TU Automotive

2018 TU-AUTOMOTIVE EUROPE

Connected Mobility in Action, from Strategy to Implementation

POST SHOW EBOOK

Revving Up the Connected Car Roadmap for 2019

It's the time of year again when analysts, experts and pundits start making their predictions.

A s the 2018 TU-Automotive Europe conference in Munich wrapped up, all eyes turned toward 2019 and what the next 12 months might mean for the connected, autonomous and electric vehicle market.

What better time to start making a roadmap for the future?

The global market for these vehicles is wide open and ready for innovation right now. In addition to traditional OEMs and automakers set to offer more and better options for eager customers, some unexpected companies that have Silicon Valley addresses have designs on expanding into this ecosystem.

That's why Munich so important: The event mapped out the route connected, autonomous and electric vehicles will take in the near future.

During his time at the show, TU-Automotive Editor Paul Myles sought out the trends that promise to dominate 2019, including how partnerships between OEMs, software vendors, telecom service providers, cloud computing firms and others will expand the ecosystem, and provide key innovations for its future growth.

Private industry partnerships are not the only notable trend on the horizon. With the concept of the "smart city" approaching reality, governments will be driving regulations that could affect connected and autonomous technology and deployment.

At the same time, issues surrounding the connectivity, mobility and security are still hotly debated, with different sides vying for their preferred technology or platform to become the industry standard.

During his time at the show, Heavy Reading Analyst Steve Bell took a deep dive into some of these issues, including how connectivity can mean one thing to an OEM, and something completely different to a consumer, who is more used to the data plans offered by the likes of Verizon Wireless or AT&T rather than what car makers are planning.

Then there's 5G evolution and how the new standard will tie together many different connected "things" and devices, including cars. This is yet another game-changer that requires close watching.

So, what's the big prediction for 2019? It's simple: This big, complex and growing market is poised to get bigger and more complex. Good thing there's a roadmap serving as a guide toward that destination. ■

__Scott Ferguson__ is the managing editor for Light Reading, Security Now and TU Automotive.

The Future of the Auto Industry Is Partnerships

Attending the TU-Automotive Europe 2018 show in Munich, I'm reminded of the words of Albert Einstein: "The more I learn, the more I realize how much I don't know."

W hile I hesitate to draw too many parallels with one of the world's greatest geniuses and the wise folk of the auto industry, it's fair to say many are currently empathizing with Einstein's dilemma.

That's because auto technology is progressing at such a pace that most involved with it can't hope to guess where it will eventually lead or, indeed, how fast it will get there. It's this realization that is driving a continuing trend towards building partnerships across different auto sectors, bonding engineer to IT specialist, as both increasingly recognize each other's strengths and weaknesses.

This was one of the main stand-out messages coming out of this year's conference, with most speakers recognizing the current and future requirements for forging partnerships in a rapidly changing technological world.

Not since the beginning of the auto industry – some 130 years ago – has it faced such upheaval, which is presenting as many opportunities as it poses challenges. The cozy world of the oil-streaked mechanic has been turned on its head by the lightning pace of the software programmers and app developers. Now it's up to the main players in the auto industry to pick up the digital ball and run with it. However, just like an NFL running back trying to gain some important yardage in a big game, he can't do it all himself.

Teammates of equal industry standing are now being sought to give carmakers the tools in this new world.

Sebastian Lasek, head of connectivity at Škoda, explained that the automaker's partnership strategy is dependent on the quality of partner considered for this pivotal role.

"We are approaching traders in central and eastern Europe and waking people up to the service and what's on offer," Lasek said.

"We have an offering only designed to work with dedicated apps and, while startups are important, it takes time and now we are concentrating on established partners for the quick wins."

On the telecoms side of the equation, Colin Willcock, the board chairman of the 5G Infrastructure Association, was adamant that the future in both the connected and autonomous vehicle belonged to those players who forged the right collaborations to make the technology work seamlessly.

"We have a series of projects trying to show that there is value for the auto industry in 5G. Yet it cannot be either just the telecoms or the auto industry setting limits, we have to work together to make this happen," he said.

A liberal dose of realism was also entering the opinions of some of the industry's top influencers.

