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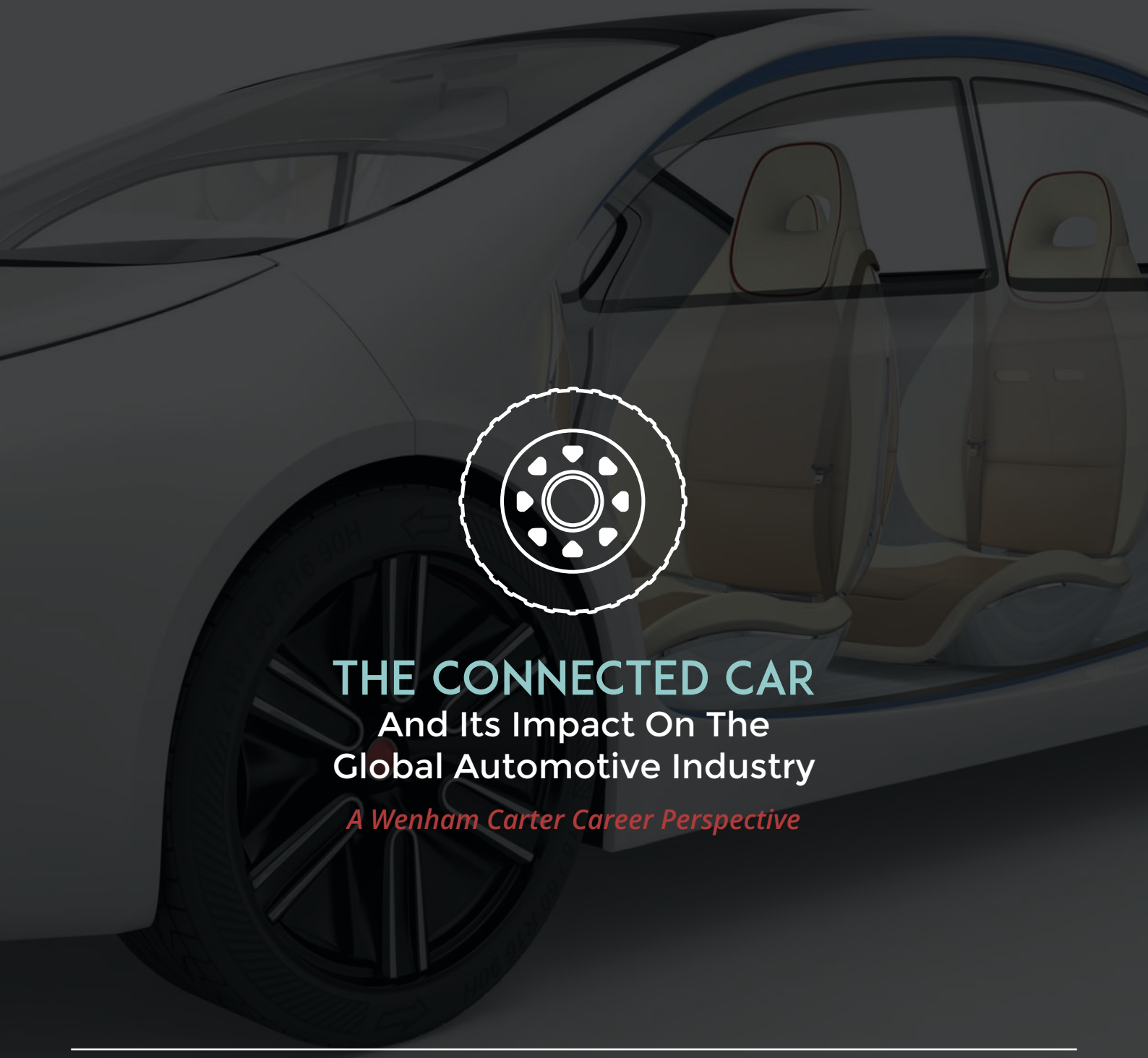

THE CONNECTED CAR

And Its Impact On The Global Automotive Industry

A Wenham Carter Career Perspective

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SNS RESEARCH
By the end of 2016, SNS Research estimates that connected car services will account for $14 Billion in annual revenue, driven by a host of applications

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INTRODUCTION

The pace of technological change in today's globalised world is disrupting established industries, forcing firms to innovate and look at new ways to serve the ever-evolving demands of their consumers. The automotive industry is no different. Long gone are the days where innovation consisted of Henry Ford's mass production lines, instead we are seeing the rise of automation, electrification, and digitalisation - and with it new players, new geographical epicentres (think China and Silicon Valley), and new challenges.

