

Look Out 2020+
Industry Trends
Automotive

Accelerating the shift to new mobility services



Thought
Leadership **Atos**

Megatrends in Automotive: Towards a change of paradigm



“The traditional automotive industry models of human-driven, personally owned vehicles may be radically challenged in the coming years. In the emerging ecosystems, each company will have to rethink where to play and how to win.”

Thilo Stieber

Vice President Portfolio & Innovation, Global Head of Automotive, Atos

The automotive industry has made a strong recovery since the last crisis. Worldwide sales are outpacing 90 million vehicles and profit margins were at a 10-year high in 2017, even though return on capital remains low. Under the surface, however, deep transformation trends are taking shape, promising to drive very disruptive changes in the coming decades.

Innovation picking up speed

Innovation is accelerating across the entire industry, bringing in disruptive advances in how vehicles are developed, built, sold and used. Industry 4.0 strategies are streamlining global value chains. Connected vehicle technologies are providing a whole new range of services. Electric and fuel-cell powertrains are offering greater propulsion for lower energy investment at lower emission levels. Breakthroughs in Artificial Intelligence (AI) mean autonomous vehicles are visible on the horizon.

Most importantly, consumption patterns are changing with young adults, along with urbanites, gravitating toward a model of personal mobility, based on pay-per-use rather than the upfront purchase of a capital asset. This fundamentally challenges today's sales model, which is centered on personal ownership of cars, and transforms sector economics.

Toward a service-driven industry

As a result, the automotive industry is in the early phases of fundamental changes. New well-funded entrants such as Tesla, Uber and Google are arriving from the tech industry. Analysts estimate 30% of industry revenue in 2030 may come from new business models.

This opens the door to massive shifts in the industry structure toward software and data-driven services. The ultimate target on the horizon: a move toward mobility-as-a-service offerings and partnerships with adjacent industries. For incumbents, this will require them to adapt to shifting ecosystems and fundamentally reinvent their technology, value proposition and business strategies.

Today's transformations are opening the way to strategic opportunities for automotive players to be at the heart of tomorrow's mobility systems and to find new avenues for growth.



share of the economy depends on Automotive today

\$ = USD / (source: Deloitte)



of automotive investments come from new entrants



vehicle sales growth will be seen in emerging countries by 2021



only of a car's lifetime is spent in motion



of consumers ask for smart in-vehicle experience



of vehicle value will come from software in 2030

(source: McKinsey)



of UE R&D budgets are dedicated to Automotive



of data are delivered by autonomous cars daily



may be monetized each year from car data in 2030

\$ = USD / (source: McKinsey)

Sources: Deloitte, McKinsey, PWC

Four transformational challenges and opportunities for the future of Automotive

1



Rethinking the mobility experience

While the driving experience was considered a key factor of choice a decade ago, the car's 'killer app' is now the in-vehicle, **personalized and connected** experience.

To succeed in this new era, automotive companies have to develop **personalized in-vehicle services** ranging from traffic information and communications to pure business and entertainment services, with **augmented reality** on the horizon promising better immersive experiences.

Well beyond today's advanced driver-assistance systems (ADAS) for adaptive cruise control or automated parking services, automotive companies must also pave the way to the **autonomous car**, whose broad commercial availability is expected in the next decade.

This marks a fundamental shift from vehicle sales toward **mobility experiences** and, ultimately, toward **mobility-as-a-service**, combining the best mix of bike, car, bus, train and plane, or even drone-taxi. The arrival of new players such as Alphabet, Uber, Baidu, Apple and many others into the automotive space is a clear sign of this transformation.

> The potential impact is immense; keep hold of customers, increase engagement and loyalty.

2



Develop more agile operations

In today's fast-changing market, automotive players face evermore varied segments with increasingly shorter life cycles: from luxury personalized vehicles to ultra-low-cost models, from traditional combustion-engine cars up to new-generation electric ones.

This calls for considerably **modernized, automated and more agile design and production processes**, enabling highly customized models to be produced efficiently in low volumes.