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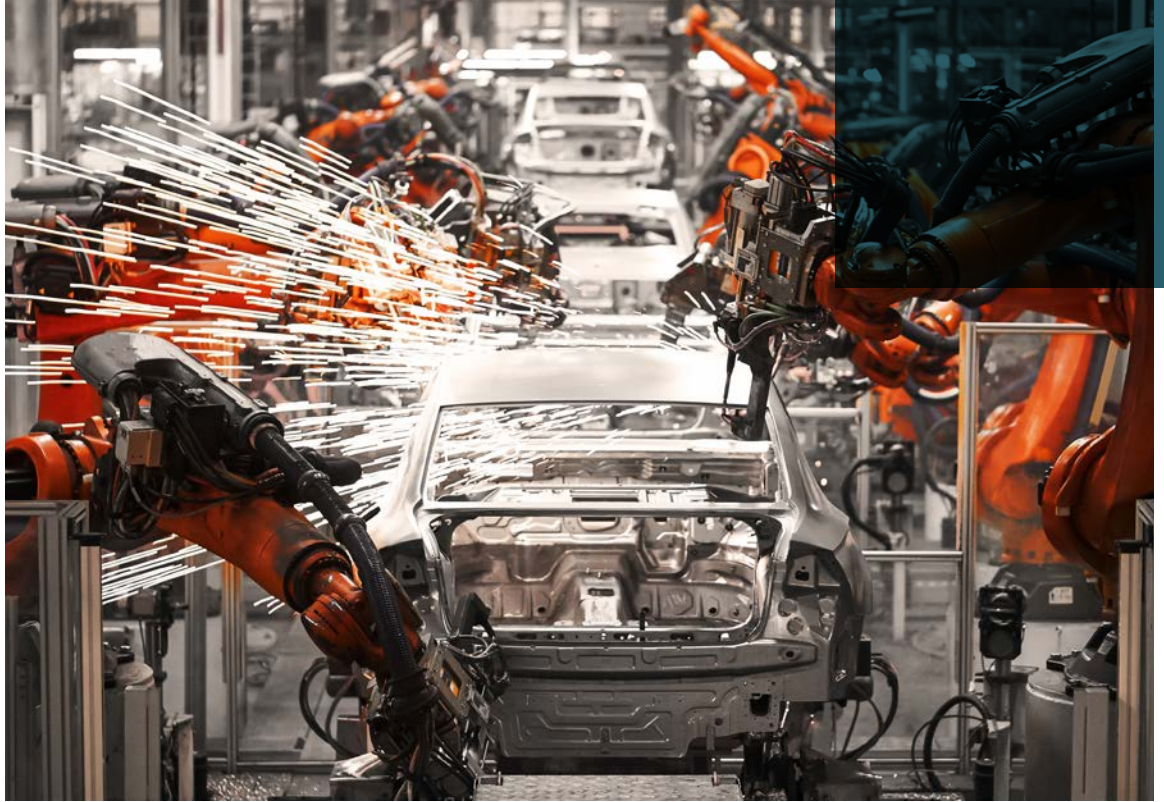
About the Author
Paul Myles is the Editor of TU Automotive.

Paul's career-long involvement in cars and motorcycles has informed his deep knowledge of the auto industry and where it is going, a knowledge augmented by a wealth of experience interviewing some of the top auto industry figures over the past 15 years.

For example, Roger Lanctot, the associate director of Strategy Analytics' Global Automotive Practice, listed the ten ways connected cars are doing things very wrong from a business perspective.

These included the realization that consumers don't care about the connectivity services currently offered, carmakers do not own the SIMs being used in vehicles, simple ways to retrofit connectivity do not exist and neither does a quick method of turning privacy settings on and off, limited or even no ability to add the car to an existing wireless plan and no ability to switch from the car's SIM to a mobile device's SIM for different data uses and applications.

Crucially, Lanctot added: "The treatment of the car [today] is as an IoT or and M2M device subject to enterprise use instead of treating it as a normal consumer device to become a 'smartphone on wheels.'"

However, Sofia Granath, director strategy and product management at WirelessCar, noted that the industry must be selective about its approach to monetizing the technology.

"Everyone is looking for new business models and revenues. The challenge is trying not to pick too many business models," Granath said. "We could see a situation where the issues of pollution, autonomous and traffic congestion are all at odds with each other. We have to be open to the fact that autonomous does not need to be electric and that ride-sharing has increased congestion. We need to give second thoughts to what is best for mobility solutions overall."

At the same time buzzwords like "smart cities" can lead the industry down a dead-end unless we fully understand what they entail, said Andrea Sroczynski, managing director of SBD Automotive Germany.

"What is a smart city?" Sroczynski asked.

"There is not one definition. There is, we know, a need to move people and goods, such as with light commercial vehicles, around the city," she added. "Yet, for carmakers, it's difficult to understand what is the right set-up for the car to exist in the smart city? They will need to tune the cars for AV transitioning from a rural environment into a city.

