ACCESS TWINE™ 4CAR

ACCESS™

THE DEFINITIVE GUIDE TO:

IN-CAR ENTERTAINMENT

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Foreword by Dr. Neale Foster

The world is in a very different place to when this eBook was originally published as a series of blogs. The COVID-19 pandemic has changed everyone's lives, both in and out of work. Of course, the automotive industry has not been immune to these changes. Factories are closed, workers are on leave, and car sales have plummeted. But the crisis will end and people the world over will get back to work and they will be travelling and buying new cars.

As the industry takes stock, we believe that right now is a great time to be publishing this guide to In-Car Entertainment. The importance of connectivity has been magnified during the COVID-19 crisis and these past few months have highlighted why it's such a fundamental part of all our lives.

The automotive sector has a 150-year history, with its production lines having manufactured over 2 billion vehicles. It will recover, re-build its strength and continue to innovate and drive forward, towards a new, connected in-car lifestyle. I hope you enjoy our insights into how this will happen over the coming pages.

Yours truly,
Dr. Neale Foster, CEO at ACCESS Europe

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CHAPTER 01

Why does In-Vehicle-Infotainment matter to the automotive industry?

1) Why does In-Vehicle-Infotainment matter to the automotive industry?

- **New generation of car buyers want more connected car features and the automotive industry is adapting to meet this demand.**
- **In-Vehicle-Infotainment offers valuable real estate to enable new value-added mobile services – yet, the automotive industry is in danger of losing out to the internet giants.**
- **The rise of Electric Vehicles (EV) and Automated Vehicles (AV) offers a foundation for the automotive industry to realign its offering to capitalise on exciting new opportunities and recurring revenue business models.**
- **The untapped potential of video and rear seat entertainment services is set to explode as the needs of millennial drivers and increase in ride sharing impacts the market.**
- **An attractive initial approach is to provide a substantial app store so that car users can use their existing subscriptions to access the 3rd party content services they love and cherish.**
- **With technology present in over 1.5 billion consumer electronic devices and tens of millions of cars, ACCESS is perfectly positioned to help the global automotive industry develop innovative new services for today that are ready for tomorrow.**

The automotive sector has a 150-year history and its production lines having manufactured over 2 billion vehicles. However, times are changing. People expect connectivity in every aspect of their lives, particularly in the car. Now more than ever, the global automotive industry needs more than ever to prepare for a new, always connected, consumer-centric digital era.

Of course, this is an industry that has always anticipated change and found new ways to make the most of advances in technology. Commentators increasingly describe the modern car as a "computer with wheels" and use this as a reason to expect new market entrants from Silicon Valley to take car leadership away from the incumbent automobile manufacturers and Original Equipment Manufacturers (OEMs). We believe that's an extrapolation too far.

With the average car having over a million lines of code, OEMs are already making 'computers with wheels'. It's the job of the OEMs and their sub-system suppliers to make sure that car passengers and drivers get the best experience possible from the next generation of digitally driven and connected cars.

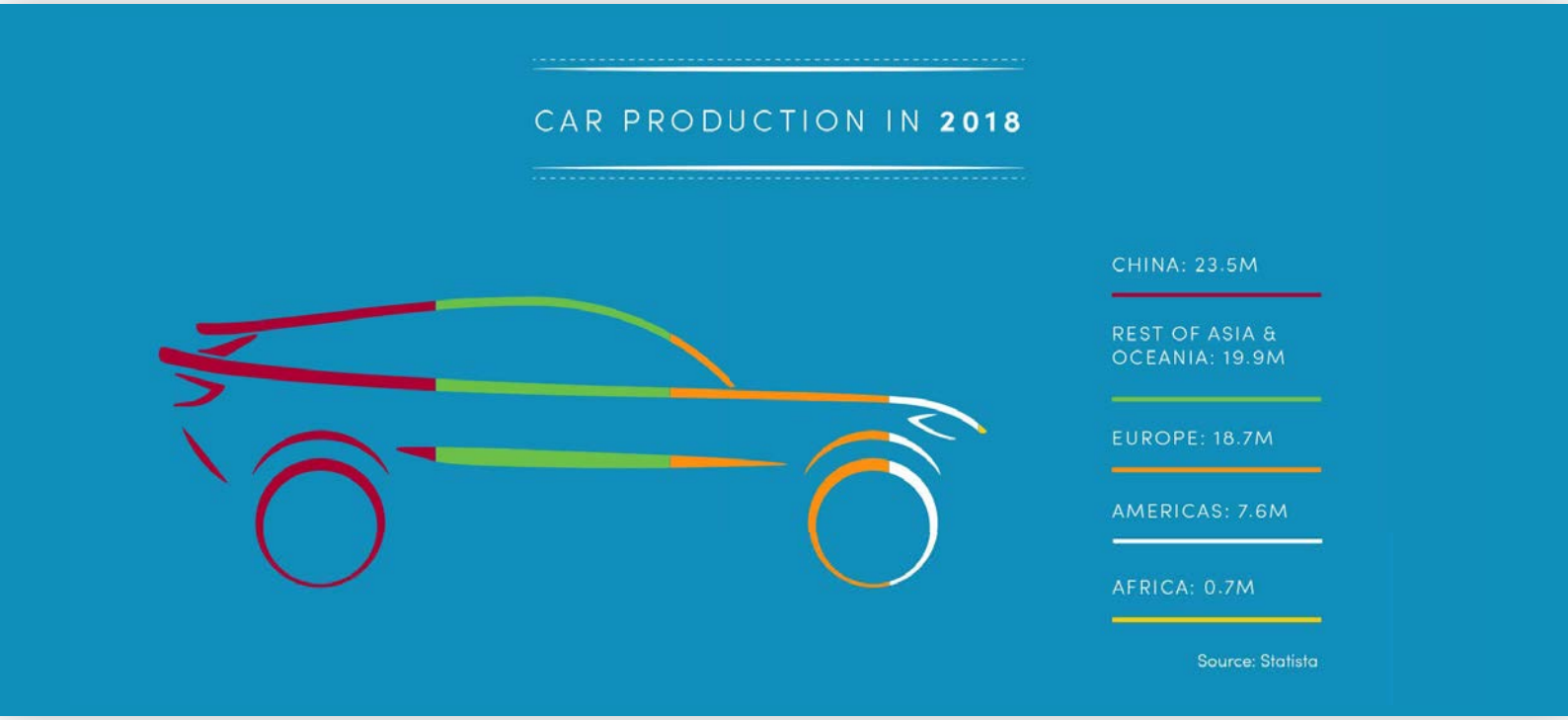
Major shifts such as the rise of autonomous vehicles are looming. Yet, in the here and now, the industry is dealing with major challenges that, if handled successfully, will define the respective fortunes of each car brand.

Emerging trends

The first trend is a perennial issue that has vexed automotive industry executives from day one – how to convince car buyers to pick their product over a rival brand? With most new cars purchased by 25-35-year olds', this internet savvy generation are demanding more features and related services from car makers. The situation is getting more complex as urbanisation prompts millennials to own less cars per household; instead turning to pay-as-you-drive models and ride-sharing in which the rear seat experience is far more important.

This leads to another trend, as automobile manufacturers vie to build closer relationships with consumers that go beyond the dealer network. The rise of ride-sharing services such as Uber was confirmed when its stock market capitalisation overtook that of Ford several years ago. The automotive industry is aware that on-demand transportation and related services offer a highly lucrative business opportunity that they are well placed to capitalise upon. This car transportation as-a-service model is not new, but the key to tapping into this market is based on accruing data and building brands; an area where the automotive industry is lagging behind the firms born in the internet era.

Another key shift has come from the Chinese market. China is the largest manufacturer of cars and yet at the same time, is well behind the G7 countries in terms of per capita car ownership – so there's plenty of potential growth. Venture capitalists have also invested billions in Chinese EV companies, although according to the research company PitchBook, VC investment has dropped by 90% within the 12 months from mid-2018 to mid-2019.



The trend that heralds the greatest impact is of course autonomy. For infotainment this really changes everything. Front seat legal issues over consuming video will change, making video consumption the no. 1 in-car entertainment medium As ever, the industry will also need to ensure that current and future generation of vehicles meet all the requirements for safety, security, entertainment and connectivity that are vital to serving both consumers and businesses.

Learning from the digital revolution

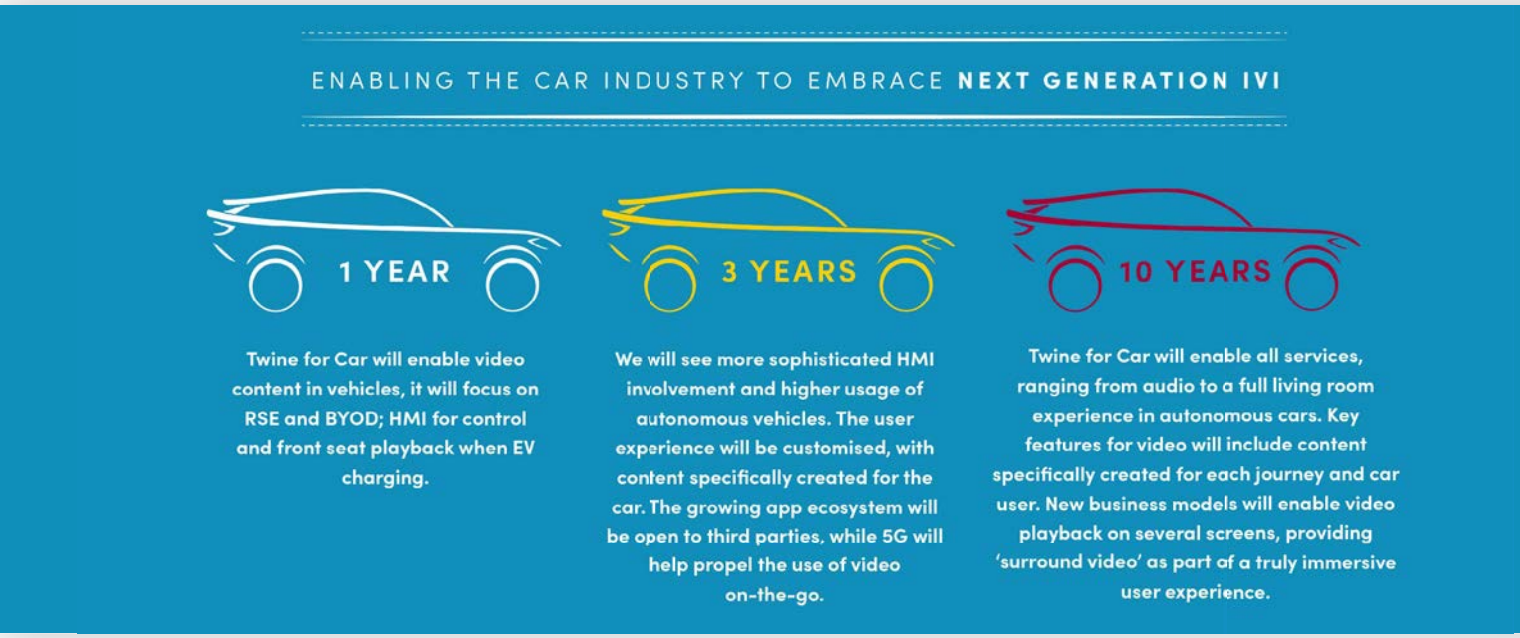
Alongside these challenges, the world outside automotive can offer some valuable insights. Mobile connectivity has revolutionised almost every societal interaction and at its core are software apps and the cloud.

The automotive industry should note Nokia and RIM's failure to respond to rapid shifts in consumer demand and their reluctance to move away from their respective Symbian and Blackberry platforms at a time when Apple had transformed the market with the launch of the iPhone. The modern automobile is increasingly a software driven experience. As BMW board member, Pieter Nota, highlights: "Increasingly, people want to bring their digital lives, their digital systems, into the car with them." Embracing this shift represents a major opportunity – but standing still will allow competitors to transform tomorrow's automotive market.

