# Experiencing the future of mobility

Opportunities for the media and entertainment industry

Deloitte's Center for Integrated Research focuses on developing fresh perspectives on critical business issues that cut across industry and function, from the rapid change of emerging technologies to the consistent factor of human behavior. We uncover deep, rigorously justified insights and look at transformative topics in new ways, delivering new thinking in a variety of formats, such as research articles, short videos, or in-person workshops.

The entire way we travel from point A to point B is changing. This transformation is creating a new ecosystem of personal mobility, with implications affecting more than just the automotive industry. Deloitte serves the entire ecosystem of companies working in and around mobility.

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# Introduction

## Disruption in the media landscape

Not to disparage the excitement of spotting out-of-state license plates, but for most of automotive history, drivers have been limited when it comes to in-car entertainment. Although there are expanding options for those with the funds, and streaming music may have mostly supplanted FM radio and cassette tapes, the entertainment experience for most drivers today is largely unchanged from when the Galvin brothers installed the first AM dashboard radio in a Studebaker in 1930.[1]

BUT what happens when a "driver" no longer needs to keep her eyes on the road and her hands upon the wheel? Autonomous vehicles are about to transform the possibilities for what the in-transit media experience can be across all forms of personal transportation.

In Deloitte's ongoing *Future of mobility* series, we've illustrated how an entirely new ecosystem of personal mobility seems to be emerging, fueled by the advancement of autonomous and connected vehicles, ridesharing, and other developments.[2] This shift could have major implications for industries across the global economy, and media executives are joining others in exploring the changes facing their sector.

In the United States, drivers spend more than 160 million hours going from point A to B daily—some 47 minutes per citizen, seven days a week.[3] As shared and autonomous mobility proliferate, as drivers become passengers, and as personal mobility becomes more seamless and interconnected across all modes of transportation, an opportunity arises for companies seeking to sell content, entertain, and generally enhance the time spent in transit.[4]

Informed by our team's years-long exploration and by conversations across the evolving mobility ecosystem, this article examines the challenges and opportunities for different media sectors in the future of mobility. The goal is not to predict each and

every product and mode that may arise but, rather, to illustrate the extraordinary possibilities that could emerge. The emergence of this new mobility ecosystem is potentially great news for all types of players in the media industry, offering opportunities to create value for consumers. *Capturing* that value, however, poses a major challenge. As shared and autonomous mobility emerge and coexist (see sidebar, "The emerging mobility ecosystem"), media companies—from the C-suite to sales and product development—must answer numerous challenging strategic questions, including:

- What will the in-transit entertainment experience be in the future? What should our role be?

- What is the size of the opportunity? When should we act—and can't we just take a wait-and-see approach?

- What media products and services could emerge across the mobility ecosystem? Doesn't the smartphone already provide all the mobile entertainment consumers want?

- What players will emerge to provide tomorrow's mobility experience? Who should we consider partnering with?

- How can media companies provide a seamless content experience when consumers could use a different mode of transit and vehicle for every ride segment?

The media industry has seen similar disruptions before—and not always to the benefit of incumbent players. The rise of digital media could have been an opportunity for established media companies to expand their control of the industry. Instead, many media powerhouses were overly cautious, and new competitors and business models emerged that killed off a number of the old guard and continue to reshape the survivors' market power.[5]

Technology, and industry players, are determining the market dynamics in the mobility ecosystem right now. *Today*. Media companies have an opportunity to play an active role in shaping the ecosystem and defining the in-vehicle experience of the future; if they don't seize the opportunity to develop compelling and differentiated products, they could forgo that chance and may find themselves adapting to standards that the ecosystem winners set.

We've seen how small openings and new platforms for media companies can drive leakage of value and market power. To avoid a repeat of this exodus of value, executives should seek to make their companies differentiated pioneers, aggressively developing in-vehicle experience expertise and product suites to create demand rather than resigning themselves to being price takers.

Media players have the opportunity to both capture share of the massive future consumption and define the future of the in-vehicle experience. As with most new technologies, there is only a narrow window, and it is open right now. Those that know how to create customized immersive experiences with a wide range of accessible content at an affordable price—introduced ahead of others—have a higher likelihood of winning.

## THE EMERGING MOBILITY ECOSYSTEM

In *The future of mobility: What's next?*,[6] Deloitte argued that a new mobility ecosystem was emerging that could provide seamless intermodal transportation that is faster, more efficient, and safer than today (see figure 1). Making that vision a reality is likely to require a diverse mix of players.