In Germany 60 local authorities came up with 60 different solutions to reduce C02 – how can a car manufacturer design a vehicle to work with that? Copenhagen may have a great bicycle culture but it will not work in Dusseldorf, because it's not set up the same way."

Finally, it was refreshing at last to hear that not everyone agrees with the noise coming out of some of the more "geeky" technology studios in Silicon Valley about how long it will take autonomous cars to be a mass-market offering seen on most city roads.

Echoing comments to me made by numerous leading automaker executives over the past year or two, Martin Rosell, managing director of WirelessCar, without giving away his age, said: "We hear a lot about when autonomous cars will be everywhere on the road but I doubt it will be in my lifetime!" ■

Connecting the connected car requires more than connectivity

At the 2018 TU-Automotive Europe conference in Munich, connected cars and connectivity dominated the discussions at the show from the start. The gathering kicked off with a keynote from Roger Lanctot, associate director of Strategy Analytics' Global Automotive Practice, who provocatively claimed that connectivity in vehicles is broken and provided a top ten list of problematic issues.

At the 2018 TU-Automotive Europe conference in Munich, connected cars and connectivity dominated the discussions at the show from the start. The gathering kicked off with a keynote from Roger Lanctot, associate director of Strategy Analytics' Global Automotive Practice, who provocatively claimed that connectivity in vehicles is broken and provided a top ten list of problematic issues.

As someone with a telecoms background who focuses on the Internet of Things (IoT) as the new growth opportunity in the mobile space, this created a major sense of dissonance to my perception of the state of connectivity in the auto industry. This comprises a mixed bag of technical, usage, experience and business process issues, all of which are solvable with current technology – so what's the problem?

The challenge may be explained because there is a requirement to escape existing industry paradigms, to rethink business models and to use design thinking to address both the required consumer experience and to create cross-industry business processes.

WHY CONNECTIVITY?
As an example, the first issue is a phrased as a statement of fact: Customers aren't interested in embedded connectivity. Is this perspective really a bad thing? If we consider the approximately 33% of the world's population that use a smartphone, consumers are interested in the services, value and experiences their devices deliver rather than what type of connectivity is embedded in it.

The service providers of these smartphone customers have learned this and moved from

charging based on connectivity subscriptions, minutes of voice use and number of text messages to data plans that tailored to users' budgets and requirements. At the same time, some providers have started to allow multiple devices, including smartwatches and other IoT devices, on the same plan.

The statement from Lanctot is really about the inability of OEMs to convince their customers to pay for the connectivity, but why should they since they already have a data plan? So, the first issue may be solved by seeing the car as another device to be added to an existing data plan. That way the user can obtain the services and value they are used to across all their devices, including their automobile.

However, why should they pay for the telematics data that the OEMs want to receive from the vehicle?

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10 THINGS WRONG WITH CONNECTED CARS

1. Customers aren't interested in (embedded connectivity)

2. Car makers don't own the SIM

3. A simple means for restoring connectivity (to a disconnected car) does not exist.

4. A simple means for transfer of ownership of an account (along with the car) does not exist.

5. A simple privacy on/off swith does not exist

6. Slow transmission of vehicle commands -remote start , door lock /unlock via mobile

7. Limited (or no ,in Europe) ability to add car to the existing wireless plan

8. No ability to shift connection from car SIM to consumer(smartphone or other)SIM for different data type applications

9. Treatment of car as IoTor M@M device subject to enterprise use instead of treatment as a normal consume device- ie smartphone on wheels

10. Overall complexity of billing and account management

This brings to the surface a whole different set of issues that are occurring because of a confluence of multiple industries into a new and emerging market space. As the telecom, semiconductor, cloud, big data and analytics providers evolve into the critical suppliers of the emerging connected, autonomous and electric vehicles markets, there are some fundamental problems that must be resolved. These problems are exemplified by the issues of owning the SIM, treating the car as an enterprise IoT device, the complexities of billing account management as well as the ability to transfer ownership.

Each of the industries have their own collective mental map of their industry value chain and business models. In addition, they have their perceptions of how their customer and consumer needs should be met, as well as distinct lexicons and taxonomies to explain it to each other. However, when you put all these industries in a single room together, as occurred in Munich, and wrap these perceptions and biases into corporate speak presentations, you see industries talking at and over each other.

That does not facilitate cross-industry solutions to the problems identified. Compounding this is the reality that despite the headlines, connected, autonomous and electric vehicles still comprise a small, albeit increasing, percentage of the 100 million cars being produced each year and an even smaller percentage of total revenue.

Consequently, the existing business model and corporate performance requirements consume the thought processes and decision criteria of the automotive organizations, which in turn reinforces the existing business processes and cultures necessary to support the performance.