The connected age

This shift is most evident in the In-Vehicle-Infotainment (IVI) platforms that are increasingly acting as the connection point between car manufacturer, consumers and additional services. The modern generation of IVI provides anything from connected entertainment and audio offerings, to navigation, booking and payment services. In the future, IVI will offer an interface for additional services such as streaming video and location-based advertising. From Netflix to Youku Tudou, consumers want localised content and the flexibility to change as markets evolve.

Catering to the connected consumer is not a goal that can be achieved in isolation. OEMs will need to work with telecommunication service providers to build data plans to cater for differing levels of content access. Additionally, new content and data models in which certain services are already included in the cost of the car could be interesting and popular in some markets.



Consumers travelling in the car represent valuable real estate and a potential battleground for rival Silicon Valley brands such as Apple and Google. Both giants are vying to convince automotive brands to let them into the vehicle. However, the evolution of the smartphone market may provide a warning. The internet giants driven either by advertising revenue or a walled-garden user experience may not prove the best ally for car brands keen to strengthen and ultimately monetise their customer relationships.

Video and rear seat entertainment

The potential for new video-based services is a massive and untapped opportunity for the automotive industry. The rise is happening now, ahead of the arrival of AV. It's happening at a time when demand for minivans/sport utility vehicles (SUV) is increasing in tandem with growing use of ridesharing designed vehicles that need to differentiate services for the rear seat passenger. For the automotive industry, delivering upon the video opportunity requires navigating complexities such as managing content deals, securing access and balancing between the rival Internet giants and media companies keen to reach the 286 million connected passenger cars that are expected to be added globally during the 2019 - 2025 period (2019 Counterpoint Research).

As we enter this inflection point of the automotive industry, we believe that successfully designing cars for three and six years out will be an incredible challenge. This is why we are reducing the content access challenge by functioning as a one-stop shop for OEMs, through acquiring content rights for TV, VOD, audio, games and apps for global usage. By enabling OEMs to focus on the service with a single point of contact across multiple markets, it is our belief that we are bringing a unique offering to the market.

Future Insight

Within this complex landscape, ACCESS, an industry leader which has deployed its technology in over 1.5 billion devices, including over 30 million cars worldwide, offers an informative series of guides on how the automotive industry can benefit from innovative IVI platforms. This series provides guidance on solving the many IVI challenges the automotive industry faces today and explains how to become better placed to meet short and longer-term strategic goals. This multi-part guide covers key areas, including:

- **Enabling the car industry to embrace the next generation IVI and how it impacts the buying decision.**
- **The importance of in-vehicle connectivity for delivering content and services for the modern consumer.**
- **The evolution of entertainment including next-generation radio, video and interactive options.**
- **A deeper look at the potential of video within the automotive landscape and how it can be harnessed to provide a compelling differentiator and value-add.**
- **An overview of the potential service delivery models with a focus on simplifying implementation of next generation infotainment and futureproofing system to ensure longevity in a highly adaptive landscape.**
- **How the automotive industry can successfully partner with key brands such as Apple, Disney, Google, Hulu, Netflix, Spotify, Tencent and other leaders across multiple types of relevant service delivery models.**

The series also offers deep insight into how the visionary car manufacturers are creating breakthrough new services using ACCESS Twine™ for Car, alongside guidance on critical considerations such as security, privacy, technical integration and emerging standards. As the world readies itself to leave COVID-19 enforced lockdown, perhaps the most important message for OEMs and Tier 1s is that if the industry does not embrace next generation IVI, someone else will – with dire consequences for today's market leaders.

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CHAPTER 02

Embracing the Next Generation In-Vehicle-Infotainment

2) Embracing the Next Generation In-Vehicle-Infotainment

• IVI and connectivity are key buying criteria (especially for millennials) that will grow with the arrival of autonomous vehicles.

• IVI and linked mobile apps offer powerful two-way communication for OEMs to finally engage directly with vehicle owners that transcend the dealer network.

• Embracing digital services - such as an in-car streaming solutions - will allow for new types of engagements and revenue streams.

• A dual strategy of supporting key mobile device brands - such as Google and Apple - while still retaining control of the in-vehicle experience offers the most benefits for the automotive industry.

• This approach allows the automotive industry to capitalise on new partnerships with content and service providers while strengthening customer engagement and brand loyalty.

For most consumers, purchasing a car is the second largest capital outlay after buying a house.

There are a whole host of factors that determine how people choose the car they buy. Does it have 'curb appeal'? Does the brand resonate with the buyer? Does it feel special sitting in the driver's seat? Will the kids love sitting in the back? Does it come with all the necessary extras at the right price? Of course, all these factors matter, but increasingly the in-car entertainment system can be the decider. So, getting the IVI system right really matters for OEMs.

Although increasing showroom sales are critical, a connected OEM branded In-Vehicle-Infotainment (IVI) system also helps to build longer-term relationships with the driver and passenger along with generating new, recurring revenue streams. At the same time, it enables the OEM to define the in-car experience rather than ceding control to Silicon Valley media tech giants. All of which means that the in-car entertainment experience has never mattered so much to people in cars and those that make them.

Capturing the market

Research companies report that in-vehicle infotainment and connectivity capabilities are becoming a major requirement; according to 2016 IHS Automotive research (which focused on the US market), up to 40% of millennials said they wanted in-car IVI based apps that 'help to enhance the driving experience.' Additionally, Gartner L2 reported in 2016 that 40% of surveyed consumers would switch their car brand for more connectivity, up from 20% in 2014. As autonomous vehicles start to emerge - freeing the driver to participate in more activities - IVI will take on an ever more important role in the vehicle purchasing decision making process.

The connected age

The overall vehicle experience has evolved in recent years through the arrival of more advanced in-vehicle technologies. The simple radio and cassette decks from the 1970s have been updated in modern vehicles with cellular enabled in-car Wi-Fi offering streaming audio, GPS-based location services, and for rear passengers, the option of live and on-demand video.

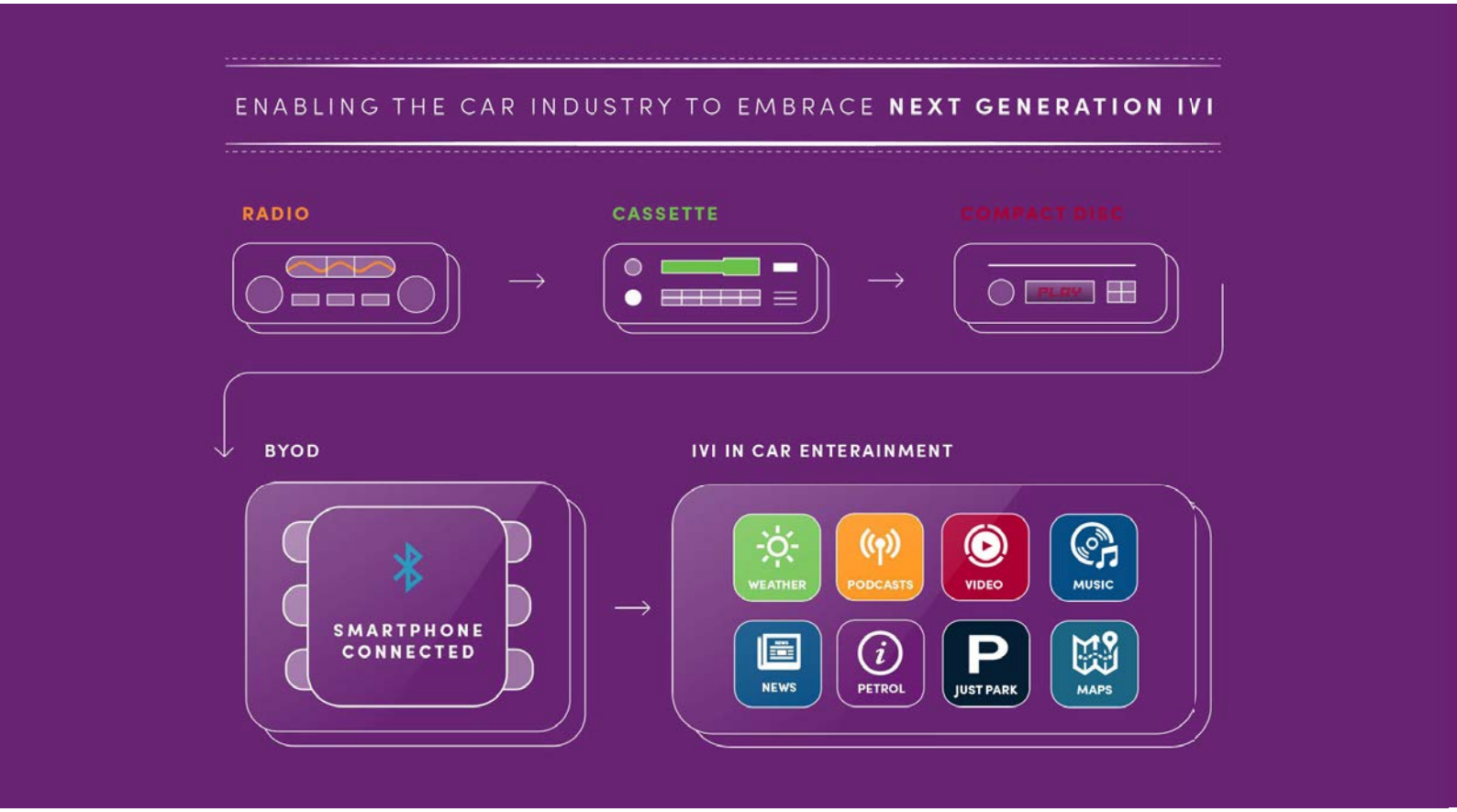
But IVI is more than just a consumer benefit. With the combination of touchscreen and voice-based interface, on-board software and cellular communications; automotive brands will finally have a powerful touchpoint direct to the car owner. This two-way interaction goes beyond the dealer network relationship and allows brands to engage directly with end-customers to share information, collate data and provide additional value-added services.

The OEMs can increase the possibility of success in IVI by working with telcos to create multiple data plans to cater for differing levels of content access. Additionally, new content and data models in which certain services are already included in the cost of the car could be interesting and popular in some markets.

Adding value

According to the 2018 Deloitte Global Automotive Consumer Study, between 50% and 63% of car owners would be interested in additional connected services provided by car manufacturers. The list includes maintenance updates and vehicle health reporting; updates regarding traffic congestion and suggested alternate routes; and access to parking information, including availability, booking and payment. The same study suggests that 59% of consumers say that they were not contacted by the manufacturer after purchasing their vehicle.

Yet most new cars sold are still not equipped with a modern 'connected' IVI. Although this is changing, many existing car owners and passengers still rely on bring-your-own-device (BYOD) offerings based on smartphones and tablets to broaden their in-car entertainment experience beyond the radio and CD player. This option is far from ideal; it suffers from intermittent connection, can be poorly integrated with the car's entertainment systems and does not provide experiences tailored to individual journeys. It is important when specifying next-generation IVI that OEMs and Tier-1s look for integrated BYOD solutions that provide greater benefits for both automotive brands and the consumer.



Integrated apps

Developing integrated apps that can span both IVI and BYOD is critical. Tighter integration between vehicle functions, such as satellite navigation, cellular Wi-Fi, audio systems and rear passengers' screens, enables advanced in-vehicle features (including instrument cluster integration and rear seat casting) to become much more streamlined for the enjoyment of all car occupants.

By offering value-added features, brands can retain control of the user experience. Car owners can enhance their experience by installing the OEM's IVI equivalent app on BYOD devices. This dual strategy offers brands a way to keep direct contact with owners. Vehicles can be resold into the secondary markets, especially if the sale is outside the dealer network.