For the businesses that can successfully navigate these complexities, there are great rewards to be had. PwC estimate that revenue in the automotive sector will grow from $5 trillion to $7.8 trillion by 2030, with profits up by 150% to an estimated $600bn in the same time period. Revenues in the connected car market specifically will nearly quadruple between 2015 and 2020, led by driver assistance and safety technologies.

Interestingly, it is the new entrants that seem to have the upper hand, with anticipated market share addressable by the traditional OEM model declining from around 70% now to less than 50% by 2030. Concurrently, growth is being driven by emerging economies rather than the traditional American, British and German heartlands of the automotive business, with some conservative estimates even predicting negative growth in Western markets.

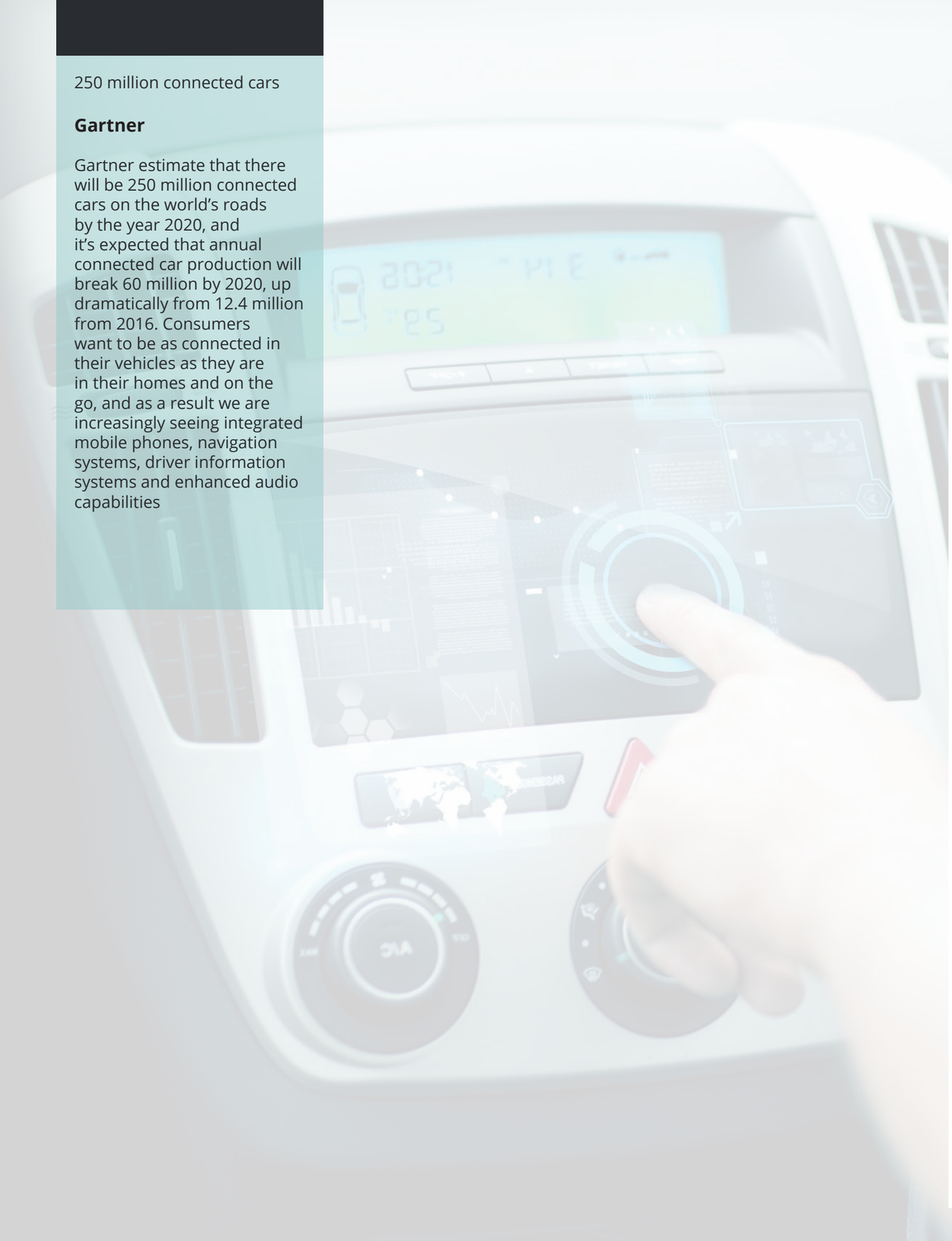
These numbers pose questions for today's executive in the business of the connected car, both those working in traditional automakers and technology vendors. How do we ensure we invest in the right technologies now to ensure profitability in the future? Which firms and suppliers should we partner with? And what talent do we need from outside the traditional automotive sector to drive our business forward to the future?

