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Although the opportunities to benefit from connectivity are rising, so are the risks associated with implementing the wrong strategy or falling behind competitors.

It's therefore important to ensure that you always have the latest, most comprehensive, and most accurate information at hand. These reports are the reference guide to OEM connected car services offerings.

CON

Connected Car

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Digital Cockpit & Infotainment Guide

Today, OEMs around the world are equipping their vehicles with more ADAS and autonomous functions in addition to more intelligent infotainment solutions. While these innovations work to enhance the overall user experience, they are often featured in the cockpit - which is now being referred to as a third living space by some OEMs, with more activities being integrated into the vehicle.

Through the rate at which these technologies are being developed and released, it is clear that the cockpit ecosystem is evolving rapidly. Likewise, it is evolving in a number of ways - with each OEM offering a unique combination of features and systems, some of which are brand-exclusive. With this offering varying further between trim levels and regions, it can quickly become difficult to understand the scope of cockpit offerings globally.

This report provides a comprehensive deep dive into the cockpit ecosystem while highlighting the solutions and configurations offered by premium and volume OEMs across multiple regions. With more than 100,000 data points per release, it details the availability, fitment, and pricing of cockpit systems and highlights key industry partnerships. The Cockpit Guide is updated bi-annually for China, Europe, and the U.S. to account for new developments and product releases globally.

COVERAGE: GLOBAL, NA, CHINA, EUROPE

FREQUENCY: ANNUALLY, BI-ANNUAL, QUARTERLY

PUBLICATION FORMAT: PDF, POWERPOINT, EXCEL, ONLINE

Sheets: 95+

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Key questions answered

- Which OEMs have the most advanced cockpit offering?
- How are cockpit features priced and packaged?
- How consolidated are cockpit platforms across OEM line-ups?
- How are OEMs varying their cockpit strategies by region?

This research supports

- PRODUCT PLANNERS
- C-SUITE
- MARKETING
- ENGINEERS

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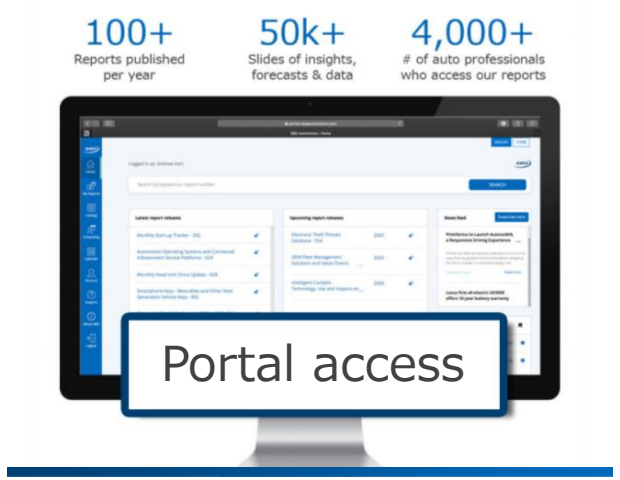

