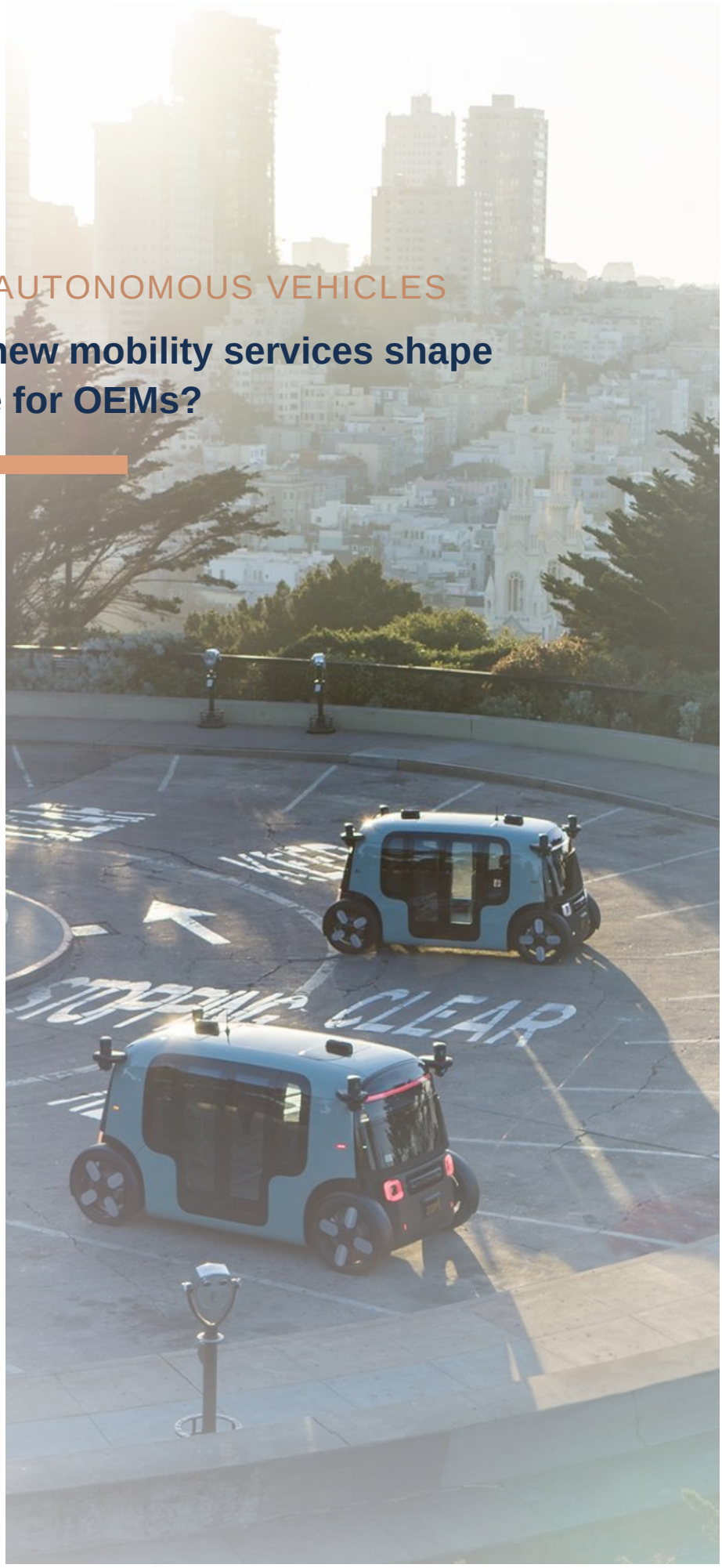
SHARED AUTONOMOUS VEHICLES

how will new mobility services shape the future for OEMs?



Images courtesy of Zoox (2021) and NEVS (2021).

The future of mobility is yet to be determined. The potential of ordering and receiving a ride in as little as five minutes challenges previous assumptions about car ownership and introduces the possibility of new forms of mobility. Shared Autonomous Vehicles (SAVs), also known as autonomous pods or robo-taxis, are of these new forms of mobility, and have the potential to transform the business landscape for Original Equipment Manufacturers (OEMs).