At the same time, this model also builds stronger relationships and greater loyalty amongst the next generation of car buyers. Offering a branded, value-added app - tied to each vehicle - creates a direct touch communication path which is directly in the control of the OEM. This means the OEM can reach every car owner, globally, with localised content.

of drivers that would switch cars for greater connectivity

Vehicle app stores

The opportunity to have a set of apps that not only span multiple models and devices but can also be made available from a dedicated vehicle app store, represents an innovation that car brands can use to avoid a dependence on either the Google or Apple app store. With a manufacturer branded IVI alongside integrated branded apps on BYOD, the ability to deliver additional value-added services is both simplified and made more reliable.

Alongside popular streamed music applications such as Pandora and Spotify, brands can now look at offering additional content services such as Video-on-Demand (VOD), live TV and premium content that can be delivered as part of a monthly subscription or within an advertising supported model. Global brands such as Amazon, Hulu and Netflix - along with regional champions such as iROKOtv in Nigeria, Hotstar in India and ClaroVideo in Brazil - are all vying for subscribers and are looking at the in-car market as an untapped space for business growth.

A world of content

Future content propositions should entail both large international SVOD and streaming services alongside local broadcaster content from several countries. ACCESS has built a substantial partner portfolio for automotive, which allows for a mix of content in a white-label product. This allows for an OEM to hold the customer relationship across all its facets.

Are you ready?

By 2040, there will be over 2 billion cars in use and it is likely that autonomous vehicles will make up most new car sales. Brands that can deliver true value-added benefits to drivers and passengers will be able to capitalise on an untapped market. Those that don't will be letting a great opportunity slip through their fingers.

of millenials want IVI apps to enhance the driving experience

of car owners want OEMs to provide additional connected services

The car industry is embracing next generation IVI through standard-based application and connectivity platforms. Leading this shift is ACCESS Twine™ for Car (Twine4Car), which enables automotive OEMs to provide branded Infotainment services on the car head-unit (HU) and rear-seat entertainment (RSE) displays. With software development kits for Android, iOS, QNX and Linux, OEMs can now also extend their branded IVI experience to customer brought in devices (BYOD) to form a seamless offering. Twine4Car spans the gap between the automotive and the content industries by enabling a content portfolio, helping to increase the safety, the comfort, and the flexibility of content consumption for drivers and passengers. Through our extensive contacts and experience, ACCESS can also act as the single point of contact for the OEM, engaging with app store providers, broadcasters, media owners and the OEM's Tier-1 suppliers to enable the integration and provisioning of state-of-the-art content and streaming services.

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CHAPTER 03

Entertainment Content for the Connected Car

3) Entertainment content for the connected car

• 4G and the adoption of 5G cellular connectivity for new car sales is growing rapidly, making the connected car the de facto standard within 5 years.

• The technical characteristics of 5G signalling gives automotive platforms reliability and performance benefits for occupants compared to personal mobile devices such as tablets or smartphones.

• Buyers are prepared to switch car brand loyalty to gain better connectivity and seamless access to additional services.

• Modern IVI will help OEMs deliver flexible networking to achieve the best possible experience for vehicle occupants – across all platforms.

• Once connected, OEMs can use communications technology to start building stronger relationships with drivers and passengers.

• This IP, cloud and app approach to IVI meets the needs of the automotive industry to manufacture vehicles that are independent of the market of eventual sale.

Across the developed and developing world, car users expect that the Internet connectivity provided through mobile devices should offer them access to entertainment wherever they are.

As we enter a new decade, basic radio and rather awkward bring-your-own-device (BYOD) experiences are unlikely to satisfy drivers and passengers as the only forms of in-car entertainment. The car OEMs understand this and are all evaluating the best way to deliver on the potential of the connected car concept. As BMW board member, Pieter Nota, suggests: "It's not just about having big screens in your vehicle, it's about the content you can have on those screens and what you can offer that's so important, in terms of things like the best possible integration of music in your vehicle."

The combination of smart software with stable 4G and advanced 5G cellular networks unlocks a future in which the car becomes an OEM-branded communications hub that offers entertainment, BYOD access and value-added services.

The relatively low cost of shipping 4G systems in a car has already seen a rise in its inclusion in next generation vehicles, and connected functionality has moved up the list of features that consumers value. A 2018 survey by mobile app developer Metova found that two out of three respondents would switch from their current entertainment service provider to one that was included with their vehicle. Buyers are increasingly prepared to change both their car brand and loyalty towards their content distributor to gain better connectivity and seamless access to in-car entertainment services. Data from Counterpoint Research suggesting that 75% of cars will be connected to the Internet by 2025, with the vast majority utilising 5G networks, supporting the notion that the connected car is on its way to mass-market adoption.

of consumers would switch content providers to get in-car connected content services

Source: Metova

5G mobility benefits

4G networks are already widely deployed and provide a pathway for highspeed connectivity across audio, compressed video and two-way communication for BYOD and on-board apps. In Europe, new car models approved for manufacture after 31 March 2018 must have the 112-based eCall system installed which uses a cellular modem within each vehicle.

Although 4G is ideal for streaming low bandwidth content, the cellular connectivity that will be fitted into all new cars is likely to be 5G ready – allowing a software / SIM upgrade to take advantage of new networks as they arrive on the market.

This move to 5G is more than just a gimmick; due to the short wavelength of 5G radio signals, cars with larger and better integrated radio antennas will offer far superior reception than that of smartphones. With the car acting as a reliable 5G access point, the ability to project a Wi-Fi hotspot for occupants provides increased reliability and performance across the entire journey for driver and passengers alike.

With connectivity built-in, automobiles finally gain several real-time capabilities that aid driver comfort, safety and utility. From instant updates for traffic and route guidance, to delivering new forms of infotainment such as streaming audio services and video for rear-seat passengers, 5G means, that for example, a built-in IVI system including a service such as Netflix will perform far better than BYOD devices running a Netflix app.

IVI acts already as a connectivity hub allowing various media formats - via Bluetooth and USB drives - to be merged into a single source of entertainment. The next generation IVIs will also be a central access point to the services offered by the OEMs, allowing them to shape these in the most attractive and efficient way for the driver and passengers.

Data on the move

Always-on connectivity also allows automotive brands to gain deeper insights into car and driver usage. As part of an opt-in model, brands can now start to directly communicate with vehicle occupants for practical issues, such as car servicing reminders and promotional activities including OEM and third-party offers.

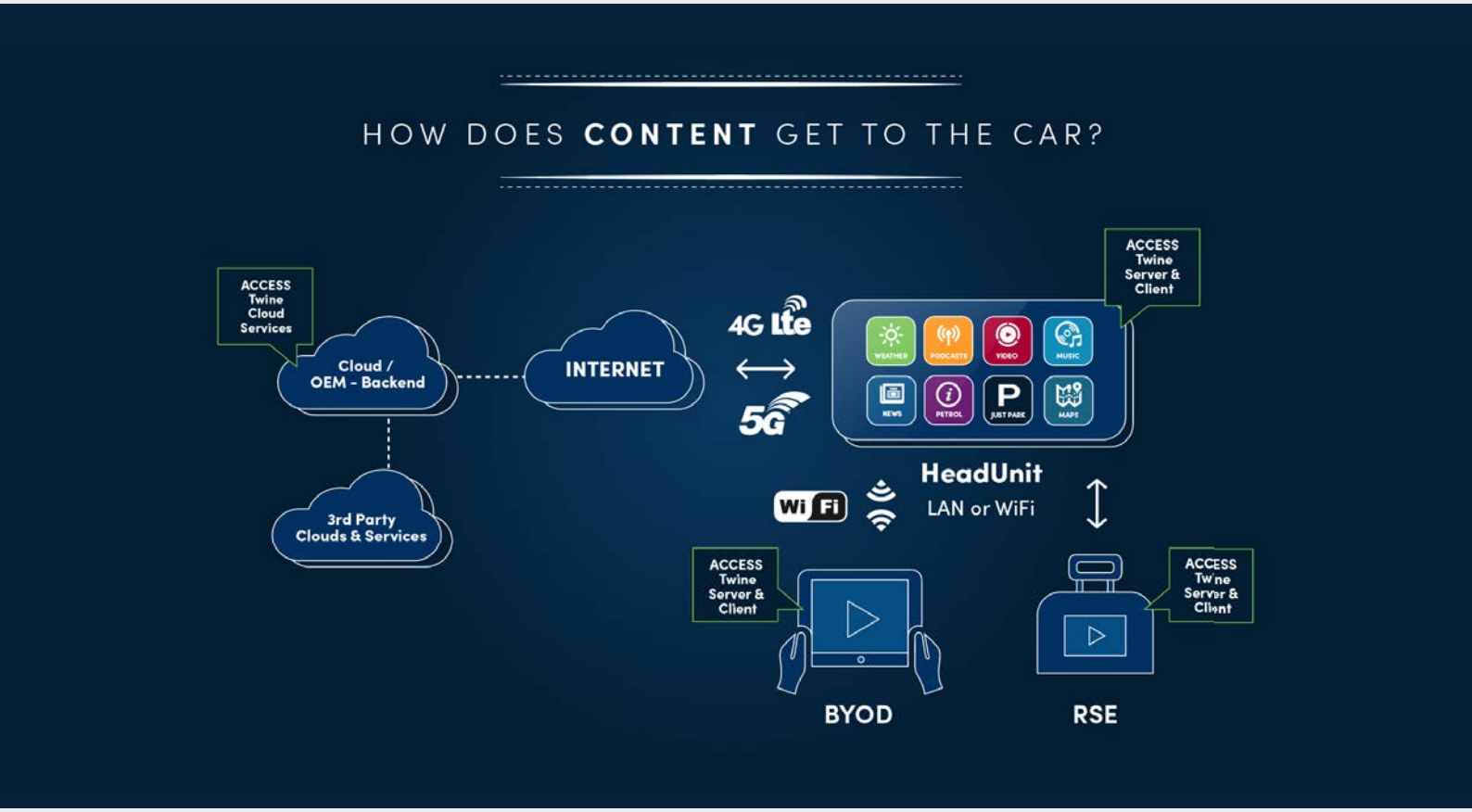
For car brands, built in connectivity combined with value added services unlocks the potential for direct-to-consumer subscription services. Early pioneers of this approach include OnStar, with its package of services such as roadside assistance, remote vehicle unlocking, and automatic crash response. This helped to showcase the potential of connectivity being available across entry level and mid-tier vehicles. Through this connectivity, OEMs can begin to streamline their direct communications and start building stronger relationships with drivers and passengers.

Infotainment unlocked

The connected car approach will also allow car brands to offer integrated infotainment services through partnerships with existing or emerging music, video-on-demand and gaming services. In a similar paradigm to the smartphone market, vehicles are likely to be a showroom for connected services that are then enabled through activating pre-downloaded apps within the IVI – along with companion apps for mobile devices.

Adoption of the connected car as standard is accelerating across the industry, fuelled by consumer demand. All current consumer and car industry research points towards an evolution in which the connected car becomes the standard option. Looking to a medium-term future where electric vehicles and charging stations become the norm, the in-car entertainment experience will play a key role in how car brands are perceived.