**Figure 1. The future mobility ecosystem**
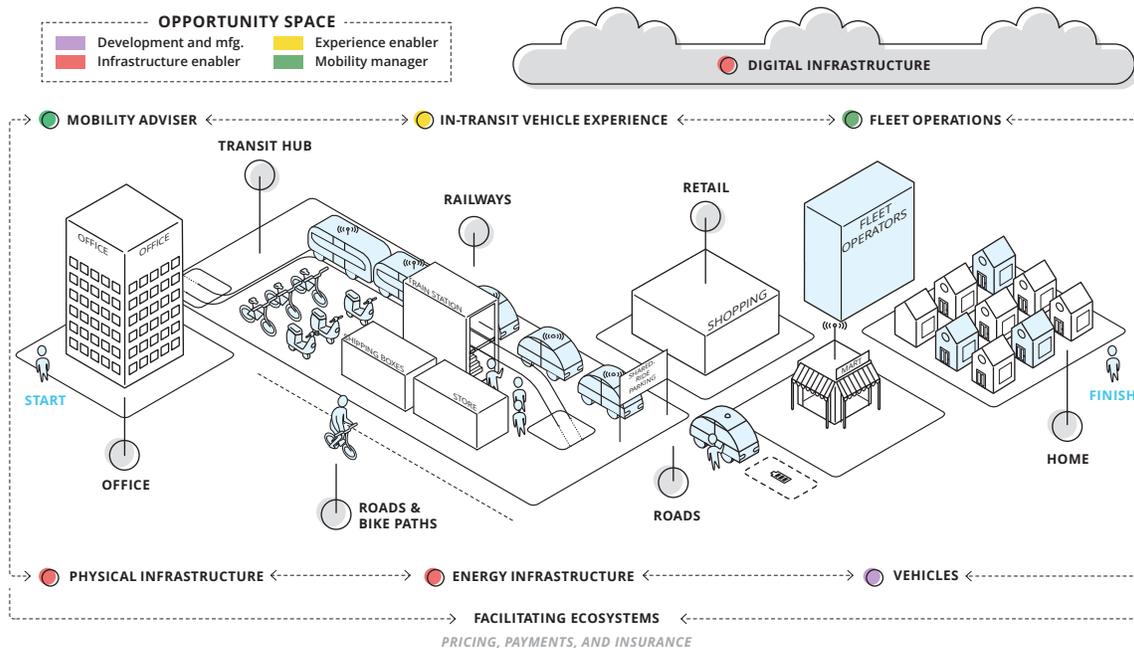


Source: Deloitte analysis.

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**THE EMERGING MOBILITY ECOSYSTEM CONT.**

### Vehicle designers and manufacturers

The in-vehicle experience starts, naturally, with the vehicle itself. Established automakers, along with new entrants, could manufacture vehicles that are increasingly diverse—from larger personally owned self-driving vehicles that can pick up kids from school and groceries from the store to utilitarian shared autonomous pods that let passengers focus on work as they flit across town to their next meeting. Importantly, automakers could increasingly design vehicles to be flexibly tailored to the specific purpose of any given journey, with interiors optimized for entertainment, productivity, relaxation, and more.

### Mobility managers

As shared, connected autonomous mobility proliferates, many expect to see the emergence of *mobility as a service (MaaS)*: digital platforms that integrate end-to-end trip planning, booking, electronic ticketing, and payment services across all modes of transportation.[7] Consumers today are able to curate their audio and video content experience through a common software platform across their home and mobile devices; MaaS could extend the media experience to the vehicle, seamlessly integrating content libraries, streaming subscriptions, and social networking into each and every ride. By managing this information along with individual mobility data, MaaS providers would be able to recommend content types and lengths suited to each journey, personalizing the in-transit mobility experience to each passenger's individual tastes.

### Infrastructure enablers

A world of connected mobility that includes integrated and immersive media experiences in every vehicle is inconceivable without a ubiquitous network of fast and reliable connectivity.[8] Connecting every vehicle to one another and the surrounding environment in order to deliver information, entertainment, and communication access to riders would be a key role for telecommunications companies. Securing those connections would also be critical.

### Experience enablers

Finally, and most critically for media companies, the in-vehicle experience will be defined by the types of content available to passengers. This could, of course, include music, radio programming, podcasts, and audio-based advertising similar to what we listen to in our cars today. But if autonomous vehicles become an everyday reality, drivers would be freed from the need to operate the pedals and steering wheel every minute on the road, and vehicle design could likely focus more on the interior experience for riders[9]—opening up the possibilities for all kinds of media to enter the vehicle.

Television and film studios, videogame developers, social media platforms, business and education publishers—all of these players and more could produce and curate the content that passengers enjoy, utilize, and generally interact with while in transit.

# Over the river and through the woods

Tomorrow's in-vehicle experience

A S new types of mobility take hold, the media experiences enjoyed in transit could be at least as diverse as today's home entertainment options. To illustrate the possibilities, let's take a peek at Erica's day.

It's Saturday morning, and Erica and her family have a day trip planned to visit her parents, who live an hour and a half away. While they could summon a shared autonomous pod to take them for the day, the family decides to use their larger self-driving vehicle—the one the family owns partly for its ability to earn extra income as part of a ridesharing fleet during the weekdays while Erica and her husband are working and the kids are in school.

Their personally owned vehicle is ideal for family trips. The interior is configured to allow each passenger to enjoy his or her own video and audio experience without hearing or seeing each other's—or alternatively share in the same experience, if anyone wants to. Through its connection to the family's streaming service account and preference configurations, the vehicle knows to start playing Erica's two children's favorite movies the instant they sit down in the back seat. In his own seat, her husband selects the *productivity* setting on the vehicle touchscreen, and the seating area automatically configures to enable him to catch up on some emails for work; naturally, all of his work accounts and files are instantly accessible. Erica, tired from the busy workweek, simply selects a jazz playlist to listen to in her seat. Neither is disturbed by the sounds of the cartoons in the back seat, thanks to the vehicle's individually targeted audio speaker system.[10]

On the ride home that evening, the kids are hungry, and Erica looks for dinner options. Through the voice-activated controls, she requests healthy restaurant recommendations no more than 15 minutes off of their route home. A menu of options with ratings, hours, and routing info fills the augmented reality (AR) windshield. Because their vehicle system recalls their dining history and preferences, it highlights several options that offer time-sensitive specials and discounts to help the family choose a restaurant agreeable to all. After a quick bite to eat, the foursome decides some friendly competition is in order, and they pass the remainder of the ride in a heated game of virtual car racing.