To adapt, automotive players need to pick up the pace of **Industry 4.0, automation and additive manufacturing** technology. They should also accelerate their long-term effort on Lean, Six Sigma, industry consolidation and shared manufacturing platforms, and even consider using micro-plants.

Last, but not least, they should develop **connected after sales services**. The challenge is not only to reduce maintenance costs but also to enable services such as fuel consumption optimization and automated traffic optimization.

> The potential benefits are huge: improving productivity by another 30%, reducing scrap by 80% and shortening process time by 50%.

3



Leverage innovative business models

For decades, automotive models have revolved around one-time vehicle sales and aftermarket revenue. But by 2030, **30% of business may rely on data-enabled services and shared mobility**.

To adapt, automotive players have to leverage the collective innovation power of digital. To avoid being left behind, they need to **create open platforms and marketplaces** to federate partners and start-ups. They must **develop new monetization streams** around digital services: infotainment, predictive maintenance, pay-as-you-drive invoicing and insurance, to name a few.

Last, but not least, they should take advantage of the promises of **mobility as-a-service and multimodal transportation**. Uber and car sharing paved the way for peer-to-peer (P2P) transportation services. Autonomous vehicles may accelerate the trend towards **fleets of robot car** in cities, which may work in harmony with other transport means such as trains or planes for long distances.

> Carmakers investing in shared fleets services, as well as air or rail companies investing in travel marketplaces and auto-sharing, are a signpost of this trend. This may radically transform automotive business ecosystems and **open new streams for monetization**.

4



Provide predictive security and compliance

More complex and interconnected vehicles, plants, systems and components, fragmented supply chains, multiplayer ecosystems and rising environmental laws mean **danger at every turn**.

To succeed, automotive players must **meet the fast-growing regulations on sustainability** - notably the CO2 emissions regulations and new fuel consumption test procedures (such as WLTP) that may increase in the near future.

They must also ensure the absolute safety of people now that most cars contain millions of lines of code, increasing their **vulnerability to cyber-attack**. Only **integrating 'native' cybersecurity into early development** can mitigate disastrous breaches.

Lastly, automotive companies must protect their own systems from fraudsters, hackers, mafia and hostile organizations and states; **not only for IP protection and system availability but also for customer data confidentiality**. The EU GDPR stipulates fines of up to 4% revenue for non-compliance. Other regions may follow.

> This makes it vital that native security and compliance are put at the heart of automotive industry strategies. The reward: **making trust a business' differentiator**.

Building next-generation platforms to succeed in next-generation automotive ecosystems



“With digital, Automotive is evolving from a hardware to a data-, software- and service-driven industry. This must completely reshape the industry’s technology strategies.”

Marko Weisse

Vice President, Head of Manufacturing, Retail & Transport in China, Atos

Throughout history, the automotive industry has **pioneered manufacturing processes and technologies**. It has literally invented Taylorism, developed new materials, adopted simulation and experimented with 3D printing.

Adopting a new mindset

All this has contributed to making Automotive one of the largest and most advanced industrial sectors today.

However, the sector is on the **verge of a fundamental change**. Automotive has been a long-term adopter of information technologies. But the rise of **Industry 4.0, connected vehicle and mobility as-a-service** models means players must evolve from a predominantly hardware mindset to an agile, software- and service-driven mindset.

Preparing for a paradigm shift

The ever-increasing **competition from new players** - from the digital behemoths to the hundreds of start-ups - makes rapid acceleration critical today. Preparing for the future requires a quantum leap in industry R&D, production and after-sales culture.