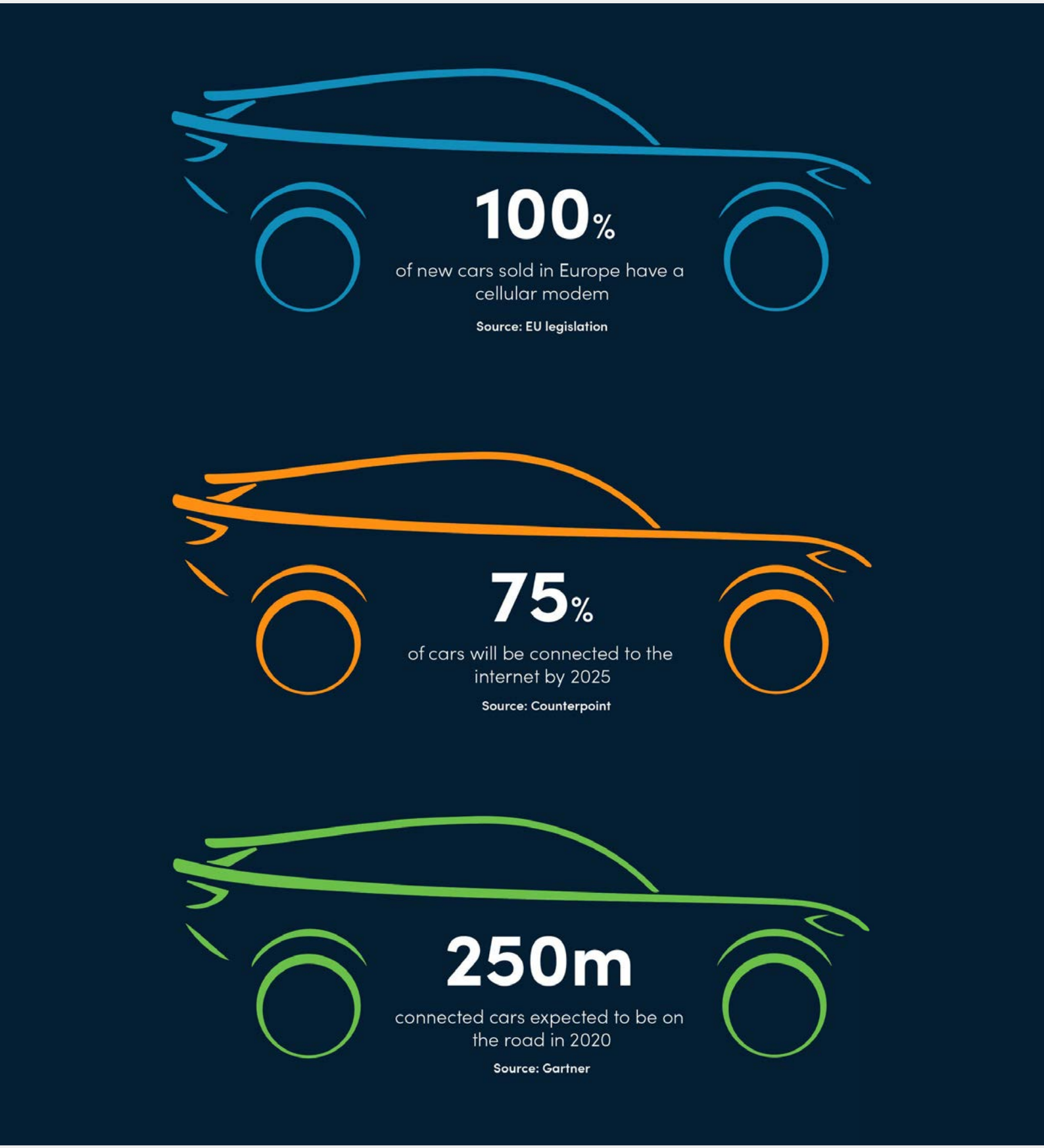
ACCESS Twine™ for Car (Twine4Car) supports automotive OEMs in creating successful multi-device in-car platforms that facilitate flexible driver and passenger consumption of media services. It enables exploration of new customer engagement approaches through the HMI and business models to create recurring revenue streams. Twine4Car allows OEMs to start with the services they wish to deploy today and add new services over time as the industry moves towards more advanced levels of autonomous driving.



Twine4Car connects the in-car infotainment system components seamlessly with BYOD devices via the in-car Wi-Fi network. It provides a decentralised control of content that enables a multi-device user experience far beyond common single device streaming applications or screen mirroring technologies. This platform approach aggregates content into a single point, offering enhanced features such as the ability to index digital content along with music and video from all devices - including USB drives, smartphones and tablets - within the car. Aggregated content can be played on any Twine4Car enabled device such as RSE units, tablets and smartphones. It allows OEMs to deploy a single IVI system across multiple brands and enables the delivery of new features simply via software updates or through changes to cloud-based interfaces rather than through physical upgrades.

This combined IP, cloud and app approach matches with the needs of the automotive industry to manufacture vehicles that are independent of the market of eventual sale. For example, a car built in a factory in Germany, sold to a dealer in Netherlands and bought by a customer that lives in Belgium, would offer an IVI experience that could be automatically reconfigured based on the owner's preference through a simple system login process – without the need for a dealer visit.

In addition, as the vehicle's owner changes or as new BYOD devices or content services appear, the IVI interface can be remotely updated from the cloud – without the need for new software to be pushed to the vehicle – and again, without a dealer visit. This innovative concept is ready here and now and under testing at several larger automotive manufacturers.


100%
of new cars sold in Europe have a cellular modem
Source: EU legislation
75%
of cars will be connected to the internet by 2025
Source: Counterpoint
250m
connected cars expected to be on the road in 2020
Source: Gartner

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CHAPTER 04

Next Generation Radio & Audio Streaming

4) Next generation radio and audio streaming

• Audio is still the most favoured infotainment option for drivers and passengers alike and is going through an evolution with the addition of streaming.

• The first generation of connected cars have yet to fully integrate radio, streaming and BYOD services, leading to lower consumer satisfaction.

• The IVI will increasingly act as a primary interface for audio service aggregation and integration including control plane functions such as voice recognition.

• Value-added features - such as audio search and caching to overcome connection outages - are a considerable consumer benefit enabled through IVI integration.

• A software and cloud-based approach increases flexibility for consumers and allows OEMs to make service and feature updates without requiring a dealer visit. A software and cloud-based approach increases flexibility for consumers and allows OEMs to make service and feature updates without requiring a dealer visit.

The car radio is still the most widely appreciated form of in-vehicle entertainment. First installed in 1924 by Kelly's Motors in New South Wales, Australia, the earliest branded car radio was marketed by Motorola (a combination of "Motorised" and "Victrola", a leading brand of phonograph) in 1930, for the equivalent of $1,500 in modern terms. The popularity of the car radio continues to endure.

Today the in-car AM/FM/DAB/satellite radio and CD-player is still loved by drivers who, by law, must not be visually distracted while on the road. However, it's now possible for new techniques to enhance the in-car audio experience with customisation and location-based services, ensuring that in-car video won't completely kill the radio star for many years to come.

Bring your own audio

At present, consumers can access most of these new capabilities via bring-your-own-device (BYOD) options such as smartphones and tablets. However, as drivers will attest, integration between these devices and the capabilities within the car are limited at best. In most cases, users will link via Bluetooth to interface a smartphone audio input and output to the car. In this scenario, audio functions such as radio, streamed music, telephone call handling, turn-by-turn driver navigation, and traffic warnings are managed in a sometimes difficult to use ad-hoc manner.

However, as more rear seat passengers begin to access their own audio and video services via built-in screens, the current BYOD position is much less desirable. This ad-hoc solution makes it very difficult to guarantee reliable operation due to the differences between devices and operating systems within a growing diversity of services.

With the rise of the connected car including built-in 4G/5G connectivity, OEMs are moving towards an integrated IVI solution that offers the ability to blend their own services alongside audio offerings from the likes of Amazon and Apple within a seamless experience.

Radio continues to dominate

According to research from Rajar in the UK that split out in-car listening:

- **Live radio took 83.9% of all in-car listening**
- **CDs trailed far behind on 7.6%**
- **Digital tracks (downloaded MP3s) were on just 5.3%**

The pattern is similar in the USA, according to 2017 Edison Research:

- **AM, FM and satellite radio accounts for 71%**
- **CDs and digital music collections are on 15%**
- **Online radio is at 9%**

We believe car drivers are choosing linear radio over MP3s, CDs or streaming services because of convenience, along with the fact that radio offers variety and spontaneity in its curated mix of music and information (such as news, traffic updates and weather). Even more importantly, the radio still provides an unrivalled user experience – you just press a button and it plays.

Streaming future

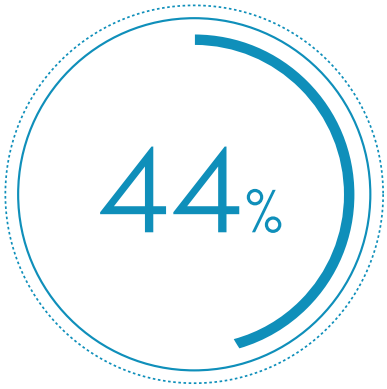
The importance of digital audio playback and Internet streaming should not be underestimated. According to the 2016 IHS Auto Tech Consumer Survey, over half of millennial drivers (58%) listen to music from a BYOD device and are also twice as likely (44%) to listen to streamed audio services than the average. However, with over a dozen major streaming radio and audio service providers including Audible, Kindle, Pandora and Spotify, plus regional specialists, OEMs need to ensure that consumers can integrate their chosen service into the in-vehicle experience.

of millennial drivers listen to music from a BYOD device

Data source: IHS

To meet this requirement, the IVI acts as a service abstraction layer to manage secure access to audio services as well as an in-car distribution platform for main speakers and headphones/screens for rear seat passengers. Through an open API, the IVI can manage either direct connection to cloud-based interfaces or as a host for downloadable apps. These services utilise the current 4G, and future 5G connectivity within each vehicle and overcome the traditional challenges of regional radio reception by providing services wherever there is a cellular network.

The IVI is a natural layer for the delivery of value-added features such as audio caching, so that as vehicles move through connectivity black-spots, audio streaming remains uninterrupted. The IVI is also increasingly used as the control plane for managing audio including dynamic search and control through practical methods such as voice recognition, using cloud-based technologies such as Amazon's Alexa and Apple's Siri.



of millennial drivers are twice as likely to stream audio

Data source: IHS

Audio content search is likely to be a killer app for many drivers. The ability to request an artist, album or song and have it played instantly from a subscribed service is commonplace for home users. This is increasingly being built-in to the connected car as standard.

Flexibility and choice

This voice control integration is crucial; it provides the driver with the freedom to access not just content but also to control dynamic services such as traffic updates, rerouting navigation services and other common tasks. As there is no single standard for all these options, the IVI needs the flexibility to allow the car owner to mix and match apps and services – and to adapt to emerging technologies.

To put this into context, Amazon Alexa has sold over 100 million devices in just four years and by 2020, experts predict its voice recognition technology may be used in half a billion homes. Consumers expect that a modern car will be able to integrate with emerging platforms like Alexa, which requires an IVI solution designed with flexibility in mind.

At present, the larger content gatekeepers such as Amazon, Apple and Google are vying for control of media distribution to the car. However, it could be argued that car manufacturers and consumers want both choice and the ability to change their minds. In a future in which cars have a subscription package for cellular connectivity and content, the ability to pick from a collection of audio, video and infotainment services seems like the best option to meet the needs and budgets of the widest range of consumers. This will replicate the way the Pay-TV industry has evolved its different bundles.

Audio becomes video

With the emergence of autonomous vehicles on the near horizon, the infrastructure and systems put in place for audio offers a natural bridge for a future move towards video. The process steps of validating users, streaming digital data and playing back onto a device are similar for both types of media. In many cases, the changes required are simply interface updates that are maintained within a cloud portal. This approach makes it easier for OEMs to update entire brands and models of vehicles across every country, without having to apply any physical updates to the vehicle that could require a visit to a dealer.

The ability to remotely enable video, integrate services and charge a monthly subscription fee that includes cellular data plans offers OEMs and dealers an upsell potential for not just primary buyers but across the entire lifecycle of the vehicle.

ACCESS Twine™ for Car (Twine4Car) offers a platform to augment traditional radio services with streaming audio and video that goes beyond technology. ACCESS can help automotive OEMs build business relationships and create profitable and successful multi-device systems and media services. ACCESS has already established - and is extending - multi-broadcaster content agreements that allow OEMs to offer a baseline in-vehicle content subscription that can be upgraded and regionalised as required.

Twine4Car enables OEMs to index audio and video content from multiple sources and content partners. The result is an embedded content service through one aggregation source but controlled and managed by OEMs – enabling them to provide the entertainment services their customers are asking for and maintain brand engagement through a truly multi-device experience.

