Microsoft

The Future of Mobility

Making the C.A.S.E. for Digital Transformation

Table of contents

Introduction

The automotive industry is facing a wave of unprecedented opportunity. New technology and services are opening doors to innovative business models and processes that disrupt and transform the entire automotive ecosystem. To capitalize on the promise of new roles and revenue streams, improved productivity, and deeper customer relationships, legacy automotive players and new entrants alike will need to embark on digital transformations.

Automotive digital transformation refers to the process of taking on the properties and behavior of software companies by integrating innovative technologies such as cloud, internet of things (IoT), machine learning (ML), artificial intelligence (AI), and cognitive services (CS). Such transformation is critical if your company is to effectively compete in the next phase of mobility. It can reduce capital and operational expenses, drive industry 4.0, digital retail opportunities, and new revenue streams. Successful transformation depends on having an agile DevOps team that can establish continuous integration and deployment pipelines as well as feedback loops to aid software and product development. This becomes critical since the future of transportation will be defined by connected, autonomous, shared, and electric (CASE) technology.

Connectivity serves as a logical starting point for the digital transformation journey.

It allows automakers to pursue transformative mobility experiences, enhance manufacturing processes, foster deeper relationships with customers, and explore new business models. Enabled by connectivity, autonomous vehicles (AVs) will become an essential aspect of transformed mobility, giving way to more dynamic and intelligent forms of transportation that alter consumer lifestyles and the concept of vehicle ownership. Assisted and autonomous driving will revolutionize mobility experiences for customers, eventually producing new mobility services and business models. The connected, autonomous, and shared mobility future will be largely powered by electric vehicles (EVs). Although adoption rates are still growing, electric vehicles will increasingly contribute to sustainable transportation.

Consumers are progressively choosing convenient, cost-effective, on-demand mobility services like carsharing, ride-hailing, and mobility-as-a-service (MaaS). These shared mobility business models are challenging the status quo by providing viable alternatives to personal vehicle ownership. Furthermore, automakers are increasingly confronted with direct competition from other ecosystem participants who are taking on similar roles in rental, leasing, transporting, and vending. The digital transformation process helps automotive players transition into new roles as mobility service providers. This process is time-consuming, resource-intensive, and incremental. With that in mind, your company should seek trusted partners that will help instill superior technology processes while guiding them through this foundational overhaul.

Chapter 1

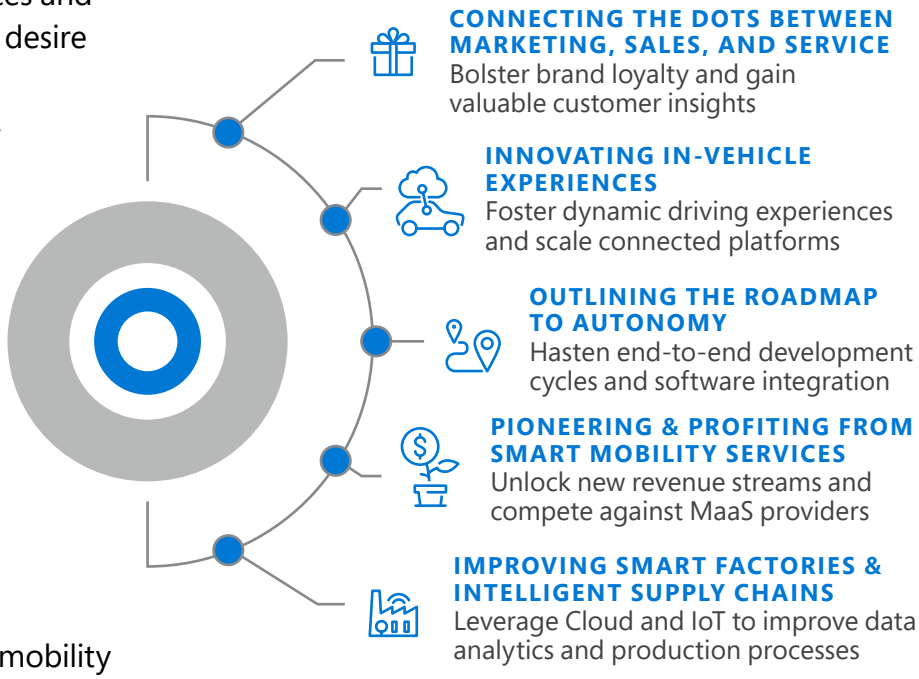
Transform Mobility Experiences

The next phase of transportation will be defined by connected vehicles and smart mobility services. In-vehicle connectivity is reshaping consumer experiences and expectations of mobility. Drivers desire customized features that remain consistent between applications, vehicles, and across multiple points of contact with an automotive brand. Frost & Sullivan predicts that 65% of newly sold vehicles will be equipped with connectivity services by 2020. Using cloud technology, connected vehicles offer highly engaging, personalized driving experiences.

Connectivity also enables smart mobility services that support new business models and revenue streams. These services leverage IoT technologies that collect, analyze, and interpret data in real-time, helping improve services, user experience, and design processes. When vehicles are integrated with scalable, secure and flexible cloud platform architecture, service providers can launch geo-enabled services with ease. These applications are actively changing the urban mobility landscape with shared, intelligent transit modalities.