## Media's role in the new ecosystem: How big is the prize, and who's vying for it?

The tailored, immersive experience that Erica and her family enjoyed represents a significant opportunity—many opportunities—for media companies. But *how* significant? Deloitte's analysis has found that by 2030, vehicle-based passengers can be expected to consume more than 52 billion hours of media content annually, and passengers on public transportation could consume roughly 23 billion hours of additional media content. (See figure 2, as well as the appendix for the methodology employed.) That's more than double today's estimated vehicle-based consumption (which occurs primarily through listening to the radio and passengers using their smartphones). With the accelerated adoption of shared, autonomous mobility, vehicle-based annual media consumption of all kinds is expected to grow to 95 billion hours by 2040, with public transit-based consumption increasing slightly to

**Figure 2. Estimated future US mobility-based media consumption**
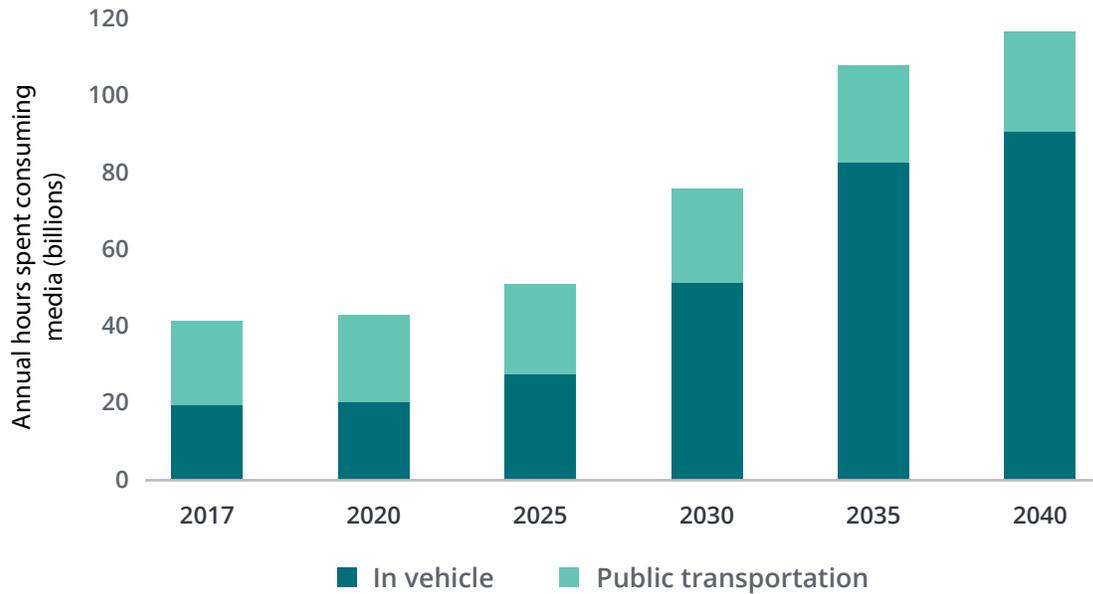


Source: Deloitte analysis based on publicly available information. See appendix for methodology.

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nearly 25 billion hours. These totals are in addition to projected growth in current forms of media consumption and, therefore, represent an additional and growing area of demand for the industry rather than a substitute or source of cannibalization.

It is worth noting that this forecast does not include other modes of mobility and the media consumption that could come along with it—for instance, bikeshare users listening to music or podcasts while riding.

Clearly, a sizable opportunity appears to exist for media companies to shape the in-transit experience for riders across all modes of transportation. As seamless, shared, autonomous, and multimodal mobility emerges, riders will likely come to view such mobility as essentially a commodity service, particularly in major urban environments where adoption is expected to be fastest.

In such a scenario, the in-vehicle experience could become one of the most meaningful points of differentiation between and among vehicles, ridesharing fleets, and modes of transit. This could present an

opening for players across the media industry to become critical partners within the mobility ecosystem, as those who develop the in-vehicle content offerings most desired by riders will likely be sought-after partners by automakers, suppliers, autonomous vehicle system operators, and MaaS providers.

What follows is an overview of the potential product and service offerings that different types of media players could offer to passengers to become that differentiated in-transit experience provider (see figure 3 for a summary). Of course, media companies likely can't do it alone, so we also explore what types of partnerships might be important. A true transformation of the mobility ecosystem can occur only through collaboration between industries to reimagine what mobility can be.