This means established silo mentalities and biases have no incentive to break molds and create new paradigms to embrace the new technologies and address the consumer experience needs, especially if it means ceding any control of the customer. Hence, the difficulty in solving these connectivity issues is a function of nonaligned incentives and intransigent turf battles.

5G AND THE VEHICLE-TO-VEHICLE TECHNOLOGY BATTLE

Despite the challenges of implementing existing technologies, there was interest and quite a few questions on what is 5G and the effect the technology will have on the connected car.

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FASTER FORWARD

PRESENTED BY ⊓ Automotive

## A video series about the future of mobility

Faster Forward is a new documentary series from TU-Automotive that looks under the hood of emerging auto tech, such as 5G Internet connectivity, vehicle-to-vehicle communications, Lidar and more.

Tune in as we travel around the world with on-location coverage of the carmakers and start-ups making connected vehicles a reality.

TU-AUTO.COM/VIDEO/FASTER-FORWARD
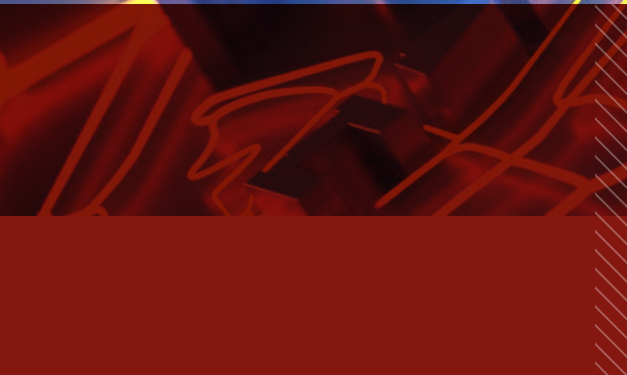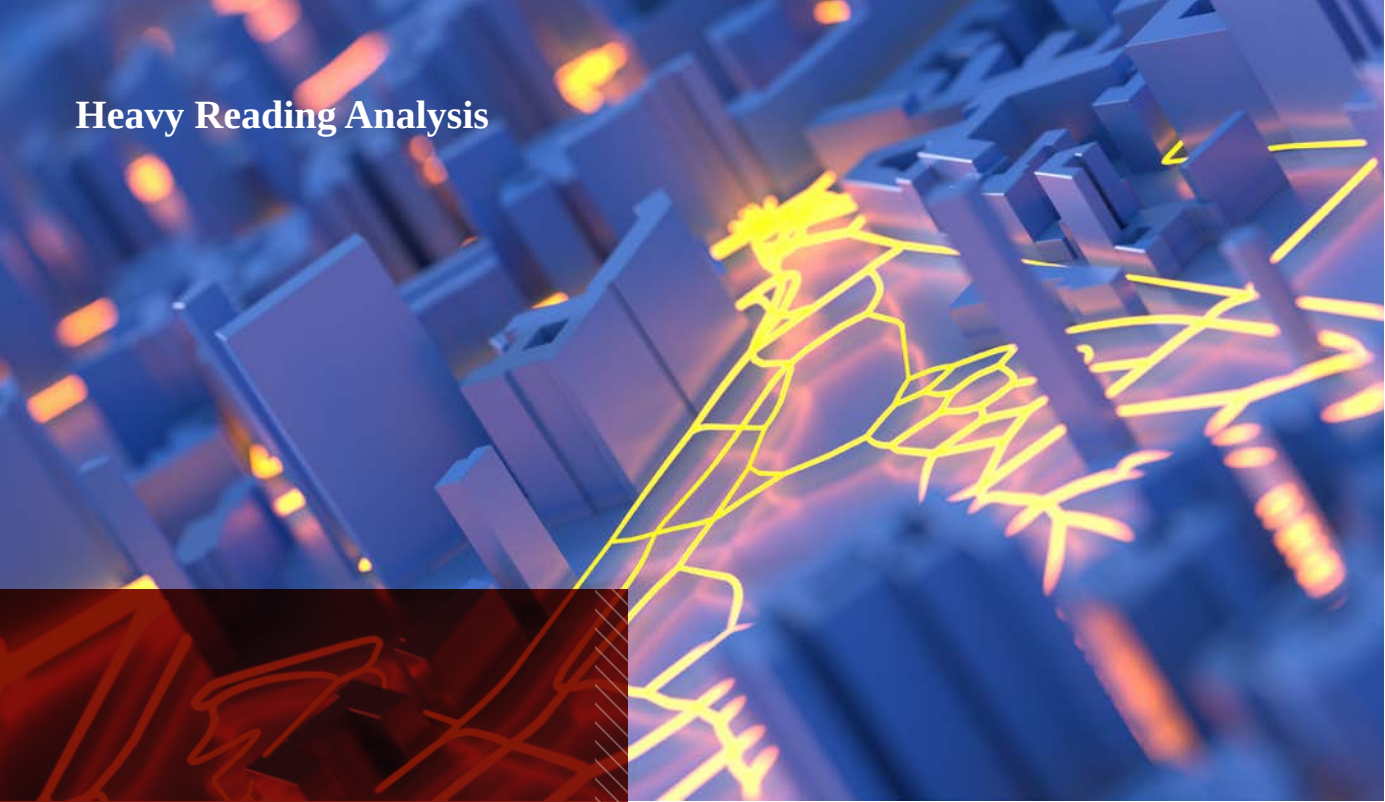
Ericsson's connected car team addressed the interest summarizing the capability of 5G: much higher speed, low latency (which results in near real-time response), the ability to handle billions of devices and sensors that only talk when necessary and consequently have limited battery consumption, edge capability with cloud functionality in the network, device-to-device (D2D) capability and the ability to have a slice of the network for specific customer services.

