



IN-VEHICLE PAYMENTS ~ RESOLVING FRAGMENTATION

Whitepaper



1.1 Introduction

A connected car, according to Juniper Research, is one that has Internet access to communicate with its surroundings and requires a mobile data connection. This is currently achieved through mobile connections such as 4G, 5G and Wi-Fi. The connection of the vehicle to its surroundings is established by in-vehicle receivers or transmitters. In most cases, the vehicle is equipped with this, or it is established via a third-party network/system.

Juniper Research defines an in-vehicle payment as:

'A payment that is made by the vehicle, without requiring the use of a connected smartphone or other devices to handle the transaction.' Generally, the payment is triggered by the infotainment system within the vehicle, either through the screen or via a built-in voice assistant.

For the past 10 years, the automotive industry has been undergoing a most significant technological transformation. Car manufacturers are focusing on more eco-friendly and technologically advanced solutions, in order to sustain sales levels. The driving factors for automotive sales have been passenger comfort, vehicle safety features, improved emissions, fuel efficiency and car infotainment for some time. However, now the market is changing and adapting to some additional considerations like smart infotainment systems, Internet accessibility, etc. Automakers are concentrating their efforts on making the in-vehicle experience as seamless as possible for drivers and passengers.

The pandemic has had an impact on automotive sales, generally due to changing economic conditions, but this did not affect the development process of technological advances which were commenced several years ago. On the contrary, the pandemic has proven to be a catalyst in the growth of software-centric

technological advances like in-vehicle payments solutions, as cashless society is now a significant part of the payments ecosystem.

The rise of the IoT has resulted in the formulation of connected cars. The IoT refers to physical items that are equipped with sensors, processing power, software, and other technologies, and that connect to and exchange data with other devices and systems over the Internet or other communications networks.

IoT has enabled the invention of applications that can be integrated with automobiles in the automotive industry. As a result, the notion of the IoV (Internet of Vehicles) was developed. The IoV is a network of vehicles with sensors, software, and technologies that link and share data over the Internet in accordance with agreed-upon standards. This term is commonly used in the transportation, trucking, freight delivery, and shipping industries. These industries require real-time identification, tracking, and management software. The IoV has important applications and business usage in various industries. The inclusion of payments to the connected vehicle concept is a major development. This report will look at what development and integration of payments in the connected car landscape mean for the larger automotive and payments industries, as well as how vendors should act to take advantage of the market's prospects.

1.2 Key In-vehicle Payments Use Cases

Key use cases for in-vehicle payments are analysed below, with an assessment of their progress to date and future viability.

Fuel Payments: Fuel payments via the vehicle dashboard is the most common use case. Rather than using a card at the pump, or queuing at the forecourt shop, owners who have in-vehicle payments features can simply drive up to any pump at a service station and use the vehicle's touchscreen to select how much fuel they require, and pay using their payments provider's platform. An electronic receipt will be displayed on the touchscreen, so customers can leave the forecourt confident of having paid. A receipt will also be sent directly from the pump to the driver's email address so it can be added to accounting or expenses software. Many major gas stations allow customers to pay for fuel using their mobile device while driving: one example is Shell Pay at Pump, which works as part of the Shell App and allows drivers to pay for



fuel using PayPal, Apple Pay, Google Pay, or by directly adding their Visa and Mastercard debit/credit cards to the app. In-vehicle fuel payments is a natural progression for fuelling, which has evolved from a highly manual operation to one that can be carried out by mobiles. In-vehicle payments are a logical step forward in these circumstances that vendors are exploring.

Smart Parking: In-vehicle payments' existing technology allows drivers to find and pay for parking using the vehicle's head unit. By aggregating multiple merchants, only one sign-in process is required, meaning that, irrespective of which provider or facility is used, drivers save time and no longer need to manage multiple accounts, while gaining useful features such as connected electronic monthly billing. The evolving payment infrastructure and various fintech innovations are unlocking numerous in-vehicle payment avenues which were earlier untapped. In recent years, parking payments is one such avenue that has drawn the attention of many fintechs and digital payment solution providers. Making digital payments at parking garages might sound fancy to many. However, in reality, users and parking space owners are embracing this idea.

Automated Toll Payments: For automobile drivers, paying at toll gates is challenging. The process of potentially automating toll gate payments through the vehicle's dashboard has a lot of end-user benefits, especially in terms of ease and time saving when conducting toll gate payments. Around the world, several countries are implementing automatic toll gate payments. Payment methods can be embedded in a vehicle's licence plate and/or a windshield label. When a vehicle crosses a toll area where payments need to be made, this can be done automatically using long-range RFID (Radio Frequency Identification). RFID-enabled licence plates and windshield labels can be read at a range of 10–15 meters, without the requirement for a clear line of sight or batteries, while ensuring privacy protection. RFID tags can be used to transmit payment data over the air, as well as enabling the use of ISO (International Organization for Standardization) and IEC (International Electrotechnical Commission) standards for cryptographically protecting the recorded and transmitted data and specify digital signature structures for authentication. There are several advantages for the current technology via RFID. A major disadvantage might be issues related to the where the information from the RFID reader is stored, as this includes a number of personal data elements for a specific automobile driver.

