Automotive OEM 2.0

Unleashing the power of business innovation with API technologies and marketplaces

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Table of Content

Executive Summary

01 Introduction

02 Business model innovation in the automotive industry – the cornerstone of Automotive OEM 2.0

2.1 Connectivity and vehicle data monetization

2.2 Autonomous vehicles

2.3 Uberization and the rise of the sharing economy

2.4 Direct-to-consumer and marketplace platforms

2.5 Innovation driven by ESG requirements

2.6 Cross-industry eco-systems – the next frontier

03 Strategic enablement by advanced API management

3.1 Evolution of APIs into an enabler for digital transformation

3.2 Key challenges in automotive OEMs' transformation journey

3.3 Upcoming of API marketplaces in automotive for business model innovation

Conclusion

References

About the Authors

Executive Summary

Today's vehicles are more digital than ever before. They can connect to the internet, offer convenient entertainment services and sophisticated digital user experiences. But tomorrow's vehicles will be capable of even more. Automotive OEMs, suppliers, logistics service providers, shared mobility players are making significant investments to leverage digital technologies for enhancing mobility experiences and customer satisfaction. However, pouring in vast sums of money every year into the rapidly changing mobility experiences is not enough.

As automakers of today embark on the Automotive OEM 2.0 journey, they must identify critical areas for new and innovative digital business models. They would have to develop agility through digitalization and systematic adoption of emerging technologies. This is only possible when they move away from an application-centric IT strategy to a product and platform-centric business strategy and create a partner ecosystem together with whom they can innovate and create new monetization avenues.

This ecosystem approach can be embraced by leveraging advanced API management - a key strategic enabler in the 2.0 transformation and innovation journey. A robust API-enabled digital transformation strategy can help OEMs ensure faster time-to-value. To make such business models successful, API-based transformation must be at the heart of every automaker's core business strategy.

This white paper explores how digital business models are disrupting the automotive industry, some strategic imperatives that an OEM must consider for successfully establishing such businesses, why an API-enabled transformation is key to champion this change, and what are some of the best practices that will keep you ahead of the curve in pursuing an API-led business innovation.

01 Introduction

Take out the driver, take out the internal combustion engine, take out the dealers, take out ownership...otherwise it's business as usual - says Adam Jonas from Morgan Stanley on the Automotive revolution.

The automotive industry is transforming faster than any other industry today. It has shown immense resilience in an uncertain economic environment emerged due to the coronavirus pandemic. Innovations driven by the megatrends of autonomous, connected, electric, and shared mobility continue to make driving safer, cheaper, more comfortable, and sustainable.

These innovations, together with the digitalization of everything, are geared to pave new avenues for automotive brands to differentiate themselves, discover new revenue pools and set up completely new and innovative business models together with an ecosystem of partners. At the center of this entire disruption is the consumer. With so many disruptions paving the way for countless new opportunities and adjacent value streams, a new automotive organization will emerge called the Automotive OEM 2.0.

To stay head of the curve in this transformation, automotive OEMs need to create internal efficiencies, make superior technology choices, and embrace agility and innovation at scale.

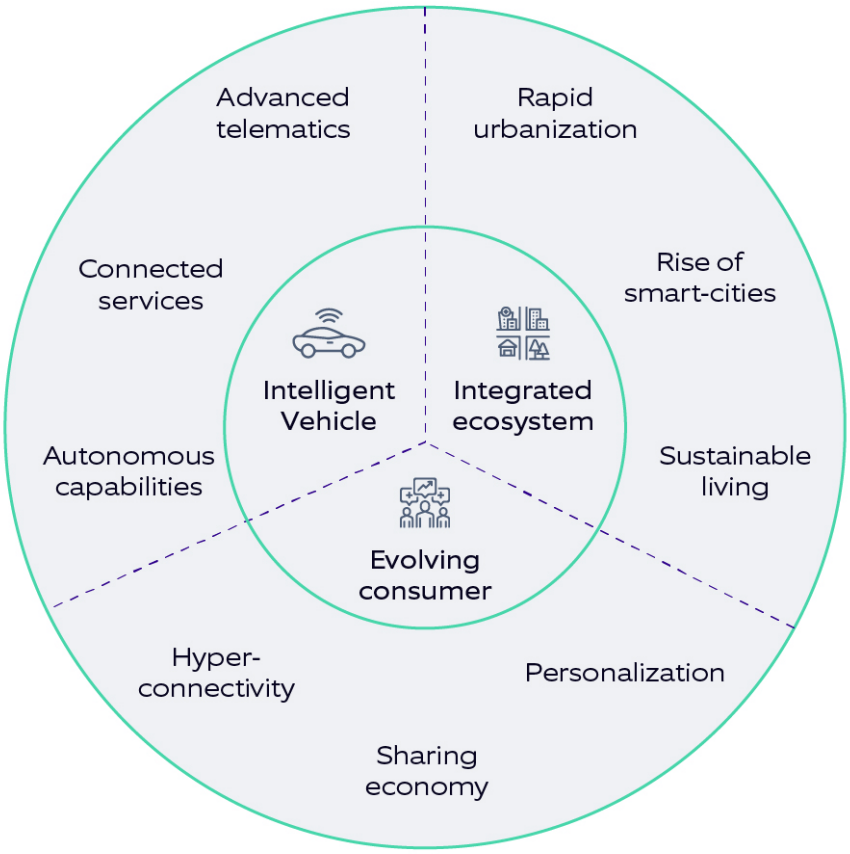

Figure 1: Key drivers of the automotive disruptions

Three mutually converging and collectively disrupting transformations are offering tailwinds to the automotive disruption:

1. Emergence of truly intelligent vehicles:

A plethora of contemporary and emerging technologies such as IoT, Big Data, AI, cloud, XR, blockchain, and 5G are enabling automakers to reimagine the emotional quotient of the vehicle and equipping the vehicle with safe, contextual, and autonomous driving capabilities. With a modular platform architecture that can process vast amounts of data and allow over-the-air upgrades, the vehicle is becoming increasingly personalized, upgradable, and unlocking new opportunities for data monetization.