One common requirement across the media landscape is likely to be the need to develop holistic profiles of users. That means providers not only aggressively tapping into the immense data sets about their own users' media habits but also gaining access to information about users' travel patterns. If companies can better understand the situational

nuances of customer media consumption prefer-ences and behaviors, and how they are shaped by a wide range of inputs—including location, mode of travel, shared versus private journeys, and with whom they're sharing any given environment (for example, at home with family or in the office with colleagues)—they can perpetuate the virtuous cycle of better serving their customers while concurrently enabling more precise ad targeting. Multiple players, including automakers, autonomous vehicle oper-ating system providers, telecom companies, and mobility managers, will likely vie to own and access those data. Who is ultimately able to monetize that data will depend on a complex and still-unsettled cocktail of regulation, consumer attitudes, ecosys-tem configuration, and market power.

## Video/broadcast

Film studios and video broadcasters (both tradi-tional television and digital "over the top" providers that broadcast via the Internet) have the potential to create immersive in-vehicle experiences in the new mobility ecosystem. As noted in an earlier Deloitte report, "It is increasingly plausible that the entirety of the cabin's walls and ceiling could become high-definition touchscreens, perhaps incorporating augmented reality technologies."[11] Passengers in autonomous vehicles could enjoy an entire universe of immersive video entertainment and branded experiences. Imagine a family trip to Walt Disney World: As everyone boards the self-driving van for the trip from the airport to the resort, the AR and

**Figure 3. The future of mobility's impact across the media landscape**

| Media category | Opportunity | Challenges | Key partners |
|---|---|---|---|
| **Video/broadcast** | More time available to consume video content; new types of interactive, AR/VR, immersive videos | Creating curated content; more short-form content; new types of video that capitalize on the capabilities of vehicle interiors | |
| **Advertising** | Sustained, targeted, more in-depth campaigns along journey routes; interactive in-vehicle advertising | Developing capabilities to shift from traditional out-of-home/billboard campaigns; regulatory/privacy concerns around personal data and advertising | • Autonomous vehicle operating system providers<br><br>• Automakers<br><br>• Major suppliers<br><br>• Telcos<br><br>• Mobility-as-a-service providers |
| **Music** | Integrated highly personalized listening experiences across modes; "themed" trips and on-demand experiences | Maintaining audience as video and other content become more accessible in transit; enabling "frictionless" listening | |
| **Gaming** | Interactive AR/VR gaming in vehicles; multiplayer gaming within and across transportation modes | Technical challenges of building transportation-based gaming platforms | |
| **Education** | Vehicle interiors and content designed to support learning/productivity; extending the classroom to the school bus/commute; on-demand technical/professional training and tutorials | Developing mobility-based education that is proven effective; regulatory/public education barriers | |

virtual reality (VR) interior surfaces transform the cabin into a princess's carriage, showing a journey through a fairytale kingdom to a prince's castle or allowing passengers to pilot a spacecraft to an immersive science fiction attraction.[12]

While technology and imagination have thus far limited the range of offerings for screens in vehicles,[13] incumbents in the automotive value chain have indicated they understand the potential experience they can offer. Last March, Ford received a patent for a retractable movie screen that would cover the entire windshield for passengers in a driverless vehicle,[14] and multiple Tier 1 suppliers have debuted AR concepts for vehicles.[15] These offerings are currently focused on driver assistance, but as vehicles move toward full autonomy, in-vehicle AR will likely shift toward the rider experience.

For local trips, broadcasters and digital video content providers will likely need to offer content with tailored durations—a trend well under way as users increasingly view video content on mobile devices. The timing already matches nicely: A typical trip with a ride-hailing provider lasts less than 15 minutes,[16] and 90 percent of Netflix's mobile viewing sessions last less than 10 minutes.[17] Broadcasters and streaming video providers will need to understand customer preferences and trip patterns at a very detailed level to recommend and stream video content that is not only appropriate for the journey's length but tailored to the circumstances. That could mean going beyond traditional categories of video content such as scripted, news, or documentary. For example, knowing that a traveler has an appointment on her calendar for dinner with a friend—but not a destination—the ride-hailing vehicle could queue up short video reviews of restaurants along the route, curated based on data about the rider's dining habits. The integration of Amazon's Alexa into Ford vehicles enables the automobile to constantly learn about its passengers and target actions and responses increasingly precisely.[18]
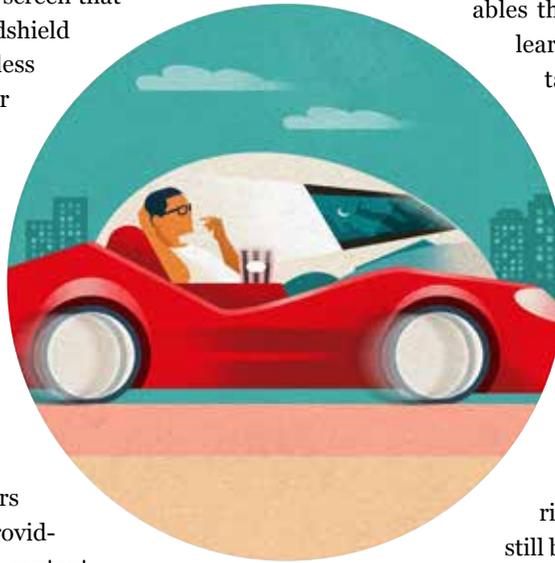
Going further, the combination of autonomous drive and AR and VR technologies on nearly every cabin surface and window would force creators and distributors of video content to radically reimagine what a video entertainment experience can be. There likely will still be a place for traditional, two-dimensional, 16:9 content in vehicles, but new possibilities could emerge to offer passengers fully immersive, interactive, 360-degree entertainment. Similar to how flight simulators currently depict an entire airplane cockpit and surrounding airborne environment, vehicles could place passengers in the center of a concert, a sitcom, an action movie, or other possibilities not yet envisioned. This frontier of entertainment represents a significant challenge to legacy video entertainment:

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With technology start-ups already working on AR and VR content, will incumbent broadcasters be able to develop mobility-based channels and offerings that enable them to compete and win audience share? This new form of immersive experience has the potential to transform the primary platform for entertainment from the home to the car.