In this article we will present current developments in the SAV field as well as how OEMs should respond to changing market forces and business models.

THE FUTURE OF MOBILITY

is yet to be determined

Traditional car manufacturers, as well as newcomers to the market, are adapting to and creating new mobility landscapes. Innovation in both technology and business models, as well as regulations for safety and environmental concerns, are driving new possibilities and customer demands. Advancement of autonomous vehicle technology and the growth of shared mobility services provide important alternatives to conventional transportation and have the potential to alter the way people move around cities.

SAVs are traditional vehicles converted to provide autonomy, or purpose-built vehicles, designed for safely moving people from point A to point B. The difference between SAVs and driverless cars is that the SAV is designed for sharing between multiple users. The development of SAVs is not only driven from an industry standpoint but from customers and the government sector as well, with SAVs providing opportunities and benefits for both individual users and society as a whole. From a societal perspective, SAVs offer the potential of decreased pollution, congestion, and efficiency for their users, while from an individual perspective, shared autonomous vehicles imply higher safety, decreased health risks and more efficient and less costly transports.

Based on the future mobility trend, several actors on the SAV market are developing both technologies and business models for SAV services. Multiple actors have also begun operating sizeable testing fleets of SAVs, and many more have announced plans to do so in the near future. These actors range from traditional vehicle OEMs to established tech-players and start-ups. Other actors have taken a more collaborative approach and created partnerships to co-develop the technologies needed. The market for autonomous vehicles will thus, not only offer possibilities for the automotive sector, but also offer dynamic and challenging market conditions. Traditional OEMs need to adapt to the changing market environment with new business models and offers.

WHAT IS

driving the change?

Significant changes are happening in the automotive industry caused by innovations in technology, ubiquitous connectivity, the growing global population, environmental concerns, and the influence of millennials. These trends are impacting how cities manage transportation networks, how parking is evolving and what customers expect in terms of mobility. From ride-hailing apps to shared ownership schemes, customers are slowly beginning to move away from the traditional approach of buying a vehicle and embracing the benefits of mobility services. This shift towards on-demand transportation through shared-service platforms will help all corners of society to become more mobile.

One of the main driving forces behind the development of SAV services is customer demand. Customers are looking for new ways to help them save time to pursue other activities, such as spending their time during transport socializing with friends and family, either virtually or when sharing the vehicle space. This is where SAVs become attractive. Furthermore, SAVs will enable customers to pursue activities based on individual preferences and they could, for example, choose to watch a movie or catch up on business one day and digitally disconnect the next day.

SAV services will both overcome the limitations of human driver performance and behaviour in the pursuit of transportation system performance and safety, while at the same time becoming information platforms that can create both a better experience for drivers and open opportunities for businesses to create value. SAVs have substantial benefits such as reduction of crashes, ease of congestion, fuel economy, reduced parking needs and increased mobility for people unable to drive. However, there is currently a lack of framework regarding liability in the event of accidents and crashes, which creates uncertainty. This in turn could delay the adoption of SAV services.

Larger modern cities require fast and efficient transportation. This new way of transportation will potentially decrease the number of vehicles on the road, offer a new infrastructure and decrease pollution. For example, the second largest city in Sweden, Gothenburg, is involved in different projects regarding new innovations and traffic systems. Gothenburg has a project called “Green City Zones” where they have set a goal to reach zero-emission transportation by 2030. The Green City Zones project is also approached at the governmental level, and the Swedish government has decided to create a transport sector that will be independent from fossil fuels in the near future. Another project more focused towards autonomous vehicles (AVs) is the CoExist project, which aims to prepare cities for adapting their current traffic to traffic with AVs. Along with Gothenburg, Stuttgart, Milton Keynes, and Helmond are additional cities working with this project. CoExist's main goals are to reduce traffic and noise and improve safety.

SAV services will impact our vehicle sharing behaviours, and it is predicted that car-sharing will increase in popularity and vehicle sales will decrease. The car-sharing market will either evolve or transform entirely, but the pace will be determined by the views of customers, regulators and technology.