2. Evolving consumer behavior:

The digital consumer is living in a hyperconnected world and expects personalized experiences delivered through smarter devices and superior brand engagement. The consumer's outlook towards personal mobility has also progressed significantly with the advent of Uberization and the rise of the shared economy.

3. Rising urbanization and push for sustainability:

The risks of climate change have driven governments, businesses, and the civil society across the world to make sustainable choices – mobility being no exception. According to World Bank, 70% of the world population would live in cities by 2050.[i] As the world population moves towards cities, emergent paradigms for mobility are showing early signs of success.

02 Business model innovations in the automotive industry - the cornerstone of Automotive OEM 2.0

The aforesaid disruptions are paving the way for technology-driven business innovation, new revenue streams and new business models in the automotive industry. These new business models and their underpinnings are creating a new automotive organization – Automotive OEM 2.0 – that is based on a strong digital foundation, equipped with modern technological capabilities and part of a large and organized ecosystems of partners.

Stakeholders within such ecosystems would have vast interdependencies for data and intelligence, and the successful implementation of new business models would be directly dependent on how well business stakeholders and systems interact and exchange data with one another. Some of the key areas where the emergence of business model innovation has seen remarkable investments and progress include:

2.1 Connectivity and vehicle data monetization

Vehicle data monetization is projected to create an annual incremental value of $400 billion by 2030 [iii]. Sensors, radars, cameras, infotainment systems, 5G and other technologies can today connect the vehicle to its occupants, to other vehicles, infrastructure, service providers, home, OEMs, and service centers/dealers. Over-the-air (OTA) updates allow functions to be added or enhanced on demand, thus adding incremental value to the OEM and to the customer. Together with vehicle connectivity, vehicle data will be critical in generating revenue, optimizing costs, and increasing safety.

A connected vehicle could generate 25 GB/hour of data through around 400 sensors with about 1000+ different parameters. A level 5 autonomous vehicle could generate around 4000 GB/day of data [ii].

Vehicle data comprises of several data types from different sources. For example:

- **Mobility data:** Trips, distances, odometer, GPS, speed, fuel efficiency etc.
- **Behavioral data:** Media infotainment data (such as volume levels, source of music, and most heard radio station), blinker status, indoor temperature, horn status etc.
- **Diagnostics & Powertrain data:** Diagnostic Trouble Codes (DTCs), engine temperature, RPM, oil level, fuel level, coolant temperature, battery health, service history, etc.
- **Safety data:** airbags, door status, seatbelt status, ADAS features, parking brake condition etc.
- **Static vehicle data:** Windows rolled-up/down status, ignition status, headlights on/off, etc.

Data and connectivity are creating several direct and indirect monetization opportunities through use cases ranging from navigation, infotainment, remote diagnostics, lifestyle, health, and well-being. The advancements in Android Auto, Apple CarPlay and Amazon Alexa are further expanding the possibilities by integrating the smartphone with the vehicle. OEMs today have access to large amounts of data from the vehicle, customer, and third parties. They leverage this data to create personalized experiences for consumers, just like data companies such as Google, Apple, and Facebook.[1]

New business models based on vehicle data are going to generate nearly 175 Zettabytes of data by 2025,[vii] creating opportunities for vehicle data aggregators (e.g., Otonomo, Wejo, and Caruso) to bridge the gap between data generators (OEMs and mobility service providers) and data consumers (third-party service providers). Otonomo, for instance, ingests 4 billion data points per day into its platform from over 40 million vehicles.[iv] These platforms are further helping OEMs to accelerate their data monetization journeys while allowing service providers to get fast access to cross-brand, cross-OEM, and mobility service providers data.

25% of the total cars sold in 2035 are projected to be autonomous vehicles, comprising of 15% partially autonomous vehicles and 10% fully autonomous cars[v].

2.2 Autonomous vehicles

Autonomous vehicles will be able to interact with one another (Vehicle-to-Vehicle, V2V) and exchange critical vehicle and environmental data. Additionally, Vehicle-to-Everything (V2X) capabilities allow for the exchange of information between vehicles, infrastructure, and application services. The advancements in sensors, connectivity, artificial intelligence, edge computing, and cloud computing are leading to the emergence of autonomous mobility ecosystems. For instance, cities such as Hamburg and Singapore are attempting to integrate autonomous electric vehicle shuttles into their public transport. Technologies such as the Siemens intelligent road-side infrastructure services are enabling such use-cases by enhancing vehicles' perception of the environment and ensure safe and efficient travel. There are over 250 autonomous vehicle companies including automakers, technology providers, services providers, and tech start-ups that are taking substantial steps to make driverless cars a reality.[x]

