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CONSUMER INTEREST SURVEY

Analysis of the survey and its findings.

HEALTH & WELLBEING TECHNOLOGIES

Describes the main health and wellbeing technologies; the different types of system available and their maturity in the automotive industry.

KEY PLAYER PROFILES

DEPLOYMENT TIMELINE

RELATED SBD REPORTS

CON #624 Automotive Virtual Personal Assistants

SBD Automotive's Virtual Personal Assistants Report provides insight on today's automotive VPA market and how it is likely to shift over the next five years, based on expert industry knowledge and consumer views across three continents.

A technology analysis of the offerings from leading VPA suppliers to global automotive markets underpins the detailed review of key automotive VPA features.



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GEN #207

12:11 Health and Wellbeing in Automotive

Technologies, Market Landscape and Consumer Survey

Following the outbreak of COVID-19, health and wellbeing have become a priority for consumers and OEMs alike. With consumer concerns surrounding health and wellbeing potentially affecting buying habits, OEMs must ready their vehicle line-ups for a post pandemic market.

Consumers increasingly expect carmakers to implement health and wellbeing technologies and adapt to a changing landscape. COVID-19 has accelerated interest in protective features in the vehicle, while wellbeing improvement is moving beyond the luxury brands.

This report provides insight into the market landscape for automotive health and wellbeing technologies, and assesses the consumer interest in these technologies.

COVERAGE



NA



CHINA



EUROPE



GLOBAL

FREQUENCY



ANNUALLY



QUARTERLY



ONE TIME

PUBLICATION FORMAT



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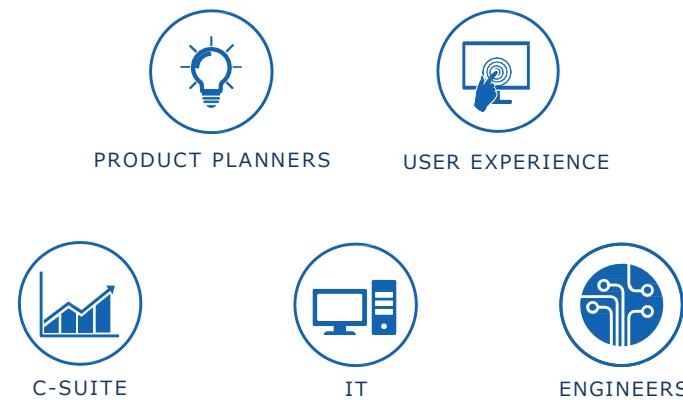


300+

Key features and benefits

- > Understand consumer preferences, willingness to pay or use health and wellbeing features and services across 5 major automotive markets (CN, DE, FR, UK, US).
- > Assesses which OEMs and suppliers are active across dozens of health and wellbeing technologies, product portfolios, and forward-looking use cases.
- > Review the current state of the market with profiles from over 50 companies, including OEMs, suppliers and other players.
- > Presents deployment timelines for the different health and wellbeing technologies.
- > Describes the main health and wellbeing technologies; the different types of system available and their maturity in the automotive industry.

This research is useful for

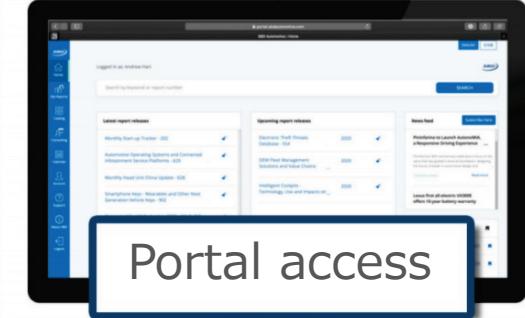


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Weather
22°C ☁

Driver



12:11

Meditation

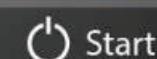


Breathing
Exercise



My Health

NIBP - SYS/DIA (MAP)
126/76
(63)



Start

Pulse
77

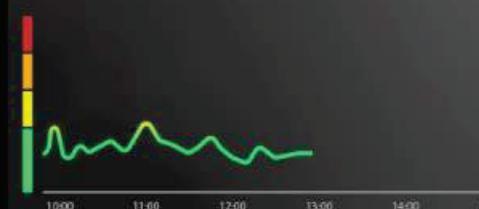
Resp
18

BP
80

Temp
36,6



Air Quality **GOOD**



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March 2021

HEALTH AND WELLBEING IN AUTOMOTIVE
Technologies, market landscape and consumer interest

GEN207-21



Introduction

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Aim of this report

The aim of this report is to provide the reader with insight on today's automotive health and wellbeing market and how it is likely to shift over the next five years, based on expert industry knowledge and consumer views across three continents. The main objectives of this report are:

1. Analyse

Review the current state of the market with profiles from over 50 companies, including OEMs, suppliers and other players.