It is important to recognise that Twine4Car is service, device and brand agnostic. This is a vital element in helping OEMs to deliver the most flexibility to their consumers and hedge against the issues that can arise as content providers and communication carriers vie for dominance in the future. As a pure platform operator with no advertising or data monetisation business model, ACCESS is ideally suited to helping OEMs solve the service delivery challenge while working within the broadest ecosystem of partners.

ACCESS TWINE™4CAR

CHAPTER 05

The Video Entertainment Revolution Begins

5) The video entertainment revolution begins

• The growing adoption of Rear Seat Entertainment across luxury, MPVs and taxi/ ridesharing will accelerate as AV enters the market.

• Delivering new video services will take advantage of a combination of IP, cloud and software technologies along with cellular networks to meet consumer demand.

• Innovative middleware and service platforms such as ACCESS Twine™ for Car help OEMs overcome technical and IAM hurdles through extensive support for key operating systems, media sharing protocols and security controls.

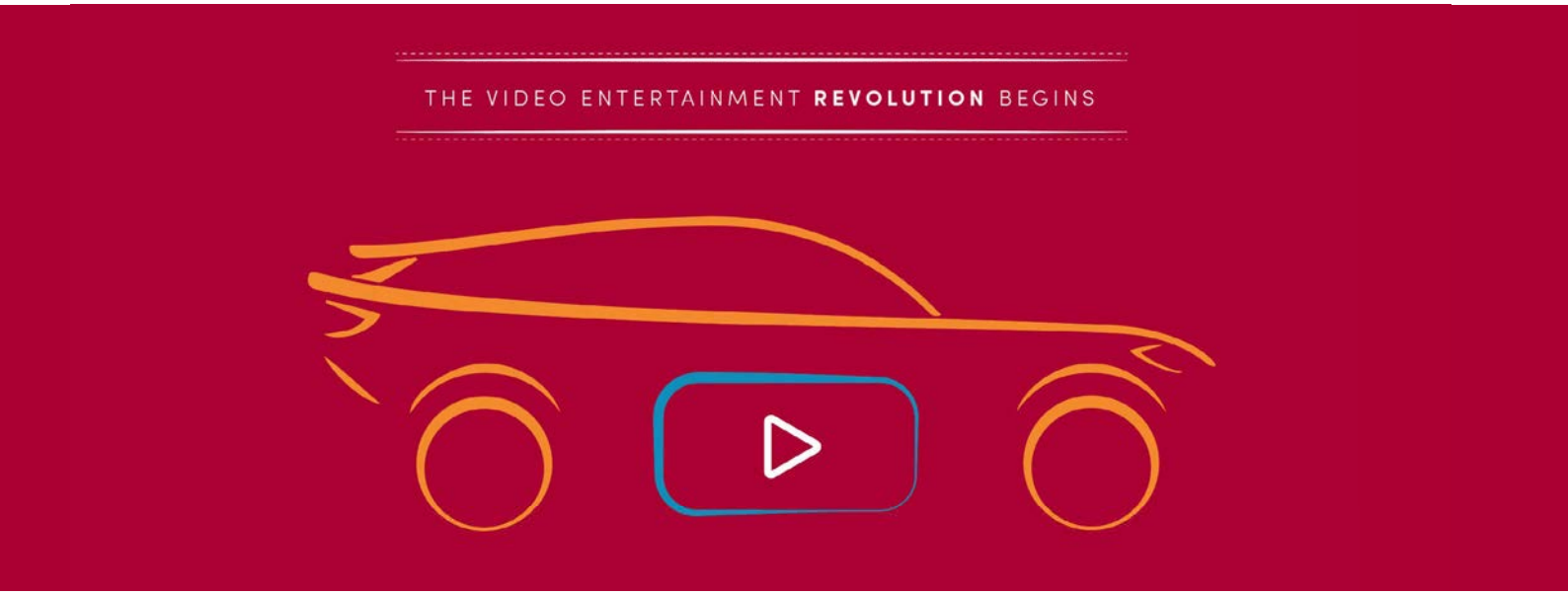
• Creating the foundation for video-based services today will help progressive OEMs prepare for wider adoption through BYOD apps and cloud / software updates.

"Are we there yet....?" Parents with children know just how important it is for the back-seat royalty to have access to video and Internet.

It's also important that the people in the front have access to great navigation and location-based services. Imagine you're a visitor to a strange city. Wouldn't you just love to have voice directions to the nearest free parking spot and have the payment handled automatically? And of course, when autonomous driving hits its stride, the front seat passengers will be able to enjoy video entertainment too.

Slow wave quickens

Video in cars is not a new concept. After all, the first factory installed rear seat entertainment units appeared in the 1990s. However, considering that approximately two-thirds of car journeys in major cities such as London involve just a driver and no passengers, the demand for these systems has remained relatively low.

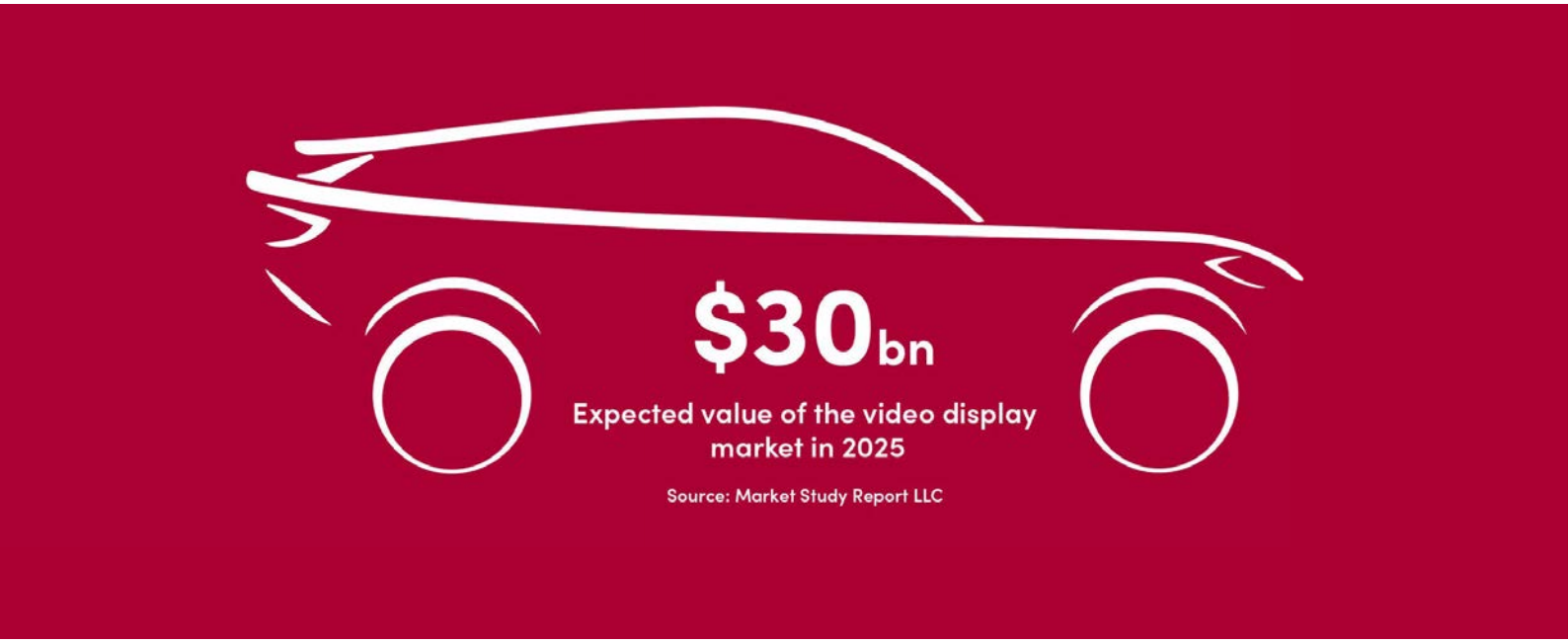


Nevertheless, Rear Seat Entertainment (RSE) has proven popular within the Sport Utility Vehicle (SUV) / minivan / Multi-Purpose Vehicle (MPV) segment, where reviewers of models such as Chevrolet Tahoe and Chrysler Pacifica have been vocal as to the benefits, especially for inter-state journeys with kids in tow.

High end luxury vehicles such as Mercedes-Maybach - which come at a sticker price in excess of $200,000 - tend to easily upsell RSE packages that may cost a couple of extra thousand dollars. Yet, China seems to be the growing epicentre of factory installed RSE on premium models.

However, the market with potentially the biggest growth is within purpose-built taxis and vehicles which are increasingly designed to serve as ridesharing services. Uber, and its rival service Ola, have already trialled RSE services in India while in the US, a growing number of third parties are offering rideshare advertising services.

Yet, with the majority of RSE installed privately through DIY kits, there are very few accurate statistics around the number of vehicles with this capability and by extension, access to video-based services. "However, industry analysts Global Market Insights suggest the automotive display market is expected to surpass USD 30 billion by 2025.



Fully autonomous vehicles shift the market

By law, front seat video systems are deemed illegal in most jurisdictions as they are considered a driver distraction. Yet demand for RSE is growing, and this position is likely to accelerate over the next decade as fully autonomous vehicles start to enter the market. Innovators such as Tesla already allow drivers to access video content on the front screen when the vehicle is parked within a charging station.

Part of this growth is due to consumer electronics commoditisation that has reduced the cost of factory installed RSE. The rise of low-cost tablets has led to a reduction in the optional RSE systems with $1,000 the starting point for OEM branded packages. Factory installed options tend to be more reliable and integrated than BYOD equivalents and have safety benefits compared to the possibility of handheld tablets becoming dangerous projectiles in the event of a crash.

The physical aspect and economics of RSE, either as standard or as optional extra, is still an evolving landscape. In general, almost every major brand has several models that have this capability. Perhaps the biggest challenge is to ensure that every passenger can enjoy a video experience that is comparable to the at-home equivalent.

IP, cloud and software centric

Irrespective of which business model OEMs decides to adopt, the video content service delivery method is likely to rely on IP-based streaming via cellular networks. This approach overcomes the limitations of technologies such as DVB – although that could potentially change over the next decade – while allowing service delivery to be handled through software, either in the car or from the cloud. This offers a major benefit by allowing cars to be manufactured in any market, and exported to any market, with the IVI and RSE configured by remote software update and configuration.

The analogy would be the smartphone; on first use, it can connect to the local carrier and ask the user for their account details, which in turn builds the GUI and app profile based on the supplied information.

As cars change owners in the secondary market, the IVI and RSE resets and the process starts again – as it did when the vehicle left the dealer showroom – and the connection between driver and the OEM is extended to the entire lifecycle of the vehicle!

Video – delivering quality, flexibility and profit

When it comes to the user experience, the IVI has a critical role to play in ensuring popular video services are seamlessly enabled. This starts with handling the Identity Access Management (IAM) layer to ensure secure and trusted access to subscribed services. This single sign-on process simplifies the user experience and is linked to additional features such as parental control and billing management for payment services.

Consumers that already have active subscriptions are unlikely to want to pay for a separate RSE package. However, when bundled with 4G/5G connectivity and sold as a package upgrade, this business model offers a tantalising glimpse into the potential of untapped video service revenues that OEMs could unlock.

ACCESS Twine™ for Car (Twine4Car) enables OEMs to integrate all kinds of content sources, be it public, private or premium content. Sitting as a middleware layer, Twine4Car enables OEMs to define the look, feel and style of the UI while the platforms handle the technical enablement of providing secured media access and enabling secured multiscreen media sharing to any head unit within the vehicle along with BYOD devices.

Additionally, by pre-integrating IAM, Conditional Access (CA) and Digital Rights Management (DRM) solutions, OEMs can both simplify the consumer experience and meet the security requirements of the SVOD and broadcaster community. ACCESS Twine™ is CA/DRM technology agnostic and is open to be integrated with any of such systems, including Microsoft PlayReady®, Verimatrix VCAS® and ViewRight™ technologies, and to provide great support for further solutions like Google Widevine® and Apple FairPlay Streaming™.

