Executive Roundtable: Autonomous Driving in an Urban Context

Exploiting challenges on the way to driverless mobility

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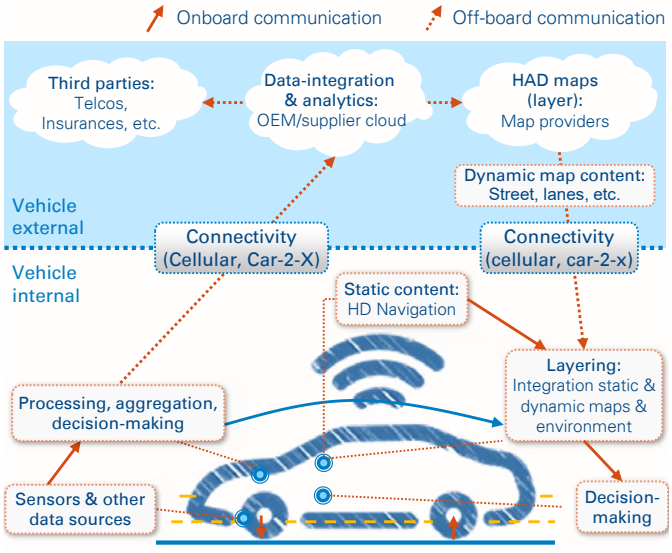
On Friday, July 7th, 2017, Ralf Baron, Partner and Global Head of Arthur D. Little's Travel & Transportation Practice, welcomed our guests to the Executive Roundtable in Munich on the topic of "Autonomous Driving in an Urban Context". The aim of the event was to provide its participants with the opportunity to be part of an interactive, cross-industry session with exchanges of real-life experiences presented by top management representatives.

Consisting of various system components, autonomous driving is a complex initiative that requires close cooperation between different market players. Hence, what is needed is "not only technical engineering, but also financial, social and political concepts," as Josef Stoll, Associate Director at MHP, a Porsche consulting company, and one of the event's keynote speakers, put in a nutshell during the group discussions.

Autonomous Driving in an Urban Mobility Ecosystem



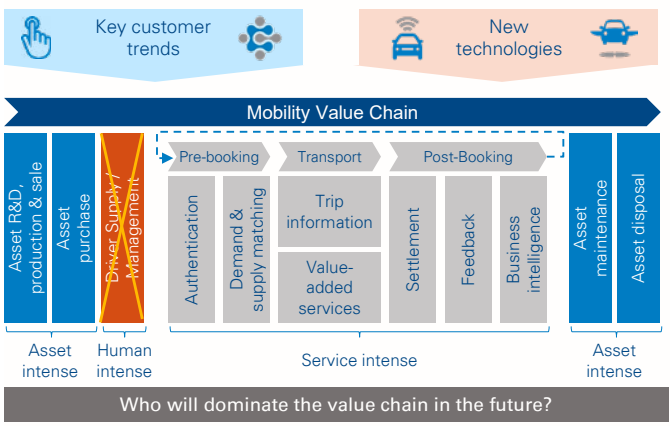
Source: Arthur D. Little

Accordingly, the cross-industry audience ranged from classical players of the game, such as OEM and telecommunication executives, up to technology start-ups up and engineering and electronics representatives. This enabled interdisciplinary discussions around challenges and requirements of successful autonomous driving concepts.

> "The challenge does not lie in lacking expertise, but in the right way to use it for implementation."
>
> (Executive, automotive industry)

The first keynote on autonomous driving was given by Joseph Salem, the Arthur D. Little key account manager of Dubai's Roads & Transport Authority. He reflected on the company's official strategy, which comprises Dubai becoming a hub for autonomous driving players in the world and providing its residents with innovative mobility solutions by 2030. To achieve these objectives the authority has recognized the importance of considering the trend from two angles: the infrastructure perspective, which requires new technologies to be set up the right way, and the customer-facing perspective, with services offered via different channels for a smooth, reliable and exciting customer experience.

The changing mobility value chain



Source: Arthur D. Little

As the mobility value chain has rapidly changed, OEMs, technology giants and start-ups have been competing more and more intensely, introducing a significant value shift, from asset providers (vehicle manufacturers, fleet management, etc.) towards service providers. According to RTA this will further intensify once self-driving is commercially available in the market.