Perhaps the most disruptive mobility experiences are enabled by autonomous vehicles. Mobility offerings such as robotaxis provide safe, reliable transportation without the need for human oversight. Increased vehicle utilization and lower human capital requirements will effectively minimize transportation costs for consumers. Long-haul freight will see similar disruption, lowering the cost of shipping goods in an industry faced with driver shortage. Furthermore, autonomous vehicles can boost public transit use by providing first-mile and last-mile transportation support. With the need for human interaction removed, autonomous vehicle interiors can be tailored to better serve the specific needs of commuters. Modular designs will allow for interiors based on the unique desires of passengers, whether they prefer privacy or collaboration, an office or entertainment space, or simply more room to sleep. In other words, service platforms will begin to dictate vehicle design more than automakers.

Reinventing the Wheel:
Digital Transformation with Microsoft



Enable New Business Opportunities through Digitization

Digital Retailing

Traditional car buying experiences are changing. With the explosion of new sales channels, digital retail, E-commerce, and social media, customers can now choose how, when, and where they shop for vehicles. Dealerships are no longer the starting point in the car purchase journey, forcing automakers to devise more engaging ways to drive sales. This starts by adapting to new customer expectations, as many buyers today prefer to browse vehicle catalogues from digital interfaces. Brands that fail to effectively engage with customers through digital channels will lose their ability to attract and retain them. From this challenge comes opportunity. Each digital touch point along a customer's journey is a chance to collect information to gain a comprehensive understanding of customer preferences and habits. This information serves as a valuable data set that can be leveraged to predict consumer behavior and create highly targeted content.

Mobility-as-a-Service (MaaS)

The future of transportation is becoming shared. MaaS provides travelers a platform to plan end-to-end, multimodal journeys from a single interface. Shared mobility models provide a viable means of transportation without the need for vehicle ownership. As such, automakers are following the lead of MaaS providers by pursuing new business models and revenue streams instead of relying solely on vehicle sales. Carsharing, ridesharing, ride-hailing, and micro mobility services, including eScooters and bikes, represent lucrative revenue streams. Shared mobility services are expected to have a combined revenue potential of $1.3 trillion by 2025. In hopes of profiting from these new mobility services, major automakers are investing in transportation network companies such as Uber and Lyft. Others are actively pushing for vehicle subscription models that provide drivers with access to vehicles for a monthly subscription. Such vehicle subscriptions provide greater flexibility to customers and reduce ownership liability, while offering on-demand access. As the average cost of vehicle miles travelled increases for personal vehicles, new mobility services are expected to provide cost reducing alternatives.

Reimagine Sustainable Transportation

Towards Zero Emissions

Automakers are building a future that is electric, clean, and sustainable. Electric vehicles are expected to capture 20% of new vehicle sales by 2030. Moreover, they are expected to form the base for autonomous vehicles, shared mobility services, and fleet services. Consumers are showing greater interest in electric vehicles, while seeking environmentally sustainable methods of transportation when affordable. As electric vehicles have the potential to reduce cost of ownership over internal combustion engine (ICE) vehicles, consumers are progressively adopting hybrid and electric cars. Frost & Sullivan estimates savings of up to $20,000 on the lifetime costs of owning an electric vehicle compared to a similar internal combustion vehicle.

Towards Efficient Transportation

Consumers are increasingly attracted to on-demand and shared transportation. When combined with autonomous technology, these services have the potential to further reduce emissions, vehicle miles travelled, and number of vehicles on the road. Autonomous vehicles will greatly accelerate sustainable mobility in public and shared transportation as they can decrease travel time, ease road congestion, and promote greater safety when integrated with shared mobility services. Automakers are acquiring start-ups, recruiting specialists, and partnering with mobility service providers to develop self-driving cars that can be applied towards new mobility services.

Towards Smarter Manufacturing

In combination with intelligent supply chain initiatives, industry 4.0 supports sustainable manufacturing processes that improve efficiency and reduce waste. Smart factories consume less energy as machines, lights, and devices are automatically shut down when not in use. Machine-to-machine communication helps in early detection and reduction in faults. This prevents the over production of inferior parts, and effectively reduces the scope of recalls. Joining business systems, process machinery, and other source data allows AI-integrated assembly systems to self-correct, self-learn and self-heal after system failures, resulting in reduced faults and waste. AI-infused decision-making expedites freight, improves scheduling, optimizes build plans, shortens integrated business plan cycles, offers next best alternative actions, and enhances customer experiences indirectly through improved order-to-delivery cycles.

Accelerate Auto Industry Innovation

The road ahead is filled with challenges and opportunities. Connected marketing, sales, and services foster deeper, more meaningful customer relationships and provide a more complete understanding of customer behavior and preferences. This allows for greater personalization, customized content, and hyper targeted marketing. In-vehicle connectivity serves as a catalyst to reimagine driving and passenger experiences, enabling dynamic experiences and services such as driver profiles, digital assistants, in-vehicle retail, and new revenue streams. Before realizing these opportunities, automotive players must address challenges such as creating comprehensive customer 360s, shifting towards omni-channel marketing, and redefining the role of dealerships.

Overcoming these challenges is a collaborative effort.