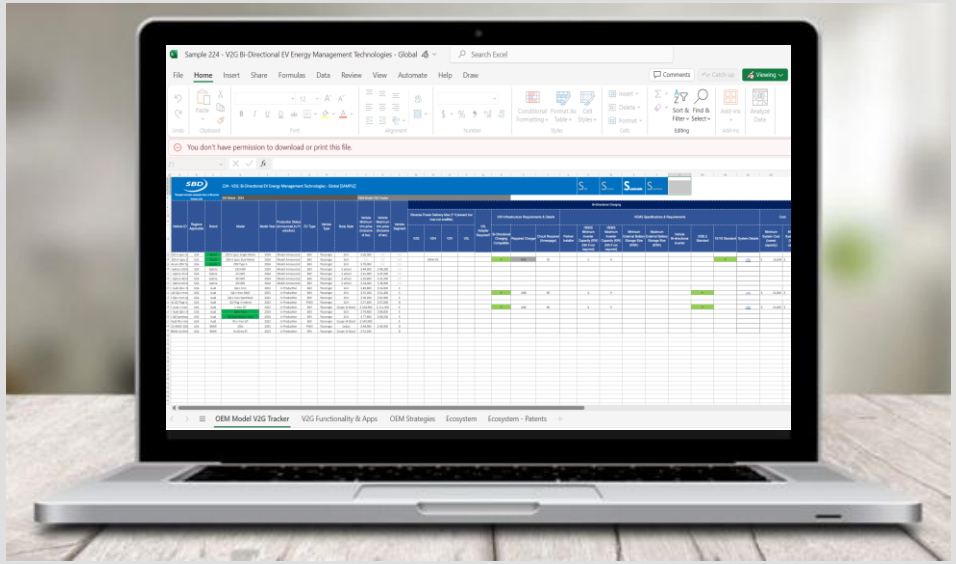

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Digital Cockpit & Infotainment Guide

Comprehensive deep dive into the cockpit ecosystem highlighting the solutions and configurati d volume OEMs

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Digital Cockpit & Infotainment Guide

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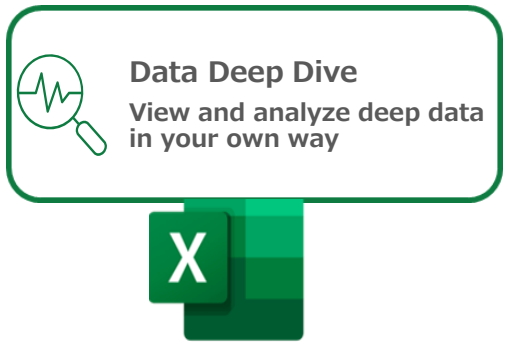

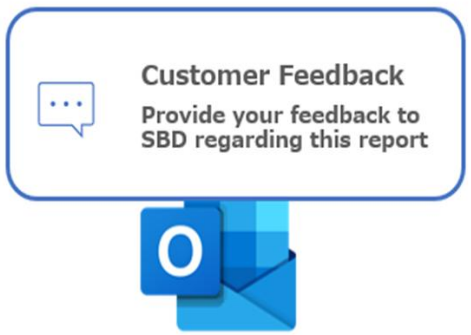

Total number of pages - 97

Introduction

Integrated cockpits and AR-HUDs remain niche offerings

Automakers worldwide are equipping their vehicles with more ADAS and autonomous functions and more intelligent infotainment solutions. While these innovations enhance the overall user experience, they are often featured in the cockpit—now referred to by the industry as a third living space, with more activities being integrated into the vehicle.

While the digital cockpit ecosystem is changing rapidly, every brand has a unique strategy that further varies between trim levels and regions.

SBD's **616 - Digital Cockpit and Infotainment Guide** provides data-driven insights into the various cockpit offerings by OEMs. The report looks at **FIVE OEM Business Outcomes:**

The guide identifies key trends in the digital cockpit and infotainment space with a special emphasis on various cockpit elements like HMI, in-car OS, display trends, smartphone integration and much more.

Layer	Section	Conclusion
STRATEGY & IMPACT	Executive Summary	There is no clear dominant digital cockpit strategy. Some brands are going after 'bigger the better' dashboards while some are keeping it simple with a de-cluttered cockpit design.
LEARNING & ACTION	The Basics	Defines the terminologies and provides a quick overview of the digital cockpit/infotainment landscape
	What's New?	Includes the key announcements in the digital cockpit space and highlights of new models announced
	Analysis	Data-driven trends related to in-car OS, displays, smartphone integration, fitment and pricing strategy, and much more
CORE INSIGHTS	Summary Tables	Identifies the most advanced cockpit combination (central display, instrument cluster and head-up display) and the features associated with them
DATA DEEP DIVE IN EXCEL	Deep Dive Markets Announcements Rankings Definitions	View and analyze deep data in your own way
CONTEXT	Birds Eye View	An overview of the tangential trends to this topic, as identified in SBD's neighboring products
	Future Outlook	Consumers associate some sticky experience with certain brands; hence, continuously monitoring the evolving trends is crucial to adjust offerings and overall strategy
	Next Steps	There are objective boundary conditions to cockpit design that must be considered, for e.g., optimal screen size