Others: While the main use cases have been covered elsewhere in this chapter, there are still further potential uses for in-vehicle payments, which we have grouped under the 'Other' banner. The primary use cases we are considering here are the following:

- Food (including takeaway, drive-throughs and groceries)
- Coffee and other refreshments
- Purchases of physical goods and services (such as eCommerce orders)
- Maintenance or unlocking of additional vehicle features. There are several active partnerships in this area.

The FCA Uconnect system contains several partnerships in the food and drink area, as do many of the other currently available solutions. Any situation where a drive-through is available naturally lends itself to in-vehicle payments, but the challenge will be ensuring that infrastructure is standardised for this.

Again, the presence of many mobile applications in this area is highly beneficial, as this means that systems could be adapted relatively simply. Integration of payments for these kinds of use cases into existing marketplace-style solutions will be a major boost to adoption

1.3 In-vehicle Payments Challenges

Fragmentation: Merchant and marketplace fragmentation as a result of payment platform relationships may be a stumbling block to growth. As the market is still in its early stages, automakers and payment providers must solve dependability and interoperability concerns induced by partnerships, in order for in-vehicle payments to reach as many consumers as possible. To achieve scale quickly and deliver desired advantages, automakers should collaborate with current infrastructure, service, and data suppliers. Instead, they frequently labour in isolation to develop or just reinvent difficult-to-scale island solutions between an OEM and a single other party. Lacking dependable partners, they have little time to focus on core competencies and differentiators. Another potential stumbling block for the market is the inability to integrate this new system with an existing infotainment system. These capabilities are only available and achievable in higher-end or brand-new models; making it



difficult to update the infrastructure in used cars and older ones. Automobile manufacturers must work with payment and technology suppliers to develop solutions that will allow owners of second-hand cars or older models to update their vehicles with these few capabilities. The fragmentation between suppliers and providers, across different countries, means there is no one-size-fits-all for a global roll-out of the technology.

Security: There is also the issue of security and whether the automaker or payment platform would be responsible for hacks or data leaks. Both parties would share responsibilities, and this is an issue that OEMs are already grappling with as their infotainment systems become more advanced. Payment companies are involved as their experience in areas such as tokenisation can go a long way to securing the overall market, which is highly important.

Automobile manufacturers would need to collaborate with payment providers which have security and compliance infrastructure in place to stay ahead of cybercriminals. Along with adhering to payments regulations like PCI DSS, payments providers also need to meet the challenges that can arise in future, as cybercriminals are primarily targeting vulnerable areas like payment platforms.

Authentication of Users: The authentication of user profiles is another important hurdle that the in-vehicle payments sector may encounter. Payment providers will have to verify that drivers accessing the information to make payments are adequately vetted if the vehicle dashboard contains the user's card details. Security measures should be in place to prevent fraudsters from using the vehicle's dashboard to make fraudulent payments. Furthermore, if another legitimate individual wishes to use the in-vehicle payments feature, the security measures required to authenticate the car driver may cause friction. Rather than storing credentials on a physical device, service providers like CarIQ store them in the cloud, where they are tokenised and communicated using a state-of-the-art encryption standard. The task at hand is to create a machine-centric system that eliminates the human aspect in security; ensuring that vehicles are not directly targeted by social engineering attacks or suffer from credential mismanagement.

Poor Consumer Awareness: A segment of the population is looking for modern technological solutions to embrace that are more secure and convenient, but this demands a level of understanding that is required for a consumer to trust the

technology in order to use it. As in-vehicle payments are still in the early stages of development, the connected car sector must make an effort to raise customer awareness of these capabilities in order to encourage the use of this new payment option. There must therefore be marketing initiatives in place to raise customer awareness of the features, which will help increase automobile sales.