FUTURE

market potential

There are yet no SAV services with full automation, although there are several pilots using automation to provide a shared mobility service of some kind. Most SAV pilots thus far serving actual passengers involve either on-demand ride services or low-speed shuttles operating in controlled environments. However, the increasing automation of shared vehicles will likely unleash innovative solutions to mobility that have yet to be realized at this time. It will most likely be several years before any services become widely available, and both technical and political hurdles will need to be overcome before these services are commonly accepted.

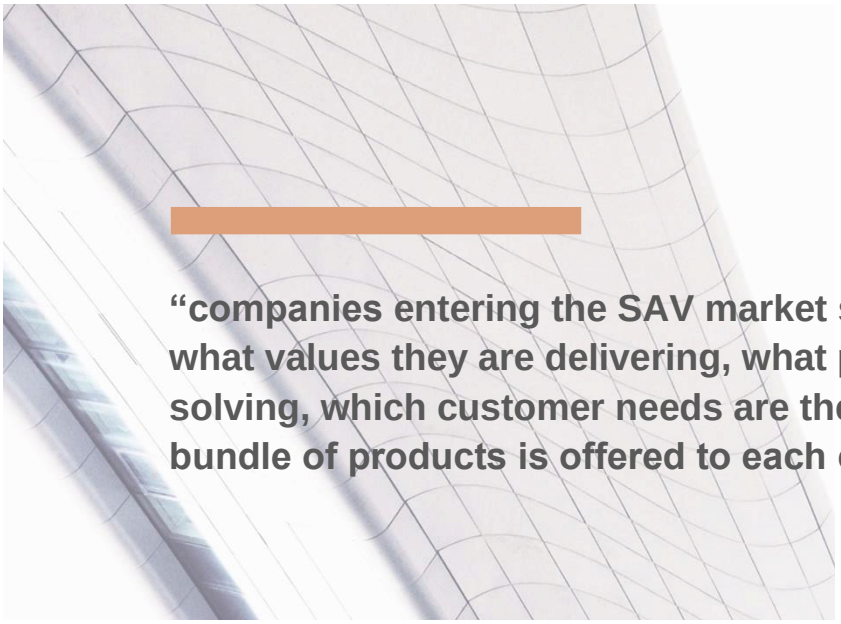
Once vehicles have reached fully automated capabilities, and are not limited by legal restrictions, it will be possible to speculate on what the market and business models could look like. Changes to vehicle types and service models might not be too different compared to current public transit and shared mobility solutions. However, the largest advantage that automation will bring is a significant drop in the price per mile of transportation services. This will certainly create attractive and competitive offers for SAV services compared to other types of transportation, including personal vehicle use.

IMPACT ON

customer preferences

Companies entering the SAV market should elaborate on what values they are delivering, what problems they are solving, which customer needs they are satisfying and what bundle of products is offered to each customer segment. With SAV services, customers can have the flexibility to choose the best solution for a particular purpose instead of using their own car for “all-purposes”, which in turn creates new segments that demand different vehicle designs that best serves their needs. This highlights a shift from focusing on the driver to the passenger experience. Purpose-built vehicles can be developed through the possibility of different flexible interior design setups in a vehicle that best serves customer preferences.

The value proposition that customers look for will also have to include a seamless digital experience. This will also mean that traditional factors such as engineering, product quality and continuous mechanical innovation and refinement aimed at the driving experience may become lesser considerations in the minds of future car buyers. OEMs will have to become increasingly customer-centric if they are to meet the challenge of producing offerings that continue to create value in the face of these shifting expectations and priorities.



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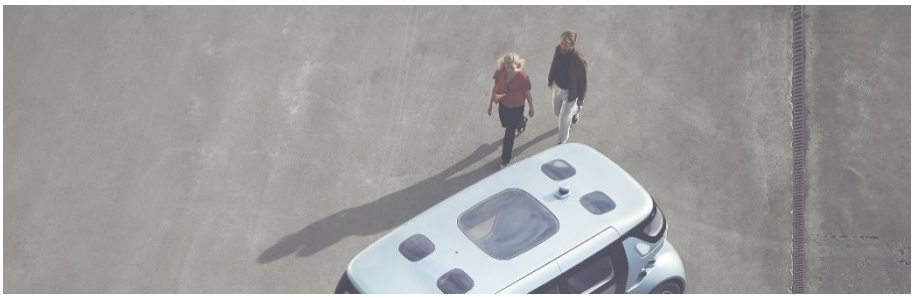
STRATEGIC ALTERNATIVES

for OEMs



Within the SAV market, there will be many different actors changing the dynamic of the automotive industry. There will also be many different value chain actors within the market, both traditional automotive, new entrants and actors from other industries. Some will be AV suppliers, while others will provide technology, software or service solutions to the SAV market. For companies to bring their solution to the market, partnerships with different actors providing different parts of the value chain seem to be essential. Big actors that are expressing a certain interest within the industry today represent just the tip of the iceberg. Many other actors are expected since this market is still developing and has potential for new revenue streams.