There are several paths to monetizing all of this new content. With half of US consumers already subscribing to at least one paid video streaming service,[19] there is potential for digital video providers to offer different kinds of vehicle-based subscriptions. Streaming-based players may have an advantage over traditional broadcasters, thanks to the flexibility in their content length and delivery mode and their experience with different payment models. As the future unfolds, one major question is how these subscriptions can best be bundled: as part of a customer's existing home-and-mobile entertainment package, or as part of a MaaS-based subscription. Pay-per-trip models similar to airplane Wi-Fi packages will likely emerge for infrequent travelers on longer trips, while daily commuters who use shared networks of autonomous pods may opt to pay for a video subscription that gets added in to their existing monthly travel bill.

## Advertising

The evolution in mobility seems to present enormous opportunity for advertising, as media consumption among travelers proliferates. Importantly, mobility is not expected to cannibalize existing advertising channels. Rather, the new mobility ecosystem is expected to enhance existing mobile and digital advertising outlets by both expanding demand (the amount of time consumers spend consuming content while in transit) and by expanding the value that gets added (by using new forms of advertising delivery that drive increased customer engagement and, thus, increased ROI for ad buyers).

Traditional outdoor display advertising such as billboards could evolve from static, mass-market messages to more targeted advertising with higher returns—bringing the same level of analytics and sophistication that is well under way in digital advertising to out-of-home campaigns. For example, Clear Channel Outdoor has begun making investments in these capabilities through its Radar analytics suite, which uses aggregated anonymous mobile data to understand travel patterns and enables advertisers to buy particular out-of-home displays to reach specific audience segments.[20] Advertising could greatly benefit from enhanced targeting through in-car analytics, another potential benefit of in-car personal assistants that can learn.

Perhaps more importantly, as vehicles evolve to include more screens that are interactive or feature AR technology, display advertising could move inside the vehicle to provide a new level of mobile audience engagement. Rather than quickly registering an image or catchphrase from a billboard as they whiz by, passengers can instead experience a longer, more nuanced, and more targeted ad campaign that would not only communicate the value offered by a product or service (specific to that traveler, thanks to analysis of MaaS-provided data) but potentially offer the ability to make purchases while in transit. Some of that opportunity is also likely to accrue to device-based mobile advertising, capitalizing on many of the same analytics capabilities. Through in-car AR, billboards could become "blue screens" enabling the car to insert any type of ad, tailoring content for individual passengers and dramatically

If companies can better understand the situational nuances of customer listening preferences and behaviors, and how they are shaped by a wide range of inputs, they can better serve their customers while concurrently enabling more precise ad targeting.

expanding the revenue that an outdoor advertiser can earn from a single location through simultaneously licensing ad placement to multiple advertisers. As technology evolves, there is also the potential to disrupt outdoor advertising through superimposition of preferred ads over real signs.

These developments present the opportunity for advertisers to dramatically reenvision how they message to audiences during a journey, enabling sustained advertising campaigns in which the message, offer, or even product can change based on the stage or mode of the journey. One exciting possibility is the idea of "route coupons," in which a retailer could offer a discounted ride-sharing trip in exchange for the vehicle being routed past one of its locations.

## Music

Music and audio entertainment providers may face a critical challenge, as the future of mobility could weaken the vise-like grip on the in-vehicle experience they have enjoyed for decades. As shared and autonomous vehicles are expected to spread, freeing eyes and hands, the entertainment options available

to passengers could proliferate: streaming video, gaming, and the full gamut of online activities—from email to social media to shopping and beyond. For companies focused on audio-only options, that likely means developing ways to better integrate visual and interactive elements into their content, either independently or in partnership with others.

But there are opportunities, too. One that seems the clearest and most immediate for the music industry is to make in-vehicle on-demand streaming music as seamless as broadcast radio, but with previously impossible levels of customization, incorporating the traveler's preferences or continuing playing a playlist already in progress at home. This could be especially critical for shorter trips, in which many riders might otherwise not bother to take the time to make a selection. Customers may be willing to pay for immediate preferred listening experiences, either as part of a MaaS package or their existing media subscriptions. SiriusXM's $480 million investment in Pandora[21] suggests that media executives already see the importance of providing high-quality radio content on demand—and being able to offer it seamlessly across multiple modes and business models (ad-supported and subscription).

