Capgemini

Connected Vehicle:
Making the vehicle a node on the network

AUTOMOTIVE
CONNECT

Consumers expect connectivity services in vehicles; OEMs see them as an opportunity to create value; others are interested in the data that they generate. OEMs' existing business models cannot support full realization of the Connected Vehicle vision, partly because of the much shorter development lifecycle that is required for services, but also because the services raise legal issues, and require collaboration across functional boundaries, together with new architecture and processes. A new approach is therefore required: one that supports this new way of creating value through services, that enables collaboration across functions to provide the requisite data and knowledge, and that enables agility. Introducing this new architecture is a significant task but brings major benefits.

The opportunity of the Connected Vehicle

In the digital landscape, consumers' expectations of cars are changing. They want their car to be "just another node on the network" – an extension of their home, office or club. It should streamline their lives rather than giving them extra work or interrupting what they're doing. For example:

- A driver should be able to turn on the heating before arriving at the vehicle.
- The office should be notified when the individual is about to arrive so that parking space gets allocated.
- Home heating systems should automatically get turned on ahead of the resident's arrival.
- An individual's preferred radio channel and routes should be selected when they get into the car.
- Safety systems equivalent to those in the home, such as emergency buttons, should also be available in the car.

Major areas where services will be provided include driving and safety, vehicle management, aftersales, infotainment and fleet management. At the same time, the importance of multi-channel connections and social media usage is growing. There is also a strong demand for mobility services.

Connected vehicles meet these consumer expectations by facilitating communication between consumers, cars and buildings, and sometimes between different vehicles, via the "Internet of Things". This idea is attracting attention from consumers, OEMs and third parties:

- **Consumers.** Our annual Cars Online consumer survey confirms the growing interest in these ideas. "As consumers become more familiar with the idea of a connected car, their interest in owning one increases."[1] In fact, this feeling is

1 Capgemini, Cars Online 2017 - Beyond the Car

rapidly evolving from an interest to a strong demand that will force OEMs to change their offering.

- **OEMs.** Connected vehicles are on our roads already, though not yet in great numbers. Premium brands like BMW are leading the way, and almost every new car has at least some connected services. OEMs are also starting to address the need to continue providing services during the extended model lifecycle – for instance, for used cars so that the focus is shifting from purchase to ownership.
- **Dealers.** Connected Vehicle data and services can help dealers to provide maintenance. However, some dealers are wary because they are afraid of losing customer ownership to OEMs.
- **Third parties.** Different players are approaching the scene and trying to get their share – specifically, their share of the customer data. Insurance companies, dealers, third-party service suppliers – virtually anyone dealing with consumers has a potential interest in getting data that's available through connected vehicles. This information could be anything from where the individual stops to what speed they are doing. Companies such as Google are investing and innovating in this area; they have a different mindset around business case development, and bring values from the digital economy to the automotive world.

Challenges of developing connectivity services

The imperative for realizing the vision of the connected vehicle is strong, but making it happen is not easy for OEMs. Structured, stable and flexible IT services and infrastructure are required. Major challenges here include uncertainty about the business case, difficulty in extracting insights from data, and the unsuitability of current development and specification processes.

- **Unclear business case.** Full-scale connected vehicle delivery implies a huge investment in new IT, processes and technology, and many OEMs lack a clear vision of how to defray the costs. They are unsure whether new knowledge about customers and cars is likely to be sufficiently valuable to build a business case, and unclear about who will pay.
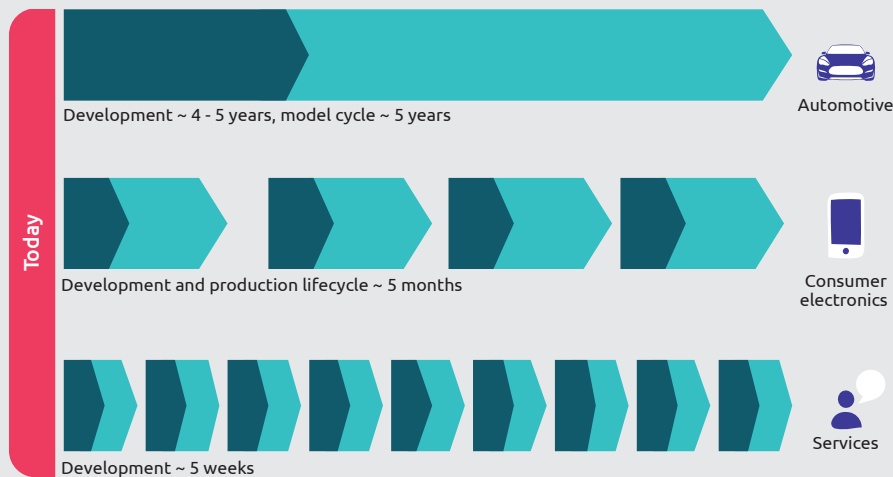
Creating a business case requires:

- **A better understanding of market requirements.** Even though OEMs are already offering connectivity to some extent, they usually have no clear strategy regarding the overall requirement in their core geographical markets – much less global ones.
- **Consideration of the B2B potential.** Most of the available services are still focused on the business-to-consumer (B2C) area, rather than on business-to business (B2B).