Example slides from the report

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Modernizing the digital cockpits has various approaches to it

Volvo EX90 screens present relevant (speed and charge levels) and contextual information (navigation, media controls) in a simplified way

The ‘minimalistic’ approach of a decluttered dashboard

> The idea is to not overwhelm the driver with too much stimuli, instead offering a calm view which strips away everything apart from the most vital information for extra focus

Thomas Stovicek, Head of UX at Volvo

No cockpit strategy is superior or inferior to the other, but all paths lead to the same destination

Digital Cockpit OEM Business Outcomes

Lincoln Nautilus gets a pillar-to-pillar integrated display paired with a central screen. The widgets are customization and can be hidden to display only vital information

The ‘bigger the better’ approach of a full-width dashboard

> In a traditional setup, you’ll have a screen in front of you and it’s intrusive. But we wanted it to be almost immersive, with it wrapping around you, but it’s kind of very far away from you. But it’s all in your zone; and you can still see outside but have all your information and all the content you need in your eyesight

Kemal Curic, Design Director, Lincoln

New vehicles are reimagining the in-car experience

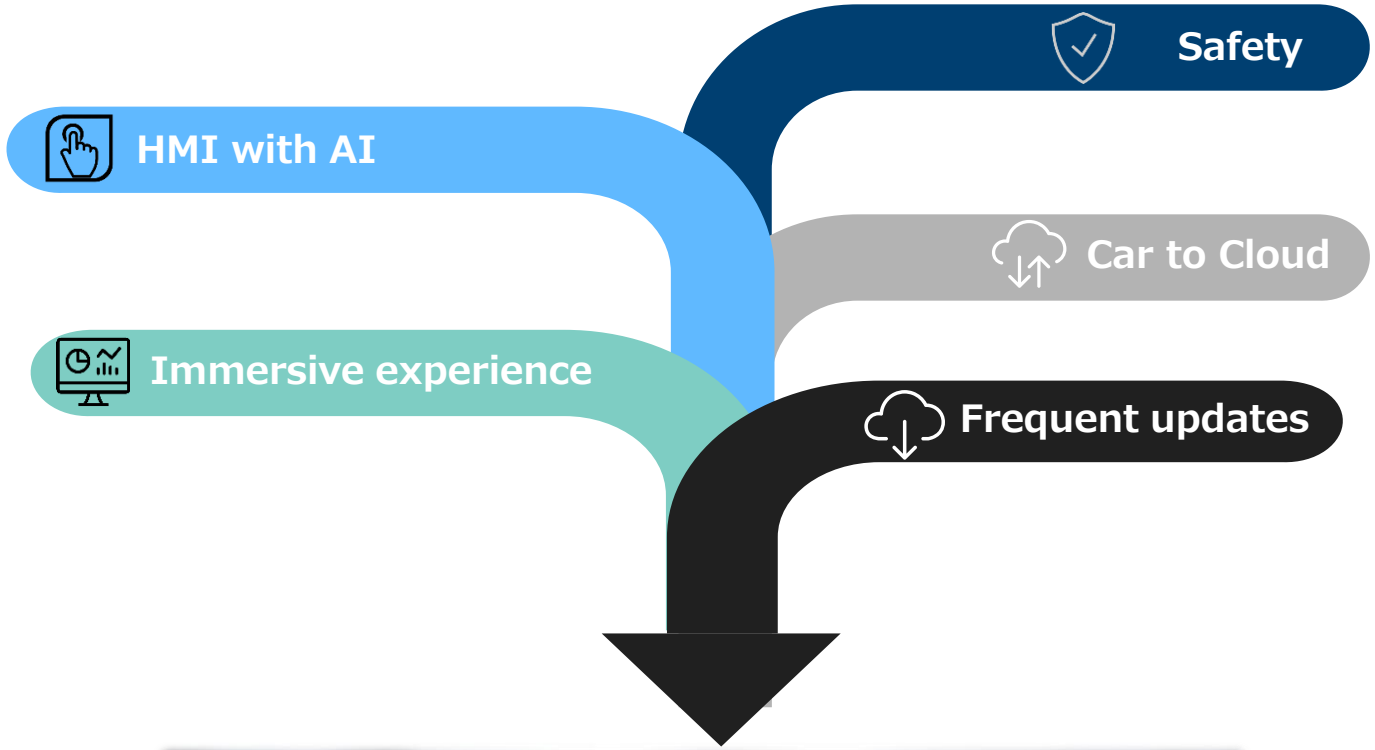
Safety
- *Top priority is driver assistance and safety*
- *Visual and audible alerts in a minimal distracting way*

