ISSUE #5

Ease.

People Powering Payment

17 trends for Smarter Parking

The revolution in on-street and off-street parking

let's make payment happen

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The smart parking revolution

Advancements in technology have revolutionised the automobile industry. This has created the potential to redesign parking, increasing the efficiency and convenience of this stressful and uncertain process for the customer. Parking has been an essential part of the car industry, but has only seen improvements out of critical necessity, such as limited space and increased number of vehicles. Stakeholders haven't always been interested in actively modernising parking, as there was little perceived room for improvement.

This is changing, and fast. In this eBook, we will cover recent trends in smart parking, focusing on how technology caters to customer needs. These needs have been around since the dawn of the automobile, but with the increase in the number of vehicles and the limited space available in our cities, the demand for innovation has become even more acute.

The legacy parking system

We can look back to the 1920s in Oklahoma City, USA, where parking became a major inconvenience. People were parking their cars on the streets, obstructing customers from entering shops and creating traffic congestion. To tackle the problem, they had to implement a new solution to manage the issue at a large scale. They designed the parking meter; and a variation of this device is still in use today.

The parking meter reserves a space for a car in exchange for money. The original design has been improved by implementing modern payment systems and increasing efficiency by

using a single machine to issue receipts for multiple cars; which need to be displayed on-board.

Is this an exceptional design that needed no improvements for so long, or was the parking industry consistent enough not to need any improvements?

Whatever the case, it is no longer sustainable to rely on basic parking meters. For the first time in history, more people live in urban areas rather than rural, and the amount of vehicles has skyrocketed. Payment needs to be seamless, and the tracking and scalability needs to keep up with demand. We must also keep in mind that the approach we take must **solve people problems**, not parking problems.

Here is where smart parking comes in, using technology to cater to the new needs of drivers. Smart parking is just one piece of the larger "smart cities" puzzle. Councils, governments, and private corporations are looking at optimising cities through technology, and this includes parking.

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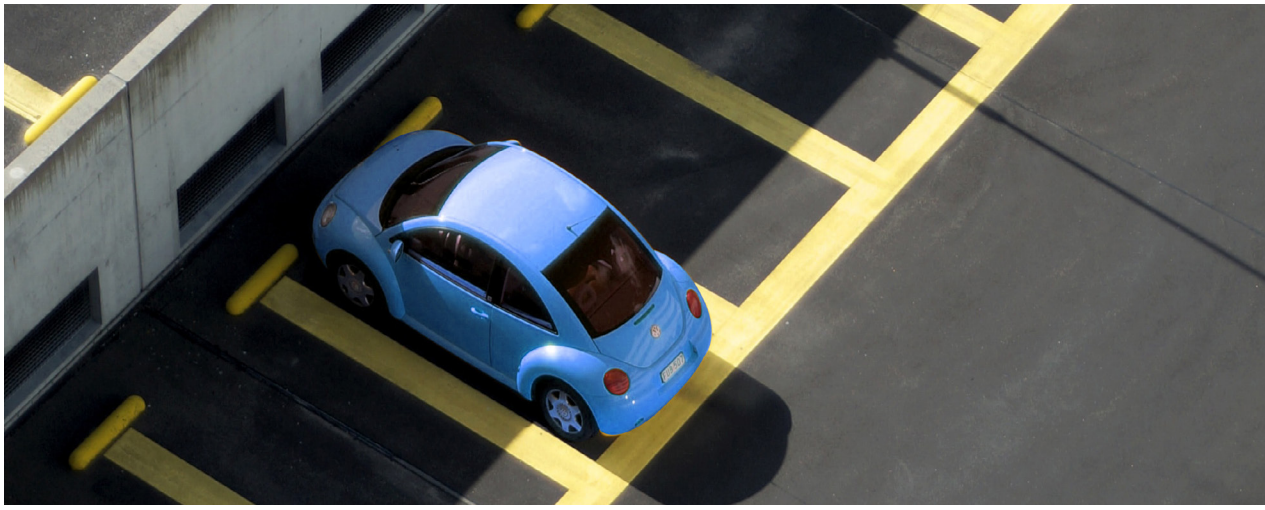


Trends impacting the parking industry

As mentioned before, the parking industry depends on the wider mobility industry. It is directly affected by innovation, technology, changes in laws and policies, as well as socio-economic shifts.

So, in order to look at the market requirements that smart parking is looking to resolve, it's important to have a good understanding of the changes and evolutions of the wider mobility industry; alongside modern consumer desires.

Here we describe some selected trends that may have an impact on parking and its future evolution.