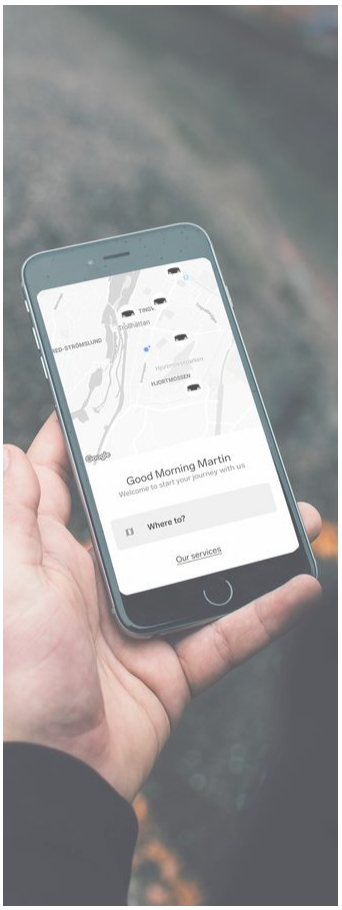
There are also several new actors curious about the upcoming market and they are therefore getting involved in the process and pushing the market forward. Even regarding new entrants, it is important for an OEM to consider which actors are best suited for key partnerships when designing a new business model. One trend that can be seen is companies with origins from different industries partnering to develop technologies for this new market. New non-traditional actors are entering the automotive industry and software and technology companies in the sector are growing at a rapid pace. New market entrants will force a change in how the traditional OEMs compete on multiple fronts and cooperate with competitors. Large OEMs need to move more towards an open approach instead of working in silos and trying to develop the complicated technology for autonomous driving and SAV solutions themselves.

There are different roles for an OEM to take when entering the SAV market. Depending on which roles they choose to take, the external factors will affect them in different ways. The shift to shared mobility and the push of automation will have an effect on the actors' business and operating model, this can be observed within the OEMs and mobility provider's interplay. SAVs could be applied into taxi and car-sharing business models resulting in a robo-taxi industry, providing door-to-door services. These vehicles will most likely be owned and operated by different mobility providers which could be actors such as taxi operators, shared mobility companies, OEMs and new entrants.

OEMs can either become the suppliers of SAVs to other mobility providers, or they can become the mobility provider themselves, where they provide the solution and service to the end-users. However, the arrangement might become more complex than that, with the development of multiple partnerships among actors, where for instance a mobility provider could possibly partner with more than one OEM. OEMs could develop and own both the vehicles and the shared mobility service, but OEMs might lack the capability of operating a mobility service and might be better off forming partnerships with shared mobility providers.

OEMS BECOMING

complete mobility provider



Some companies have taken the approach of securing vertical integration between vehicle manufacturing and mobility services in a complete package, both developing and manufacturing SAVs from the ground up, along with the autonomous technology and business model to provide its mobility service capabilities.

Zoox is one of these actors. Owned by Amazon since 2020, Zoox is a San Francisco-based company with the goal to provide autonomous transportation and on-demand mobility, via both their own vehicles and services. The two-year-old start-up covers (both electric and autonomous) vehicle design, fleet management and ride-hailing operation, thus competing with both OEMs and ride-hailing companies.