HMI with AI
- *Personalized and intelligent cockpit*
- *Learns driver*

Car to Cloud
- *Connected services*
- *Vehicle data insights*
- *Car to home, home to car*

Immersive experience
- *Integrated IC and IVI*
- *Gaming rendering engine*

Frequent updates
- *OTA update enables more & more frequent updates*
- *On-demand features*



The size of in-car screens has increased over time

For a few decades through most of the 1980s, 1990s and into the 2000s, most cars had only a single screen. The classic **DIN radio** would inform you what frequency you were tuned into, via the same sort of seven-segment display

BMW went ambitious with an attempt to (re)invent infotainment. iDrive arrived on the 2002-model year 7 Series. The 8.8-inch screen replaced all of BMW's usual entertainment switchgear with one single operator-controlled knob.

For the Model 3, the screen shrunk to just 15.4 inches and rotated through 90 degrees. But it was more powerful than the previous Model S and even started displaying your current speed. The instrument screen was discontinued

The Mustang Mach-E's interior features a vertically mounted 15.5" central infotainment display with a built-in soundbar. Ford fitted a small but useful driver-facing instrument display to put the car's speed in your eyeline.

Past

Present

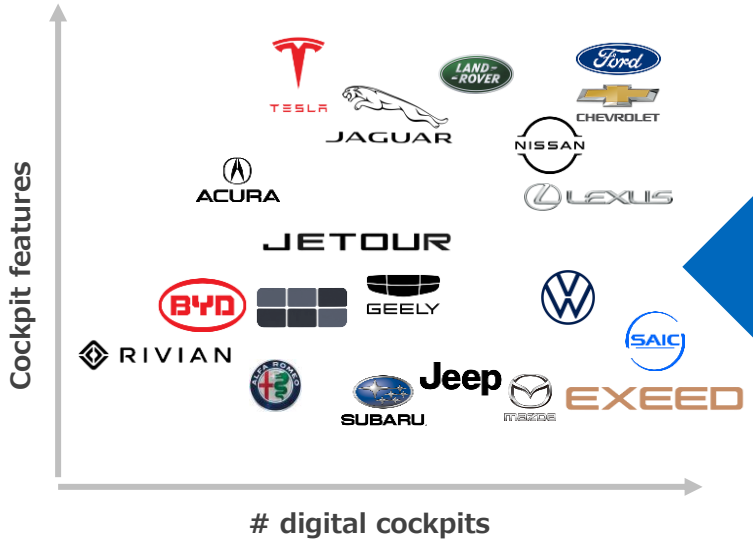
The first production car to have a touchscreen was 1986 Buick Rivieria with the 9-inch 'Graphic Control Center' However, there were flaws. So, Buick sensibly dropped the GCC from order books, and touchscreens were discontinued by 1990

In 2012, Tesla introduced a 17-inch portrait display that controls menus for the climate control, navigation, multimedia, charging control, and safety systems (ADAS).