In the case of autonomous development, partnering with tech companies can greatly facilitate end-to-end development cycles. Data ingestion, data curation, model training, simulation, and re-simulation present insurmountable challenges for developers lacking a solid DevOps team that can continuously integrate and deploy software to autonomous vehicles. Without the appropriate human capital and talent, this process can become unsustainable. In such cases, partner networks become essential to accelerating autonomous development and competing effectively with the wide range of autonomous vehicle players.

New entrants and mobility service models have redefined the competitive landscape and consumer paradigms. As new alternatives to personal vehicle ownership grow in popularity, established players have much to learn from new entrants as they embrace the novel roles of being service providers. Although automakers are diversifying their product and service offerings, they will still be selling vehicles for years to come. Manufacturing and production processes must therefore improve alongside CASE innovation. Automotive players have realized the importance of IoT, even as industry 4.0 has propagated smart manufacturing capabilities such as robotics, automation, data management, predictive analytics, and connectivity. These processes catalyze the digital transformation of automotive manufacturing facilities, generating new opportunities across each CASE vertical. A future defined by CASE technology is the destination, but the journey itself is marked by partnerships. Along the way, companies must not only ensure that business practices work harmoniously, but that they adapt nimbly to thrive.

Chapter 2

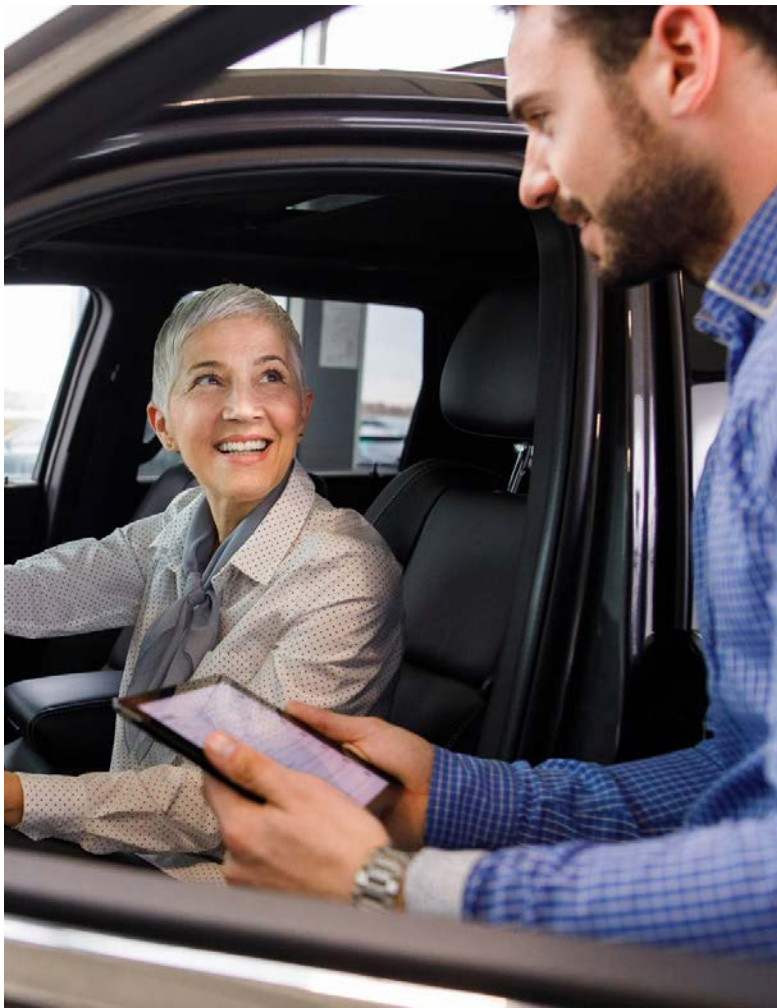
Connect the Dots: Connected Marketing, Sales, and Service

Challenges and Opportunities

Automotive retail has been shifting from dealership centric models to a network of digital services and interactive experiences. Today, consumers can browse vehicle catalogues online and make a purchase without leaving the comfort of their home. Therefore, automakers are tasked with creating engaging customer experiences that instill brand loyalty and promote vehicle sales. This presents a challenge to many that lack the customer visibility needed to showcase their high-quality products, services, and support a captivating brand experience.

Digital transformation is fundamentally changing the way companies engage with customers. Connectivity serves as the means to collect consumer information along every touchpoint. Compiling this information into a data set enables a 360° customer profile with valuable insights into their habits and desires. This allows automakers to offer customers a consistent, high quality retail experience. When digitally transforming conventional retail models, focus on:

- **Customer 360° View:** Constructing a comprehensive customer relationship management (CRM) platform that effectively tracks and captures customer data across multiple touch points to deliver highly personalized experiences.
- **Omni-Channel Presence:** Ensuring a consistent experience at every point where the customer interacts with the brand. Managing customer experience across multiple channels builds more personalized experiences while fostering trusted brand-customer relationships.
- **Interactive Purchase Experience:** Expanding interactive virtual experiences and digital showrooms to offer new modes of engagement beyond dealerships. These spaces generate qualified leads, boost showroom traffic, and increase brand value all while inviting customers to engage with their brand on a deeper level.