These future capabilities are great but there is no reason to wait for this new 5G technology.

Right now, 4G LTE can deliver almost all of what the automotive and intelligent transport systems (ITS) need. In fact, the reference to D2D feeds the paranoia about the biggest elephant in the room, specifically the battle between two different vehicle-to-vehicle (V2V) communications technologies.

This includes, on one side, Dedicated Short-Range Communications (DSRC) and the ITS-G5 standards based on 802.11p, and on the other, LTE-V along with Cellular V2X (C-V2X).

(Maybe I am alone in this, but I can't help but feel the use of ITS-G5 acronym in the same breath as talking about 5G creates confusion.)

Can this elephant be addressed? The answer is yes. In a TU-Automotive webinar on V2V communications, the results of recent field tests conducted by Qualcomm and Ford in cooperation with 5GAA showed that in side-by-side comparisons, LTE-V /C-V2X significantly outperformed ITS-G5/DSRC in range and in terms of interference resistance from WiFi.

The results were so compelling that a poll of webinar attendees showed a significant shift in favor of the LTE-V/C-V2X standard.

The discussion on this issue is critical not just to the auto industry, but also more significantly to the future development of cost effective ITS solutions, which is of strategic importance to departments of transport and cities around the world that must invest in the roadside infrastructure that will be the enablers of smart cities and transport systems.

The fact that China is moving rapidly to deploy C-V2X will result in low-cost modules and roadside units. But if the current mindset in the European Union regulatory body

Technology Preference	Pre-webinar	Post-webinar
DSRC	18.2%	11.1%
C-V2X	26.5%	47%
Combination of both	40.5%	33.2%
I don't know	14.8%	8.8%

prevails, the continent will adopt ITS-G5 despite the efforts of 5GAA and others promoting a technology-neutral position.

This could result in a sub-optimized situation where a city will have to decide which technology to use based on cost or standards compliance that will cost taxpayers more money.

Meanwhile car manufacturers will likely have to install both modules, which will increase the cost of the vehicle and will require intelligence in the vehicle to determine what system to use in which city.

This theme of dual modules was also referenced in a presentation from Orange Business Services, albeit a different module and business logic. Orange dissected the connectivity market for the auto industry and determined that there are multiple segments with different needs and approaches. The connectivity needs of the OEM are totally different to the consumer, as are the needs and requirements for third-party services that want a place in the car.

For this reason, they were advocating the use of dual-SIM and dual-action Embedded Universal Integrated Circuit Cards (eUICCs), so that consumers can add the car as a device on their own data plan. This reinforces the point of rethinking connectivity in the vehicle.

However, this requires dual modules and antennas to allow

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the kind of separation between services on potentially different carriers. So, the OEM either pays for the connectivity or the third-party provider subsidizes the connectivity and the owner is then allowed to use an existing data plan.

THE FUTURE OF CONNECTED CARS

While the technology exists to solve the problems that Lanctot surfaced, the challenge is much greater than planning and implementation. It's about transformation at multiple levels of converged value chains, which is not easy.

The thing that fascinates me is that I have always seen connected cars as the most tangible form of what IoT truly means – it's about digital transformation of experiences and value chains. However, what this conference highlighted for me was the degree to which the interaction of complex systems, with natural biases and assumptions, will create friction to the ultimate implementation of new technology and systems.

If the industry is to succeed, there is a need to use design thinking to drive the solutions from the consumer perspective and build new models for implementation and monetization.