Porsche had touchscreens in 911 and Cayman already and they were pixel upgraded in the 918 Spyder, but suddenly, physical buttons were removed. Alongside a main touchscreen front and center, Porsche offered another optional passenger display

The Mercedes-Benz EQS comes with three separate screens (two 12.3-inchers, and one 17.7-incher), but they all live under the same 56-inch swathe of gorilla glass. Also, this unit has more computing power

Traditional mega-volume brands introducing premium offerings



Mainstream players

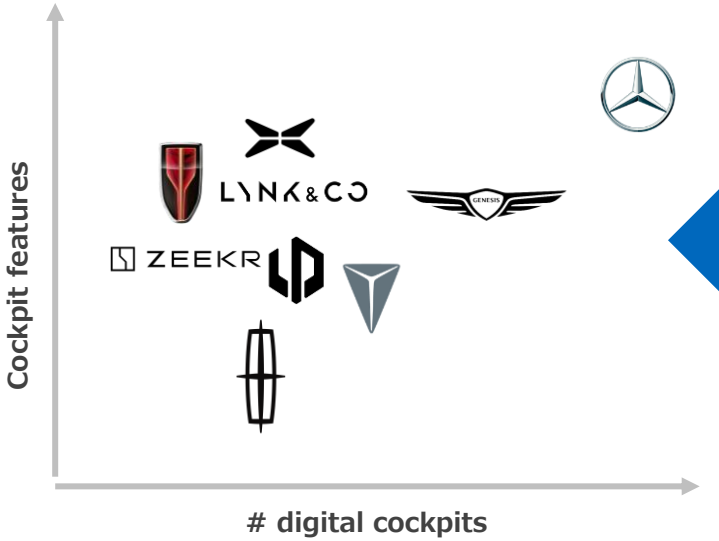
Largely dominated by volume brands with more cockpit options spread across the lineup, mostly in the 'Connected' or 'High Bandwidth' infotainment category with a few exceptions in premium

Redefining premium

Traditionally dominated by established premiums but slowly gaining volume brands as new entrants (e.g., Hyundai, Kia, Nissan, Buick) whose offerings are at par and sometimes exceed many incumbent premiums'.

Traditional players

Brands that still heavily rely on screen-duplication methods to enable infotainment and navigation through the cockpits and have very limited 'connected' infotainment offerings



Niche offering

Innovative brands that have very premium integrated cockpit offerings (Pillar to Pillar) or state-of-the-art technology like user authentication through biometric, facial recognition (Mercedes-Benz, Genesis, Lincoln)

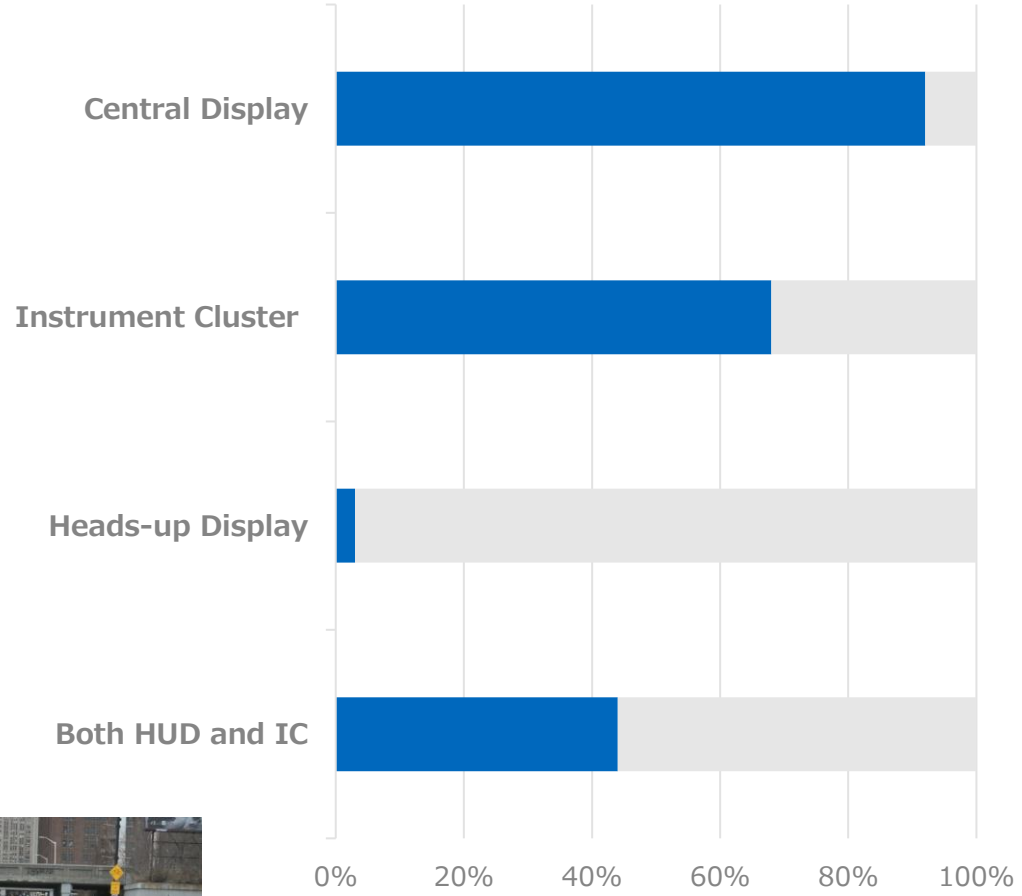
Note: The above graphs indicate global brand positioning of a few selected brands based on their cockpit offerings. Some brands may have regional differences in their offerings