In 2015, Tesla started to commercialize 'Autopilot' features in its cars. Waymo, Baidu, Cruise, Argo AI are some of the leaders in autonomous vehicle technology. Automakers such Audi are hiring anthropologists and social scientists to help build intelligent vehicles that can think and act more human and communicate intent to cyclists, pedestrians, and other drivers. Nauto, a company which gathers vehicle and driver data, has partnered with BMW i Ventures to improve autonomous vehicle systems by analyzing driver and vehicle behavior data from connected cars equipped with Nauto products. Level 5 autonomous mobility capabilities would lead to several commercial applications such as in shuttles, taxi services, micromobility, valet parking services, etc. Autonomous vehicles will offer tremendous value for consumers e.g., we'll see interiors that resemble living rooms, workspaces or even lounges., the ability to work while commuting, or the convenience of watching movies while traveling, etc. Product differentiation through cabin experience features is already replacing driver centric features. Competitive value is evolving and will be delivered through innovative services and user experiences especially in the case of autonomous vehicles.

2.3 Uberization and the rise of the sharing economy

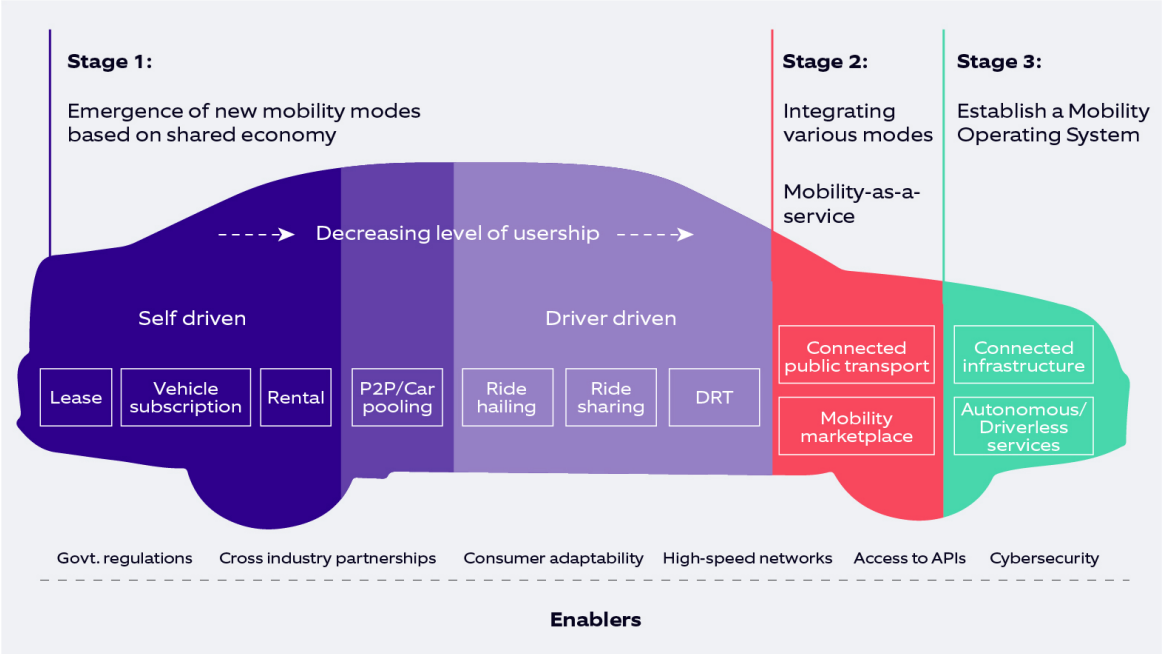

Figure 2: New mobility models of the sharing economy

Europe is expected to be the largest global market for carsharing with an estimated market size of $11.7 billion, while North America would follow close behind at $7 billion by 2030.

Disruptive ideas in shared mobility and consciousness towards sustainability are pivoting consumers' perception towards automobiles from being a product of personal consumption to collaborative usage. The success of shared mobility rests significantly on creating omnichannel experiences that are well supported by a connected and integrated ecosystem[2]. While e-hailing has succeeded into an established business model globally, other models such as subscription, P2P carsharing and last-mile connectivity solutions are burgeoning across markets like Europe and USA. Autonomous mobility too could find its way into the mainstream arena through direct responsive transit for point-to-point mobility. Downstream services such as smart parking and charging too would become partners in such models.

While all stakeholders in the value chain – automakers, financers, aggregators, technology companies, insurance providers, or parking and charging companies – would focus on carving out shared revenue models, it would become equally important to prioritize a digital and platform strategy – one that enables seamless transactions and data sharing for creating ubiquitous mobility experiences.

2.4 Direct-to-consumer and marketplace platforms

Compared to other industries such as electronics or apparels, the automotive industry has been relatively slower in adopting a direct-to-consumer approach – a trend that changed dramatically when the COVID-19 pandemic forced physical dealerships to close and customers to stay confined in their homes. For an industry that is striving fiercely to show marginal improvements to markets, a direct-to-consumer strategy promises to help OEMs sell more vehicles and have a wider customer reach that too at much lower costs.

As per a JD Power survey of 2019, 43% of auto shoppers wished to complete the entire car purchase transaction online. This was even before the coronavirus outbreak.

Amongst the OEMs, Tesla was the first mover to sell its Model 3 completely online. The online car shopping market continues to proliferate with disruptors such as Vroom, Carvana and the Wal-Mart owned CarSaver. Unlike other OEM and third-party digital platforms that compete, CarSaver integrates its platform with a network of dealership and OEM sales systems to offer its 250 million customers a wide range of car choices to buy, lease and finance – all this while keeping its brand promise of everyday low price intact.