In this 'Wenham Carter Perspectives' we'll outline the top trends shaping the Connected Car niche in 2017 and beyond. We'll look at the challenges the industry is facing, with a particular focus on how technological forces are altering the talent landscape. The "Connected Car" here refers to the market for vehicles that receive and send information, communicating as part of a wider network of people, cars and infrastructure.

250 million connected cars

Gartner

Gartner estimate that there will be 250 million connected cars on the world's roads by the year 2020, and it's expected that annual connected car production will break 60 million by 2020, up dramatically from 12.4 million from 2016. Consumers want to be as connected in their vehicles as they are in their homes and on the go, and as a result we are increasingly seeing integrated mobile phones, navigation systems, driver information systems and enhanced audio capabilities



CURRENT TRENDS IN THE CONNECTED CAR

The potential of the connected car is clear, but this new sector is fraught with complexities. For the connected car executive, keeping your products on trend and your team on track is business critical. So what are the hottest trends shaping the industry today? At Wenham Carter we talk to senior leaders in the industry daily: here are the trends they think will be shaping the automotive sector for the years to come.

Navigation is Becoming Smarter

Only a few years ago, companies like TomTom and Garmin pioneered the use of PNDs (personal navigation devices) using GPS satellite technologies and brought it to the mass 'automotive after-market'. Now navigation is more integrated into the vehicle and the focus is on making it seamless and more user-friendly for the driver. We are seeing voice command systems which aim to solve frustration with manual programming as well as increasing safety by minimising distraction. New applications allow the driver to plan out a journey beforehand via a smartphone or other device, with the routes syncing to the cloud and activated immediately on entry to the car. These can be enabled offline too.

Better navigation systems will start displaying not just the fastest route but also the most fuel-efficient. With the emergence of Amazon Alexa in the Connected Car space it looks like voice command for navigation will become smarter, faster and more reliable. We're likely to see an increase in partnerships with location-based and social apps such as Trip Advisor and Red Square, enabling your car to "Take us to the best Chinese restaurant in Seattle", such as what you would find in Telenav's Scout product.

There's more innovation coming too. Companies like HERE and Nvida are partnering in the development of HD maps for Highly Autonomous Driving, with live mapping enabled to update changes to the environment to the cloud, in real time. The HERE and Nvida partnership is evidence of the ongoing trend of navigation converging towards automation, shifting from navigating the driver to navigating the self-driving car. A new future is being designed where navigation is fully optimised across a network of cars in the smart city, taking into account traffic conditions, weather conditions, and other factors that an individual driver would not be able to predict. If executed in the right way, this has the potential to drastically cut traffic, pollution, road fatalities, and give us a radically different in-car experience.