ADAS alerts are becoming common beyond the central infotainment

Why redundancy in ADAS alerts is paramount?

*The timely ADAS/safety alerts (visual, audible, or haptic feedback) can help the drivers make informed decisions in various scenarios such as – **changing lanes, taking turns at junctions, reversing, parking assistance**, and oncoming vehicles in the **blind spot** among many others. More interfaces capable of displaying such alerts would be helpful to the drivers so long they aren't too distracting. Furthermore, they are more crucial as vehicles come with SAE L2/L2+/L3 piloted driving that requires the drivers to resume control at any point.*

ADAS warning example in instrument cluster and HUD



Displays capable showing of ADAS alerts

Overview

The graph highlights the various interfaces **(output HMIs)** for drivers to get ADAS/active safety-related alerts. The **% represents the model-level penetration** i.e., how many unique central displays, instrument clusters, and HUDs can show ADAS alerts

Key Highlights

- **Central displays in more than 90% of European models can alert drivers with visual or audible cues** (in some cases, haptic feedback through the steering wheel or seat belt).
- For the sake of redundancy and given the mission-critical nature of some ADAS (automatic emergency braking, lane departure prevention, etc.), **many alerts are also shown on the instrument cluster. As of early 2025, ~70% ICs are ADAS-ready.**
- Additionally, HUDs complement this and show critical ADAS warnings. For instance, they can show the speed limit captured by the Traffic Sign Recognition (TSR) system on the windscreen. The proportion of ADAS-ready HUDs in Europe is much lower than in the US.
- New **augmented reality HUDs can further improve the transparency between drivers and systems** as they provide alerts directly in the line of sight of the drivers, which can curb distraction problems. But these systems are fairly new across Europe and US.

Tech companies getting their share in the digital cockpit evolution

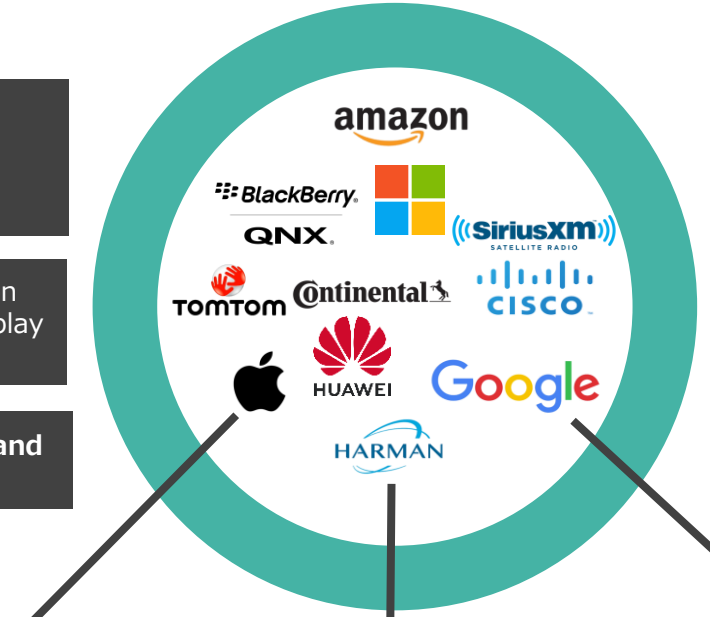
Who are OEMs partnering with?