Partner for Success

Microsoft constructs engaging, interactive retail experiences with HoloLens and Dynamics 365. Dynamics 365 is a cloud-based platform that combines enterprise resource planning (ERP) and CRM, while providing productivity applications and AI tools. It empowers partner organizations to make informed business decisions by unifying data from different retail channels and applying analytics and cognitive intelligence on the data.

Partners use HoloLens to integrate mixed-reality models in retail spaces, allowing customers to explore vehicles inside and out, test features and conduct virtual test drives before even physically stepping into the vehicles. Introducing these technologies into their digital retail strategy will help automotive clients unlock deep customer insights while providing an integrated, immersive, and absorbing customer experience.

Microsoft also offers the Automotive Accelerator, an open-source program designed to assist partners realize the full potential of digital transformation. The Automotive Accelerator provides extensions to Microsoft's Common Data Model (CDM) for connected marketing, sales, and service. This unites automakers and dealerships with a standardized view across their extended sales and service ecosystem, better facilitating end-to-end collaboration. Partners use the Automotive Accelerator to ensure consistent, differentiated customer experiences with a shared data language and insight from data-driven applications.

Innovate In-Vehicle Experiences

Challenges and Opportunities

Vehicle connectivity is enabling an array of innovative in-vehicle experiences. Connected vehicles offer a wealth of driver and vehicle data. To deliver the best driving experiences, automakers must extract valuable insights from the generated data. Cloud-based solutions ingest massive volumes of data from connected vehicles, enabling delivery of personalized services.

Combined with big data capabilities and predictive analytics tools, personalization enables customers to discover and be served highly dynamic, relevant content across multiple channels.

Such solutions also improve maintenance and support, offering greater insight into how vehicles are used in the real-world including how they should be engineered. Vehicles should also continually learn about driver habits, preferences and daily routines to enrich driving experiences. This can be achieved through digital assistants embedded with cognitive capabilities. Connectivity has also led to in-vehicle marketplaces that allow drivers to make purchases from the convenience of their vehicle, thus opening new revenue streams. Over-the-air (OTA) software updates enable customers and automakers to add new features that enhance the performance, safety, comfort, convenience, or entertainment options in the car.

Partner for Success

Microsoft enables partners to transform driving experiences through the Microsoft Connected Vehicle Platform (MCVP) and Azure. The Microsoft Connected Vehicle Platform unites vehicles and devices with Microsoft cloud services. Azure is a hyper scalable, customizable cloud platform through which automotive clients can offer mobility services such as digital assistants, productivity tools, advanced navigation, and vehicle diagnostics services. Partners can build custom virtual assistants through Virtual Assistants Accelerator. Microsoft provides an open source framework so that partners can take complete ownership of the end-user experience.

Outline the Roadmap to Autonomy

Challenges and Opportunities

Autonomy is the most exciting word in the automotive industry today. Although poised to redefine mobility, developers must still refine autonomous technology with rigorous on-road and simulated testing. The first challenge confronting the industry is data collection and curation. Autonomous vehicles generate massive amounts of data during development, roughly 20-100 terabytes of data per day. Autonomous vehicle developers are challenged with bandwidth constraints for managing, storing and analyzing these big data sets. Cloud infrastructure and edge computing will help in processing real-time data and reducing bandwidth constraints. This will also enable on-board decision making as autonomous vehicles need to act and respond to data immediately, before uploading to the cloud.

Autonomous vehicle development requires comprehensive testing in varied scenarios. Machine learning algorithms and deep neural networks can train the models on how to react in different circumstances. In-vehicle and external sensors capture road images and event data. Deep learning systems integrated with scalable cloud platforms will handle the tremendous load of storing and processing these images and labeling data automatically. This enables vehicles to continuously learn for better perception, anticipation and decision making in any given environment. To power this continuous learning, developers must have dedicated software integration and deployment processes. Autonomous developers that seek to improve cycle time, feedback loops, and software development need to build a comprehensive toolchain that effectively reduces time to market.

Partner for Success

Microsoft provides the tools and services necessary to power autonomous vehicle development, assisting autonomous developers to ingest and curate data with high-performance computing (HPC) services and a simulation platform for virtual testing. Partners collaborate with Microsoft to reduce end-to-end cycle time and manage traceability, reducing the costs associated with product development and allowing hyper accurate pinpointing of flaws.

Additionally, Microsoft's DevOps team helps partners rapidly deploy updated software, further hastening development cycles. Software integration and development is crucial to model training, simulation, and re-simulation. Microsoft's vast partner ecosystem enables autonomous developers to draw on the expertise of a global network, simplifying collaboration, validation, and management with sophisticated digital solutions:

- **Data Ingestion and Curation:** Developers use Microsoft Azure's cloud architecture to scale with the performance needs of big data processing, virtual simulation, rendering and validation workloads. Partners can use Azure to create a data lake that filters hot, cold, and archival data for appropriate storage.
- **Training, Simulating, and Validating Autonomous Driving:** Cloud-based simulation systems validate the performance of autonomous systems virtually. Microsoft's automotive partners can run any number of validation tests, using the data collected from on-road testing to better inform simulated models.
- **DevOps:** Microsoft empowers developers to train and build autonomous vehicle software, machine learning, and AI, regardless of existing in-house expertise. Partners can continuously integrate and deliver software updates as necessary to train autonomous models.
- **High Performance Computing:** Partners use Azure High-Performance Computing to process workloads that are compute intensive and build machine learning models with large data sets. Cloud Workstation, Cloud Rendering, High-Performance Computing Simulation and Analysis, and Deep Learning and AI Training support end-to-end development workflow.
- **Integrated Toolchain & Open Ecosystem:** Collaborators have access to Microsoft's highly automated, traceable toolchain that supports end-to-end autonomous vehicle function development. The open ecosystem fosters a collaborative approach to development by allowing partners to integrate their unique tools and solutions.