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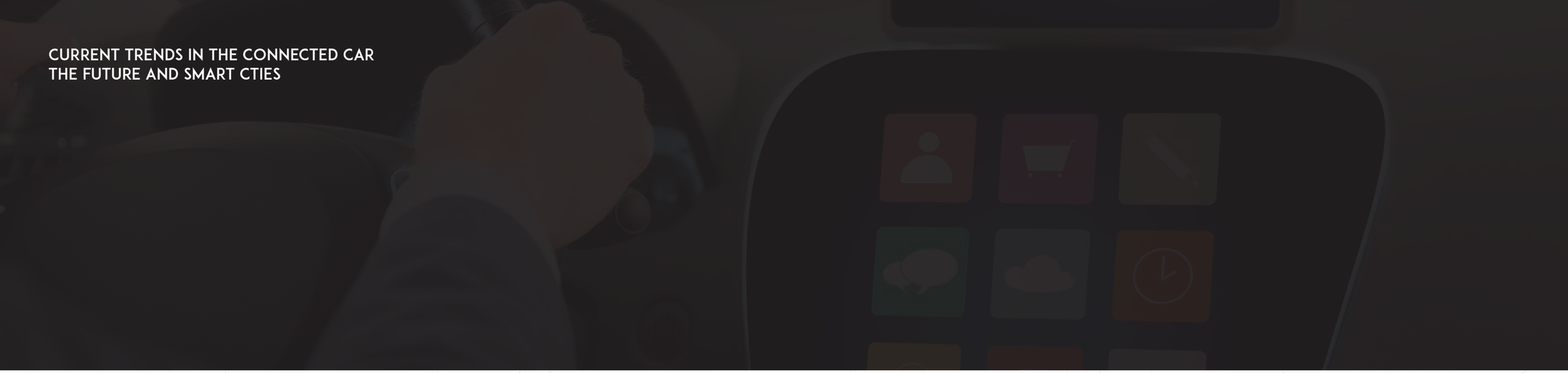


The Future is V2X

V2X, (Vehicle to everything) here means the transfer of information between a vehicle and another entity (such as other cars on the road, the driver, manufacturers, insurers, municipal authorities, pedestrians, etc). V2V, (vehicle to vehicle), V2I (Vehicle to Infrastructure) and V2X (the all-encompassing term) are becoming buzzwords as more cars get connected and the number of connections within the average car grows exponentially.

V2X has a number of applications, but the most important are safety related. Since approximately 95% of traffic fatalities are down to human error, there's a gap to be bridged by technology by feeding the driver the right information in the right way to minimise error. V2X communications are becoming more sophisticated in alerting drivers to potential hazards, such as slow traffic ahead, curve speed warning, forward collision warning, emergency vehicle notification, and more while V2P (Vehicle to Pedestrian) systems can send safety alerts to pedestrians and cyclists.

Vehicle management systems already have the capacity to provide detailed information about the car's performance, such as vehicle condition, service reminders and usage data, which can be automatically sent to insurance companies, manufacturers and fleet owners. We're likely to see an increase in the quality and prevalence of such data in the future, which will enable manufacturers to improve their product both in terms of bug fixing but also enhancing user-experience.

We're also seeing the development of V2I features to support urban mobility management (more on this in the next section), optimise route times and enhance driving experience. Traffic light information is one example of this, launched by Audi at the end of 2016 and piloted in Las Vegas, the first V2I technology to be rolled out in the US. Piloted in Las Vegas on select 2017 Audi Q4, Q7 and allroad models, it displays the 'time to green' to the driver.

Although we shouldn't confuse current V2X technologies with self-driving cars, it's clear that V2X technologies are paving the way towards a more automated future.

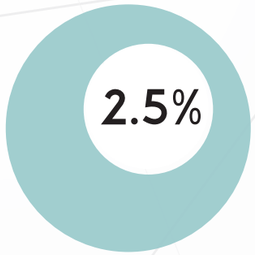
At the same time, the car makers aren't exactly standing still, either. GM has reportedly hired 8,000 extra software engineers as it winds down outsourcing contracts to build up internal IT expertise, while one of the main suppliers to the sector, Bosch, has similarly expanded its tech headcount, in its case by a massive 14,000 programmers and system developers – in 2016 alone . Similar expansions are happening right across the board in everything from in-car infotainment to driver assistance and safety to vehicle man-agement – again, expansion that is starting to open up a wide range of genuinely excit-ing tech professional career vistas for anyone interested in this as a future.

Smart Cities: Redefining the Car

UN projections indicate that the trend towards urbanisation combined with a growing world population could see an increase of 2.5 billion people living in cities by 2050.The connected car clearly has a part to play in optimising 'urban mobility' (the movement of people around cities), to reduce premature deaths from air pollution and accidents, as well as make our lives more comfortable and efficient. As urbanisation continues to take hold worldwide, this trend threatens to not only to impact the connected car space in a major way, but disrupt the entire notion of what a car is.

The traditional automotive industry has already collided with start-ups in the sharing economy who have disrupted traditional modes of transportation (Uber, Lyft, Gett, Didi Chuxing) and further projects are emerging. Lynk and Co. is a new brand from the Chinese carmaker Geely (who also own Volvo); their SUV 01 model has a focus on connectivity and includes a car sharing button, allowing people to rent out their cars in the same way they would their home via Airbnb.