OEMs are leveraging tech companies' digital offerings to offer more and better digital features to their customers because of the variety, flexibility and smooth experience. Since nearly a decade ago, Google and Apple have been moving into the automotive industry, from powering dashboards and infotainment systems to building autonomous and electric vehicles. OEMs see this as an opportunity to attract new customers to their digital ecosystems as they are already familiar with these technology companies which makes it much harder for other tech companies to compete because they don't have that ecosystem. These partnerships are generally, global in nature and aren't limited to fewer models.

Stellantis unveils a game-changing virtual cockpit for faster infotainment tech delivery which is powered by **BlackBerry QNX Cloud Innovation**

Continental and Hyundai collaborate for a dual-function display combining the instrument cluster and center display arranged in a **V-shape under one cover glass**

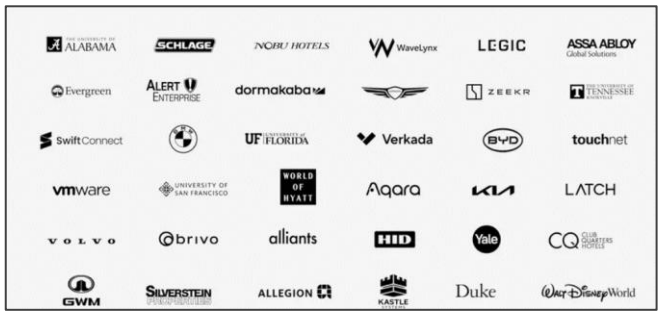
Apple's next-generation **CarPlay to debut in Porsche and Aston Martin**



Porsche and Google are expanding their collaboration to enable deeper integration of **Google services** in **Porsche vehicles**

TomTom and Microsoft collaborate on an AI-driven automotive assistant, enabling drivers to engage in voice conversations with their vehicles

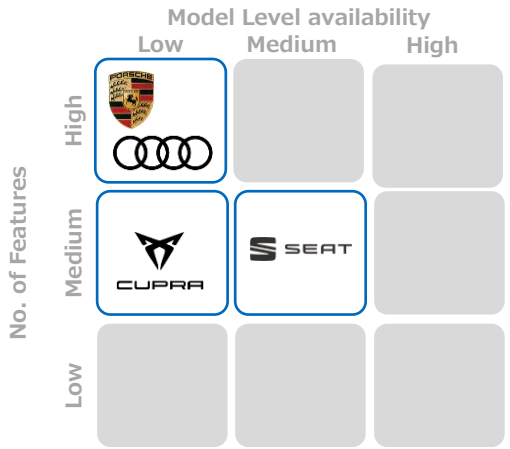
Ford and **Google** sign six-year deal for in-car connectivity and cloud services



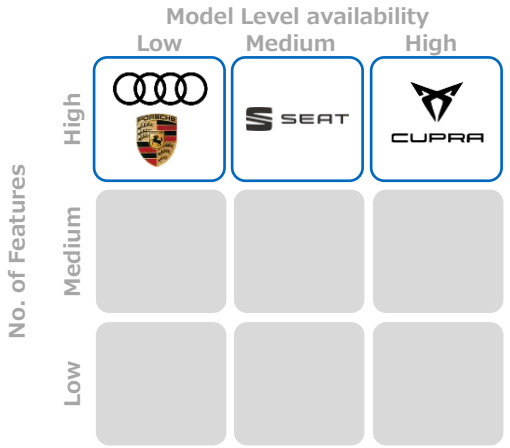
Volkswagen Group (1/2)

OEM brands placed in the 3X3 grids in terms of their 'most advanced' cockpit offerings

