling the emotions in the song" was somewhat or very important. Similarly, 94% of respondents confirmed that "Listening to music the way the artist intended it to be" was also a high importance rating. In addition, almost all respondents said that "hearing music all around me" was somewhat important (26%) or very important (72%). Music matters – and consumers will go to great lengths to feel more closely connected to it in their vehicles.

"I'm in Southern California and car culture is a really big deal here. And for many people, music is part of that lifestyle," says Michael Zydzik, Creative Director for an aftermarket audio brand. "We deal with a lot of vintage car owners. They want better audio quality than what came with the car 10, 20, or 60 years ago. There are also consumers who want to build the most extreme, intense systems they can in late-model and vintage vehicles. In both cases, they'll put a lot of time and money into getting exactly what they want."

Zydzik's company does not yet offer Dolby Atmos-enabled hardware, but the lesson for OEMs is clear – if you don't give consumers what they want, he believes that they will find someone who will. That could perhaps mean that either selecting another brand or buying a vehicle without paying for an audio upgrade and then going to the aftermarket. "I grew up in Los Angeles and there were a lot of people I knew who would take out the factory unit, the factory speakers, and build a custom system –

and they'd spend a lot on it," says the Director of Operations and Customer Experience we spoke with. "It's an easy win for OEMs now to say, 'You don't have to do this anymore. We put it there for you. We've given you the sound quality that you're looking for.'"

Creators in Cars

In-car entertainment has presented challenges for OEMs and audio suppliers. Audio systems must contend with road noise, engine noise (at least in internal combustion vehicles), and reflective metal and glass surfaces. However, technology has evolved to help manufacturers compensate for the challenges of the environment. Dolby Atmos allows precise control over the placement of audio objects, giving audio engineers pinpoint control over the soundscape. "If you do it well, in-vehicle is one of the best places for audio," says Behlmer. "In a car, you know exactly where everyone is sitting. You know precisely where the speakers are. That precision is almost as good as in the studios we create the music in." A Dolby Atmos mix, says Behlmer, can really be appreciated in a well-designed in-car setup.

Designing a system that will enhance the creator's intent is evolving. Some challenges, such as engine noise, will diminish as EVs become more common. Improved digital signal processing technology will enhance the capabilities of the systems in vehicles. However, the quality of the source could still be a problem. "When you look at the quality of audio, it's not all equal," says a Dolby Technology Platform Lead for LG Electronics. "There's a lot of low-quality content, encoded in older formats or highly compressed. On a good system, the flaws are easily heard. But with Dolby, creators can control the quality. Dolby Atmos will deliver a consistent experience, a 'sound bubble' that you don't have in an old-fashioned system."

Behlmer agrees that proper recording and mastering of audio is crucial. Approvals from the artists who created the music are important. So is respect for other mixes. "We're not replacing stereo. Those are separate pieces of art. Dolby Atmos enhances the music, giving fans a new way to enjoy their music and artists different ways to express their vision," he says. It's having these multiple experiences available that makes Dolby Atmos-enabled devices attractive to consumers.

In addition to creating music that sounds great on the go, there are options to go even further. The living room-like experiences that autonomous vehicles and EV charging stops make possible provide creators with additional outlets for expression. For example, instead of just listening to music during a charging stop, consumers could watch music videos – or even a whole concert – in the vehicle, catch up on the latest binge-worthy TV series, meditate to a wellness track, pick up where they left off on their favorite video game, and more – all with the enhanced experience of an immersive soundscape.

"It's a time of innovation," says the Director of Engineering at the multinational audio manufacturer that we spoke to. "What about speakers in the headrests and shakers in the seat to give you a full cocoon of sound? You could even give each passenger a separate sound bubble. There are no limits."

Although there might be no limits on imagination and innovation, there is a concern that often comes up in discussions of enhancing in-car entertainment: bandwidth.

How connectivity will Cope with New Demands

As streaming entertainment has grown in popularity, the need for increased mobile bandwidth has grown as well. Consumers want reliable connectivity on mobile devices and home internet without the disruptions. With 4G and 5G, always-on high-speed connectivity is becoming increasingly important for all devices, including vehicles. This ubiquitous connectivity is key to realizing the potential of in-vehicle entertainment.