Offering such experiences successfully requires OEMs to develop scalable platform architectures that integrate vehicle, dealership, parts and accessories, financing options[3] and F&I products on to a single platform. Making modern technology choices and creating omni-channel capabilities while building such platforms would enable OEMs to offer customers a distinguished brand experience.

2.5 Innovation driven by ESG requirements

Concerns on climate change and rapid urbanization are pushing automotive stakeholders to adopt sustainable strategies that enable a low-carbon and a socially inclusive economy. Road traffic accounts for 18% of global CO2 emissions.[viii]

To reduce carbon footprint, companies are shifting their product portfolio towards electric and fuel-cell vehicles and offering sustainable connected services to incentivize their uptake[4]. OEMs are also taking aggressive targets towards carbon neutrality, RE100, and circular economy. For instance, Renault operates a remanufacturing plant imbibing closed loop design principles that contribute to over $270 million in revenues annually[ix].

Catena-X, a European automotive network, is an example of such consortiums that aims to create an open ecosystem for efficient and secure data exchange between companies. Building sustainability applications is one of their key focus areas.

The automotive sector will also play a crucial role in the functioning of smart cities. New strategies will emerge in line with UN's Sustainable Development Goals to create economic and efficient mobility options for the entire society. Stellantis-backed Free2Move, which functions as a mobility marketplace, aggregates hundreds of mobility service providers to optimize fleet utilization and tackles issues of congestion and parking deficits.

New business models would require collaboration with data providers and third parties, and their integration needs robust governance mechanism of data safety and security e.g., compliance to NEVADA, GDPR, etc. To enable viable partnerships, OEMs are forming consortiums.

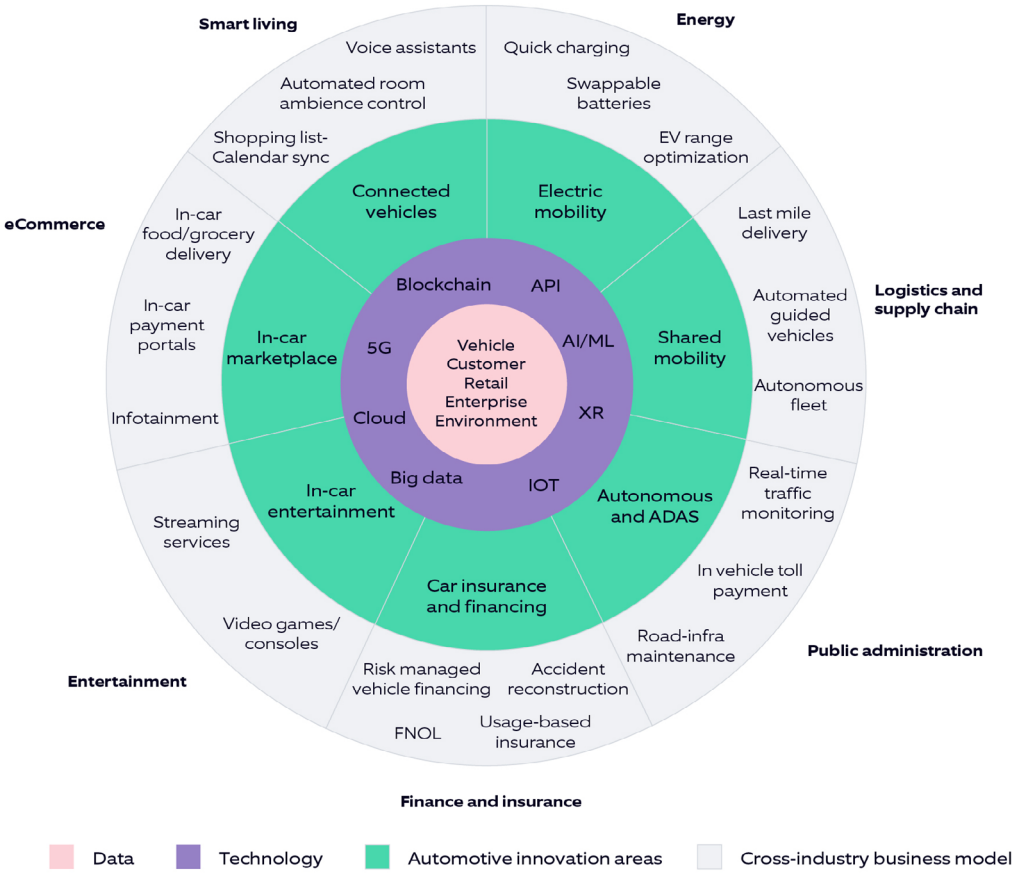

Figure 3: Automotive ecosystem

Going forward, to maintain the competitive advantage in an ever-changing business environment, automotive stakeholders must not only comply with environmental norms but also contribute towards societal welfare. Adopting sustainability practices would play a vital role in enhancing OEMs public reputation.

2.6 Cross-industry eco-systems – the next frontier

The disruptions in the above-mentioned areas are creating an impact beyond the automotive industry across several other industries as well. This has led to the evolution of innovative business models and avenues for partnership-driven growth. The industries that are creating synergetic growth avenues together with automotive industry are:

eCommerce – Connected vehicles are considered as a medium for customer engagement. For instance, BMW's IPA (Intelligent Personal Assistant) has Amazon's Alexa that gives access to the Amazon marketplace, while Mercedes Benz' MBUX has a marketplace to order food or make dinner reservations.