Pioneer Smart Mobility Services

Challenges and Opportunities

Digitization leads to new revenue streams and opportunities through smart transportation. Smart mobility services are disrupting the way people, goods, and fleets move. These mobility services leverage cloud and IoT technology to provide superior fleet management capabilities. Fleet managers can better optimize loads, improve fuel economy, predict maintenance issues, and reduce vehicle downtime. Services using geofencing such as carsharing and subscription-based car services can more accurately track and manage vehicles. Service providers using cloud and IoT can collect, analyze, and interpret data in real-time. Using this data improves user interfaces and experiences, while identifying flaws faster.

Partner for Success

Microsoft enables greater efficiency and reliability with Azure IoT and location intelligence services. Azure IoT transportation solutions are built on the Azure cloud platform and track, manage and monitor connected vehicles in real-time. The Azure platform collects performance information of vehicles and stores it in the cloud. This information can be displayed as a dashboard, giving fleet managers a detailed view of fault-events, fuel efficiency, and safety reports. Partners can also roll out over-the-air firmware updates control modules through Azure.

Azure Maps integrate geospatial service APIs into fleet management solutions for real-time route optimization, traffic simulation, and location intelligence. Partners can use Azure Maps' real-time intelligence to monitor, anticipate and manage urban events, from traffic congestion and flooding, to utility optimization and construction. This will aid in smarter city planning and improved transit solutions. Clients are regularly innovating new use cases. Partners and collaborators across adjacent industries have derived value from these services, such as insurance companies that can now more accurately price policies, and retailers that can now introduce new in-vehicle commerce channels.

Improve Smart Factories and Intelligent Supply Chains

Challenges and Opportunities

Not only are automotive production processes often time consuming and repetitive, they are also hampered by the presence of discrete business units that don't always work in cohesion. Legacy systems in factories are not scalable or agile enough to support rapid innovation. Traditional facilities do not provide the means to ingest, analyze, and interpret real-time data, making it difficult to predict and adjust to market forces. In the meantime, manufacturing and supply chain processes that fail to keep pace with CASE technology threaten to impede innovation. Smart factories and intelligent supply chains can dramatically shorten the automotive production process. Overhauling manufacturing facilities is undoubtedly a daunting task but by prioritizing where to start, manufacturers can realize process improvements and cost savings sooner rather than later.

Partner for Success

- Identify the most profitable use cases and create a roadmap to successfully implement and maximize benefits.
- Start small by first testing concepts in a manageable environment and then scale to include multiple assets, production lines, and factories based on the results.
- Look beyond simply connecting assets by identifying ways to store, manage, analyze, and derive meaningful business insights from the data generated.
- Ensure machines and business systems are inter-connected to improve feedback loops, increase transparency, and reduce operational inefficiencies.

Building an Automotive Ecosystem

Microsoft supports automotive organizations in their digital transformational journey by providing leading-edge infrastructure, platforms and services to help them create a sustainable mobility ecosystem. Partners can better capitalize on new business models while delivering personalized customer experiences. A range of customer success stories indicate the potential of Microsoft solutions and business outcomes across different phases of the automotive value chain.

Connected Vehicles

- Deliver consistent mobility services across all Volkswagen brands
- Connect more than 5 million Volkswagen vehicles by 2020

Volkswagen is also speeding up the development of its ecosystem with its own software know-how and the strength of external partners. We envision the automobile evolving into a central hub in the Internet of Things, enabling customers to take their world into their vehicles.

Heiko Huettel
Head of Connected Car, Volkswagen Group

Learn more ›

Autonomous Vehicle Development

- Reduce processing time as Audi stores low-resolution images and data
- Reduce labeling time while Audi stores real-time data

Thanks to the cloud, we have found the right solution to the challenge of storage capacity and computing. We can now focus entirely on the development and safety of our technical solutions for automated and autonomous driving.

Adrian James
Head of Automated Driving Safety, Audi AG

Learn more ›

Smart Mobility Services

- Analyze and visualize key insights about performance, safety, and fuel consumption across Daimler fleets
- Secure data transfer from the vehicle to the backend across Daimler fleets

It has long been a dream of ours to operate a big data solution on a cloud platform that would make it available to all company divisions worldwide. Microsoft Azure offers precisely the data protection and data security functions we need, and essentially paved the way for us to migrate to the cloud.

Guido Vetter
Head of Corporate Center of Excellence Advanced Analytics and Big Data, Daimler AG

Learn more ›

Connected Marketing, Sales and Service

- Innovate digital retail experiences that engage and excite Volvo customers
- Build interactive interfaces that are fully personalized and consistent between Volvo's platforms

With HoloLens we have the freedom to create a bespoke experience which customers can steer themselves. Imagine using mixed reality to choose the type of car you want—to explore the colors, rims, or get a better understanding of the features, services and options available.

