Connected car
App based dongle solution as shortcut to connectivity

Study – Extract
Management summary

> **The connected car** is currently one of the **hot topics** in the automotive industry – Increased data transfer capabilities open up limitless potential for **new products and services**

> However, while OEMs are developing their highly sophisticated **proprietary connectivity packages**, other players are coming in with **retrofit solutions** and continuing to capture the **customer interface**

> **Network effects** create irreversible **lock-in** of users in connectivity services but OEM solutions are only slowly penetrating the **car parc**

> **App based dongle solutions** offer the best preconditions to quickly **establish a connectivity ecosystem** with **daily relevance** for its users based on **smartphone integration** and coverage of relevant **use cases**

> **OEMs** should accept a **dongle based offer as a shortcut** to achieving their connectivity ecosystem – Benefit from multibrand mindset and cooperation, rapid car parc penetration and relevant customer base

> **Non-OEM** players should foster a **shared technical platform as an open industry standard** based on cross-industry cooperation to establish applicable use cases and become relevant for their users

Source: Roland Berger
Connected car is currently one of the hot topics in the automotive industry – Data transfer opened limitless potential for new products

The evolution of the automotive ecosystem

**Today's world**

- Fully connected vehicles
- (Electric) autonomous driving
- New/shared mobility
- Digital sales channel and multi-channel sales
- New stationary formats

**New world** (with combined trends)

- Digitized competition
- Needs to be prepared for in any business model adaptation <2020

**Audi strategy 2025**

- All new cars to be online in the future with Audi connect as standard equipment
- Digital business models expected to account for half of turnover in 2020
- 1/3 of the R&D budget is planned for the development of software and digital services

Source: Audi; Press research; Roland Berger
Current OEM connectivity applications are subject to certain limitations, which results in slow market penetration.

Limitations of current OEM connectivity solutions

1. Slow penetration of car parc due to premium focus of built-in solutions
   - Premium OEMs have the broadest connected car service portfolio – Volume OEMs are following behind with more cost-efficient and less sophisticated solutions
   - Slow and limited penetration of car parc with built-in solutions possible

2. Current proprietary solutions do not meet all customer needs
   - Proprietary OEM connected car solutions struggle to meet all customer requirements – Often market push instead of market pull
   - This might also be due to the fact that the necessary awareness and know-how on the OEM side is not yet fully developed

3. High R&D and IT costs increase end customer prices
   - OEMs are required to make significant investments in R&D, IT and new business models in order to offer connected car solutions
   - These costs need to be passed on to the customer in the form of high initial prices for hardware and services

Source: Roland Berger
Due to OEMs limitations alternative solutions have already been developed – Dongle technology as attractive shortcut

Overview of connectivity solutions

<table>
<thead>
<tr>
<th>Cost</th>
<th>Business focus</th>
<th>Level of integration</th>
<th>Function-&lt;br&gt;alities</th>
<th>User examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5 EUR</td>
<td>B2C</td>
<td>No integration</td>
<td>GPS tracking, Micro-billing</td>
<td>evopark, Axa, HUK-COBURG</td>
</tr>
<tr>
<td>&lt;30 EUR</td>
<td>B2C</td>
<td>Plug-in</td>
<td>GPS tracking, Micro-billing, Speed control, Accident recognition, Braking behavior</td>
<td>TankTaler, HUK-COBURG, evopark</td>
</tr>
<tr>
<td>10-150 EUR</td>
<td>B2C and B2B</td>
<td>Fixed installed</td>
<td>GPS tracking, Micro-billing, Speed control, Accident recognition, Braking behavior, Diagnosis/vehicle data</td>
<td>TankTaler, HUK-COBURG, evopark</td>
</tr>
<tr>
<td>&gt;70 EUR</td>
<td>B2C and B2B</td>
<td>Fully integrated</td>
<td>GPS tracking, Micro-billing, Speed control, Accident recognition, Braking behavior, Diagnosis/vehicle data</td>
<td>TankTaler, HUK-COBURG, evopark</td>
</tr>
<tr>
<td>&gt;2,000-3,000 EUR</td>
<td>B2C and B2B</td>
<td>Fully integrated (with delivery)</td>
<td>GPS tracking, Micro-billing, Speed control, Accident recognition, Braking behavior, Diagnosis/vehicle data, Entertainment, Individual services</td>
<td>TankTaler, HUK-COBURG, evopark</td>
</tr>
</tbody>
</table>
OBD dongles have strong potential to disrupt the current OEM-centric connectivity ecosystem in the automotive industry