Smart living – More than 20 carmakers today have integrated Amazon's Alexa in their models. The vehicle will work as a virtual assistant and complete tasks like set the room temperature and home lighting according to customer's expected arrival time.

Energy – Start-ups are pioneering innovations in the areas of mobile charging stations, swappable battery packs, charging time, and range optimization solutions. Energy companies would partner with OEMs to set up end-to-end charging solutions for the growing EV market.

Finance and insurance – The finance and insurance industry has established new business models derived from automotive industry disruptions like UBI (Usage-Based Insurance), FNOL (First Notification Of Loss), Total loss vehicle valuation and risk managed vehicle financing.

Gaming and entertainment – As vehicles become more autonomous and the cockpit slowly turns into a lounge, in-vehicle entertainment will become a significant business opportunity. Tailor-made subscription plans for in-vehicle streaming services, video games and consoles with XR technology are currently being designed for the passengers in the vehicle.

Logistics – Autonomous vehicles will go one step ahead from AGVs (Automated Guided Vehicles) and will be utilized for cargo movement inside a facility and on motorable roads as well. They will be used extensively for last mile delivery of goods and other applications in logistics management.

Public administration – Services such as toll collection could be managed through in-vehicle payments enabled by advanced IVI (In-Vehicle Infotainment) systems. Maintenance of road infrastructure and traffic management can be augmented by connected vehicles providing real-time information of driving hazards such as harsh weather, potholes, debris and broken signages.

Establishing these new lines of businesses, revenue streams, and digital business models requires automotive OEMs to rethink the status-quo in more ways than one. As automakers of today embark on this 2.0 journey, they would have to develop internal efficiencies and agility through digitalization and systematic adoption of emerging technologies, move away from an application-centric IT strategy to a product and platform-centric business strategy, and create an ecosystem of partners together with whom they would co-innovate and co-create new monetization avenues.

For instance, a large German OEM is creating a retail platform that captures customer preferences across channels[5]. This data will help offer personalized customer journeys and new digital services and establish new business models tailored to customer and market needs. This API-enabled data platform creates a value-based network exposing monetizable resources and collections, which can be further used to create new business models enriching customer experience.

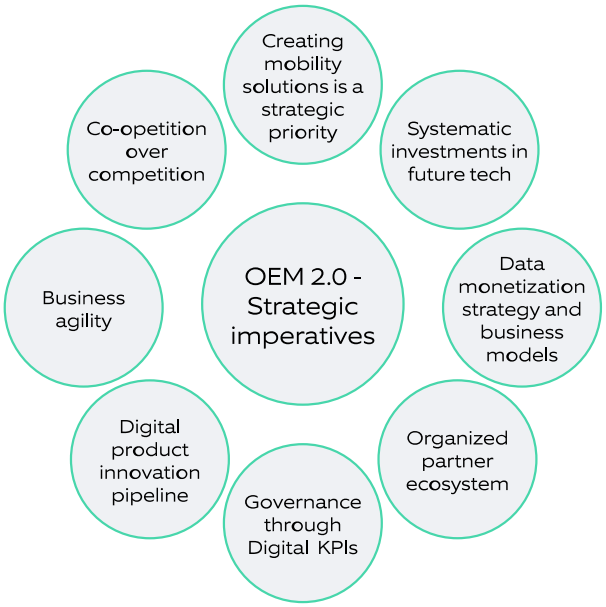

Figure 4: Strategic imperatives for Automotive OEM 2.0

Together with cloud adoption and seamless data management, advanced API management would be critical to the success of such a business strategy and business ecosystem. There is an imperative for OEMs to prioritize API-enabled transformation in their organizations. The senior leadership is the key to steer such a massive transformation across the enterprise and ensure strong governance through digital KPIs that drive productivity and provide critical insights into the success of ecosystem-driven business models.

3 Strategic enablement by advanced API management

For an Automotive OEM, the ongoing transformation results particularly in a shift towards seamless direct-to-consumer interactions, the upcoming of connected mobility services, and the development of related business models in close collaboration with partner ecosystems. We also see in this context the emergence of new paradigms such as the "Connected Car" where data is generated from user interfaces, control units and sensors. This data can be utilized together with internal and external partners to unleash the potential for service innovation and incremental revenues. Within an automotive OEM organization, for instance, this data can be leveraged to improve existing processes or create superior processes and products, given that it flows with fluidity. Moreover, this data can be sold to third parties such as data aggregators, data marketplace operators, and service providers. Consequently, automotive OEMs embrace the ecosystem play by taking advantage of advanced API management as a strategic enabler for digital transformation and innovation.

3.1 Evolution of APIs into an enabler for digital transformation

Back in the early days more than 30 years ago, Application Programming Interfaces (abbreviated as APIs) have largely been understood as a systems or application integration technology. Today, we speak about APIs as a B2B product that connect systems applications even across organizations to interact, exchange data, and execute services. Like any other product, APIs connect producers with consumers for mutual benefit. Consumers are internal or external developers who pay a price for API product consumption in terms of time and money. Those API products are fueled by producers who aim to benefit in terms of direct or indirect revenue by portfolio enrichment or expansion, business model innovation and addressable market expansion.

Consequently, the management of APIs is increasingly perceived as an enabler for transformation and innovation by data provision, integration, and monetization. Figure 5 describes this evolution of APIs with the focus shifting from access and integration towards transformation and innovation.