Björn Annwall
Senior Vice President, Marketing Sales and Service, Volvo Cars

Learn more ›

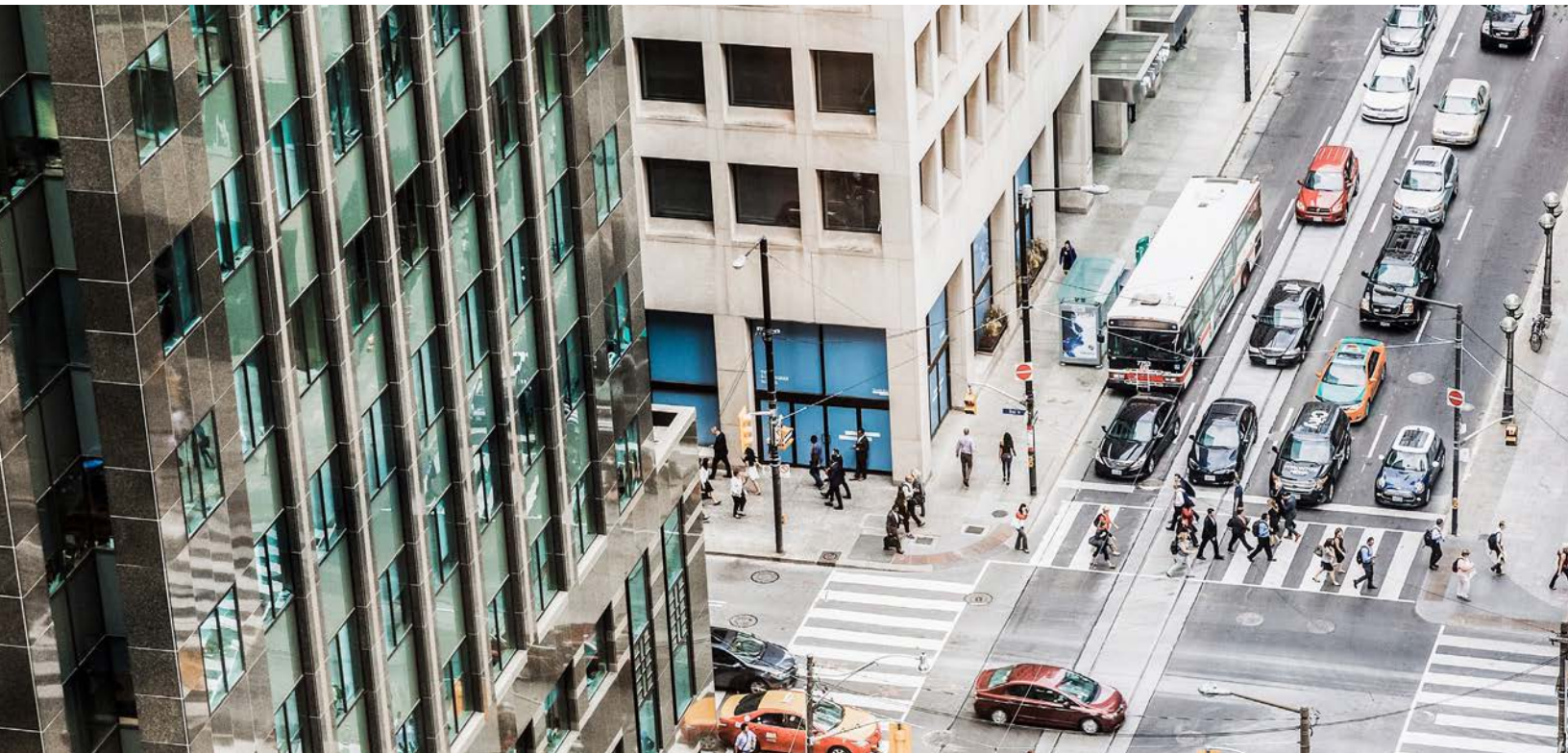
Intelligent Supply Chain

- Daimler effectively reduced IT operational costs by 50%
- Proven to deliver faster compared to Daimler's on-premise system

By using Azure, we started to deliver months faster than would have been possible in our on-premises environment.

Dr. Stephan Stathel
Operations Lead for New Procurement System and Team Lead for the Build2Run Team, Daimler AG

Learn more ›



Partner for Success

Microsoft's expertise lies in empowering connected product innovation, smart factories and intelligent supply chain with industry 4.0 digital solutions and intelligent platform services.