For OEMs with multiple brands, Twine4Car can help optimise costs by overcoming the issue of device fragmentation. This is because its SDKs are available for all major operating systems, along with integration with leading in-car systems such as GPS, Bluetooth, Wi-Fi, 4G/5G, DNLA and key automotive software technologies such as Apple CarPlay and Google Auto. Additionally, operators benefit from ACCESS' wide experience of the consumer electronics market having deployed on more than 1.5 billion devices.

ACCESS TWINE™ 4CAR

CHAPTER 06

The Video Entertainment Revolution Continues

6) The video entertainment revolution begins

- **Video delivered via In-Vehicle Infotainment (IVI) is an untapped market that will grow rapidly, thanks to automotive trends such as Electric Vehicle (EV) charging, increased ridesharing and the arrival of fully autonomous vehicles.**

- **An approach that embraces IP, cloud and software allows OEMs to build an infotainment strategy that decouples the country of manufacture from the service delivery agreement.**

- **The fragmented streaming video market and simmering rivalries between content providers makes delivering a flexible, integrated service a significant challenge for the automotive industry.**

- **ACCESS has removed all the stumbling blocks around content deals, so that one single service can be provided across all OEM markets. ACCESS functions as a one-stop shop for acquiring content rights for TV, VOD, audio, games and apps for global usage.**

- **Delivered as either a managed or co-managed platform, an OEM's in-house development team is relieved of the burden of having to maintain continual updates to ensure BYOD device compatibility, access security and ongoing content agreements.**

Video is the fastest growing form of mobile data usage and the automobile is the last frontier that has yet to be conquered.

Although many assume that Autonomous Vehicles (AV) will be the catalyst for this expansion, the starting point is here and now – especially as drivers begin to use charging points and more journeys move to ride sharing vehicles that are increasingly equipped with Rear Seat Entertainment (RSE).

Vast and untapped

The economic potential of video in vehicles should not be under-estimated. To provide some perspective, at the end of 2019, Netflix, the largest global SVOD platform, had 167 million subscribers worldwide (60 million based in the US) and revenues of around $20 billion. Estimates in recent years suggest that there could be as many as 2 billion cars on the road by 2040. Even if just one in five of these drivers subscribe to an RSE/SVOD package, the revenue would potentially eclipse even Netflix.

Although services such as Netflix are popular, there are regional and demographic differences that need to be considered. For example, the Disney+ service potentially has more content suitable for children in the backseat than a service such as ESPN, which provides live sports streaming to viewers of all ages.

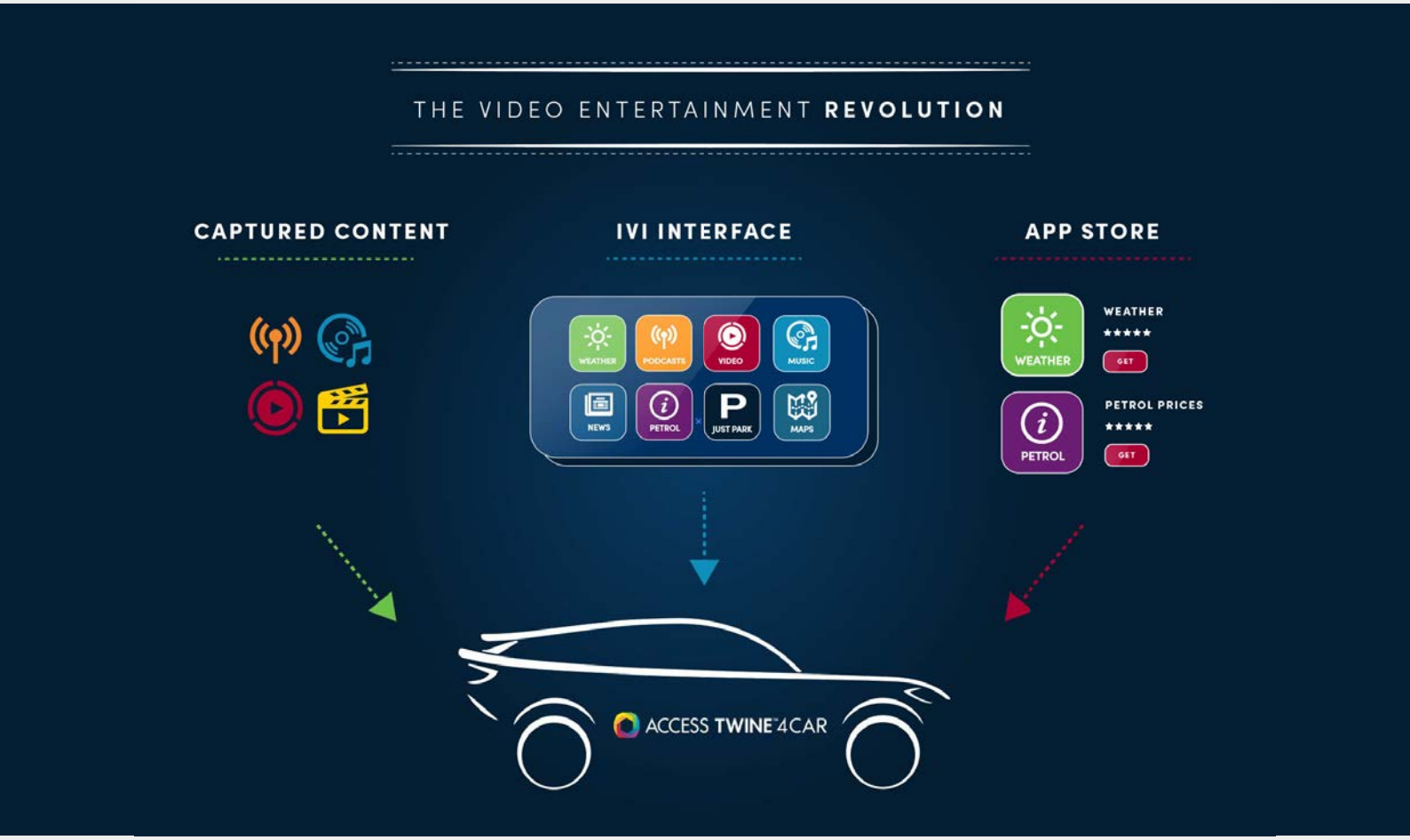
In the multi-seating-row minivan/Sport Utility Vehicle (SUV) market offering, there is huge potential for OEM brands to differentiate by delivering various content streams to any seat across the vehicle through an on-board media server, via 5G streaming or gaming apps. This presents the possibility for a new recurring revenue profit engine to emerge.

IVI - the video enabler

Across all these examples, the IVI offers that natural focal point for service delivery as well as future flexibility through software-based adaptation. It also offers a benefit for regional customisation with Over-the-air (OTA) software updates, providing access to local services without requiring a dealer visit.

As of 2018, there were approximately 1.5 billion active pay-TV or SVOD subscription worldwide, a figure which is expected to reach 1.87 billion by 2023. The global demand for content offers the potential for OEMs to include video content as standard for RSE audiences. This can range from free-to-air (FTA) channels such as news and sport, to ad-supported premium content that generates a small revenue stream – in effect carriage charges – for the OEM. In this model, a potentially more valuable offering is through in-vehicle video advertising.

The wider SVOD market is fragmenting to support more operators. Leaders such as Netflix, Amazon and FOX have been joined by Disney, HBO and NBCUniversal, plus there's an overlap from traditional pay-TV providers with mobile SVOD, such as Sky in Europe and Star in Asia. Added to the mix are premium sports brands like NBA, MLB and NFL that are increasingly looking at direct-to consumer SVOD as a way of bypassing traditional broadcasting structures.



Flexibility & Reliability

Although great for consumer choice, these shifting sands mean that OEMs keen to deliver more RSE must prioritise flexibility and reliability as their top two criteria. Just like the smartphone market, every RSE-equipped vehicle must be able to effectively access every major SVOD service with little friction. In a similar way to progressive TV manufacturers such as Samsung and Sony, the RSE must have the capability to receive FTA channels. It must deliver access to built-in content portals, plus a range of SVOD apps ready for activation with just the addition of subscriber credentials (such as username and password).

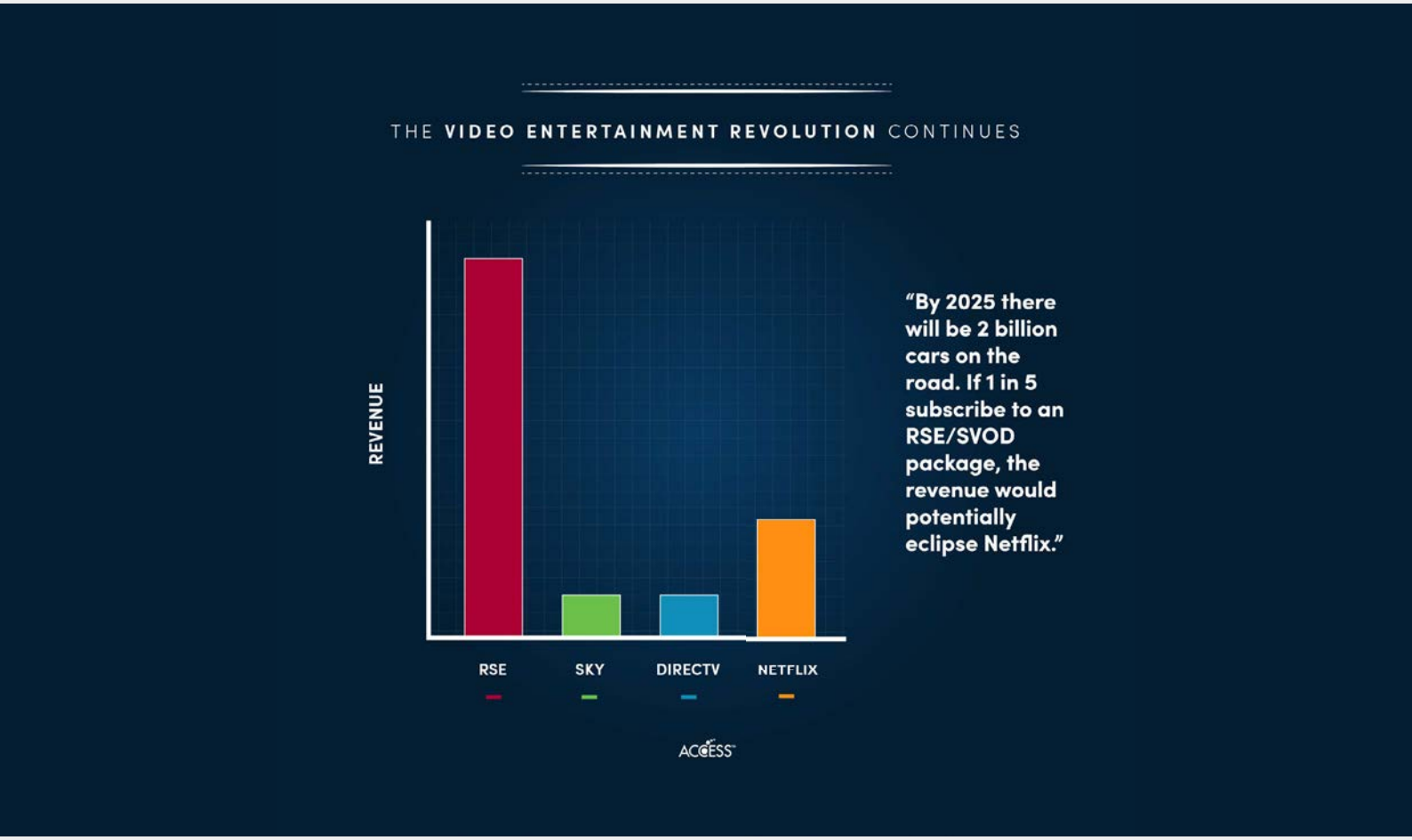
Avoiding the content turf wars

OEMs need to insulate themselves from these types of competitive rivalries by ensuring the IVI and RSE systems are developed with independent technology vendors that do not have competing content businesses.