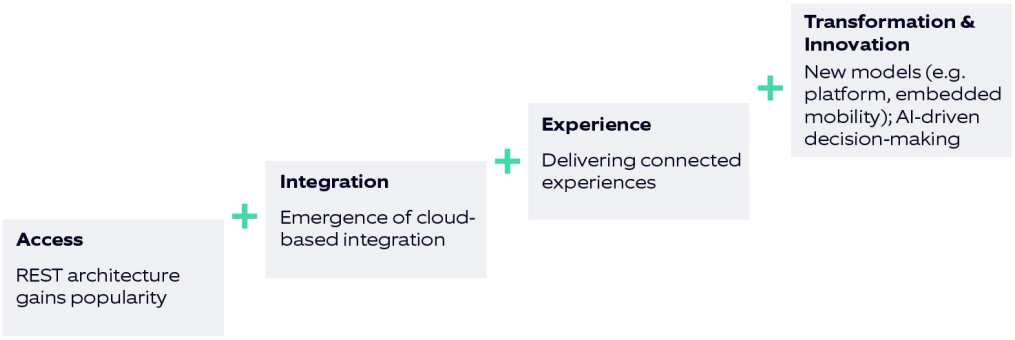

Figure 5: Evolution of APIs into an enabler for digital transformation and innovation

We understand the advanced management of APIs as an end-to-end lifecycle concept to drive business value. This lifecycle concept comprises all stages, i.e., creating and publishing APIs, enforcing their usage policies, controlling access, nurturing the subscriber community, collecting, and analyzing usage statistics, and reporting on performance.

The major technical components of an API management platform solution to provide respective functionalities include – but are not limited to – the API developer portal, the API gateway that receives API requests, enforces throttling and security policies, passes requests to the back-end service, and then passes the response back to the requester as well as the API lifecycle manager to monitor, analyze and monetize respective data consumption. Such an API management platform solution is instrumental for a strategic business transformation journey towards automotive OEM 2.0.

3.2 Key challenges in automotive OEMs' transformation journey

One of the major challenges that legacy environments face is willingness to change the mindset. While the new business model throws up new avenues for working with new set of partners, it does has its own internal pushbacks due to reluctance to accept the change and cultural shift. Ultimately organization that are ready to embrace a change – are more future ready and demonstrates flexibility and agility to market need.

Here we are trying to address two such transformation which are much needed in these types of transformations:

Business & Organizational Transformation

Firstly, there is a need for change on the business and organizational layer for an automotive OEM in a highly connected, data centric environment.

- **Openness to share and co-create –** A bold step that OEMs need to take to move towards more open enterprises. This change also pave way for modernizing an organization allowing them to co-create and co-invent products by creating a development ecosystem where participation is open and curative. It helps its own partners to work collaboratively to co-produce a market-oriented product. The ability to transition the self-image and assignment of the IT function – backed by respective capabilities and company-wide governance structure – is instrumental in this context to succeed in API-enabled business transformation. Transforming regular business partnerships into creating ecosystems goes beyond technology. OEMs must adjust processes to fit the new digital business environment and help its different stakeholders to work in new environment. They need to promote transparency and collaboration by providing incentives or adjusting ways of working.
- **Product mindset –** While APIs have come a long way from being a technological connector to revenue generating business product, one cultural shift that is at core of this transformation is "product" mindset. This shift evolved from supply-side thinking to demand-side thinking with respect to digital assets and services. Products' design, features and value are driven by "outside in" perspective rather than internal priorities and dynamics. Move towards more heterogenous, network-centric organizations require automotive OEMs to embrace smarter centralization, for example, by embracing abstraction of API lifecycle manager functionality with a virtual layer. The ability to virtually consolidate API gateways from various vendors is instrumental in this context to overcome internal data silos and tap into the full data potential.

Technological Transformation

While technology needs to be transformed to provide agility and flexibility in architecture in terms of scaling, de-coupled layers and better end user experience. OEMs need to transform their technical landscape to cater to rapidly changing business needs. The emerging data ecosystem in the automotive space on the one hand as well as the – often home grown – heterogeneity of platforms for the advanced management of APIs in large organizations on the other hand translate into strategic IT capabilities required for automotive OEMs to succeed

We feel following two high level areas where they need to focus:

- **API first based architecture –** APIs are used as a tool to modernize backend IT systems. It helps in building up business functions and division based microservices – which in turn help in loose coupling and provide velocity based on market agility. This flexible architecture also helps in optimizing operational cost and helps to scale up in their growth journey.
- **Platform as a strategy –** One great leap towards this transformation journey is to move away from "app" strategy to "platform" strategy. At the end of the day, if any OEMs need to survive and eventually thrive in this new model – they need to position themselves and their products through a platform-based ecosystem where interactions and continuous feedback help in achieving co-creation and co-invent products and services. Move towards ecosystem-centric platform business and co-opetition require automotive OEMs to setup and operate API marketplaces with service offerings beyond the traditional portfolio. The ability to integrate 3rd party offerings from various service providers is instrumental in this context to create compelling portfolios characterized by best-in-class offerings and broad choice.