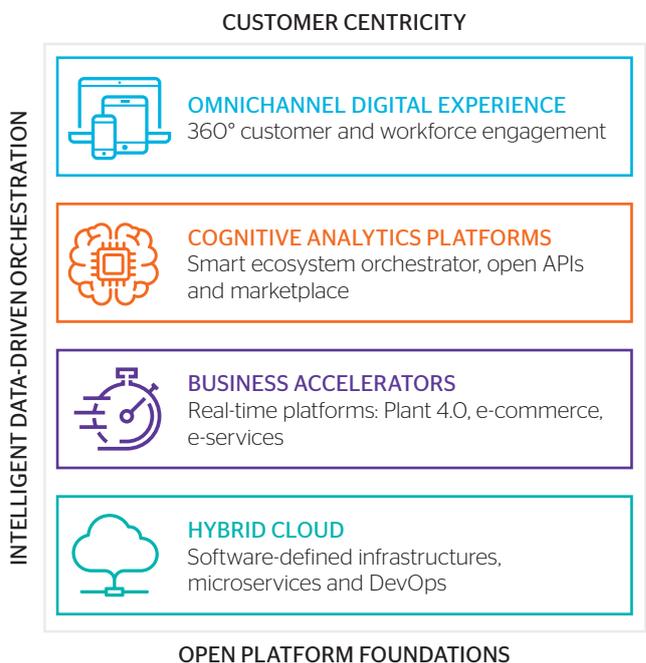
To embrace the challenges of a digital world, automotive players should:

- Become wholly **customer-centric** rather than purely vehicle-centric, enabling a 360° service and user experience.
- Provide **intelligent data-driven orchestration**, being able to adapt to market changes and evolving customer demands in a real-time, prescriptive way.
- Adopt **open platform foundations**, and real-time process automation to deliver the best products and services at the lowest cost, all while being ready to adapt to market changes.

The road ahead

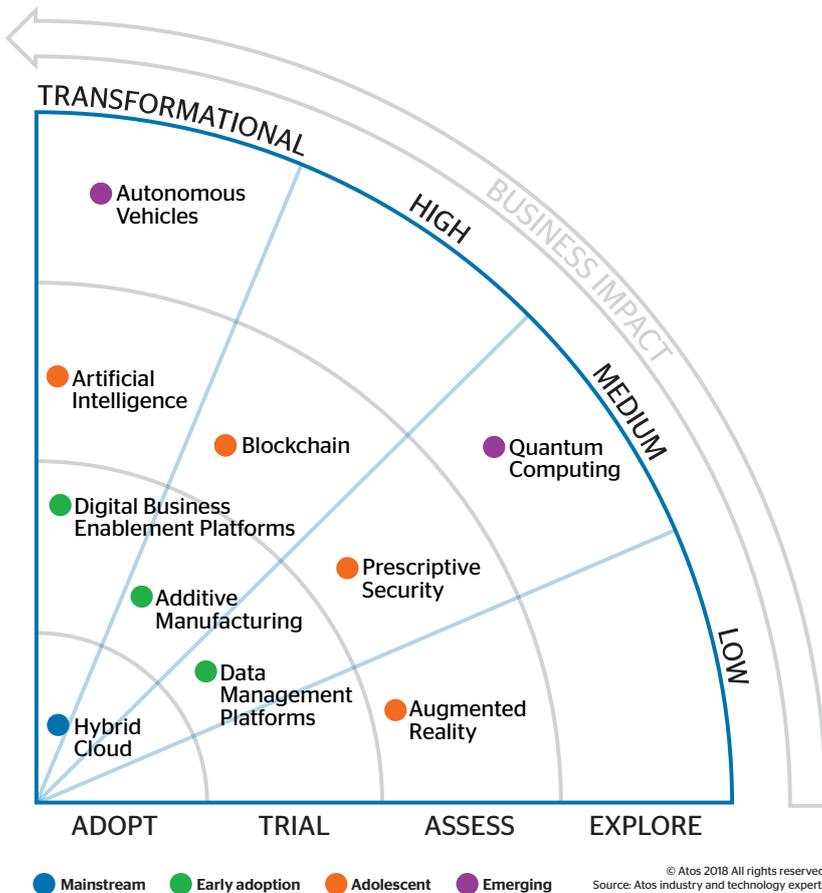
To thrive, automotive companies will also need to create the right partnership and convene the largest ecosystem to enrich their offering and services. Automotive players should begin transitioning to a new data-driven information architecture today. Modernizing legacy - from plants to networks, vehicles and services - and fully embracing the latest Cloud, automation, Big Data and mobile technologies is only the start of the journey.