This means all members of the emerging ecosystem of vendors for connected, autonomous electric vehicles must challenge their existing assumptions and biases to move forward. ∎

About the Author
Steve Bell is an accomplished strategy and technology analyst whose coverage at Heavy Reading focuses IoT and related technologies. For the last year he has also been analyst in residence on The Connected Car providing insight on the future of this emerging industry. Steve joined Heavy Reading in 2014 after an extensive executive career in industrial applications and then Telecoms with Motorola in Germany, the U.K. and the U.S. He is also an entrepreneur having founded two companies: one an analysis and advisory firm the other a digital city services platform focused on parking. Steve is a frequent speaker at industry conferences. He can be reached at bell@ heavyreading.com.

Looking Beyond the Traditional Auto Ecosystem

As it does every year, the TU-Automotive Europe conference brings together the top influencers in the auto, telecom and software development industries to offer a clearer vision of the future – warts and all.

By Paul Myles

At the 2018 show in Munich, most attendees agreed that the future is heavily reliant on building environments, whether it's in the context of a "smart city" linking all its major infrastructure components and its population to a seamless connectivity experience, or in solving urban traffic congestion while promoting clean sustainable energy sources to power the transport network.

With that as our backdrop, here are the key trends from the 2018 conference and how each will affect the ever-expanding auto ecosystem.

PARTNERSHIPS

Roger Lanctot, the associate director in the Global Automotive Practice of Strategy Analytics, got the ball rolling by suggesting that the fate of a desirable future vision of transport was not in the hands of the industry's main players at all.

"The shared, autonomous, electrified future of transportation will not arrive without major public interventions," Lanctot said. "Carmakers, renters and dealers are ill-equipped to alter consumer behavior and unable to modify their business models. In the absence of public intervention, the best hope for a brighter transportation future remains with the disruptive startups."

We also heard Rutger van der Wall, vice-president, global product at LexisNexis Risk Solutions, expand on inter-industry data sharing to promote motorist safety.

"ADAS data figures are showing a significant lowering of loss among car users. If you have four ADAS features on the vehicle, you lower the risk of claims by 40%," Van der Wall said. "However, these data figures show that lane departure warning systems, operating on the

steering wheel and on the seat, do not work, so just take them out. Sharing these sorts of findings between insurers and OEMs can produce benefits for both in the market. If we know more about what the consumer is using their vehicle for we can build business models that will produce results."

However, the selection of suitable partners is also a major consideration for companies to ensure they steer a course to a successful future, said Martin Rosell, managing director of WirelessCar. "We need to pull the right partners into this and build services for many years ahead not just for the next year or so," Rosell added.

The relationship between automakers and disruptive startups is also a key area where the door must be open to worthwhile innovations, said Scott Lyons, the head of Business and Partner

"I never want to own a car but I use Drive Now and so I am a consumer for BMW. I think there are a lot more innovations coming out of other areas than Silicon Valley where issues are being solved in the real world."

Development of Connected Services for Ford's European division.

"Startups play a big role for us and, for me, it's about bringing new experiences into the vehicle," Lyons said. "There is a halo effect to what they bring to the company, but it seems the OEM gets a better deal out of this than the startup. The decision is really about the solution but it's also about the people because you have to be able to work with the people. What is harder is to get people internally to invest in something that could compete with what we are doing. I think you have to hedge against the future which could include solutions we want to bring out to the market. For example, I never want to own a car but I use Drive Now and so I am a consumer for BMW. I think there are a lot more innovations coming out of other areas than Silicon Valley where issues are being solved in the real world."

A panel discussion debating the merits of cloud versus edge computing partnerships was also seen as crucial.

Miltiadis Filippou, standards and research engineer with Intel, noted: "Collaboration is key and trust by the consumer is key and we must not lock things down." In the same conversation, Olivier Lenz, programs director at the FIA, added: "There is a need to develop solutions that are market wide and in a standardized format, so OEMs need to work together on this. I think this is not a compromise on security because we have seen security breaches where people have not shown each other their findings."

The need for collaboration was the feature of a whole presentation by Timo Bauer, executive vice-president of business development and strategic partnerships at Xevo. He bemoaned the current industry climate where, "there is a lot of fragmentation in the market between the OEMs, the telecoms provider and other service providers, so how can I have a service in every car? What we need is data in all these services if you want to monetize it."

CONNECTIVITY & UX

The connected car is not so much about the hardware and software used but how the consumer will perceive the value of being connected while on the go.

So, quality of the user experience tops Škoda's list, said Sebastian Lasek, head of connectivity for the company. He added: "The service has to be localized and it's not about quantity but quality of service. We have been surprised that we have seen a 20% take-up of the services. Of these, around 40-45% agreed to be approached by third-parties."