It's not certain how the automotive incumbents will react to this kind of disruption, but it's likely we're going to see more partnerships with car sharing services, (we've already seen Volkswagen invest $300m in taxi app Gett, and Volvo partnering with Uber to develop self-driving cars), acquisitions and investments into new start-ups in the urban mobility space.



Un projections
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Again, everyone is looking towards a future of autonomous connected vehicles that interact with the smart city infrastructure, optimising urban mobility to make our lives safer, greener, and more efficient. Currently, there aren't enough V2I equipped vehicles on the road to make this work, but the industry is definitely heading in this direction, with Google and Tesla amongst some of the companies leading the field.

IoT / V2X technologies too are creating new ideas of transportation in tomorrow's cities. Veniam, (the project of co-founder of ZipCar, Robin Chase) is a pioneer in IoT application, aiming to create a mesh network of connected vehicles which feedback information from sensors. This could help logistics and transport companies improve operational efficiencies, as well as feed data to authorities for urban planning.

Finding the Right Partners

As the industry diversifies, it's more important for players at all levels to partner with the right companies. Automakers largely control the final product and lead innovation in hardware and assembly, but it makes sense for them to leverage insight from the technology and telecoms sector whose ability in connectivity, applications and software far surpasses anything they could build in-house. Similarly start-ups will often rely on investment from larger industry players to get off the ground.

The connected car relies on stable, secure and low latency networks, meaning manufacturers need to make the right choices that will not only facilitate V2X communications today, but into the future as telecommunication technologies move into 5G and advanced LTE. Partnerships with media and location-based app companies are critical too; on the infotainment side we've seen manufactures such as Tesla and BMW partner with big names like Spotify or companies like Volkswagen investing $300M in Israeli Taxi start-up Gett

As more and more companies enter the space, there's a question around how technology vendors, connectivity providers and car manufacturers will interact: who will have access to the consumer, and who will be reaping the financial reward? Traditional telco players such as AT&T, Verizon and Qualcomm have invested in connected car technologies through partnerships, but Google has gone further with self-driving project Waymo which would compete on a more direct level with the traditional players by bringing manufacturing in house. And of course, we'll see acquisitions and investment by big players with financial resources into high potential start-ups – BMW's iVentures VC spin off who are investing in companies like Moovit or Ridecell, and Ford's investment in artificial intelligence firm Argo AI are just two examples that may be signs of more to come.

Cyber-Security

The more connected cars there are on the roads, and the more they are exposed to complex external software, the more vulnerable drivers are becoming to potential cyber security threats from hackers, fraudsters and terrorists. With exposure in the mainstream media such as the experimental hacking of a Jeep Cherokee that sent Fiat Chrysler's stock price plummeting, and 54% of new car buyers worldwide strongly agreeing with the statement "I am afraid that people can hack into my car and manipulate it if the car is connected to the Internet" there's clear consumer pressure to get this right.

Automotive companies are aware of the need to invest in ever more sophisticated technologies to mitigate these threats. New, leading players such as Argus Cyber Security are emerging to fill this gap in the market, and cybersecurity professionals are being hired directly into the larger manufacturers. No firm wants to be at the centre of a hacking scandal, and while Telsa managed to roll out software bug fixes over the air in an impressive 10 days, prevention is better than cure. Cybersecurity is a key challenge that is only likely to grow over the coming years with the move towards fully autonomous vehicles.

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CHALLENGES / OBSTACLES FOR THE INDUSTRY

Understanding the New Consumer

A major challenge for car manufacturers is that in order to provide a great in-car experience, they now need to understand how people like to use their devices, music and applications. In turn, they need to create vehicles with a platform for integrating consumer based apps such as Spotify or Netflix, without compromising safety. And as consumers grow accustomed to regular upgrades from smartphone and tablet manufacturers (where the average product cycle is just 1 year), they start expecting the same in their car.

Due to this, we're seeing almost a shift in power in the industry to vendors who can offer leadership in understanding this type of consumer. These new players are increasingly coming from outside the automotive sector entirely - e-commerce, media partnerships, big data or consumer technologies.