Next-generation architecture for automotive companies



More disruptive technologies will emerge. While some may only appear as dots on the horizon today, they will turn out to be transformational in the years to come.

10 disruptive technologies that will shape the future of Automotive



Automotive Look Out 2020+ Radar: 10 key technologies set to impact automotive companies over the next 5 years.

Want to know more? Examine the Look Out 2020+ Global Technology Radar to get deeper insights into these 10 strategic technologies and many more: atos.net/lookout

Hybrid Cloud is reviving Cloud initiatives by enabling seamless integration of private and public Cloud platforms. With this model, organizations can exploit the benefits of public Cloud: pay-per-use, 'infinite' bursting resources, agility and innovation. Automotive players must adapt their IT processes and prepare for related security implications.

Digital Business Enablement Platforms allow data and services to be distributed across third parties. Automotive players should put these platforms at the heart of their digital strategy to attract ecosystems partners and create multi-sided marketplaces.

Additive Manufacturing or '3D Printing' facilitates rapid prototyping and low-volume production. Beyond its potential in new model design and testing acceleration, automotive players must consider its broader adoption for small series manufacturing, spare part management and vehicle personalization.

Data Management Platforms enable firms to analyze customer behavior and manage interaction across all channels and touchpoints. Well beyond marketing applications, automotive players should consider making it a cornerstone for their next-generation digital service platforms.

Artificial Intelligence promises to second human cognitive capabilities with virtual assistants, chatbots, knowledge engineering, smart machines and autonomous vehicles. It will impact customer experience, business models and operations along the entire value chain. Automotive players must prepare for the business, human and legal impacts.

Blockchain is a potential game-changer for conducting business with parties without prior trust relationships. Beyond vehicle identity management and history audit, it could revolutionize supply chain management, automated contracting and the microservice economy.

Prescriptive Security uses real-time dark web monitoring, AI and automation to detect potential threats and stop them before they strike. Applications range from cyber-protection to car safety, fraud management and compliance. Automotive players should explore integrating it into their IT/OT Security Operation Centers and the vehicles themselves.

Augmented and Virtual Reality are blurring real and virtual worlds, allowing customers, partners and employees to engage with digital services within the context of their current environment. Automotive players should explore potential use cases in driver experience, sales, maintenance and on the shop floor.

Autonomous Vehicles have the potential to disrupt the industry as we know it. Beyond driving assistance, driverless vehicles could ultimately provide completely new forms of passenger mobility or automated freight transportation and platooning. Technological, business and legal implications are huge and must be explored now.

Quantum Computing promises to break traditional combinatory analysis limitations, bringing advances in High-Performance Computing for vehicle design and manufacturing. It will also elevate risk by potentially breaking current cryptographic standards. Automotive players must start preparing now.

A glimpse into the future of Automotive: Expert views on best practice for digital transformation



Thilo Stieber
Vice President Portfolio & Innovation,
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Tom Collins
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What could automotive companies look like in five years?

With the continuous rise of electric vehicles, the first massive deployments in autonomous fleets and the generalization of shared mobility services, **major changes are on the five-year horizon**. Many start-ups and tech behemoths such as Alibaba or Amazon are entering the market today and will have probably a significant presence by then. So, part of the automotive world will be very different in five years and even more in a decade.

However, **those who think today's players may be completely replaced by Uber or Tesla are misled**. Incumbents are very active in transforming themselves. And in contrary to what some futurists may think, some parts of the automotive market will not change so much in the next 10 to 15 years. The reason is simple: combustion-engine vehicles and ownership models are still very attractive in emerging markets. Despite shared mobility, the automotive market is expected to grow from 90 to 120 million vehicle sales per year by 2030!

So, **we should expect to see a dual world**, with strong innovations in new mobility technologies and services co-existing with traditional automotive markets. Consumer preferences and usages will vary considerably by geography, style of living and moment in life.

Which driving forces will help them succeed?