Trend 1: Self-driving connected cars

The prospect of autonomous vehicles takes human control, decision-making, mistakes, and inefficiencies out of the equation. All cars will be connected to the same network and be able to communicate with each other, broadcasting their destination and routes - and also optimising depending on the traffic. Car parks would no longer need to have as much human interaction. Administration tasks such as payments and reserving a space can be done via machine-to-machine interaction. The driver could be disembarked at a designated point, and would never need to set foot in the car park or physically pay for the stay.

Trend 2: Millennial habits

Defined as the generation born between the 1980s and late 1990s, millennials are known to embrace technology and adopt an eco-friendly lifestyle. They are more likely to use public transport, bikes, drive mopeds, or simply walk. There is no indication that cars are going to become obsolete - but parking may be impacted as this generation gradually shifts away from traditional mobility solutions.

Trend 3: The rise of electric vehicles

Electric vehicles have seen vastly increased sales worldwide, and are predicted to soon become the vehicle of choice for consumers, fleet operators, and businesses. As opposed to fossil fuel cars, EVs have several advantages and a different set of requirements. Charging stations are already being added to on-street and off-street parking locations, and will be widely implemented in car park infrastructure over the upcoming months and years. With an already-existing power supply, off-street parking locations typically have an advantage when installing EV charging stations. Furthermore, the long-stay scenario means that more affordable chargers are effective enough; the speed of charge isn't such a priority.

In terms of payments, the cost could be incorporated into the overall price of a car park stay – though this isn't allowed in all countries at the moment. In theory, this could reduce the need for multiple payment terminals on EV chargers within the gated-access car parks, in favour of one fully-integrated payment solution. There are a number of ways to do this.

The experts at CCV are well-placed to discuss how this would work in practice and whether it is possible in your location, so don't hesitate to give us a call.

Trend 4: Responding to advanced consumer demands

As the developed world gets wealthier and more connected, demands are becoming more focused on convenience, ease of access, and time-saving. It is safe to assume that people might prefer to pay a premium for an automated car parking experience that removes the pain of traditional awkward, uncertain, and time-consuming manual processes.

Parking industry stakeholders will tap into this. There is a compelling benefit of not having to worry about where to park, how to pay, and the physical actions required to complete these stressful tasks. This will make the experience consistently easy, freeing up valuable energy and attention for drivers who see parking as an anxiety-inducing task.

Trend 5: Law enforcement and security

Especially in urban areas, parking is a need as opposed to just a convenient benefit. With limited space in on-street and off-street locations, there is likely to be more systemised data-led control. This is good news for security, as law enforcement can have a clear view of all vehicles and their location using data. Cars on the blacklist will be trackable, and there will be little opportunity to hide within city boundaries.

Trend 6: Carpooling

Carpooling is the practice in which multiple people who are going to the same destination share one car for their travel. The number of carpooling vehicles worldwide is projected to reach nearly 45 million by 2025, up from 7.6 million in 2015. This has clear advantages for traffic levels, and also the environment.

There is a strong case proposed by Yuval Noah Harari in his book, Homo Deus, on implementing a smart carpool system using driverless cars. A "network of self-driving cars" would constitute the whole traffic. People could submit a request to the network to get from A to B, and a car following that route would pick up the user alongside other people, drop them off at the destination, and continue on its way.

Such a technology is certainly looking into the unknown future, but if this option does indeed materialise, the current need for parking would look drastically different.

Trend 7: Large corporations acquiring startups

The acquisition of smaller startups by large corporations, such as PSA acquiring TravelCar, is going to dramatically shape the structure and makeup of the parking industry. It has potential to become an industry similar to telecommunications, where a few providers own most of the key infrastructure and maintain their market share. This has pros and cons, of course.

There are also huge investments taking place. For example, SoftBank's $1 billion investment in US-based ParkJockey; a fast-growing startup that offers a parking management platform to monetise commercial car parks. ParkJockey has already acquired other parking industry startups through its early growth. It's clear that this is a dynamic industry, ripe for disruption and growth, and ready to embrace innovation.

Trend 8: The Internet of Things (IoT)

The IoT is represented by smart, connected, devices that interact via networks. In the context of parking, these range from self-driving cars to smart parking meters. The IoT is the basis for the development of smart cities, improving the efficiency by conducting real-time analysis and optimising whole city-wide processes. The reality of widespread connected devices is already here; it's just about applying these ideas in ways that make parking a better experience for the end-user.