To meet this need, IVI must also be independent of the vested interests of the internet platforms dominated by the likes of Apple, Amazon and Google. These giants have traditionally made it difficult to access content from a perceived rival's walled garden. For example, Netflix and Apple TV recently cited "technical issues" which prevent Netflix from working on recent versions of Apple Airplay and, in some instances Apple CarPlay.

With the assumption that access to multiple video service providers is needed, the IVI can provide additional value-added features. However, to overcome the need for continuous 4G/5G connectivity on the road, combined capabilities are required. They include pre-caching, to create pools of HD content using cellular connectivity while the vehicle is off-the-road; live video caching, for advanced controls such as pause and rewind; and unified search.

Signing content deals to provide services for all OEM markets is a real challenge. ACCESS has removed this heavy lifting by functioning as a one-stop shop for OEMs, acquiring content rights for TV, VOD, audio, games and apps for global usage. This is unique in the market and enables OEMS to have a single point of contact for multiple markets. One of the more attractive approaches in the shorter-term is for OEMs to provide users with a substantial car-centric app store so that car users can utilise their existing subscriptions to access the third-party content services they love and cherish.



Ready for growth?

Live TV and SVOD services for cars are part of an untapped market that has many elements converging. If unlocked, this represents a major revenue opportunity for the automotive industry. Consider again the potential in respect to the Netflix story.

In 2008, the year after the SVOD leader launched its services, Netflix had an audience of under 10 million subscribers, all based in the US. By 2018, Netflix had accrued an estimated 55 million US subscribers – more than half the total number of pay TV subscriptions in the country (94 million).

Today, by our analysis, less than 1% of vehicles have video enabled RSE. However, the combination of reduction in cost, growing demand for minivans/SUVs, AV and increased ridesharing usage – as well as increasing 5G connectivity - suggests this figure will grow.

Until the arrival of mass market automated vehicles, the adoption of vehicle based SVOD is unlikely to match the staggering growth rate of Netflix. Near-term scenarios such as waiting 20 minutes in an EV at a high-speed charging stations will start to increase demand and use of RSE.

Automotive brands can learn from the pay-TV industry by adopting open standards and ensuring that technologies are fit-for-purpose. To do so, they need to lay the groundwork in preparation of the rise of video. If AV arrives faster than expected, OEMs without an RSE (or potential Front Seat Entertainment via the Head Unit) option will be left out in the cold.

ACCESS Twine™ for Car (Twine4Car) comprises a content services layer that includes a pre-built catalogue of content that has been sourced from a wide range of national, regional and international content partners such as ViacomCBS. This broadcaster, studio and content provider network is growing continually. These are controlled via cloud-based rights management capabilities that can allow OEMs to offer optional, basic and premium packages that are adaptable and based on the country of the vehicle's purchase.

This approach simplifies the content acquisition and service process for OEMs and provides a one-stop-shop for handling future rights management and content licensing agreements. Through an IP-based delivery method to head units and OEM Bring Your Own Device (BYOD) apps, OEMs can benefit from an integrated and branded service, localised to the customer without the complexity of having to manage hundreds of separate content agreements and ongoing service and software maintenance challenges.

Content monetisation and service profitability are perfectly supported by Twine4Car to allow the creation of a unique and highly differentiated selling proposition that outperforms all non-integrated offerings.

ACCESS TWINE™4CAR

CHAPTER 07

The Race for Autonomous Vehicles & In-Vehicle Infotainment

7) The race for autonomous vehicles and In-Vehicle Infotainment

- **The world's automotive manufacturers and tech companies are racing to deliver fully autonomous cars and the next few years will see industry defining innovation emerge.**

- **The opportunity is vast and will fundamentally shift how the world transports goods and people, as well as the operating and ownership model of the entire automotive industry.**

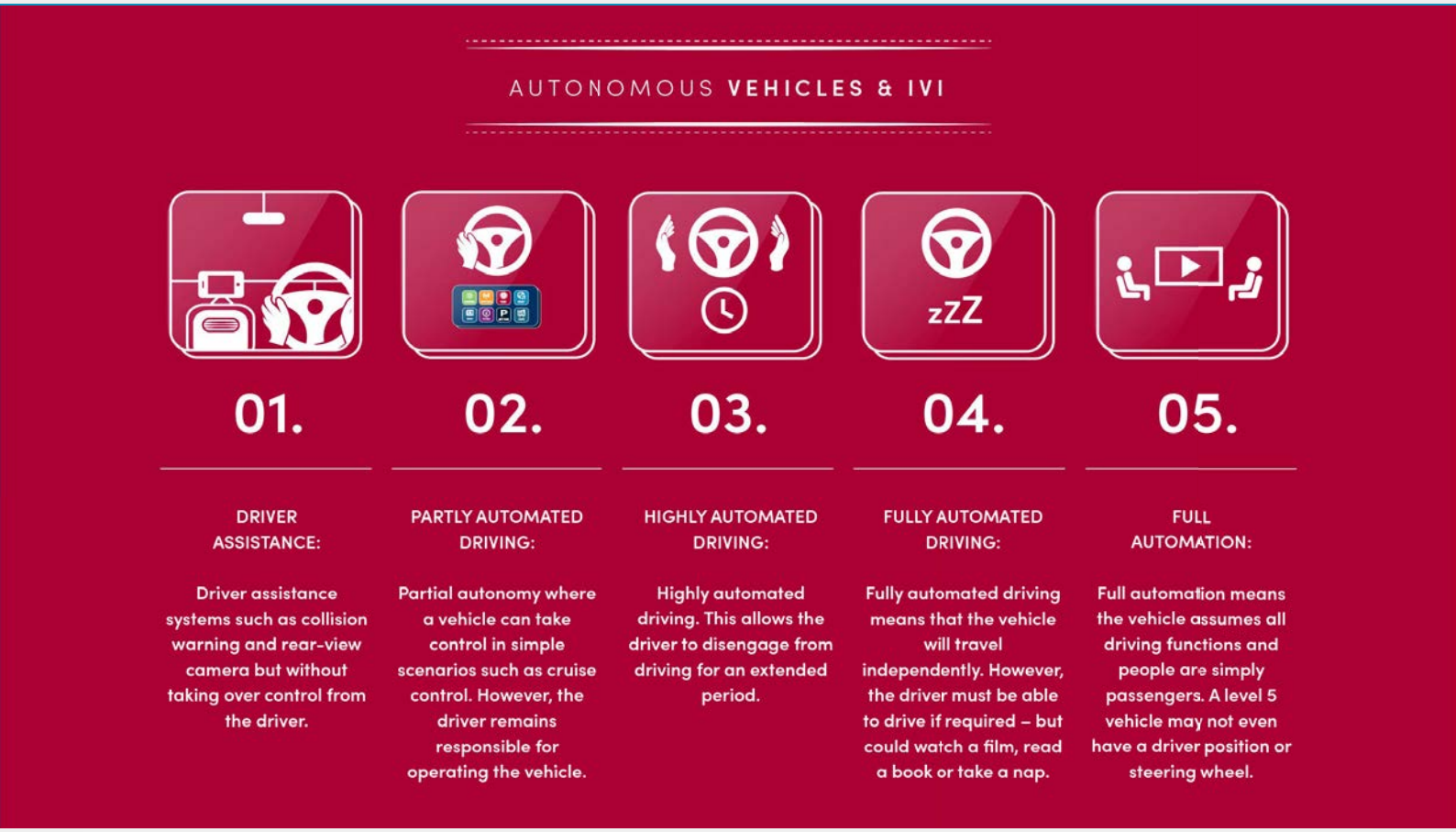
- **The In-Vehicle Infotainment (IVI) function will evolve from an optional to a fundamental element of the Autonomous Vehicle (AV) experience. Investment in this area will grow, as will the sophistication and feature set needed to meet varied AV use cases.**

- **As connected cars become the norm, the network effect of AV on the world's roads will create a new wave of automotive services which can potentially benefit society through increased safety, improved navigation, faster journey times and a reduction in pollution levels.**

Ask any two senior executives within the automotive industry when autonomous vehicles will arrive to market, and the answers will almost certainly differ. What is clear is that it's a race that everybody is keen to win!

For the last 130 years of the automobile, changes such as the automatic gearbox and electric driven train have dramatically shifted the balance of the industry. However, the 1.2 billion vehicles that travel the world's roads all have the commonality of a driver behind the wheel.

So that we are all on the same page, autonomous vehicles are not a one-size-fits-all concept but exist on a spectrum of capabilities. Figure 1 provides a neat summary of the levels of automation based on guidelines from the Society of Automotive Engineers.



The top 10 largest car manufacturers (correct as of 2017) have all got models that can accomplish stages 1 and 2 through features such as cruise control, while a growing majority now have models that offer level 3 via features such as automatic lane changing.

Tests of level 4 vehicles are taking place now with Waymo (Google) and Baidu (owner of China's largest search engine) often cited as leaders in this area. However, every major car company has level 4 cars in development, either directly, such as Cruise (GM), or through joint ventures, like Ericsson, Volvo and Autoliv's Zenuity. There are certainly other level 4 vehicles undergoing field trials and potentially even level 5 vehicles that are under wraps that may well start to enter private-road trials later this year.

A 2017 Brookings Institution report estimated that from August 2014 to June 2017, a total of nearly $80 billion was invested in field of autonomous vehicles. That figure is the equivalent in modern terms of what the US spent on space vehicles for the Apollo Moon landings between 1960 and 1973 – and it's only likely to grow further over the next few years.

Nearly $80 billion was invested in field of autonomous vehicles from August 2014 to June 2017

Data source: Brookings Institution

Changing course

To understand why fifth level AV is such a game changer, it is worth putting it within the context of the wider transportation sector. In the US, 65% of all consumable goods are moved by road and driver employment costs, which accounts for its largest single expense. Even without moving to fully electric trucks, McKinsey & Co, a consultancy, estimates with full autonomy, operating costs would decline by about 45 percent, saving the US for-hire trucking industry between $85 billion and $125 billion. Scaling this saving globally could potentially equate to hundreds of billions in savings for an industry worth $1.2 trillion.

In an AV world, the global automated taxi market might be worth more than $2 trillion a year by 2030 according to UBS Group AG analysts. The impact may ripple through retail with 'next day delivery' being supplanted by 30-minute delivery via AV for everything from food to medical supplies. The changes to the $5.5 trillion global logistics market could be profound.

New ways of travelling

However, AV is not just about replacing drivers with machines to strip out cost. The technology could shift how consumers purchase vehicles by moving towards on-demand, as-a-service models. With full AV, journey patterns may well change as an hour long travel to work via mass transit networks (bus and train) – evolves to an AV taxi that picks up multiple workers that are travelling to and from the similar geographic locations and transports them all collectively by road to a convenient drop off point. Though an 'Uber' style app, this new version of car-pooling may end up being faster, more comfortable and cheaper than current mass transit networks.