The net result of the current lack of a business case is that many current services are just "me too" offerings, and not aligned with real market requirements. Companies from outside the industry, such as Google or Tesla, have a different mindset around such business case development, and are bringing values from the digital economy to the automotive world.

Difficulty in extracting insights from data. Customer data is the new currency, and OEMs have a lot of it but often struggle to make use of it. (Please see our Connected Insights paper for more details of the possibilities here.[2])

Source: Capgemini research

Unsuitable processes. Developing and specifying connectivity services requires a completely new process (see diagram) from conventional development, largely because of the much shorter lifecycle involved. New processes for support and administration are also needed – a requirement that OEMs sometimes overlook.

Managing the transformation

The transformation to a coherent, fully thought-through service offering has to start now. Each OEM needs to ask itself several questions:

- Which services should we offer?
- Who sells each service?
- Who owns the customer?
- What's the business model?
- Who should we collaborate with?
- How can we differentiate ourselves?
- How can we get to where we want to go?

Having answered these questions, the OEM then has to rethink itself in three different dimensions:
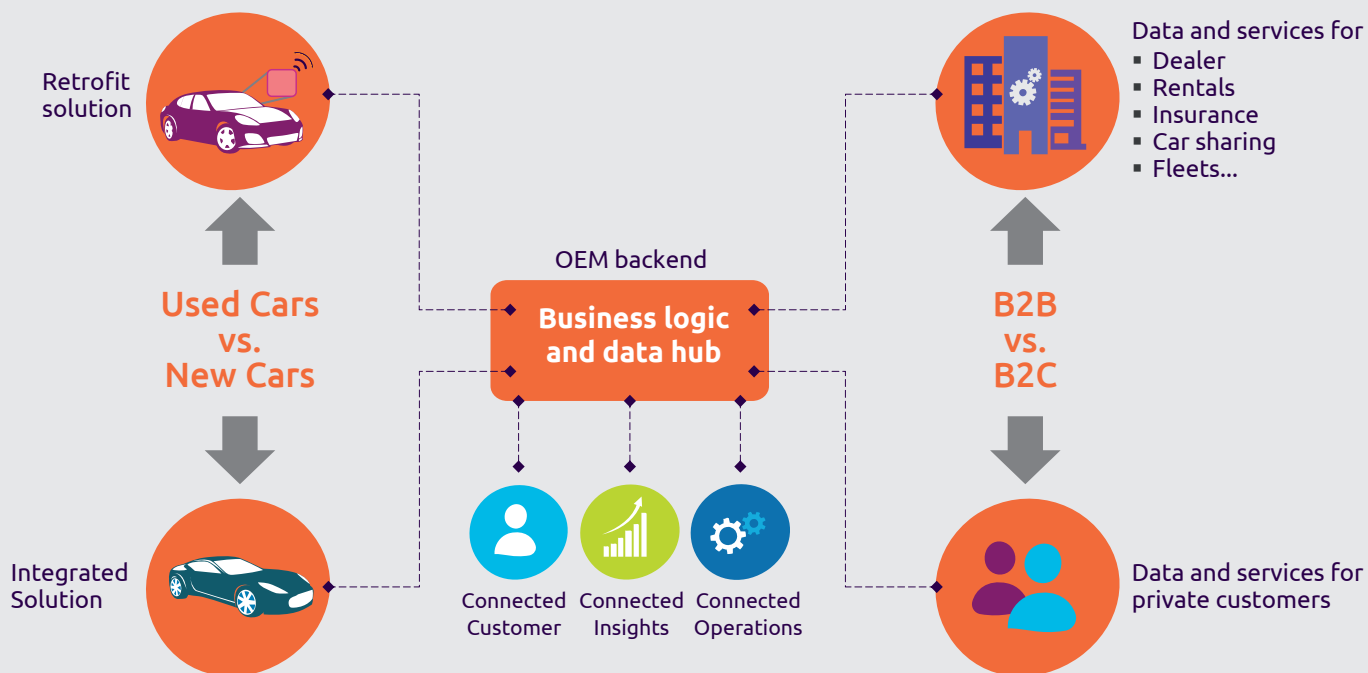
1. Creating a business model for generating value through ongoing services
2. Enabling organization-wide collaboration to facilitate the right services
3. Adopting a development approach that promotes agility

A business model for creating value through services

Experience shows that companies can tackle these challenges more effectively once they adjust their overall business model. The new business model needs to clarify how the company intends to create value for consumers through services and define the path that they will take to position themselves to do so.