Music providers can also use knowledge of these preferences, and the partnerships with other mobility ecosystem players that enable that knowledge, to offer premium services and experiences. Picture a local public transportation agency or ridesharing service providing discounted rides to fans attending a major concert event, in which the performing artist's music label or streaming music provider acts as a partner to provide a curated playlist of that artist's material en route to the concert—and then instantly makes the concert rebroadcast permanently available to those who attended (as a new benefit for in-person attendance) as soon as during the journey home.

## Gaming

Perhaps even more than video, gaming presents an opportunity to reimagine what a trip inside a vehicle could be. The interactivity of gaming, combined with AR and VR technologies and vehicle connectivity and autonomy, creates the possibility of entirely new forms of mobile interactive gaming. Already, mobile gaming represents a dominant share of the overall gaming market and appears poised to continue growing.[22] Think of the way Pokémon Go (which has been downloaded more than 650 million times and inspired its players to collectively walk 5.4 billion miles[23]) seemingly took over cities by blending the physical and digital worlds and encouraging players to explore their neighborhoods; now, extend that concept to passengers in self-driving vehicles, who could interact not only with the surrounding environment but with other vehicles and passengers through an AR/VR-enabled cabin.
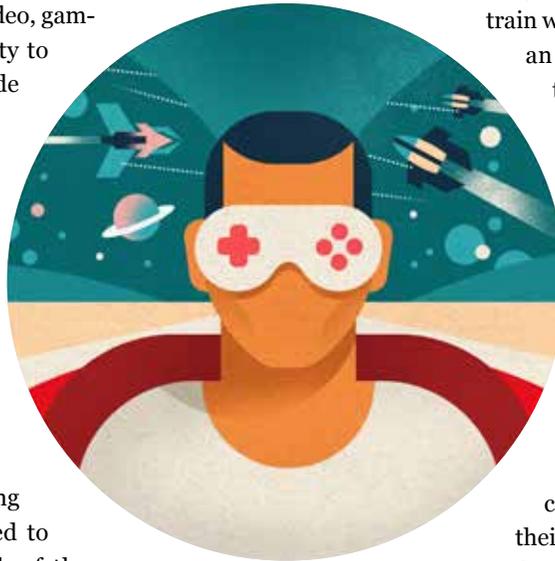
The possibilities for vehicle-based gaming are as limitless as gaming genres are today: First-person shooters could project hostile aliens attacking your vehicle from the surrounding city or mountain landscape on AR windows; movement-based games (such as a Nintendo Wii platform) would encourage exercise to break up what would otherwise be extended periods of inactivity on long road trips; any multiplayer game could be played against those in the surrounding vehicles on your route. With advanced cabin configurations, children could each play their own games without seeing or hearing their siblings' experiences right next to them, a blessing to parents with children of different ages.

AR-based mobile gaming wouldn't be limited to vehicles; other modalities offer exciting possibilities. Imagine commuting on a city bus or train while viewing the city through an AR-capable lens that uses the surrounding environment as the landscape for an interactive game, or viewing a guided tour throughout the city, introducing new revenue streams for perpetually cash-strapped public transportation systems. Naturally, all of these gaming experiences could be ad-supported, encouraging players to upgrade their experiences with in-transit purchases.

## Education

Without the need for a human driver, and with specially designed interiors to support concentration and learning, autonomous vehicles could represent a quantum leap forward in the mobile classroom. Some autonomous vehicles (AVs) in shared fleets could be designed for immersive entertainment experiences, whereas others could be configured

to serve primarily as "productivity pods" in which the emphasis is placed on enabling riders to work or study. Enhanced mobility would also create demand for duration-specific training and education programs, designed to be consumed by travelers on trips of different lengths. Mobility-based education is therefore an area ripe for innovation and growth, potentially transforming a user's commute from an inconvenience into a critical forum for education and professional development.

Importantly, autonomous and connected mobility could expand access to education. Start-up technology firm Kajeet, noting that US students cumulatively spend 520 million school days on buses each year,[24] is partnering with school districts to bring 4G LTE connectivity to school buses, allowing the school day to extend to the bus ride. Imagine the kind of immersive learning experience children could enjoy when this kind of connectivity is paired with AR screens installed on the back of every bus seat.

There are many opportunities beyond the expansion of traditional classroom learning as well. For engineers and technical professions, commercial-purpose autonomous vehicles offer an outstanding venue for just-in-time training modules as field service personnel head out to a job site. The public sector could promote workforce development through regionally targeted job training in high-demand skill areas, enabling workers to advance their careers by learning during their normal commute. Education and training would provide a spectrum of content opportunities for the casual learner as well—from an impromptu conversation in a VR French café, to a timely lesson in preparing your

evening's dinner, to the DIY home improvement project planned for the weekend.

Other, perhaps less intuitive areas of the media industry could also see new possibilities. For instance, within publishing, news organizations seem to have a natural opportunity: Given that the majority of trips are (and will likely continue to be) short,[25] and that most forms of news media are already shorter-form content, commuting and errand-running passengers are a ready-made audience. Business information services have opportunities to facilitate mobile offices/workspaces/conference rooms that enable teams to collaborate in transit. Information publishers can package and display content—such as financial data or analyst reports—in sophisticated new ways that promote mobility-based productivity.