The revenue potential is already being seen, according to LexisNexis's van der Wall.

"We have seen, with the connected car, 80% of revenues are generated by just 20% of the use cases. What matters is the value to the consumer then the revenues will follow. Today, when we talk to OEMs, the question is, 'help me generate money from this connectivity.' You have to make the customer experience about consent management – of offering consent, holding it and withdrawing it. Defining legitimate interest in a consumer's data is vital for an OEM. If you can match the consumer's requirements, then you have so many use cases to work with and generate revenues."

It is this data management that will dictate if the consumer will buy into the services being offered, according to WirelessCar's Rosell.

"We need to use the data and put it into the right data flow to create a service that I want to use," Rosell said. "Ecommerce is done with one click so we need to have a one-click, or one speech service, because this coming generation of consumers will expect nothing less. OEMs need to build in flexibility into their digital platforms where people can subscribe and de-subscribe whenever they want or need to. Creating this openness with the digital opportunity we have now is the key to this industry."

However, the industry had a stark warning from Sofia Granath, director of strategy and product management at WirelessCar. The headlong rush to bleed money out of the consumer will do nothing to spread the technology wider through the market.

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"We will not give up the customer interface. This is the determining thing in the car for the future because if you don't plug in you don't get the services that can be offered so it's the Holy Grail for us."

"We, as automotive people, have a responsibility to be trusted with safety and security and not get lost in just focusing on making revenues from the data. Why try to keep pace with the tech giants?" she asked. "Why not try to do something different by giving the best connectivity for consumers while driving to set the trend as the best, most trustworthy solution? It's a matter of design thinking with hard-to-copy software so that it is framed on safety and privacy and we are not just digging goldmines."

This honesty and openness was echoed by Benoit Joly, Renault's head of sales and marketing for connectivity, mobility and autonomous services. "We believe in open ecosystems," he said. "Because then there is a blurred experience between the digital sales experience and the connectivity of the car. So, we work with dealers to ask how we convey the connectivity to the consumers. This connected digital experience helps people become aware of the connectivity in their cars. It's important that we have an open ecosystem but without giving away the consumer data. Customers want an integrated experience, across the city, medical, smart home because the car will be just one part of the digital experience."

BMW, too, understands the need for consumer trust, especially in the premium market, said Dieter May, the company's senior vice-president digital products and services.

"We will not give up the customer interface. This is the determining thing in the car for the future because if you don't plug in you don't get the services that can be offered so it's the Holy Grail for us," May said.

Brand is also important for a mass-market producer such as the Renault-Nissan-Mitsubishi Alliance Connected Vehicles according to Tanja Neubert, its head of UX design Paris.

"It's important to think about the significance of the brand and then there are brand- or region-specific things that also have to be considered because these are the differentiators. This is a constant learning process because software changes so quickly and we have to remain dependable as a brand but still stay flexible to change," Neubert said.

MOBILITY

Carmakers are targeting mobility solutions and viewing sales in an entirely new way, said Lars Klawitter, the executive director of InMotion, which is the strategic business unit of Land Rover.

"The actual hardware supply may not be the most important part of the value chain," Klawitter said. "The future for a manufacturer is not just about being a hardware supplier but that they have to out-Google Google. This is just not possible, so the only way is to enter strong partnerships as we have done with Waymo.

You cannot ignore micro mobility in a city like London, because micro mobility would be on the investment side of the business and we are looking into this to find out where we end up. Will ownership ever die? That's a false dichotomy that there will only be homogenous pods but there will always be ownership and

that will not change anytime soon."

From the providers' viewpoint, automakers need to build their mobility offerings on a personal level, said WirelessCar's Rosell.

"Carmakers need to start with simple car-sharing mobility with friends, family and get the car used better," he added. "They need to become the digital platform for mobility transformation from selling products to providing services. It's a huge transformation and the system it has to drag behind it causes problems."

Telecom improvements promised by 5G connectivity will also feature large in the future mobility landscape, according to Juergen Danis, vice president of global sales for Ericsson's connected vehicles unit. Yet, the beneficiaries of the upgraded technology are not necessarily the consumer.

"Mobility is likely to be bigger commercially than the top line of selling automotive products and 5G will have a place in this," Danis said. "However, the consumer doesn't need 5G but the industry does. This is industry-driven technology so there needs to be enough money in the system to build the networks necessary to make it work. I think there is a good chance to move from a cost point of view to a value point of view to invest in the network."

AUTONOMOUS & CYBERSECURITY

Probably the standout presentation was to show how Volvo could quickly get consumers to trust its autonomous driving technology.