2. Who

Assess which OEMs and suppliers are active across dozens of health and wellbeing technologies, product portfolios, and forward-looking use cases.

3. What

Describe the main health and wellbeing technologies; the different types of system available and their maturity in the automotive industry

4. Why

Understand consumer preferences, willingness to pay or use health and wellbeing features and services across 5 major automotive markets (CN, DE, FR, UK, US).

5. When

Present deployment timelines for the different health and wellbeing technologies

Health & Wellbeing technologies covered by this report

| | Measure and influence health and fitness | Measure and influence comfort and emotion |
|---------------|--|--|
| Individual | <p>Health</p> <ul style="list-style-type: none"> • Heart rate • Blood pressure • Skin conductance • Brain waves • Body temperature • Breath analyser • Blood alcohol level | <p>Wellbeing</p> <ul style="list-style-type: none"> • Breathing pattern • Facial expression • Voice volume |
| Environmental | <ul style="list-style-type: none"> • Air purifier/filter • UV lighting • CO2 detection • Anti-bacterial coating • Disinfectant solution • Heating for disinfection | <ul style="list-style-type: none"> • Ambient lighting • Fragrance diffuser • Sound-proofing • Advanced audio • Muscle therapy |

Measure the driver

Alter the environment

Example slides from the report



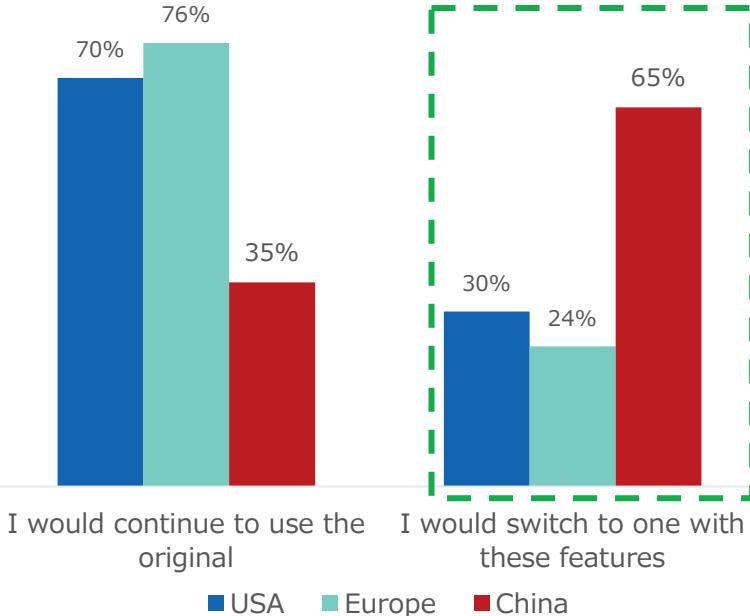
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Shared mobility to benefit from H&W introduction