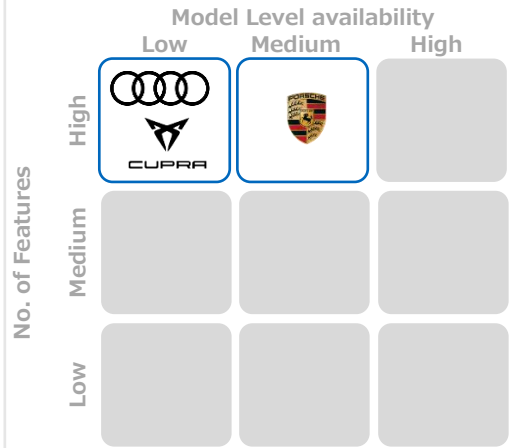
Central Display



Instrument Cluster



Head-up Display



Key Highlights

- The Audi A6 Avant e-tron and A6 Sportback e-tron models get the most advanced central display, which comes standard.
- All Cupra models get a high-bandwidth infotainment system and fully digital instrument cluster, with the high-priced variants getting bigger screens. Born and the new Tavascan get the AR HUD.
- In Porsche, the Taycan EV gets the most advanced digital cockpit system with a 16.8" curved driver-facing display.

Brands	Most Advanced Units (Individual OEM brands)			Key features of the cockpit
Audi	Audi - MMI Navigation Plus with MMI Touch - 14.5" (Connected Integrated Cockpit)	Audi - Virtual Cockpit Plus - 12.3" (Full Digital)	Audi - AR Head-up Display (Windscreen)	Wireless charging, Real-Time Traffic, Linux, Haptic Feedback, Handwriting Recognition, Online media streaming of Smartphone Apps, 3D Maps, Car-to-Home
Cupra	Cupra - Navigation System with Full Link - 15" (High Bandwidth Infotainment)	Cupra - Virtual Cockpit - 10.25" (Full Digital)	Cupra - AR Head-up Display (Combiner)	Wireless charging, QNX, Real-Time Traffic, Alexa, Car-to-Home, Sennheiser Audio Speakers
Porsche	Porsche - PCM Navigation and Dual Center Stack Screen - 10.9" (High Bandwidth Infotainment)	Porsche - Curved Display - 16.8" (Full Digital)	Porsche - Head-up Display (Windscreen)	1920 x 720 central display resolution, Wireless charging, Linux, Real Time Traffic, Car-to-Home, Home-to-Car, Bose/Burmester audio speakers
SEAT	Seat - 3D Navigation system with Full Link – 12.9" (High Bandwidth Infotainment)	Seat - Virtual Cockpit Fully Digital Instrument Cluster TFT Display - 10.25" (Full Digital)	NA	Car-to-Home, Wireless charging, 3D Maps, Floating Display, Real Time Traffic, Beats Audio QNX OS

Consumer expectations from digital dashboards are evolving

Vehicle 4.0 Benefit 1 — Consumer Demands

Analyzing and adapting to the evolving preferences of consumers

	2025	2026	2027	2028	2029
Established Premium Medium Volumes High Margins High Legacy	Improved channels for feedback from customers feed and prioritize the hopper	Continuously monitor evolving consumer trends and technological advancements to adjust strategies and offerings	Mainstream usage of innovative haptic technologies or configurable switch gear		Elevated premium experience with focus on and pivot to the most important aspects
Disrupter Through start-up or resetting for BEV have leapt straight to Vehicle 2.0 but some struggle to deliver the full value	Improved channels for feedback from customers feed and prioritize the hopper	Improved tool chains for automated and continuous development	Prioritize screen based user experience to release agile tool chain usage		Minimalist dashboards that some will love but other may find frustrating due to a lack of tactile response
High Volume High Volumes Low Margins High Legacy	Improved channels for feedback from customers feed and prioritize the hopper	Higher reliance on standardized ecosystems			Wide range of increasingly integrated and updateable digital cockpits across the lineup
New Entrants High Volumes Medium Margins High Legacy	Increased R&D resources after Start of Production and during service rollouts	Understanding global consumer needs through market research			Configurable software that pivots to global consumer demands

Outcome | Barriers | Solutions

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