This approach has to be quite different from that associated with setting up a conventional automotive service, for example a tire pressure sensor. This might involve well-defined stages like team set-up, brainstorming, design, implementation and testing. Interaction with a few other departments, suppliers and service providers normally occurs at predefined milestones within a clear product development process. This process has been developed over decades and is now well structured and well known. The lifecycle for development of connected vehicle services contrasts strongly with this conventional process. Whereas the development cycle of vehicles typically lasts four to fi ve years, the need to satisfy fast changing consumer expectations means that we now have to deal with a service development cycle of just a few weeks or months.

Figure 2: High-level model for integrating vehicles and services into the network

Retrofit
solution

Data and services for
▪ Dealer
▪ Rentals
▪ Insurance
▪ Car sharing
▪ Fleets...

OEM backend

**Used Cars
vs.
New Cars**

**Business logic
and data hub**

**B2B
vs.
B2C**

Integrated
Solution

Connected
Customer

Connected
Insights

Connected
Operations

Data and services for
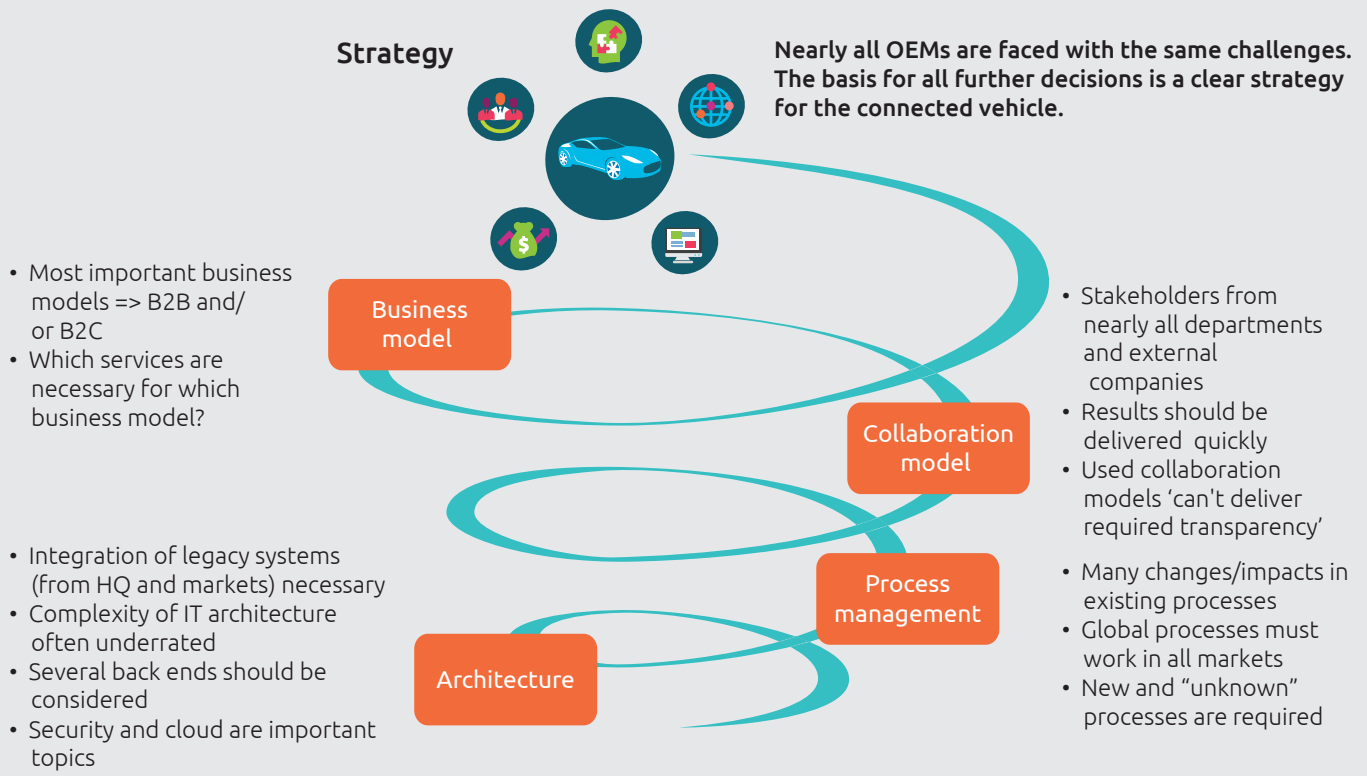private customers

Source: Capgemini

They need to shift their focus away from the moment of purchase to the time of use: the whole period when the vehicle is owned by the buyer. Making this shift successfully requires a clear and well-defi ned strategy and methodology, as illustrated on the above.