Finally, social media can influence and amplify riders' interaction with and sharing of content across modes of travel. Personally owned autonomous vehicles, for instance, could function the way smartphones currently do—as personal platforms for riders to share their journey with friends, family, and social audiences. The connectivity and media experiences that riders might enjoy across shared modes of transit would naturally lend itself to the sharing trends of social media—for instance, concertgoers on a subway to the venue could share the artist's music with anyone else traveling on the same subway, enabling fans to meet and socialize while en route. The immersive potential and data available could also represent a revolution in proximity-based social media, ranging from geolocation games to dating apps.

# It takes a village

## Partnership opportunities for media companies

THE number and variety of future mobility experiences present a rich opportunity landscape for media companies. However, they will likely not be able to create these experiences on their own. Partnerships between ecosystem players could be essential. Additionally, as the mobility ecosystem takes shape, media companies' ability to differentiate themselves will likely be diminished. By developing the experience of the future, media companies have the opportunity to make up some of the ground that was ceded during the initial explosion of digital. In short, moving early likely matters.

## Automaker, supplier, and AV system provider partnerships

A clear area for partnerships is with automakers and component suppliers. Automakers will likely not need to wait for full autonomy to begin offering vehicles that have more sophisticated video-based passenger entertainment capabilities, whether aimed at the kids in the back seat or at users of ride-hailing services. Automakers and suppliers could be the partners who can help the gaming industry to conceive, design, and build vehicle interiors that can support full immersive mobile gaming experiences, and work with the education industry to reimagine vehicles as advanced learning environments by leveraging design thinking and psychological research to build cabins that enhance learning by maximizing focus and productivity for riders.

Music streaming and satellite radio services could partner with automakers to provide the default audio service in vehicles—an opportunity that certain automakers have already recognized as fundamental to creating value in the future of mobility.[26]

Music providers should also explore partnerships with manufacturers and suppliers of audio content systems to vehicles, perhaps to develop high-fidelity audio capabilities that could provide different listening environments to individual riders and enable interactive, rather than one-way, audio experiences.

For personally owned driverless cars, the providers of AV systems could be important partners. AV system companies are likely to capture a relatively comprehensive picture of how, when, where, and why people move, just as MaaS operators could for shared forms of mobility. That potentially grants them access to the key data that media companies will likely need to provide tailored in-vehicle experiences.

## MaaS provider partnerships

Their central role in managing mobility and position as gatekeepers of massive amounts of valuable data will likely make MaaS providers essential partners to media companies.

MaaS companies seem to be an obvious partnership target for advertising firms, as the data and knowledge they accumulate around travel behavior could serve as the basis for better-targeted advertising strategies. Advertisers should, in fact, carefully assess the acquisition value of certain location-based analytics services companies, as their ability to effectively target advertisements with high ROI could become an essential pillar of successful out-of-home marketing and advertising.

For the other sectors of media to maintain a competitive advantage in the mobility ecosystem, they will likely need to offer the kind of differentiated

in-transit entertainment experience that can come only through understanding the details around customer journeys and preferences described above. The vision of a *seamless* world of future mobility is one not only of seamless transportation from one location to another but of the entire customer journey, including payments, information, and passenger experience. Video, gaming, and music companies will likely depend on the knowledge of routing, timing, and passenger preferences managed by MaaS providers to effectively curate and recommend content for every journey. The data that MaaS services collect and analyze could underpin personalized learning curricula and modes for all riders—students, professionals, or just hobbyists looking to enhance their knowledge and skills in an area of personal interest.

Many large technology companies focused on mobility already have media platforms inside and outside the car. However, the creation of content is likely where media companies can reinforce their position in the mobility ecosystem and establish themselves as must have partners for the car. Automobiles have a lengthy history of introducing new technologies, from the initial AM radio to power outlets and in-car Wi-Fi. The immersive entertainment experience possible in transit can effectively leapfrog what is possible in the home.

## Infrastructure enabler partnerships

For all media subsectors, partnering with infrastructure providers—including telecommunications companies, public transit agencies, and other government organizations—could be essential to providing high-bandwidth content streaming across all modes of travel.[27]

Consumers, leery of being hit with excess data charges on their mobile devices, may be willing to pay for unlimited streaming entertainment service in both vehicles and on other modes of publicly run travel such as trains and buses, creating opportunities for both new forms of subscription packages and ad-supported "free" Wi-Fi. Many media companies could even arrange for exclusive partnerships in which their content is offered for free or at a discount on certain modes/routes to ensure that they capture a dominant audience share within a certain geographic market or time slot.

For advertisers, infrastructure enablers could develop and manage the environments in which out-of-home advertising would be consumed, including next-generation displays both inside and outside autonomous vehicles, buses, trains, and other modes of travel.

Some are also seeing interesting ways for the gaming and education sectors to partner with public sector partners to promote positive behavior through gamification-based incentives. The home-to-school connection is an area of intense focus for education technology companies, and partnerships with public education departments, public transportation agencies, and other public sector organizations can offer opportunities to advance mobility-based education outside of a school's time and location limitations. Kajeet's connected school bus is an early example of such a partnership, and such a service could be expanded to mass transit modes such as city buses and light rail, particularly in urban environments where many students rely on these modes, rather than school buses, to get to and from school.