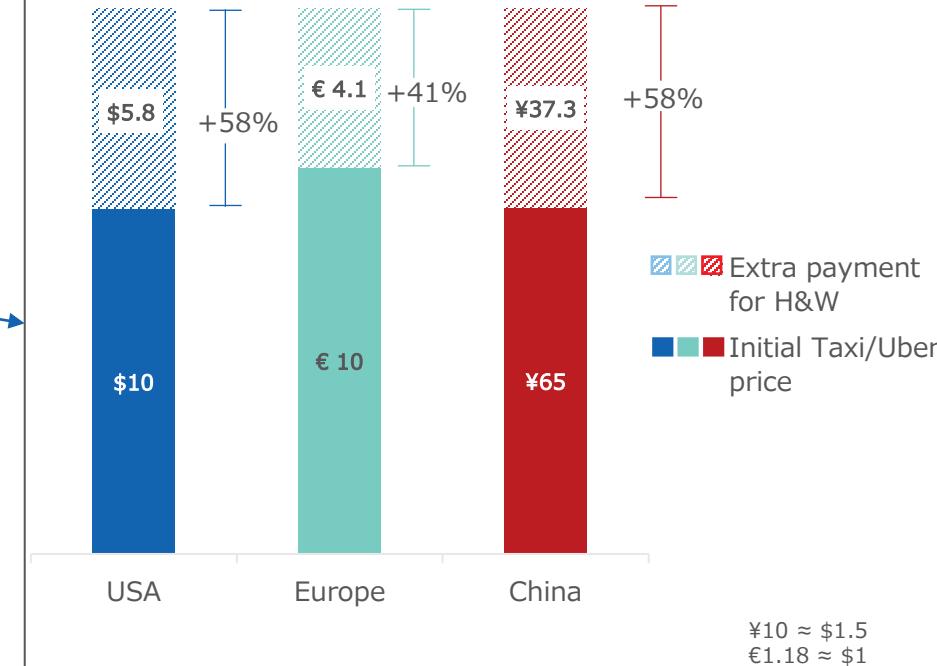
In 2020, revenue and consumer confidence around shared mobility services decreased considerably. Health and wellbeing features will help with both.

On average, **40% of consumers would switch** for a **shared vehicle with H&W integration**. These consumers are **willing to pay an extra 50%** if their ride includes H&W features.

Health and Wellbeing Impact use of Public Transport



Average expectation to pay extra for Taxi/Uber with H&W



Companies need to analyse if the revenue increase due to H&W features compensate the costs incurred to implement H&W features in shared vehicles

Survey Scope

Survey size

- Approximately 3,000 respondents
- 1,000 US consumers
- 1,000 European consumers (x330 UK, x330 Germany, x330 France)
- 1,000 Chinese consumers

Respondent Requirements

- Must live in the USA, UK, Germany, France or China
- 50% respondents intend to buy a car in the near future
- 50% respondents have bought a car within 3 years prior to the COVID-19 pandemic (pre-2020)

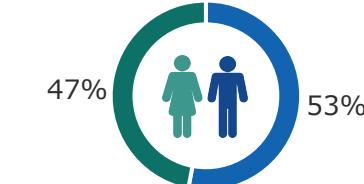
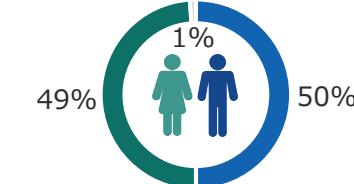
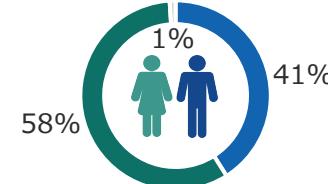
H&W Features covered

- 10 of the most relevant features in the market: Air purifier, ambient lighting, anti-bacterial coating, breathing pattern, breath analyser, body temperature, fragrance diffuser, heart rate monitor, heating for disinfection and UV lighting

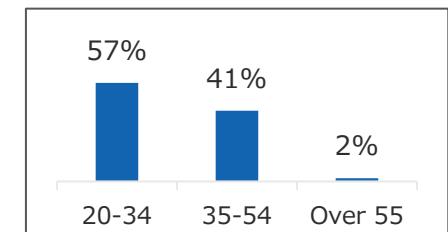
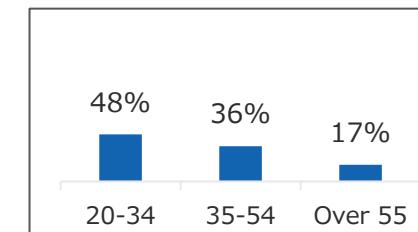
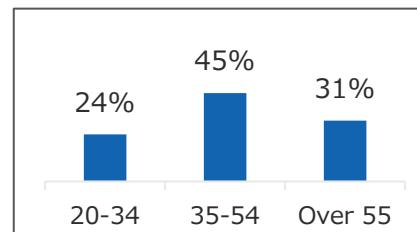
Demographics – Market comparison