We were treated to a reveal of Volvo's method of building trust in autonomous technology, with an insight into its Drive Me pilot program with three families in Gothenburg, Sweden, coming to grips with full Level 5 autonomy.

Volvo's Christoffer Kopp presented several videos showing how quickly consumers, who had earlier expressed severe unease with the technology, learned to trust it implicitly, performing several other functions while the Volvo XC90 test mule took complete control of the driven journey.

Kopp explained: "How will people trust these cars? Lots of research shows many will not. What we see is the usual graph how you build trust – start with a lot of information and, when they get into the car, you can decrease the information until they trust it. The graph says it takes weeks or months, but we found this was not the case."

Volvo's videos of consumers trying out the technology for the first time highlighted how quickly the users were able to "switch off" and start reading magazines, using smart devices to get on with work and even watch movies on the driven trip.

"It's all about how the car feels – if it feels it can cope then the driver will trust the technology," Kopp added. "This shows the level of information does not have to be that much after people get into the cars. People get bored and here is where connected services come into play.

It shows that some people go to their personal devices, which is not what we want because we want them to use our services. Also, the screen needs to be where the driver is looking and that's at the windscreen. People get bored quickly and may take over the driving because they are bored."

However, many will argue that we can't let driverless cars on the roads unless we know they cannot be hacked and several companies are working on "digital keys" to protect access to the vehicle's systems. One such firm is Irdeto.

Peter Johnston, Irdeto's global head of products for connected transport, noted that security must also handle autonomous car-sharing models. In a car-sharing scenario, Johnston explains that:

"Digital keys must also be able to be revoked when you want to and for the period agreed. You can pass the key from one phone to another and this can be done by touching phones even without connectivity. If you're in a deep carpark you need to be able to operate the car with no network access. Fleet managers can have several users knowing that the digital keys are secure."

Biometrics, too, could form an alternative methodology according to Hao Chen, product line management for director automotive security at Giesecke+Devrient Mobile Security.

"Fingerprint and facial recognition are the best candidates for car security, although with facial there is still the issue of user consent," said Chen. "The big question is will customers accept the tech, will they pay for it and how much? Also, do we accept the tech when we can't guarantee 100% reliability?"

In addition, what is topping many consumers' lists of requirements is that their data does not get whisked away to the cloud without their say-so. "Private car users want their information to be stored locally and never leave the vehicle," Chen added. "The security of a biometric system depends on the uniqueness of the identification. The car-sharing use case is a good example. People want to feel secure even in an environment they have to get used to very quickly." ∎

> "We will not give up the customer interface. This is the determining thing in the car for the future because if you don't plug in you don't get the services that can be offered so it's the Holy Grail for us."

Governments & OEMS Need to Come to Grips With Our Autonomous Future

Much like children in a well-stocked sweetshop, the auto industry's decision-makers are having trouble focusing on which of the technological goodies on offer they want to go for first.

By Paul Myles

This leaves many with the sense that it's impossible to invest too heavily in one direction over another until that gamble is clearly worth taking.

Roger Lanctot of Strategy Analytics is not the only one to suggest that it behooves central governments and local authority regulators to become the catalyst for the technologies, making the choices that suit their vision of what future transportation should look like.

Artur Martins, vice-president for marketing and product planning with Kia Motors Europe, said as much when he told me at the Paris Motor Show 2018 that governments should instigate driverless-only roads if they are serious about accelerating the adoption of AV technology.

With this in mind, it's probably appropriate to give the last say on what the future holds for our mobility solutions and the smart city to Juan José Arriola, the head of Spain's Directorate General for Traffic office.

Speaking at TU-Automotive Europe 2018, Arriola explained that his main responsibility was focused on the regulatory side of AVs to analyze

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the role of the car in the smart city of the future.

"It depends on the demand from the customers plus the potential of connectivity and finally the way we position the cities of the future as smart, safe and sustainable," Arriola said. "Fatalities and congestion are the things we need to balance here and with AVs we are thinking about dedicated lanes. There is no perfect answer to this because, if we want to make the roads safer, we need to work with AVs but also to cope with possible increased congestion."

So, it's clear some regulators do have an appetite to get involved but it requires them to come up with a clear vision, whether on the centralized governmental level or simply city-by-city, to give the automakers a brief they can work towards.

By the same token, financing of this vision needs to be settled on with the taxpayers consulted as to whether their money should be used to help private corporations exploit a potentially huge commercial opportunity.

Naturally, the sooner these thorny issues can be agreed upon, the sooner the auto industry will be able to steer a course towards that very different horizon. ∎