In the new world of electric, autonomous vehicles and shared mobility, **the battle will be on technology innovation and ecosystem leadership**. Hence today's fast-moving landscape of research projects and alliances. Both suppliers and car makers also have to adapt to radically evolving technologies. For example, when a combustion engine usually includes thousands of components, the simplest electric ones have less than ten!

At the same time, **players need to continue to excel and be profitable in the traditional vehicle business in order to fund innovation** for the new world. There, Industry 4.0 is crucial for streamlining production.

But one factor will be common to both worlds: the importance of software, data and service monetization. In 2020, 36% of automotive industry profits will come from new services. As a result, while **digital business enablement platforms** were just an add-on for automotive players a few years ago, they're part of their core business today. **For players, it's important they don't just purchase platforms but are heavily involved in their development**, in-house or with integrator partners such as us.

Sales transformation is also strategic. Traditional retail sales are no longer the only channel. Some experiment with sales in malls. Other develop online sales. Connected vehicles is also revolutionizing sales models by enabling continuous add-on sales with App stores, premium over-the-air software upgrades and pay-per-use for some functions. **Sales transformation must revolutionize go-to-market strategies.**

“
Tomorrow's automotive landscape will combine multiple different segments. But in all of them, connected services will be the key to success.”

What should automotive companies do today?

Automotive players are facing huge challenges, but also opportunities: adapt their portfolio, evolve from just selling cars to selling mobility services, adapt how they sell, ... The large customers we work with usually have four key priorities, which we are helping them to meet with our Digital Transformation Factory. The key priorities are:

- **Leveraging Industry 4.0 to streamline the production process and adapt the shop floor to the multiplication of customer segments.** For that, additive manufacturing and micro-plants are an interesting way to manufacture in small volumes and handle millions of different combinations to produce personalized vehicles.
- **Building digital services.** We have developed innovative platforms with them to meet the key challenge: turn data and services into new monetization streams and profits.
- **Most are working on electric vehicles.** Here, beyond the car itself, it's a full ecosystem that must be set up, including charging, batteries recycling, etc. In Europe, we are among the pioneers in this domain, in synergy with utilities.
- **Working on autonomous driving.** Here also, we are among the pioneer integrators within several ecosystems.

To succeed, security will be essential, deeply embedded from IT to OT, from design to operations. This is at the heart of our approach.

But **the mother of all battles will be talent**. Tomorrow's automotive future will be in software and AI. In the face of heavily funded start-ups, large US Tech players and Chinese's BATX, **traditional automotive players have to reinvent as software companies**. This is what we are helping them to do, leveraging our expertise in digital, industrial ecosystems and our partnership with Google.

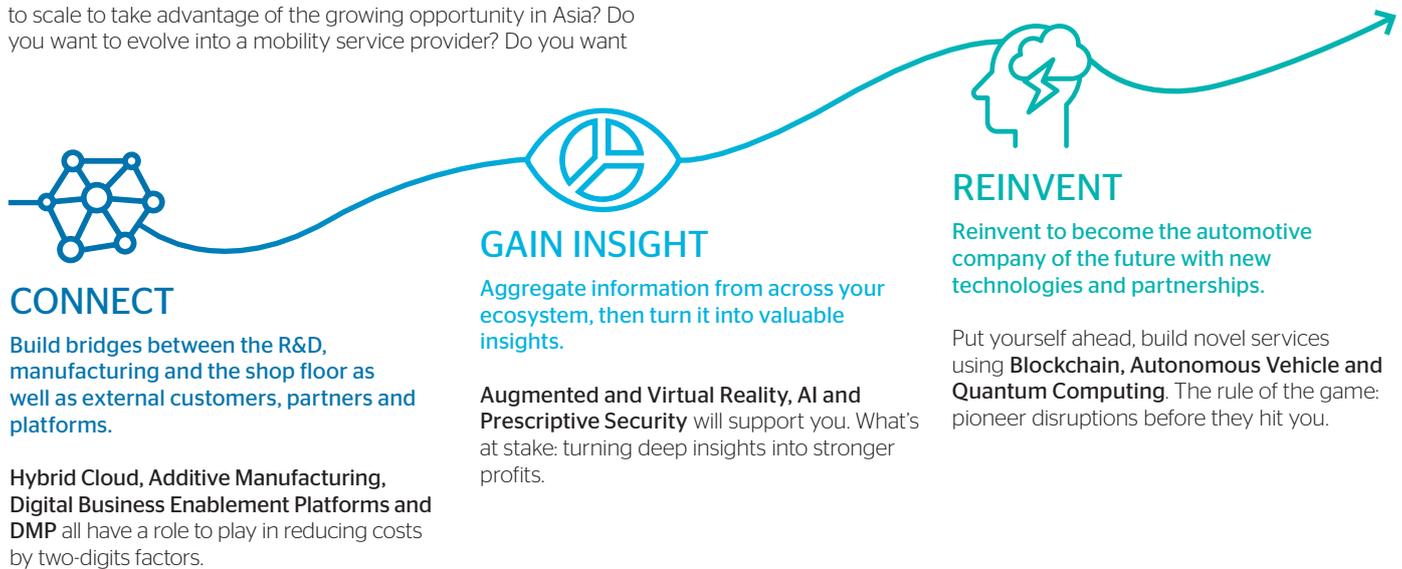
Creating your own automotive transformation journey