KEY TAKEAWAY

Context is key. To understand how smart parking fits in, we need to understand the background of technological innovation and consumer demands in the mobility industry as a whole. Parking doesn't exist in isolation – it is an industry which is directly affected by plenty of external factors.

Off-street parking

Off-street parking will retain prominence in the face of increasing restrictions on curbside parking in the inner cities. These dedicated locations offer amazing opportunities to operators. There are less barriers to innovation, and more opportunity for value-added experiences. Operators are free to construct their customer journey in the optimal way to benefit all parties.

What are the major trends in off-street parking?

Trend 1: Data analysis and data-led actions

The advantage of off-street parking is the ability to accurately monitor the inbound and outbound vehicles, as well as their usage and times. By having access to this information and processing it into valuable insight, operators can optimise the efficiency of their resources. This might involve:

» Optimising digital or physical advertising
» Hiring the optimal amount of on-site staff
» Applying premium or off-peak pricing structures

In many private car parks around Europe and the US, these features are already in place - especially at shopping centres and airports. This data-led approach will be the driving force that shapes the future of off-street parking.

Trend 2: Real-time information

The use of real-time data can be extended much further, and indeed this is already happening. For example, to feed insights to retail units in a shopping centre about the busyness of the car park. If drivers are registered online with an account linked to their number plate, the car park systems could also feed demographic insights into the commercial areas to optimise advertising or discount offers to be most suitable to the people in the area at any given time.

Trend 3: Seamless payments

Payments are an essential part of the car parking experience. In a study conducted by IPMI, 48% of respondents have named "technologies to improve access control and payment" as a top emerging trend in parking. Traditional payments are becoming obsolete; whereby drivers would need to pay in cash to reserve the space for a certain amount of time.

Payment solutions have been evolving with technological advances, delivering on the market needs of convenience, ease of use, and security. These can be easily implemented in car parks through a wide variety of techniques, many of them already being in use right now.

These include:

- Contactless payments using debit and credit cards
- Digital smartphone wallets and smart wearables
- Payments through applications and mobile websites
- Smart connected cars processing payments automatically

Trend 4: Automated parking processes

From the moment the car reaches the entrance of the car park to the moment it leaves, the process can be fully automated. This can be done in multiple ways, as we describe below.

1. Robot-assisted parking

Although this doesn't fit the popular conception of a robot; a connected, intelligent machine could be able to park instead of the drivers. Such technology already exists, and is deployed in a car park in West Hollywood, California - and other places. By simply placing the car in a dedicated easy-to-access spot, a machine similar to a flat forklift lifts the car securely and leads it to storage.

The robot is aware of all parking spaces available in the car park. It can go up and down different floors using a dedicated lift, and is able to move freely - picking up and dropping cars with ease. To launch this technology into the mainstream, a lot of investment would need to take place. Whilst critics doubt the widespread popularisation of this idea, it is a superb indication of the appetite for innovation in parking.

2. Vending machines for cars

In Guangzhou, a five-floors tall machine contains 42 cars and is completely automated. The machine is owned by Alibaba and Ford, and allows customers to purchase a car without any human help in under 10 minutes. Using a mobile application, they select a car, get their face scanned, and verify their identity at the vending machine. The machine selects the car from its depository, lowers it to the ground floor and enables the user to drive it away.

Of course, this is very much a gimmick! Whilst it is far-fetched as a mainstream car-buying idea, similar technology (in reverse) could be implemented when it comes to parking. A vehicle could be driven to a designated drop-off point, after which it is taken by conveyor belt to be stored securely. This would maximise the use of space, automate processes, and reduce congestion.