As automotive OEMs position themselves to ride on this exciting journey on new business model transformation, we recommend few fields of action to succeed on above four strategic changes. During this change management, they should focus on two aspects – laying our business strategy and executing the strategic plan. From strategy perspective, we recommend OEMs to take care of the following aspects:

- Detailed analysis exercise on business context and its corresponding change drivers
- Elaborate strategy on API-fication which provides business vision and mission
- Detailed out business value with attainable KPIs and metrices

While executing the plan, we recommend OEMs to act as follows:

1. List, design, develop API products – prioritize them and catalogue them as a package
2. Modernize underlying architecture to enable agility and innovation
3. Incentivize API adoption across organization and encourage increased participation

The aspects mentioned above are summarized in Figure 6 on major fields of action to design and implement API-enabled transformation.

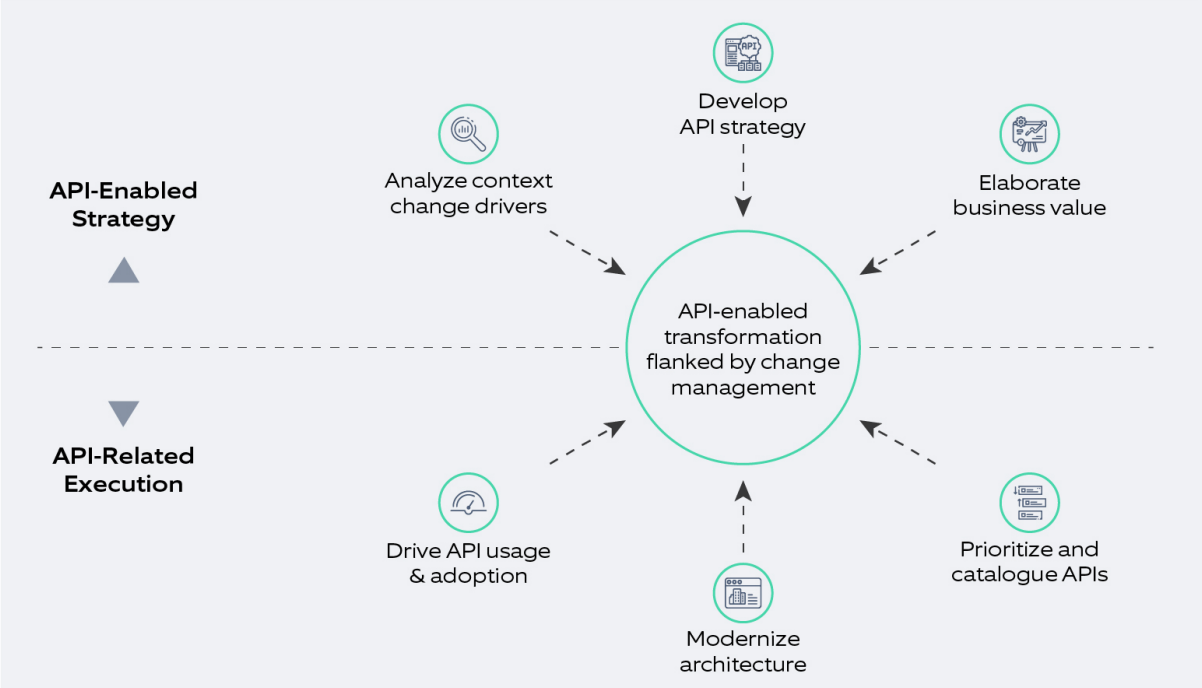

Figure 6: Major fields of action to design and implement API-enabled transformation

Starting from the discussed fields of action, we recommend automotive OEMs to derive a tailored roadmap for API-enabled transformation to unleash the business value potential of connected mobility experiences. We suggest embracing an agile roadmap planning approach based on an aligned understanding on business intent and vision as "north star".

This way, automotive OEMs can continue their story on API-enabled transformation with a clear view of this "north star". About this "north star" we believe that engaging selected ecosystem partners, creating differentiating developer experiences, and leveraging additional channels via an API marketplace is instrumental.

3.3 Upcoming of API marketplaces in automotive for business model innovation

In the automotive space, we see a clear trend from "closed shop" approach towards an "ecosystem play", i.e., more intensive collaboration and data-related exchange with selected players in relevant ecosystems to jointly tap the service innovation and revenue potential. Beyond mobility, automotive OEMs increasingly engage also in a growing range of adjacent ecosystems such as entertainment, insurance, and energy.

To engage with selected partners in those ecosystems, creating differentiating 3rd party developer experiences and attractive options for monetization are instrumental as competition on limited resources gets rougher. Creating such an experience for developers is about understanding the relevant context of how they use APIs, the tasks they need to complete, the underlying technology, integration points, and working experience alongside the API lifecycle.

Starting from there, automotive OEMs can take a variety of actions to boost developer experiences such as simplifying API design, improving developer onboarding or providing sufficient documentation, effective support, and access to meaningful exchange within the developer community.

Beyond creating differentiating developer experiences, it is instrumental to untap business potential by means of API monetization. This term describes the API provider's ability to generate revenues by packaging APIs into API products, provide them in a preferably broadly accessible way and ultimately charging for respective consumption. The provision of APIs can take place in different forms, the three most common options are briefly described below:

- **API developer portal** describes the most basic option where potential consumers of APIs and application developers come to discover and subscribe to APIs. It is also called API directory and represents a repository providing information and categorization of APIs.

- **API hub** is an integrated API developer portal or directory that provides various tools and functionality on top of listing. Furthermore, it typically provides – but is not limited to – advanced access management, developer self-service as well as API discovery and search.

- **API marketplace**, however, goes above and beyond simple API management by ensuring the APIs to achieve what they were intended for in the first place: consumption and usage. Thus, the API marketplace enables the connection between producers and consumers of APIs.