“Connectivity is the essential element that brings all services to life,” says Bastians. “No operating systems or entertainment app does its job without connectivity”. The way automakers integrate connectivity in their vehicles varies.” For example, integrated connectivity is common. This means a SIM card is built into the car and it connects the car to a mobile network operator (MNO). This can provide a seamless and user-friendly way to connect a car and maintain a persistent high-quality connection for the best customer experience. However, unpredictable usage patterns have been raising concerns for automakers around the world, leading to concepts in which customers bring their own connectivity, such as a tethered phone or an eSIM, which can be part of the customer’s phone plan.

“With the deployment of 5G networks Deutsche Telekom and its partners have been doing around the world, bandwidth for vehicles should not be a concern,” says Bastians. “The sheer capacity, the high number of users it can support, and the high bandwidth will ensure consistent connectivity. And, of course, there are always improvements available such as a dedicated bandwidth for autonomous vehicles. We call this network slicing.”

Intelligent planning by network operators can also ensure that drivers and passengers have the capacity they need on a long trip. For example, says Bastians, his company is working with operators of charging stations to ensure that high-bandwidth connections are available, even in remote locations.

Connectivity doesn’t mean just MNOs though. Vehicle-to-everything (V2X) is an emerging technology standard for connecting vehicles to any entity or device that might affect or be affected by the vehicle. This could mean that autonomous vehicles might continually report their position to the vehicles around them, to traffic lights, or emergency vehicles to optimize the flow of traffic and to avoid collisions.

Navigating the Road Ahead

For consumers around the world, vehicles continue to offer choices and freedom. The Brand Partnership Director for a music publisher in China said that, after COVID-19 lockdown restrictions were lifted, many people took to the road, just wanting to get out of the city, enjoy nature spots, to get out and enjoy time with friends and family – and that having their music with them was an important part of that.

People still want to drive, but they want more control and choice over the experience. One of the things they’re valuing most is a high-quality entertainment experience³. Evolving technology and economies of scale mean that enhancements such as Dolby Atmos are becoming available at a range

³ How Do Consumers Perceive In-Car Connectivity and Digital Services? | McKinsey. <https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/how-do-consumers-perceive-in-car-connectivity-and-digital-services>. Accessed 8 Dec. 2023.

of price points. Consumers are expecting higher quality across their devices⁴. Even basic in-car entertainment options can use technology to enhance the experience. Consumers want in-vehicle entertainment at least as good as the quality they get from their other devices at home and on the go⁵.

For OEMs, offering a high-quality in-car entertainment option – or multiple high-quality options – makes good business sense. But the experience must actually *be* high-quality, not simply more expensive. “You have to add value with a noticeable difference in the offering,” says the Director of Operations and Customer Experience. “When Tesla first came out, everyone was talking about the screen and how you could control everything with it. Every innovation in the market raises the bar. For OEMs, they have to find a way to continually evolve.”

The key to that evolution is collaboration. OEMs can draw on the expertise of audio brands, which collaborate with Dolby, which in turn works with the middleware manufacturers that develop the in-car control units, streaming services, app developers, and telcos to create an entertainment ecosystem. These systems can receive over-the-air updates to keep them aligned with the apps and services that consumers are using at home, at work, and on mobile devices.

In-car entertainment is rarely the primary factor in purchasing a vehicle – the Dolby survey shows that safety, performance, and energy efficiency are the top three considerations. However, in-car audio was ranked “very important” by 60 percent of respondents – higher than luxury interiors (47 percent). It’s clear that consumer demand for high-quality in-car entertainment is growing. The good news is that it has never been easier for OEMs to meet that demand, thanks to the ecosystem of collaborators available to them. Dolby is an integral part of that ecosystem, working to ensure that high-quality options like Dolby Atmos are available across the market and at various price points.

The choice for OEMs is to take the lead in meeting consumer expectations for incredible entertainment in their cars – or take the slow lane.

⁴ How Do Consumers Perceive In-Car Connectivity and Digital Services? | McKinsey. <https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/how-do-consumers-perceive-in-car-connectivity-and-digital-services>. Accessed 8 Dec. 2023.

⁵ How Do Consumers Perceive In-Car Connectivity and Digital Services? | McKinsey. <https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/how-do-consumers-perceive-in-car-connectivity-and-digital-services>. Accessed 8 Dec. 2023.