Reasons why dongle solutions will be successful

**App based dongle solutions …**

1. … are **technically feasible** and data are available for different players **supported by current legislation**

2. … can be used with the **entire available car parc** registered since 1996 and for new car sales as long as the port is not yet blocked

3. … are **independent from the car itself** (hardware and software requirements, brand, etc.) and **cheap compared to OEM solutions**

4. … **connect the car with mobile phones** and thus turn the most important tool in daily life into a **perfect co-driver**

5. … **enable all relevant use cases** from the customer perspective and leverage customer benefits for both B2C and B2B

Source: Roland Berger
From a B2C and B2B customer perspective, all relevant use cases can be implemented with app based dongle solutions

Selected use case scenarios

Source: Roland Berger
Different players, also from outside the automotive industry, have already seen the potential of connectivity solutions based on OBD.

First players with dongle solutions and related services

- Retrofit car parc and dongle solution for cheaper models
- Remote diagnostics and repair services
- Mainly app-based business models with bundling of services
- Dongle production and leverage usage through services and partnerships
- Rental companies track the status of their vehicle parc including turnaround management optimization, journey logs, and tracking services
- Usage-based insurance services
- Leverage network competencies especially in providing WiFi within the vehicle

1) AdmiralDirekt uses Bluetooth adapter via cigarette lighter and does not use OBD based vehicle information

Source: Company information; Roland Berger
Retrofit solutions such as dongle are required to equip substantial shares of the car parc with connectivity solutions

Penetration of built-in/retrofit connectivity solutions in car parc [%]

> (Cheap) retrofit solutions such as dongles are required to win substantial shares of the car parc in the short term

> Strong growth expected to drive equipped volumes to ~90 m units by 2020 after introduction of mass market solutions in 2016/2017 – By comparison, built-in solutions exhibit slower penetration and only ~70 m units covered

> With both technologies combined, almost 50% of the European car parc is equipped with a connectivity interface providing a comprehensive user base for service offerings and network effects

Source: Company information; IHS; GSMA; Roland Berger
To successfully participate in the connected car and build up your own ecosystem you should apply a structured approach

The structured approach

First mover
Try to block the OBD port as soon as possible

Service offering
Create relevance for daily life of user (breadth & depth of offering)

Terms and conditions
Determine suitable conditions (e.g. pricing, incentives, subscriptions, etc.)

Network effect
Amplify growth of your customer base by leveraging community features, word of mouth, data sharing …

Lock-in
Reach critical mass in order to establish your own connected car ecosystem

Indicative – # of customers

Source: Roland Berger
OEMs should accept dongle solutions as a possible shortcut to a proprietary solution before other players achieve lock-in

5 steps for OEMs

1. Think multibrand and cooperate with 3rd parties to increase user base and customer benefits

2. Bring your own app based dongle solution quickly on the market with basic services to block the OBD port in new car sales

3. Penetrate existing car parc with your dongle solutions via your own repair shop network

4. Leverage existing access to all vehicle data to identify additional services for the customer

5. Benefit from your new offering – e.g. by additional service revenues and sharing of development costs for connected car services across a larger customer base

Use the dongle technology as a shortcut to establish a holistic connectivity ecosystem in terms of services and customer base

Source: Roland Berger
Other players should focus on cooperation to foster a shared technical platform as an open industry standard.

5 steps for non-OEMs

1. Agree on cooperation with other players to create relevant services based on dongle

2. Foster the development of a shared technical solution as an open platform

3. Find a way to get your app based dongle solution into the existing car parc as quickly as possible

4. Get access to the right data points and develop a whole ecosystem

5. Start monetizing your solutions – Which does not have to be driven by selling the device or charging for the service directly

Source: Roland Berger

Become the daily companion of end users and create a sustainable lock-in effect
Overall, it will be key to take actions and acquire a critical mass of users to win the race for the connected car.

Lock-in effect of connectivity solutions – Outline

# of customers [Germany]

There is only one OBD port per vehicle – so the first to reach a critical mass will win the race for the connected car customers (lock-in)

War gaming

> One of the players (especially non-automotive) with a huge customer base like Google Android (>40 m users) hands out free OBD dongles + app

> With services offered based on crowd interaction, additional benefits arise for customers (network effect) – Google could achieve a lock-in effect

Source: Company information; Roland Berger
Please contact us for further information

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Source: Roland Berger