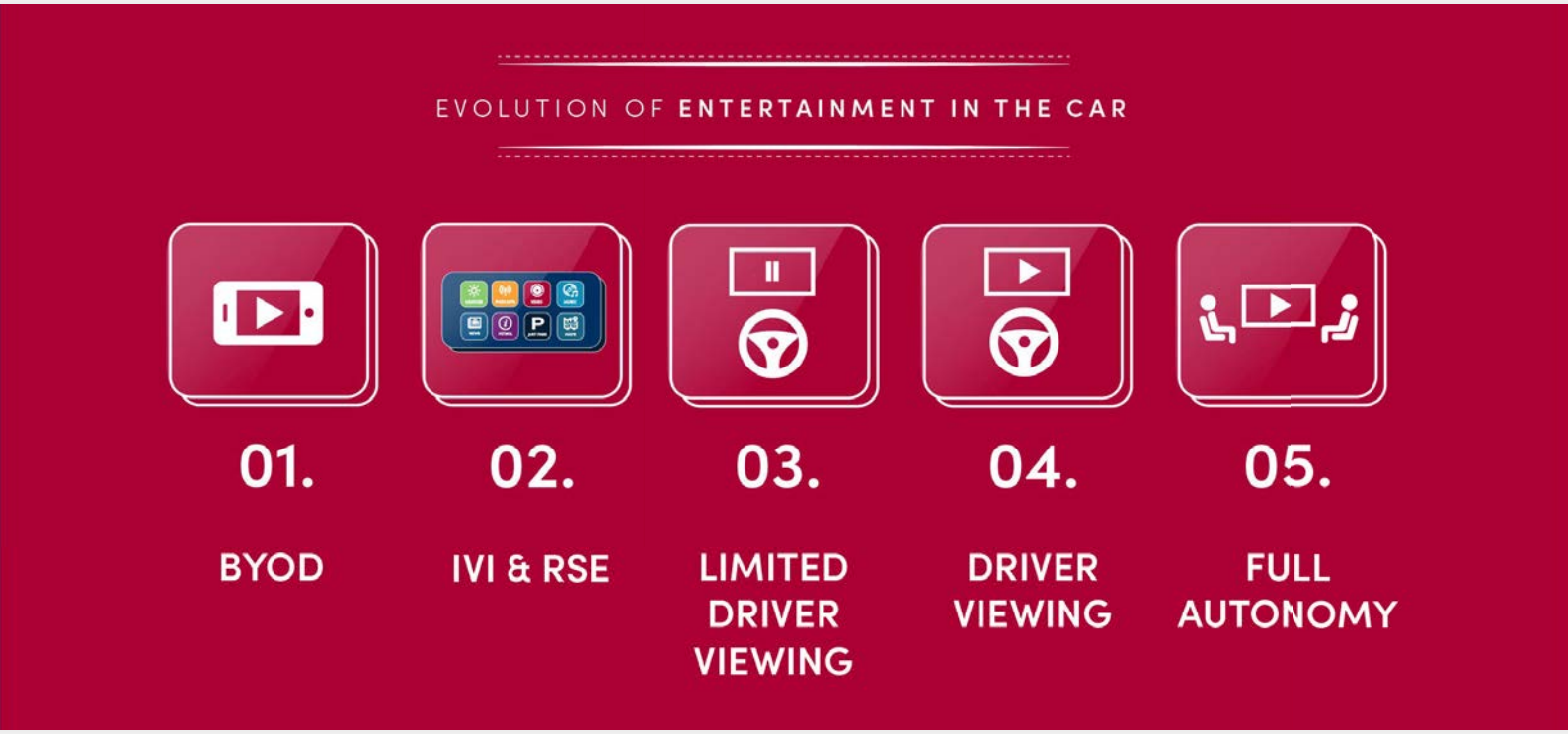
In this scenario, the IVI needs to be individualised with separate screens and audio outputs, say via Bluetooth, to cater for each passenger, in an air travel style model. Vehicles may need to offer a 'built-in' AV – i.e. libraries of content with different language options – to reduce 5G bandwidth while still offering consumer comfort.

From a connected car, IVI and RSE perspective, level 5 autonomy is a major game changer. Consider GM's 'Cruise Origin', a car that has no steering wheel or driver compartment that is currently starting road trails. The internal passenger space provides an ideal space for entertainment, Wi-Fi connectivity and work while traveling.

Designed predominantly for ride sharing schemes, Cruise Origin is part of an upcoming generation of vehicles where passenger comfort will be a key delineator between brands. In a similar mould as the airline industry, the process of onboarding passengers, running through safety checks and in-drive services will not be conducted by a flight crew, but will ultimately be driven by in-vehicle screens and connected applications.

Nice to have becomes must have

At this junction, IVI becomes the primary method for a whole range of tasks related to safety, comfort, support, entertainment and value-added services that are tied to data. A vehicle that knows who you are, where your journey started and where you are going is a gold mine for businesses that are centred around consumer data. This understanding explains why one of the biggest investors in AV is Google through its Waymo subsidiary.



As vehicles such as Cruise Origin enter service, and start to form autonomous networks of vehicles, the whole industry starts to gain value from the network effect. As AVs start to become standardised - gaining the ability to share information between vehicles such as location, occupancy, traffic conditions and journey patterns – it may be that it starts to replace not just local transit systems but potentially short haul flights as well.

As the IVI becomes the primary interface for service access, the need to standardise the interface increases. In the same design language that places a steering wheel, pedals, gear sticks and dashboard in a certain aspect and iconography within a traditional car, the IVI of the AV era must exhibit the same ethos. This is to ensure that a passenger stepping into a Volkswagen, Ford, Toyota or plethora of emerging brands can access both navigation and entertainment features with ease. In doing so, architectures can be built seamlessly, integrating with voice, multiple languages and third-party services in a secure and scalable fashion.

Are you ready?

By 2040, there will be over 2 billion cars in use and it is likely that autonomous vehicles will make up most new car sales. Brands that can deliver true value-added benefits to drivers and passengers will be able to capitalise on an untapped market. Those that don't will be letting a great opportunity slip through their fingers. For the IVI, the arrival of AV is a game changer and shifts the perception of the technology from luxury to necessity. In the future, it will gain the same relevance as operating systems such as Android or iOS. The big question is when? If the tech industry has taught us anything, it will probably be sooner than you think...

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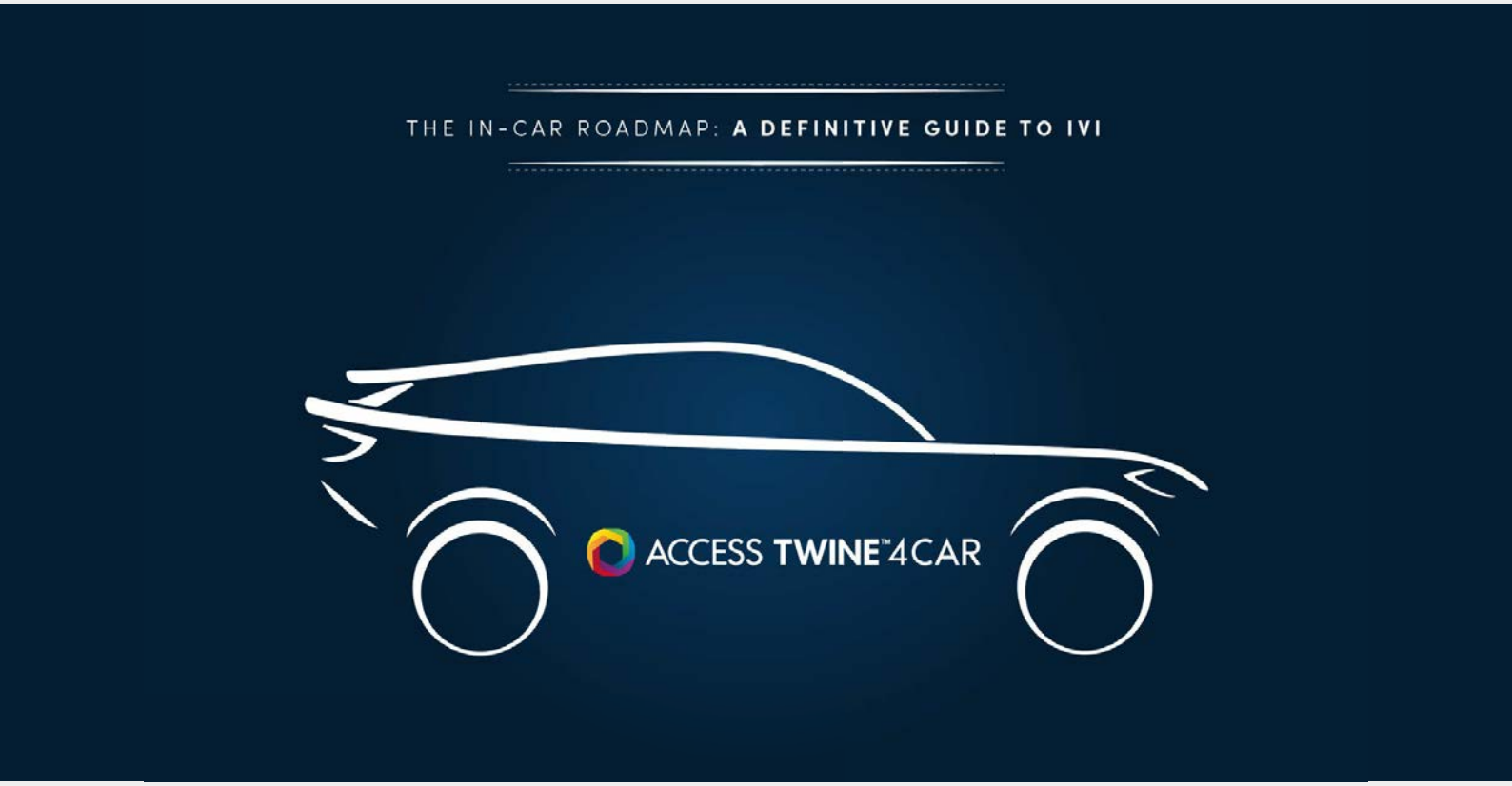
A DEFINITIVE GUIDE TO IVI

In-Vehicle Infotainment: The Key Takeaways



At the time of publishing, the world is a very different place to when the blogs were written that this eBook is based upon. The COVID-19 pandemic has changed everyone's lives, both in and out of work. One thing the crisis has highlighted is just how much we rely on connectivity, so it is now even more inevitable that cars will be more connected to drive a new, in-car entertainment lifestyle. We believe that that the speed of this change will accelerate when the world starts moving again.

The In-Vehicle Infotainment (IVI) function will evolve from an optional to a fundamental element of the in-car experience. Investment in this area will grow, as will the sophistication and the feature set needed to meet the use cases that drivers and passengers want and will come to expect.

As connected cars become the norm, IVI will benefit society through increased safety, improved navigation, faster journey times and, as a result, a reduction in pollution levels.

IVI offers valuable real estate to enable new value-added mobile services and build incredibly strong relationships with car owners and users.

Branded IVI allows OEMs to own the relationship with car owners and passengers through controlling the in-car experience, which is crucial as the internet giants move into IVI.

A dual strategy of supporting key mobile device brands - such as Google and Apple - while still retaining control through IVI technology, such as ACCESS Twine™ for Car, offers the most benefits for the automotive industry.

We believe that there are seven steps to IVI success, as follows.

1. **Launch connected IVI in your next generation of cars.**
2. **Make sure you provide compelling and easy to use connected audio and rear seat video experiences.**
3. **Deploy a dual strategy of launching your own app store while supporting key mobile device brands – such as Google and Apple – through your own branded IVI. Retain control of the in-vehicle experience through an IVI solution such as ACCESS Twine™ for Car.**
4. **Integrate a dedicated app store for cars that provides audio, video and journey specific apps.**
5. **Make sure you provide great experiences in every territory you sell cars – this will require local content and apps.**
6. **Listen to your customers – and what they listen to and watch. If they want Disney+, Netflix and Spotify, provide it to them.**
7. **Implement your connected IVI strategy as soon as possible.**

If the automotive industry does not embrace next generation IVI, someone else will. However, given its 150-year history of anticipating change and finding new ways to make the most of advances in technology we are sure that the OEMs, Electric Vehicle (EV) & Autonomous Vehicle (AV) companies and Tier-1's will be successful in driving the next generation of connected IVI experiences. Given the rise of EV and AV, we can already see today how there is a foundation for the automotive industry to realign its offering and capitalise on the exciting new opportunities and recurring revenues on offer. So, embrace the future. Deploy a car-specific app store and more with a solution such as ACCESS Twine™ for Car to operate a winning strategy that will protect you brand and drive it towards an exciting new future.

I hope you've found this eBook informative. If you'd like to know more about how we can help car manufacturers and Tier-1s create breakthrough new IVI services using ACCESS Twine™ for Car, along with guidance on critical considerations such as security, privacy, technical integration and emerging standards, then please get in touch.

www.twine4car.com