Competition-driven solution development

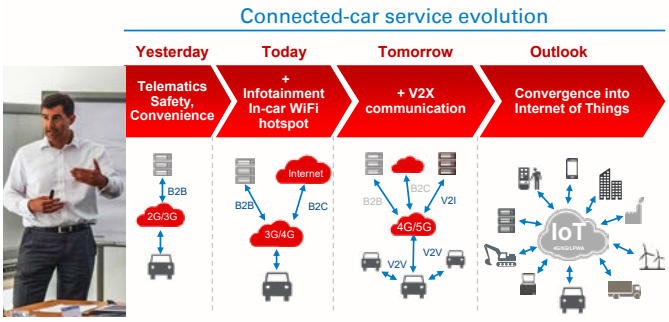
By creating a competitive landscape, Dubai aims to attract diverse global market players to enable rapid development of working concepts. As an example, RTA recently announced that it had signed an agreement for the purchase of 200 electric vehicles from US-based Tesla Inc, which were fully fitted with autonomous driving technology. Daimler, on the other hand, has invested in ride-hailing firm Careem to take part in its expansion plans. Ralf Baron, the host of the event, commented that e-hailing was an intelligent step in the transition to fully driverless concepts.

A significant difference of Dubai compared to other markets is its political and legal structure. With central decision power in place, political discussions are minimized, facilitating a more decisive, innovation-driven mentality than in many European markets. In these, long-lasting bureaucratic processes often form an obstacle on their way towards fast system implementations.

5G – The core, or only a small part of the big puzzle?

The second impulse, presented by Marc Sauter, Head of IoT Commercial and Marketing at Vodafone, addressed the role of telecommunication service providers, with a special focus on 5G.

Marc Sauter presenting the Connected Car Service Evolution



Source: Vodafone, Arthur D. Little

According to him, 5G is going to move the perspective away from human service as the focus of 2G and 3G, towards vehicle-to-vehicle and vehicle-to-infrastructure communication. Showing typical vehicle-to-everything ("vehicle-to-x") use cases quickly raised the question of general safety risks and pedestrian security. Unlike common arguments, which usually address concerns regarding risks a fully automated vehicle would bring, Mr. Stoll brought forward the controversial hypothesis of why we weight these doubts so strongly, considering how, in the aviation industry, autonomous systems have been standard for decades already without causing similar objections. The significant difference, according to the audience, lies in the aspect of human habit.

Still, aside from the question of liability, safety doubts should be resolved to overcome the skepticism that is holding back the majority of people from using driverless solutions.

> "We are setting higher expectations on machines than we do on humans!"
>
> (Executive, automotive industry)

However, a key transformation for the telecommunication industry was clearly said to be the decreasing importance of mere connectivity services. Mr. Sauter and Mr. Schnierle (Head of Business Sales IOT/M2M at Telefonica Germany) both confirmed the need for companies to enter vertical-market segments to avoid being replaced by players such as Google and Amazon, which are offering their customers more and more internet-based products and services for their daily lives. With this in mind, Vodafone has entered the 5G Automotive Association ("5GAA"), a cooperation alliance between automotive and telecommunication players, as well as road operators.

A look from the infrastructure perspective

The potential of a vehicle & infrastructure data integration

Source: Siemens, Arthur D. Little

In addition to connectivity offered by telecommunication firms to enable data transfer for information provisioning to the vehicle, infrastructural changes are required to realize fully autonomous driving systems in an urban environment. Mr. Zwick, Head of Innovative Mobility Solutions at Siemens, described the important role of intelligent infrastructure elements that cannot be replaced by any other player as follows: "Infrastructure can

take a look around the corner – something a sensor on the car will never be able to do." Still, he emphasized the potential that lies behind integration of vehicle, people and infrastructure elements. Only bringing together vehicle knowhow and routing information at the vehicle site, with area information and additional security layers at the infrastructure site, will allow exploiting the full potential.

Building up such a system again asks for cooperation between different players. Here, Siemens sees a greater need for a broader exchange with scientists and regulators and with typical mobility players or OEMs, as scientists and regulators have different perspectives of innovative mobility concepts regarding legal and scientific issues such as data security, legal restrictions and other aspects. As an example, Siemens is currently working on an initiative for autonomous shuttle activities with the following partners: the Technische Universität München (TUM) or the Institut für Klimaschutz, Energie und Mobility (IKEM), among others.