# What should media companies begin doing?

WHILE some industries will likely struggle to find their way in the new mobility ecosystem, few seem to have as much unmitigated potential upside as the media sector. Unlike automakers or insurance providers, shifts in mobility are unlikely to challenge existing revenue sources or necessitate radical business model transformations.

Still, media companies likely cannot afford to be complacent. As the rise of digital content and streaming services seem to illustrate, there is no shortage of new entrants prepared to capitalize on emerging technologies—especially as barriers to market entry continue to fall. Media companies will need to choose their preferred strategy to properly prepare, and the consequences of different routes are clear: Employing a wait-and-see approach will likely relegate a media company to being a price-taker at the mercy of the larger ecosystem players. Working to develop the experience of the future has risk as well, and media companies should be confident they can compete. And they should be brutally honest with themselves: about their capabilities, strengths, and weaknesses. Regardless of path, media players that drag their feet could start well behind.

To that end, media companies should begin positioning themselves for the future of mobility now by:

**Determining partnership opportunities and potential models.** Media players should think expansively and consider nontraditional partners—including automakers, suppliers, access providers, and mobility managers—to develop the future in-vehicle experience. Media companies likely cannot build this future themselves but can nonetheless fulfill a critical element of the mobility experience. Establishing sustainable and valuable partnerships

with other mobility players may be essential to their survival and success. Determining ownership of and access to data, a key driver of value, is likely to be an important component of any agreement's terms.

**Focusing on product innovation.** Just as video game consoles and smartphones introduced platforms with new possibilities, autonomous vehicles could be a blank canvas for media companies to explore innovative types of content. Across subsectors, media firms should review both their existing and planned product and service portfolios against the different types of mobility. Executives will need to determine if they believe these products and services could create additional value in the future mobility ecosystem and, where there are gaps, develop an innovation agenda around ideas that can enable them to capture opportunity. That likely requires the ability to deliver current products in enhanced ways, as well as delivering entirely new types of products. Approaching the challenge through the consumer's eyes and the types of experiences people are likely to want could be key to enabling fresh thinking.

**Exploring monetization models based around potential future states.** As new types of mobility emerge, media consumption patterns will likely evolve along with them. Media companies therefore should explore how these patterns can impact their current advertising and/or subscription-based revenue models, and how shared and autonomous mobility can either threaten or enhance those models. For example, as MaaS evolves, mobility advisers will likely aim to streamline the payments process for riders not only to include the cost of the ride itself but to incorporate in-transit purchases for services, including entertainment, into one simple payment through a rider's mobile

device. This means that media companies may consider partnership agreements with MaaS providers—and to evaluate how a mobility-based subscription model can fit into such an integrated payment platform.

## Becoming truly mobile

In recent years, media companies have ventured into a range of unforeseen platforms, finding themselves managing multimedia content for devices as small as a watch face and as large as a billboard, with shifting customer bases and revenue streams. But the future of mobility could open up a set of opportunities that will likely seem especially fresh to drivers long admonished to stay alert, regularly check their side-view mirrors, and refrain from texting.

In the new mobility ecosystem—bringing a revolution in personal mobility and transportation—media companies have a chance to become critical players as the in-transit experience becomes a defining feature of personal transportation. Mobility will likely no longer be a sideline business: For the first time, audio and video—and even augmented and virtual reality—can serve, and target, customers wherever they are, whether at home, at their destination, or in transit. Business will find the best ways to monetize this opportunity. If media companies wish to be on the more profitable side of that ledger, they should start moving today.

# Appendix

WE have used several data sources, including our own prior analysis, to calculate the projected consumption of mobility-based media.

For population and vehicle miles traveled data, we used prior analysis from our 2016 report The future of mobility: What's next? by Scott Corwin, Nick Jameson, Derek M. Pankratz, and Philipp Willigmann, at https://dupress.deloitte.com/dup-us-en/focus/future-of-mobility/roadmap-for-future-of-urban-mobility.html.

For the percentage of Americans driving per year and time spent driving per year, we used AAA Foundation for Traffic Safety's September 2016 American Driving Survey 2014–2015, at http://publicaffairsresources.aaa.biz/wp-content/uploads/2016/09/AmericanDrivingSurvey2015.pdf.

For our public transportation forecast, we included data from the latest US Census on time spent riding public transportation, at www.census.gov/hhes/commuting/files/2009/travel_time.pdf; industry analyst reports on expected growth in public transportation, at www.ibisworld.com/industry-trends/market-research-reports/transportation-warehousing/transit-ground-passenger/public-trans-portation.html; and independent research on ridership rates in the United States, at www.pewresearch.org/fact-tank/2016/04/07/who-relies-on-public-transit-in-the-u-s/.

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For an estimate of expected time spent by individuals consuming media in transit, we used the Bureau of Labor Statistics' American Time Use Survey. The statistics on how leisure time is spent report that as much as 84 percent of leisure time involves some form of media consumption; we believe this is a conservative assumption for in-transit media consumption, as other forms of leisure activity, such as exercise or volunteering, are either impossible or far less likely to occur in transit. We therefore estimate time spent consuming media at 85 percent of overall time in transit. See Leah Libresco, "Here's how Americans spend their working, relaxing and parenting time," FiveThirtyEight, June 24, 2015, https://fivethirtyeight.com/datalab/heres-how-americans-spend-their-working-relaxing-and-parenting-time/.

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