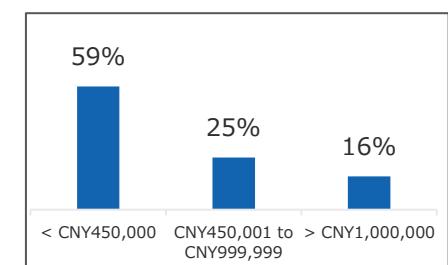
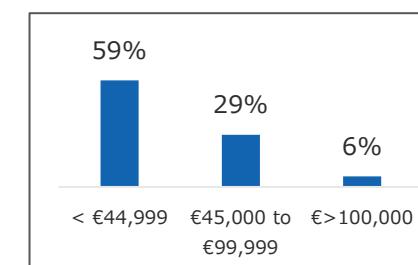
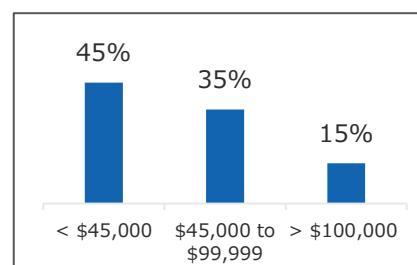
Gender



Age



Household pre-tax income*



Not shown: respondents who chose to not answer the income question.

Body Temperature



The widespread introduction of driver monitoring systems (DMS) will accelerate body temperature measurement in the vehicle. Body temperature data is relatively simple to gather using infrared cameras, widely used on DMS. Monitoring body temperature might help the HVAC system to better adjust its settings accordingly.

- Body temperature measurement can be done using an infrared camera sensor or a normal thermometer system. However, the possibility of remote sensing using cameras incurs in lower cost and more versatility.
- Users are likely to be more open about this measurement as it is not intrusive by nature.
- Cabin temperature can be better adjusted if information of body temperature is known.

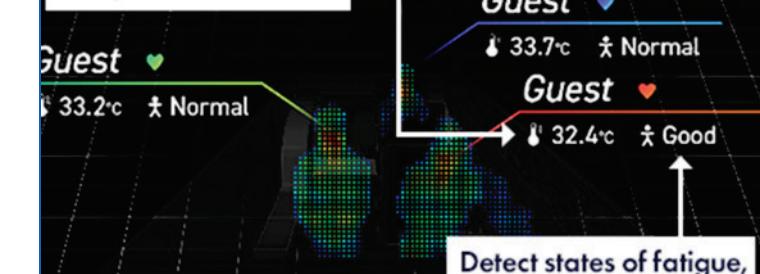
New Cabin Features for “Connected”

Biometric sensing
Example:
pulse/body
temperature
distribution,
stress/fatigue
level



Example of biometric sensing in concept. Source: [DENSO](#)

Sensing of each occupant’s body surface temperature using thermal sensors



EMIRAI S features. Source: [Mitsubishi Electric](#)

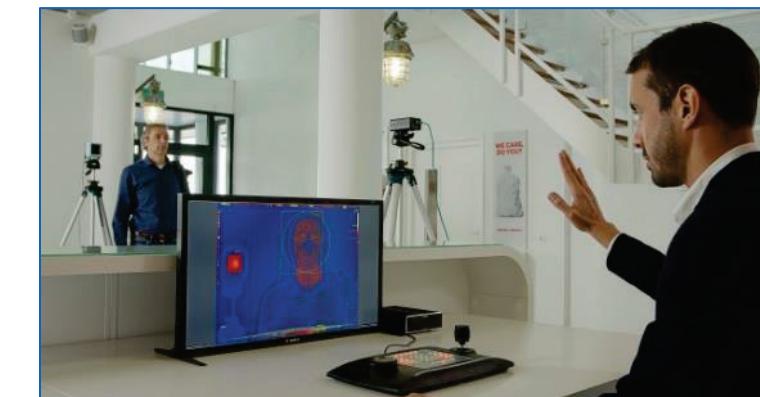
Use cases:

- Measure occupants temperature to adjust HVAC systems
- Assess occupants condition

Development stage:



Timeline to wide adoption:



Body temperature measurement system. Source: [Bosch](#)