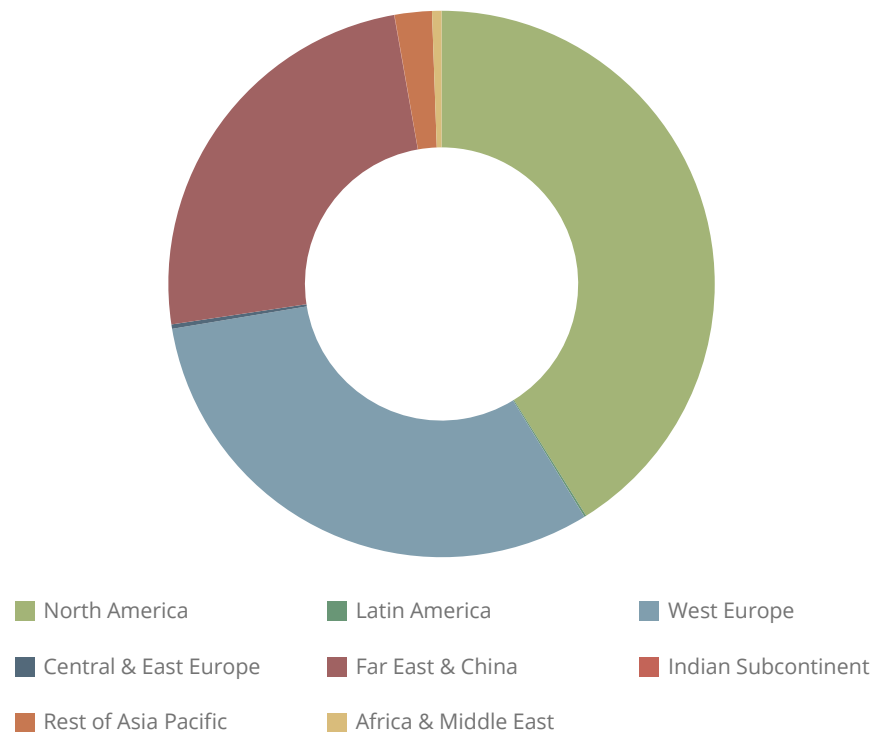


1.4 Forecast Summary

The global transaction volume of in-vehicle payments will exceed 4.7 billion by 2026, up from just 87 million in 2021. In-vehicle payments are those where payments are made via vehicle systems, without requiring the use of a smartphone to process the transaction.

- This extraordinary growth of over 5,300% in the next five years will be driven by increasing industry collaboration and initiatives from vehicle manufacturers, aimed at reducing the high level of fragmentation between different in-vehicle marketplaces. Payments vendors will need to quickly develop new capabilities in order to capitalise on this growing opportunity. As a result, we anticipate the rate of acquisitions and partnerships to intensify to meet these urgent requirements.
- North America will have the largest in-vehicle payments share of transactions by volume; accounting for 42% of all transactions globally by 2026. The growth is driven by a large installed base of payment-enabled vehicles and a high level of partnerships in place. The recent collaboration between industry participants in North America will be beneficial in overcoming fragmentation and incentivising user adoption through rewards and loyalty schemes over the next five years.
- The research found that vehicle fuelling will be the most common use case over the next five years; accounting for around 48% of total in-vehicle payment transactions by volume. This growth is being seen as the natural progression for fuel payments, which have evolved from cash to card payments, then to smartphone payments, and now to in-vehicle payments.

Figure 1: Total Value of In-vehicle Payment Transactions per annum (\$m), Split by 8 Key Regions, 2026: \$89 Billion



Source: Juniper Research



Order the Full Research

Juniper Research's new *In-vehicle Payments* report delivers extensive analysis of the evolution of this new area; featuring detailed coverage of market benefits, challenges and future outlooks. Discover a comprehensive study of new partnerships and key trends driving this highly important market for users, payment providers and vehicle manufacturers.

Key Features

- **Market Dynamics:** Detailed assessment of how the in-vehicle payments market is evolving, leading use cases and their role in future growth.
- **Segment Analysis:** Future outlook and comprehensive analysis for segments where in-vehicle payments are being deployed, including the following areas:
 - Fuelling/EV Charging
 - Smart Parking
 - Automated Toll Payments
 - Other (Coffee, Fast Food, etc)
- **Juniper Research Competitor Leaderboard:** Key player capability and capacity assessment for 16 in-vehicle payment vendors including:
 - Amazon
 - CarPay-Diem
 - Daimler
 - Harman
 - Mastercard
 - VISA

- **Benchmark Industry Forecasts:** Forecasts for in-vehicle payments users, transaction volume and value, each segment forecasted separately for commercial and consumer in-vehicle payments, as well as splits by our 8 key regions and 25 countries.

What's in this Research?

1. **Market Trends & Opportunities:** Detailed analysis and strategic recommendations for the expansion of in-vehicle payments vendors, including evaluation of crucial areas, such as the role of industry collaboration and how fragmentation will affect the market growth in future.
2. **Strategic Analysis:** Examines the future outlook for the in-vehicle payments ecosystem and provides comprehensive analysis of the key trends and market disruptions. The report also provides an assessment of 16 major players within the in-vehicle payments market and their positioning via our Competitor Leaderboard.
3. **Interactive Forecast Excel:** Highly granular dataset comprising over 21,000 datapoints; allied to regional and sector analysis tools. Includes regional and country-level analysis, together with five-year forecasts for the in-vehicle payments market, including transaction volume and transaction value, consumer and commercial in-vehicle payments across multiple segments.
4. **harvest Digital Markets Intelligence Centre:** Visualises all the data in easy to use and exportable graphs, tables and charts, and features continuous data updates for 12 months.



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