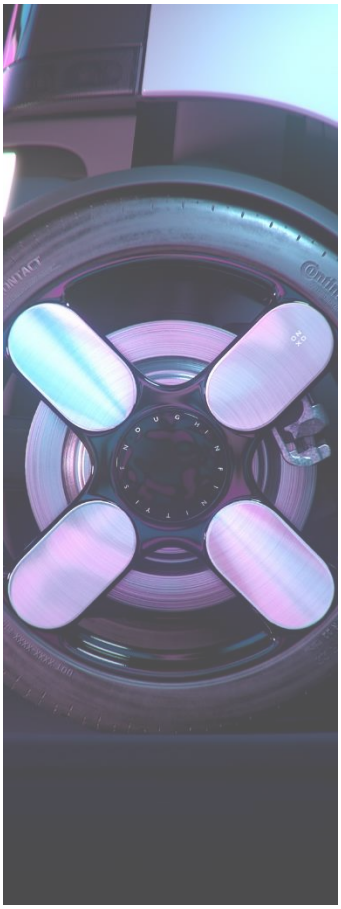
Another example is **NEVS**, a Sweden-based company which has developed a connected transport ecosystem based on SAV, called PONS. The PONS consist of three parts: Koro, Okulo and Sango. Koro is their mobility service platform which manages the fleet and all maintenance to ensure effective operations, while optimizing the balance between demand and supply. Okulo, is the app where you can order your journey and pay for it. Sangos are electric vehicles designed to optimize shared mobility in city environments and have a self-driving system for up to SAE level 4.

To become complete mobility providers, OEMs must understand and master the business models that are currently being used by mobility services companies and experiment with other business models that are more applicable to fleet-based mobility. They must also understand the KPIs that result in operating profitably under such models. Such understanding will require that OEMs consider the entire fleet-based on-demand personal mobility value chain. Mobility services business models (subscription-based, transaction-based, commerce-based, and advertising-based) are still in their infancy. Automotive OEMs are accustomed to testing vehicles but not business processes and business models, and their business model has been unchanged for a long time. To get the operating process right, OEMs will also need to consider collaborating with fleet operators and fleet managers to secure efficient ownership and maintenance of vehicles.

However, the competence and resources needed for an OEM to become a fully-fledged mobility provider would be different from those needed to sell cars through an extensive retail network. To get there, OEMs would have to reinvent themselves taking along a workforce that is fully tuned into the new business model, both regarding the skill set and mentality.

OEMS REDUCED TO

white label manufacturers



The scenario of OEMs becoming manufacturers of white-label components and vehicles (i.e. non-branded products that are sold and marketed by other actors) is also an emerging business model. The business model relies on new market entrants, most likely technology and software companies, focusing on user-centric software and services delivering the SAV services to the market, while OEMs are responsible for hardware and vehicle development. For example, mobility providers could require specific demands for vehicles and then contact manufacturers to build these vehicles on a contract basis.

Examples of this are **Navya** and **EasyMile**, which have designed autonomous electric shuttles and the underlying platform to operate them, the complete system being deployed by various mobility operators and municipalities around the globe.

Similarly, **Open Motors** has developed a highly modular and upgradable platform which can be used for various ride/car sharing fleets in the future. In the future, additional OEMs with low brand value could eventually manufacture SAVs under contract in a world where mass private ownership fades away.

In this scenario, OEMs need to secure that their specific SAVs will be the ones provided to large fleets of mobility service providers, securing their own market exposure. Key to success in this scenario would be if they are able to provide a superior platform for infotainment and add-on services, and/or retain a strong brand image.

The main beneficiary would however be the mobility service providers, using their market access and customer data as leverage. The OEMs would thus not be able to fully cash in the full revenue potential, and the margin per vehicle would most likely decrease. Owning and understanding the customers and their mobility needs will be key to success and profitable business in the future of mobility.

THE

road ahead

There is still much uncertainty in the new market for mobility services such as SAVs, and nobody knows for sure which actors will emerge as market leaders. Business models, travel behaviour preferences, and public policy will be key components in determining how the SAV market and impacts unfold.

It is, however, clear that the core business of OEMs will undergo major changes in the near future. Current revenue pools and market shares are endangered by new mobility services and increasing competition from new entrants. As both incumbents and new entrants compete for the new mobility market, each actor should consider where to play and how to secure success.

Companies only have a small window of opportunity to get ahead and position themselves to shape the future ecosystem. OEMs need to quickly scale their contribution to mobility services if they are to avoid becoming white-label contract manufacturers, although as has been touched upon in this article, it may be a good strategy for some.

WANT TO KNOW MORE?

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