The overall strategy must include elements of the business models for used cars and those for new cars, as well as various B2B models. With B2B, other players are interested in vehicle or consumer data: for example dealers, rental companies, insurance companies, car clubs, and fl eet operators, in addition to B2C service providers. The interested parties and business models, as well as the legal and political constraints and requirements, can be different for each market.

It is therefore important to carry out a separate evaluation for each intended market. This leads to a clear roadmap for the introduction of connectivity services. The map should include:

• The individual business models
• The main services
• The functionality required
• Affected processes (new and existing)
• Technical requirements
• Related vehicles/models

Figure 3: The journey to a new business model requires a clear strategy and methodology

Strategy

Nearly all OEMs are faced with the same challenges. The basis for all further decisions is a clear strategy for the connected vehicle.

Business model

Collaboration model

Process management

Architecture

- Most important business models => B2B and/ or B2C
- Which services are necessary for which business model?

- Integration of legacy systems (from HQ and markets) necessary
- Complexity of IT architecture often underrated
- Several back ends should be considered
- Security and cloud are important topics

- Stakeholders from nearly all departments and external companies
- Results should be delivered quickly
- Used collaboration models 'can't deliver required transparency'

- Many changes/impacts in existing processes
- Global processes must work in all markets
- New and "unknown" processes are required

Source: Capgemini research

Enabling collaboration

Services can only be developed if functions within the organization collaborate by sharing data about what consumers need and then working together to make it happen. This could involve every area of the business – those responsible for legal, software development, marketing, electronic and electrical integration (e/e) development, safety and security, and so on, plus perhaps third parties such as parts or software manufacturers.

A development approach that promotes agility

The short lifecycle required for services calls for a new development approach that enables agility. However, this is about more than just agile software development – and the software development approach we would recommend is not exactly agile as usually understood.

Once again, the key is collaboration with transparency. Existing processes have to be tailored and connected together, in order to align all areas of the company with the shortened development cycle and new ways of working. Dedicated processes are also needed to manage connected vehicle activities. The stakeholders affected must be involved from the beginning in identifying requirements and anticipating their impact on processes.

Dealing with the challenges set by the connected vehicle architecture requires expertise spanning several different technology realms. To give an idea of the

range of disciplines that potentially need to be involved, consider that connected vehicle services categories include convenience, infotainment, safety and security, maintenance and fleets.

The architectural domains span several distinct technology realms: vehicle, connectivity, backend functionality, and integration of legacy systems and external partners. All of these potentially need to be represented in the development team. Particularly if worldwide coverage is required, it's necessary to deal with many different connectivity solutions e.g. – 2G, 3G and 4G plus various mobile network operators, service providers, markets and regulatory issues.

We recommend a collaborative approach that begins with cross-functional workshops to identify:

- Services required, relating them to the overall business model
- Deliverables needed to get each service running, and to ensure the service can scale to meet future needs
- Responsibilities for each deliverable, depending on the deliverable type
- Activities required to complete the deliverable

Although it looks similar to regular programs, this approach is fundamentally different in that it involves the whole company.

Usually a company would consider reorganization, but that doesn't solve all the problems.

For example, it's important that the legal department is involved in order to evaluate the judicial and regulatory implications of a service in a particular country. This enables services to be assigned to markets in a way that takes account of local conditions.

The approach generates an up-todate, prioritized service portfolio that focuses subsequent development on company strategy and market demands. It also enables departments that may previously have had difficulty working together to collaborate in a common process, creating a rounded view of the market that benefits all stakeholders.

A sustainable approach to connectivity

Our recommended approach has been demonstrated to bring major benefits:

- A mature understanding of services and a mature project planning process early in the development lifecycle
- Reduced throughput times and budgets
- Customer- and business-focused objectives
- Efficient risk management based on increased transparency

Reshaping the company to be agile enough to deliver connected vehicle services is certainly not a trivial undertaking, and the challenges continue into the future. Leveraging connectivity in the vehicle fundamentally changes the nature of the product and the interaction with the customer. Keeping the connected vehicle up to date requires a continuous joint effort on the part of business and IT going beyond the conventional vehicle development cycle to the end of the model lifecycle: potentially up to 50 years into the future.

Capgemini has extensive experience of applying these approaches with leading automotive companies, and understands the need to ensure that they are sustainable in the long term.

About Capgemini

A global leader in consulting, technology services and digital transformation, Capgemini is at the forefront of innovation to address the entire breadth of clients' opportunities in the evolving world of cloud, digital and platforms. Building on its strong 50-year heritage and deep industry-specific expertise, Capgemini enables organizations to realize their business ambitions through an array of services from strategy to operations. Capgemini is driven by the conviction that the business value of technology comes from and through people. It is a multicultural company of 200,000 team members in over 40 countries. The Group reported 2017 global revenues of EUR 12.8 billion.

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