With all these changes converging at once, you must drive your automotive company forward. Faced with rapidly advancing technology and an evolving business ecosystem, the questions you will be asking is not 'Why change?' but 'Which direction?' and 'How?.'

The first step is **figuring out your priorities and the role you want to play within next-generation automotive ecosystems**. There are several possible positions, each with its pro and cons. Do you want to scale to take advantage of the growing opportunity in Asia? Do you want to evolve into a mobility service provider? Do you want

to become the overarching driver for the connected car services ecosystem platform?

Having made that strategic choice, you must next **embark on a journey of progressive and continuous transformation**, combining people, organizational and technology streams. Your journey requires a roadmap. We have drawn up a three-step approach, with steps that can be undertaken simultaneously.



Throughout these phases, an open approach to innovation, such as the **Digital Business Continuum** approach developed by Atos, will be paramount to success. In an ecosystem world in which start-ups appear and spread at internet speed, openness is also the best way to capture collective intelligence. As automotive companies strive to transform, **open innovation labs** - such as the Atos FinLab and Atos Labs with Google - will provide an ideal environment for bringing new ideas and new concepts to life - and creating connected car services for tomorrow.

Where should you begin?

As the Trusted Partner for your Digital Journey, Atos can help. Meet our experts and stay one step ahead by getting hands-on experience of new disruptive technologies.



ENGAGE in a co-innovation workshop at one of our Business Technology & Innovation Centers.

Get off to a quick start with a personalized workshop. Ask for a meeting:
> atos.net/btic



EXPLORE how the latest technologies can boost your own practice.

Leverage our experts and labs to build POCs tailored to your own business:
> atos.net/automotive



STAY TUNED with the latest trends and best practices in digital transformation.

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This is an extract from the full Atos Look Out 2020+ report, which provides an in-depth analysis of the emerging megatrends, business transformation opportunities and technologies that will drive innovation in the years ahead. Explore the full report on atos.net/lookout.



About Atos

Atos is a global leader in digital transformation with approximately 100,000 employees in 73 countries and annual revenue of around € 12 billion. European number one in Big Data, Cybersecurity, High Performance Computing and Digital Workplace, the Group provides Cloud services, Infrastructure & Data Management, Business & Platform solutions, as well as transactional services through Worldline, the European leader in the payment industry. With its cutting-edge technologies, digital expertise and industry knowledge, Atos supports the digital transformation of its clients across various business sectors: Defense, Financial Services, Health, Manufacturing, Media, Energy & Utilities, Public sector, Retail, Telecommunications and Transportation. The Group is the Worldwide Information Technology Partner for the Olympic & Paralympic Games and operates under the brands Atos, Atos Consulting, Atos Worldgrid, Bull, Canopy, Unify and Worldline. Atos SE (Societas Europaea) is listed on the CAC40 Paris stock index.

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Let's start a discussion together