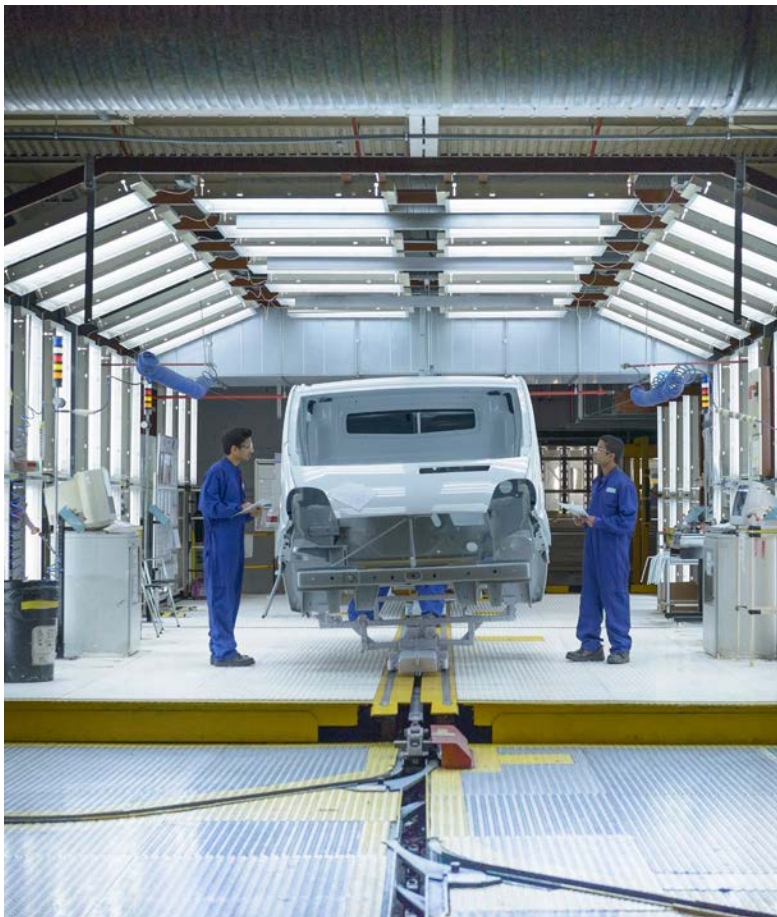
- **Improving Process Efficiency:** Azure IoT Connected Factory provides clients with a flexible, cloud based IoT platform to ingest, analyze, and visualize operational information across factories.
- **Empowering Employees:** Dynamics 365 empowers employees with mixed-reality applications for remote collaboration, providing hands-on learning on how to use parts and tools in real-world or virtual situations.
- **Creating Virtual Models of the Physical Environment:** Partners visualize factory design and production flows using Azure Digital Twins to understand performance outcomes before development.
- **Optimizing Design:** Partners use simulation-driven design processes on Azure Big Compute to build high-fidelity models without the need to maintain capital intensive infrastructure.
- **Interactive Experiences of Real-World Scenarios:** HoloLens enables partners to build fully immersive, high-definition, and interactive experiences. These tools are fully supported best-in-class Dynamics 365 mixed reality applications (Dynamics 365 Remote Assist, Dynamics 365 Layout, Dynamics 365 Guides).

LEVEL		BENEFIT	
1	Get Connected	Foundation	
2	Get Visible	React at Time 0	
3	Get Perscriptive	Control	
4	Get Cognitive	Orchestration	

The Journey to Intelligent Supply Chain

For all companies embarking on the transformation to an intelligent supply chain, it is important to grasp the levels and the expected benefits achieved at those levels. In addition, as companies proceed on the journey, they will realize that different parts of business and suppliers will be at different levels of maturity.

- Level 1—Get Connected: Bring together business systems, process equipment, graph, event, transactional, blob, and state data into a single platform of intelligence. This enables data query from one joined, common data model-based location for addressing business questions, effectively granting tremendous speed of response.
- Level 2—Get Visible: After the data is in the data platform and related through common data properties, purpose-built visualization and interaction technologies simplify the access to data. This level brings all business users to a single location to interact with and act based on the data instead of each individual business system working and making decisions in isolation. This brings decision making to time 0, allowing everyone in the organization to see an event in real-time and instantly act.
- Level 3—Get Prescriptive: Leverage the data lake, enable flow technologies, data grading, statistical control, and logic functions to monitor trends in all areas of the business and flag potential problems before they occur. Connect bot framework, notification, and event grids to drive insights and bring action to trends before undesirable outcomes occur.
- Level 4—Get Cognitive: Bring the power of AI, machine learning, and cognitive services to the data. AI can automate tasks, suggest next best conversations and outcomes, and ultimately drive highly optimized decision-making while orchestrating the complex decisions made daily in supply chain and manufacturing operations. This eliminates inefficient operations and poor decision-making based on limited datasets.



Conclusion

Digital transformation is a means to achieve higher productivity and operational gains. With the surge of digitization, the automotive industry begins to embrace the shift towards new mobility services and service-oriented business models. An unswerving focus on customer experience will help determine who among the new and established automotive players will emerge winners in this rapidly evolving environment.

Connectivity is a critical catalyst in this era of digital transformation.

Combined with intelligent cloud and edge technology, it is a tool the automotive industry uses to realize data centric business models, connected supply chains, new mobility business services, and deeper customer engagements. However, traditional automakers are challenged by the need to be cost-effective while engaging the customer throughout the vehicle life cycle. To fully realize the exciting potential of digital transformation, companies need to partner with an organization that supports and complements their efforts rather than competes with them directly.

Transform Mobility Experiences

Shared mobility services offer viable alternatives to vehicle ownership for consumers that seek convenient, cost-effective mobility experiences. MaaS solutions present tremendous opportunities in terms of profiting from integrated, multi-modal mobility solutions. These smart mobility solutions hold the potential to bring about smarter urban planning and improved transit solutions.