Voice Volume



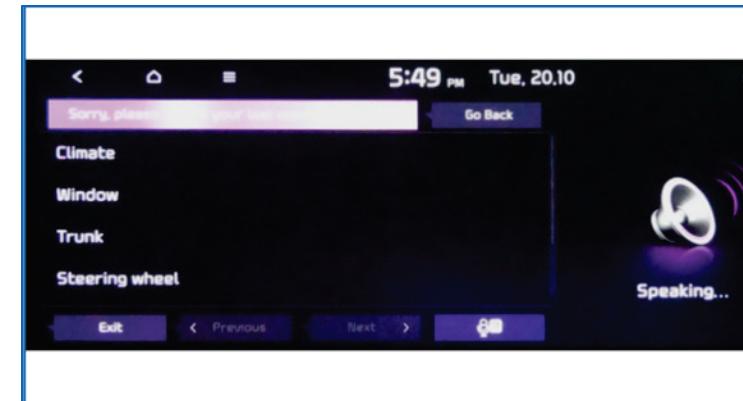
Voice recognition systems for hands free commands have been widely adopted in the automotive industry and are available on a large proportion of new cars. Furthermore, a majority of OEMs have contextual speech in or planned for their VPAs.

Hence, it is expected that voice volume will become one of the characteristics that VPA systems analyse in the next 3 years.

- Speech recognition systems, work by analysing dozens of acoustic characteristics every few milliseconds and compare them against large statistical models to determine what has been said.
- Virtual Personal Assistants (VPA) could register changes in the volume to better understand the emotional state of the occupants.
- For additional information on the on today's automotive VPA market and how it is likely to shift over the next five years, please check SBD's [Automotive Virtual Personal Assistants CON624-21](#).

Use cases:

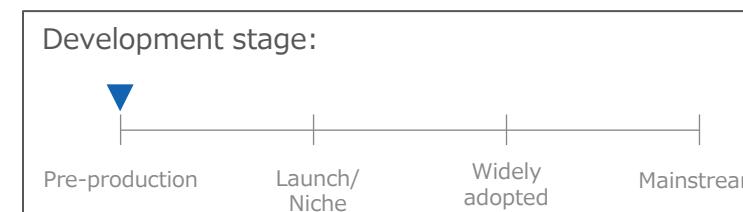
- Mood detection
- Positional detection
- Future use cases: Proactive suggestions