While some public API marketplaces already exist that provide a catalog of existing public APIs, we currently see that most automotive OEMs starts with building an "internal" API marketplace that is specific for an organization and exposed either internally or externally. However, the same principles can be used to build a public marketplace as well as Figure 7 illustrates.

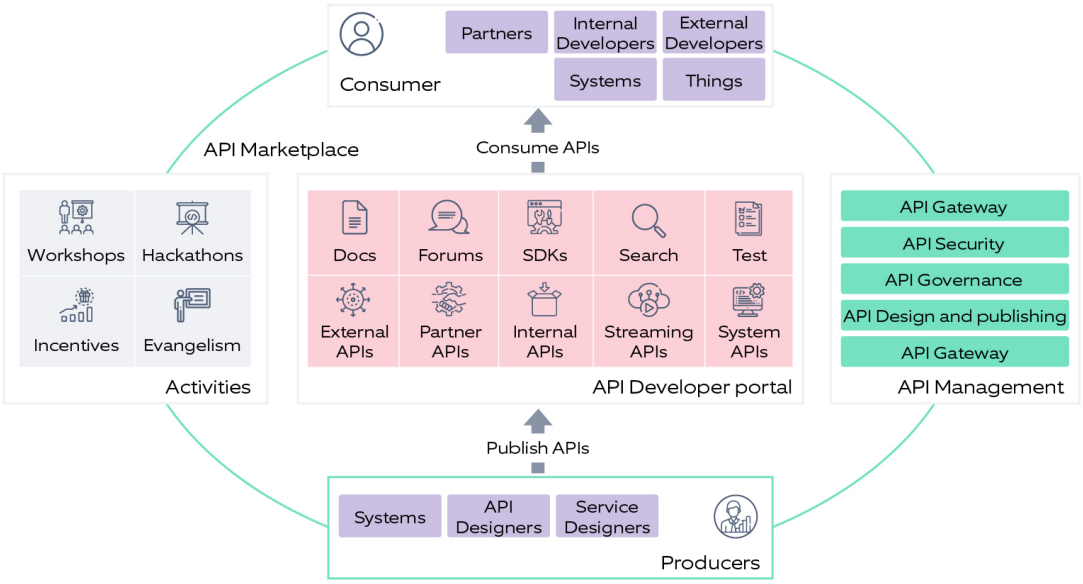

Figure 7: Conceptual setup of an API marketplace as strategic enabler for an "ecosystem play"

An API marketplace works in the same way as well-known online marketplaces, allowing automotive OEMs to act as providers to publish APIs by cataloguing and displaying them via an API developer portal. Consumers of the APIs come to the developer portal directly or indirectly (via system APIs for instance) to find, discover, and explore APIs.

API management consists of many other components vital to the marketplace, including the API Gateway, API Security, API Analytics, etc. Furthermore, the marketplace operator as an organization typically also organizes activities and events and produces material to encourage producers to build APIs and consumers to consume APIs.

To set-up an API marketplace in a cost-efficient manner, automotive OEMs can select and customize an "out-of-the-box" product. About product evaluation and selection, it's best to consider vendor and product-related aspects. Because of long-term intended use and typically high switching costs, we believe that the vendor should carefully be selected by evaluating market positioning, financial stability, and business strategy as well as decency.

Furthermore, evaluate the vendor's product on the most critical capabilities on complete lifecycle API management and performance KPIs. Regarding the first one, we'd like to highlight API testing and publishing, provisioning, discovery as well as API analytics and monetization. Finally, the ability to provide highly automated as well as secure and scalable API operations is equally important.

Conclusion

The transformation in the automotive industry offers a plethora of opportunities to create strategic business value through disruptive business models. Business model innovation in automotive rests heavily on making scalable and sustainable technology choices. A robust API-enabled digital transformation strategy can help OEMs ensure faster time-to-value. For emergent business models, API-based transformation must be at the heart of every OEM's core business strategy. An API management strategy should not just be premised on the technology landscape but also on the business goals and the value being offered to the customer.

Engaging with selected partners and creating distinguished third-party developer experiences have become increasingly critical for the automotive OEM's success in a rapidly evolving environment. Therefore, we believe that the design, implementation, and continuous evolution of API marketplaces to connect with those partners and developers is instrumental. Starting from a respective "north star," we suggest taking an agile roadmap planning approach that is not limited to advanced API management in the narrow sense but broadly addresses the required change of various layers, particularly in the business, organizational, and technical layer.

Due to the associated level of complexity and ambiguity, let's close with an African proverb we believe in: If you want to go far, go together.

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xiii. WSO2: Building an API Strategy using an Enterprise API Marketplace

Success Stories

1. Intelligent vehicle solution for on-road weather detection and data distribution
2. Enabling mobility-as-a-service with digital car rental platform
3. Creating a hassle-free online car buying experience
4. Digital engagement to drive electromobility adoption
5. Transforming automotive retail experiences with an API-first digital ecosystem
6. Fast-tracking innovation with one-click deployments

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About the Authors

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About Nagarro
In a changing and evolving world, challenges are ever more unique and complex. Nagarro helps to transform, adapt, and build new ways into the future through a forward thinking, agile and CARING mindset. We excel at digital product engineering and deliver on our promise of thinking breakthroughs. Today, we are 10,000 experts across 26 countries, forming a Nation of Nagarrians, ready to help our customers succeed..

Further information is available at www.nagarro.com.