This collaboration has already achieved key results, and is still ongoing to develop efficient driverless use cases:

1. Defined and piloted Siemens self-driving vehicle suite under controlled conditions
2. Derived Siemens R&D and business-model roadmap
3. Established partner ecosystem (make-or-buy/partner/invest/M&A)

Cutting the big case into small pieces – A start-up's approach to handling the complexity of autonomous driving

> "The 19th century was a century of empires, the 20th century was a century of nation states and the 21st century will be a century of cities"
>
> (W. Webb, former Mayor of Denver)

After three big players in the market had presented their insight on challenges and requirements of autonomous driving systems, a completely different perspective stirred up minds when Mr. Jagsch, CEO of eluminocity – a start-up producing smart lighting and urban charging infrastructures – took over the presenter role and showed his view on the topic. Coming from a diverse starting point with rather low budgets, missing networks and a small team of developers, he set the hypothesis of taking one step at a time instead of provoking a "big bang". In his view, developing an overarching concept in stages helps to better meet customer needs and wishes and avoids investing large amounts of money into project results that may not match what the community needs.

A lot of firms and players concentrate on data as the value-adding part of this system. But this is also wrong, according to Mr. Jagsch. A business case can only be generated if the use case is realistic and focused and, above all, realized end-to-end before moving to the next step of driverless structures in a city.

Blockchain – The death for intermediaries!

Josef Stoll, Associated Partner of MHP, closed the event with a keynote on Blockchain and its consequences for the question of data ownership. The technology behind Blockchain can be seen as a decentralized database that is duplicated on a variety of computers on a network and continuously updated with new transactions triggered by the actual owners of the data. It mainly builds the base for so-called crypto-currencies, such as Bitcoin, and is winning attention for its ability to shift back the authority for triggering transactions from intermediaries to the actual owners of the data – hence questioning the need for third parties, which have been taking over the responsibility for triggering customer requests so far.

Based on a provocative use case combining Bitcoin, Uber and self-driving cars, Mr. Stoll initiated the discussion on changes that would occur once Blockchain became an integrated part of our daily lives.

Use cases of the "self-owning car"

Blockchain – A Car as a shareholder?

"Bitcoin. Uber. Self-driving cars. What happens when you mash the three together?
The Self-owning car. A car that pays for its Toyota lease, its insurance, and its gas, by giving people rides. A car that is not owned by a corporation. A car that is a corporation. A car that is a shareholder and owner of its own corporation. A car that exists as an autonomous financial entity with no human ownership. This has never happened before, and thats just the beginning"

Andreas M. Antonopoulos: "Mastering Bitcoin"

Source: MHP, Arthur D. Little

In the use case, the car is said to "own itself," benefiting from full authority it gets by the Blockchain technology to steer every required transaction itself. In the example it was called "an autonomous financial entity with no human ownership."

Whereas today, the discussion of who owns the transmitted data within innovative transportation systems is still ongoing, this issue can be eliminated by one single trend that shifts the rights for data away from companies that use and transfer it back to its actual owners. But is the community ready to take full responsibility for its data? Does the customer really want to trigger each and every transaction himself, only for the benefit of ensured data protection, but with the price of additional efforts? One thing is clear: If Blockchain is delivering to its full potential, the need for intermediaries could decrease to a significant degree, causing a drastic change in roles, products and services needed in the market.

A second part of the presentation comprised the need to involve customers within decision-making processes during product and service development. Mr. Stoll presented a tool that would not only collect input from the customer in one direction, but also push back results for how the customer's inputs have actually been used to improve the underlying system back to the customer. In this way, Mr. Stoll is sure one would enable a customer-oriented product and service development, and at the same time, increase the willingness of customers, as they would become part of the system development.

Summary and outlook

Ralf Baron summed up the discussion results about the real-life examples and cross-industry exchanges between the executives as follows:

1. Autonomous driving systems need to be put on the roads as soon as possible
2. Therefore, a "big bang" is needed to wake up the market players and make them cooperate effectively to realize the most promising concepts
3. The right balance between an open cooperation and a healthy competition needs to be found, which is one of the greatest challenges
4. To leverage potential synergy effects, players can cooperate on lower levels, where required activities are common and differentiate themselves on higher levels
5. A split between vehicle development and the overarching concept development can help to focus on key aspects, such as data security and legal restrictions, by involving regulators and scientists in the latter.
6. Customers need to be taken into account much more strongly during concept development ...
7. ... where innovative vehicle features are to be developed considering customers' actual needs and wishes, which would also include accepting it if traditional features remained the preferred ones (don't innovate for the sake of innovating!)
8. New roles and business models can help to separate service supply from actual operations, e.g., through introducing a new intermediary role responsible for selling the concepts to cities and keeping responsibility for operations management

Besides overcoming these challenges and creating new ways of cooperation, the diverse market players have to define focused strategies that allow stepwise development of full driverless scenarios in the urban context.

Hence, the next Executive Roundtable will deal with key questions on how to cooperate and which business models to follow to turn smart mobility concepts into reality – a further chance to see successful examples and participate in exciting discussions with peers.

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Arthur D. Little

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