Although it's challenging in its complexity, connectivity in the car gives automakers previously untapped information about their consumers, and for those able to monetise this new data by to delivering more relevant and personalised products, huge revenue opportunity lies. For example, navigation vendors could collect data on customers who drive past a start-up gym on their route to work, and could sell this information to the gym to allow them to promote membership. Concurrently, manufacturers could now collect detailed data on usage to design new products in the future and even target specific consumers.

Again, future challenges surround the ownership and control of this kind of data, and it remains to be seen who will win in monetising it.

Finding the Right Talent

There are very real challenges that both traditional car makers and technology vendors face in this larger, more complex automotive market. A huge market potential, combined with structural and technological dynamics makes finding the right people to lead the business even more critical.

We're seeing first hand people moving to work in the connected car space from 'digital' or UX backgrounds and no prior experience in the automotive sector. Of course the need for great mechanical design engineering skills has not evaporated, but it's clear that as the connected car is evolving, the talent focus is on software, IoT, data science and telecommunications. Other skills such as partnerships, app design and platform integration are becoming more influential as automotive companies aim to understand the new digital consumer (as we saw above).

Organisational structure of the industry is also changing. New start-ups, joint ventures, and partnerships are increasingly common, which has in turn affected the talent landscape. It seems that talent is migrating both ways; with traditional incumbents or larger players looking for the 'technology start-up' mind-set, and start-ups attracting those looking to apply their automotive background in an environment perceived to be more exciting, innovative and fast paced. Anecdotally, our consultants have found that the talent is moving more in this direction, with candidates around the world expressing a desire to move to Silicon Valley start-ups. This can be a challenge for the major players, who may have to set out to prove that they can offer a start-up environment within the security of a larger organisation.

WENHAM CARTER: **Connected Car Hot Skills 2016**

Our most 'in demand' skills from the Connected Car space. Does your profile match?

- Product Management
- Partnerships/Business Development
- IoT
- User Experience / User Interaction (UX/UI)
- Technology Evangelists
- Big Data / Data Scientists

In an increasingly globalised world and with the epicentre of the automotive sector moving east, more than ever before companies are looking for candidates with international experience and those that can successfully lead cross-cultural teams located across many geographies. International mobility is on the rise too, and we've found that our clients are willing to pay for relocation for the right talent.

With women accounting for less than a quarter of engineers at most tech companies, addressing underrepresentation of female talent is still a challenge. In the connected car space, getting the right balance of skills that can lead the industry through dynamic and complex times is absolutely critical. An EY survey last year found that 90% of auto companies say they need to change how they attract and retain talent, but only 10% say they do a good job of bringing women on board. Solutions including diversity and inclusion initiatives, mentorship and sponsorship, and a more flexible working environment are on the rise, but it looks like the diversity challenge is far from solved. For more information, see the Deloitte series on retaining and recruiting women here and also Wenham Carter's piece on Women in Technology.

THE CONNECTED CAR:
WENHAM CARTER'S CONCLUSIONS

Technology is disrupting the car industry and forcing traditional players to adapt in new ways. However with this comes great opportunity for established brands and start-ups alike.

We're likely to see further technological developments in V2X applications using the Internet of Things, more intuitive navigation and a rise in automation to increase safety and convenience. New business models will emerge, influenced by urbanisation, increased connectivity and the rise of self-driving cars.

Talent will be the driving force behind these trends. The organisations that will win will be those who hire creative, insightful leaders that can manage new industry dynamics, supported by a range of deep technical experts. These people may be found in variety of high tech sectors, not just the traditional automotive companies, which is why Wenham Carter's Connected Car Division routinely collaborates with our other colleagues specialist sectors such as IoT, smart cities, IT and telecoms to find top candidates. We are excited to be working with innovative companies in the global connected car space to help locate talent critical to the future of this industry.

Do you work in the connected car space?

We'd love to hear from you. Whether it's career advice you're after, help on hiring the best talent for your team or just to chat about the industry, please contact our Automotive team.

FOOTNOTES

1. http://www.strategyand.pwc.com/media/file/Connected-car-report-2016.pdf

2. http://www.gartner.com/newsroom/id/3460018

3. UN, World Population Prospectus, 2014 http://www.un.org/en/development/desa/news/population/world-urbanization-prospects-2014.html

4. McKinsey's Connected Car Consumer Study, 2014

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