Microsoft's portfolio helps foster an ecosystem that collects and curates vast amounts of data that power smart mobility services.

The MCVP, in combination with Azure cloud, maps, and data marketplace delivers personalized, convenient and multi-device experiences. This technology empowers smart city initiatives due to ease of implementation, integration, and governance. The platform has the capacity to reduce emissions and congestion, while enabling monetization opportunities through smarter mobility services.

Accelerate Auto Industry Innovation

Autonomous vehicles depend on object detection, classification, path planning and motion to successfully navigate on roads. The development of autonomous vehicles demands continuous software updates, cloud connectivity, and high-powered on-board computing capacity. The core challenge autonomous vehicle develops face is reducing end-to-end cycle time while maintaining traceability. This depends on well executed data ingestion and curation policies that augment model training, simulation, and resimulation. HPC, scalable cloud infrastructure, edge-computing, and most importantly software are crucial along every step of development. Without the necessary talent or DevOps team the process becomes costly and time-consuming.

Similarly, legacy supply chains are hindered by inefficient data flows, time lapses, and limited visibility. As market forces and customer needs pressure ecosystem participants to deliver innovation at a faster pace, connected supply chains augment operational efficiencies. The goal is to push a faster time to market by reducing time between prototyping to production. Smart factories will achieve this goal by building a connected manufacturing ecosystem where employees, processes, machines, data, and customers are interconnected. Machines and IT systems across multiple production facilities will be seamlessly integrated, tightening the link between supply and demand, and accelerating new product innovation. Manufacturers will see improved operational visibility, allowing them to make targeted improvements based on real-time data.

Manufacturers will transition from basic maintenance models to cognitive predictive maintenance.

Cognitive technologies and deep learning algorithms will play a crucial role in improving the operational effectiveness of machines. AI-powered platforms will have the ability to self-learn and self-heal during system failures, thereby identifying and reducing faults. AI, machine learning and predictive analytics will be used to predict maintenance issues, thereby reducing machine downtime. Real-time visibility across multiple production facilities, predictive maintenance at an enterprise level, and intelligent supply chain tracking will become industry norms by 2025.

Whether developing autonomy or connecting a supply chain, the capability to rapidly analyze a variety of data sets is imperative. Microsoft's competencies in connectivity, cloud, IoT, and AI will allow rapid deployment for companies that lack knowledge and core competencies. Microsoft's connected platform on Azure cloud, storage and edge compute can benefit both autonomous development and connected supply chains with the flexibility to integrate disruptive innovations. Going forward, cloud storage and IoT will promote greater collaboration and responsiveness.

Enable New Business Opportunities

Retail strategies need to evolve to enhance customer experiences and engagement channels. Customer channels should intrigue and engage customers, while reinforcing loyalty and retention through personalization. Consumers seek immersive, consistent retail experiences. Comprehensive customer 360s allow the building of personalized, engaging omni-channel experiences.

As companies migrate from transactional models towards more service-based models, leveraging contextual consumer data will guide these experiences.

Microsoft is redefining customer engagement through its comprehensive portfolio of cutting-edge tools that helps organizations create a truly connected customer innovation process. Azure, data marketplace, Mixed Reality HoloLens, and Dynamic 365 applications will bring about the union of technologies, collaborative exercises, and process innovations for value creation.

Reimagine Sustainable Transportation

Automotive companies undertaking digital transformations are mindful of their environmental impact. More than simply complying to regulations and public outcry, eco-friendly modes of transportation present an opportunity to bolster brand value and better serve customer expectations. The auto industry should define sustainable objectives that positively impact business, societies, economies, and personal lives. The convergence of intelligent supply chains and mobility services provide sustainable solutions. Digital capabilities create transparency and performance optimization that foster sustainable business practices. Autonomous and electric vehicles present further opportunities to promote sustainable modes of transportation.

As vehicles become an extension of a customer's digital lifestyle, the auto industry must embrace digitization as a transformative journey.

Successful transformation depends on synergetic efforts from all ecosystem partners. These efforts need to deliver distinct business and operational advantages that achieve next generation growth opportunities. The goal is to develop a diverse digital strategy that not only improves the bottom line, but offers a sustainable, future-proof solution.

Jump-start your digital transformation with Microsoft

Microsoft is not looking to get into the business of making automobiles and we understand the value of trust. Our strategy is to complement automotive firms and not to compete with them. OEMs retain full ownership and control of their data and their brand. Microsoft is committed to developing trusted solutions for automotive, working with industry partners, competitors, worldwide regulators and most of all, automotive customers.

Sources

Frost & Sullivan, Global Autonomous Driving (AD) Industry Outlook (2019)

Frost & Sullivan, Global OEMs' Online New Vehicle Retail Strategies, 2025 (2019)

Frost & Sullivan, Global Connected Car Market Outlook (2018)

Frost & Sullivan, Automotive Data Monetisation Pricing and Business Models (2017)

Frost & Sullivan, Digital Transformation of the Automotive Industry (2017)

Learn more about automotive solutions ›

Ready to get started?
Call 1-800-426-9400