Vehicle control integration using voice



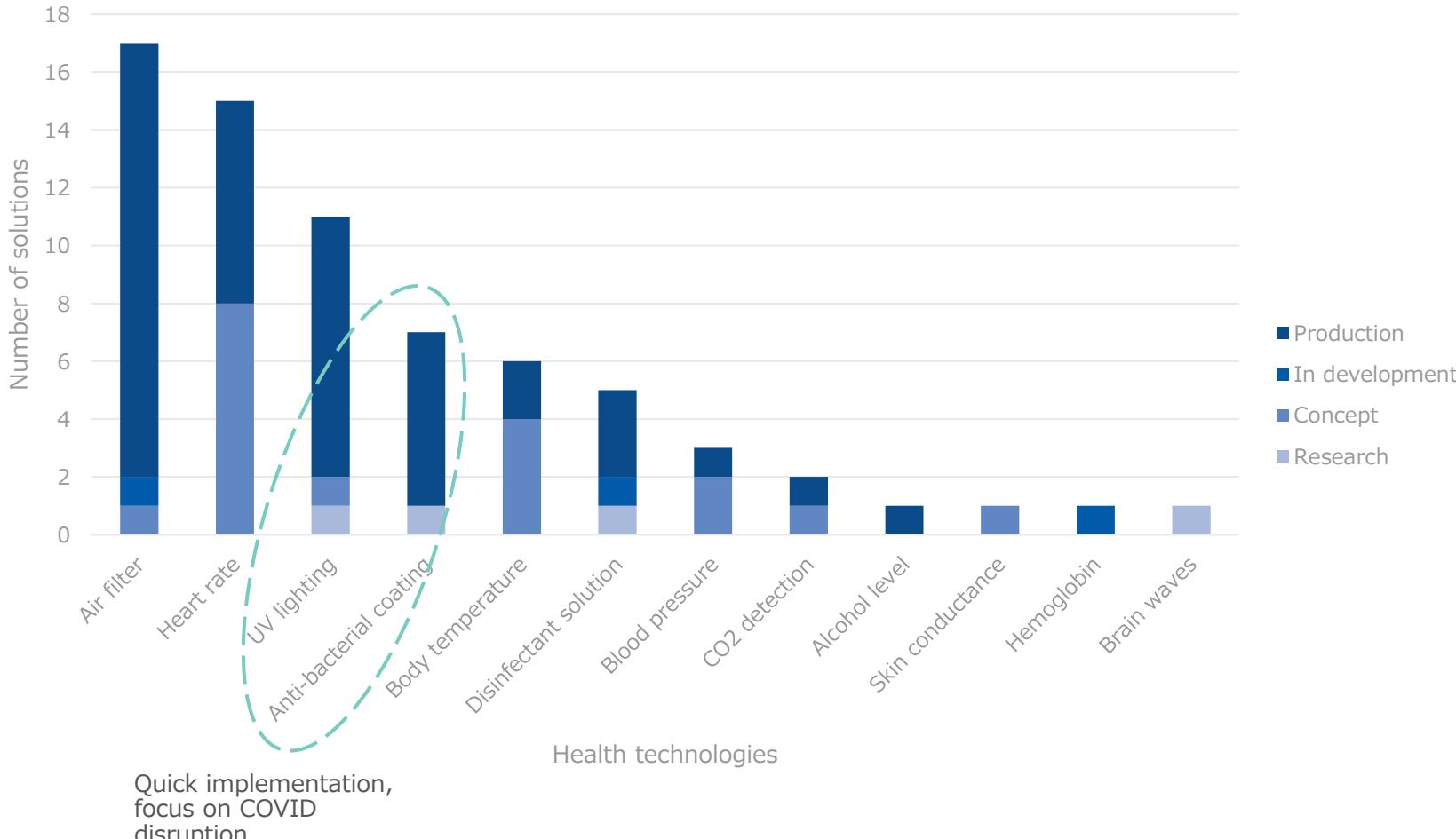
VPA system in vehicle HMI



VPA system in vehicle HMI

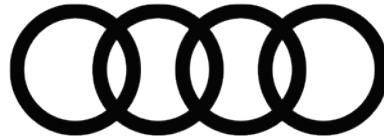
Suppliers quickly provided health tech to combat COVID-19

Health technology - Supplier implementations



- Suppliers were quick to react to COVID-19 producing systems focused on sanitising the vehicle.
- Suppliers are providing a sound foundation for OEMs to introduce health technology in the next 1-3 years.**
- Given the prevalence of wearables and driver monitoring systems, heart rate is the main biometric measurement offered by suppliers.

| | | | | | | | | | | | | | | | |
|---------|-------|------|------|----------|---------|-------------------|---------|---------|---------------|---------|-----------------|---------|-------|--------|------------|
| Premium | Acura | Audi | BMW | Cadillac | Genesis | Jaguar Land Rover | Lexus | Lincoln | Mercedes-Benz | Porsche | Roewe | Tesla | Volvo | Xpeng | |
| Volume | BYD | Fiat | Ford | GAC | Geely | Honda | Hyundai | Kia | Mitsubishi | Nissan | Peugeot Citroen | Renault | Skoda | Toyota | Volkswagen |



Audi would need to rely on a partnership with third-party wearable companies, e.g., Fitbit or Apple, to integrate wearable technology. A proprietary wearable system from Audi might have a low take-up rate within consumers.

Audi could use some of its current in-vehicle sensors to complement data received from wearable device.

| | Health-related technologies | Research | Concept | In Development | Production |
|-----------------------|-----------------------------|----------|---------|----------------|------------|
| Measuring Human | Heart rate | ✓ | x | x | x |
| | Blood pressure | x | x | x | x |
| | Skin conductance | x | x | x | x |
| | Brain waves | x | x | x | x |
| | Body temperature | ✓ | x | x | x |
| | Breath analyser | x | x | x | x |
| | Blood alcohol level | x | x | x | x |
| | Air purifier | x | x | x | ✓ |
| | UV lighting | x | x | x | x |
| | CO2 detection | x | x | x | x |
| Altering surroundings | Anti-bacterial coating | x | x | x | x |
| | Disinfectant solution | x | x | x | x |
| | Heating for disinfection | x | x | x | x |

- Audi is working to develop Audi Fit Driver, a system that integrates wearable technology such as smart watches with the car's own sensors.
- For heart rate and body temperature the systems uses data from wearable systems, not from sensors in the vehicle. Based on sensor data the vehicle systems respond to ease the driver.
- Audi is a founding partner of Flying Health Incubator, focused on helping start-up develop digital innovations in the healthcare industry.
- Audi's air purifying system uses three filters. The outer layer uses polyphenols to filter allergens, such as pollen; the second layer is microfiber; the final layer uses activated carbon.



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