3. Driverless cars

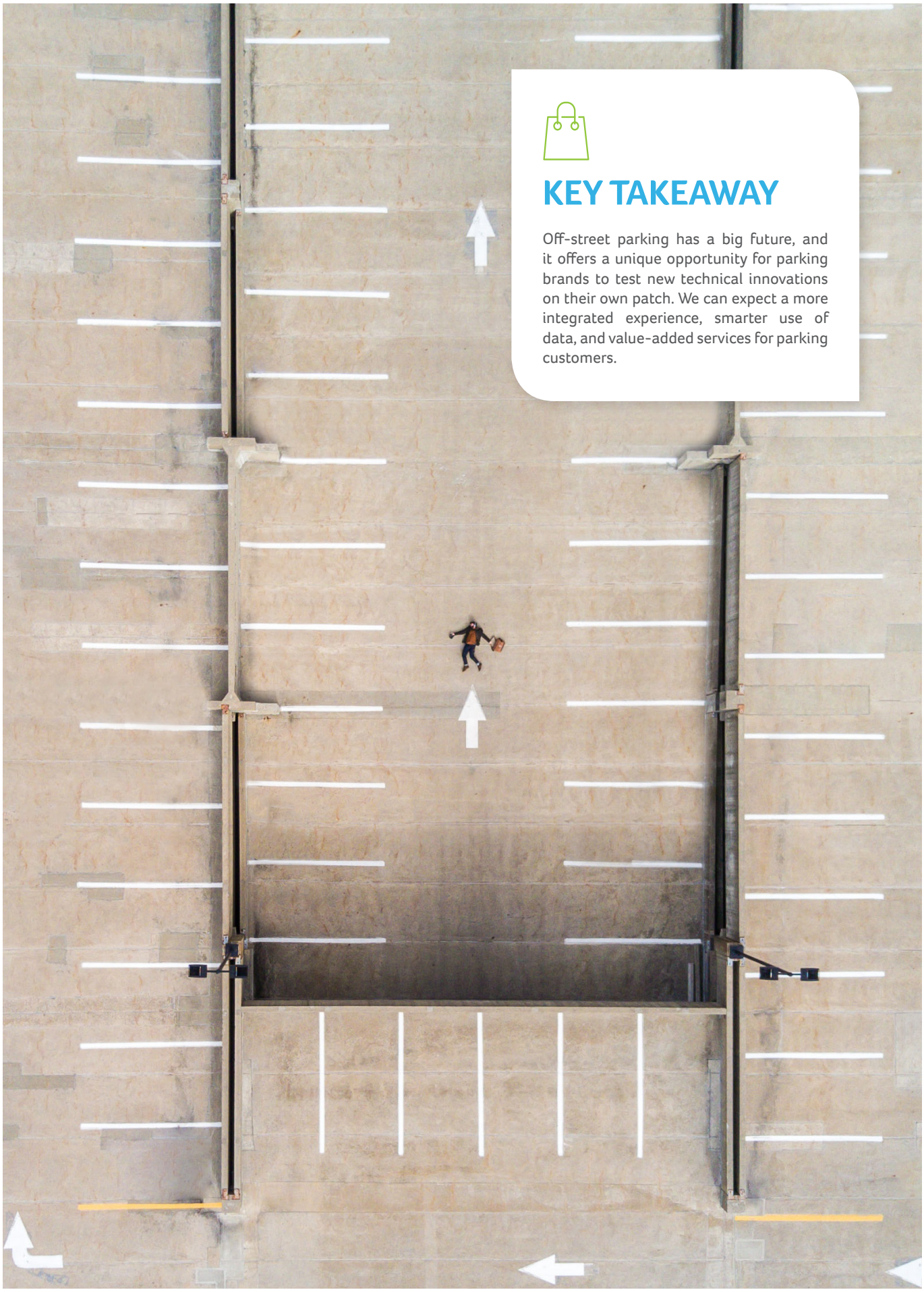
As described above, self-driving cars can be connected to the car park network and be automatically aware of all the available spaces. The passengers would be dropped off at their destination or outside the car park itself, and the car would navigate by itself to a parking space. This type of driverless and connected car opens up a world of opportunities for mobility industry stakeholders.

Trend 5: Added-value opportunities for off-street parking

Car parks are designed to meet multiple types of customer purposes, depending on the length of stay. These different purposes lead to different added-value opportunities.
Car parks for six to ten hours are the most common scenario, used by people during the day as they commute to work or go shopping in town. Emphasis must be on ease of access, speed, and seamless payments - as well as EV charging facilities. A large proportion of customers will be repeat visitors, which opens up the opportunity for loyalty schemes, tokenisation of payments, apps, and digital accounts.
Airport parking is often for periods between two days and two weeks, although there are of course shorter stays for pick-up and drop-off. Particularly for long-stay, the focus must be on security and the efficient use of space. The airport experience is traditionally full of pain points; so it's also important to make the parking process as smooth as possible for the traveller. Again, this opens up the potential for seamless tokenised payments, but also increased automation of the parking itself.

Supermarket parking is commonly short-stay; zero to three hours. There is usually a limit on time. If managed digitally and tracked in real-time, the supermarket could inform the customer via push notification when their slot is running out. Again, supermarkets tend to have repeat customers. This gives opportunities for loyalty schemes, digital accounts, and other value-add benefits.

In general, typical off-street parking locations are becoming more like hubs for a variety of other services, including Park & Ride, bicycle storage and maintenance, personal lockers, and much more. Industry stakeholders know that people want to save time, energy, and effort – so to integrate multiple services into a "one-stop-shop" is highly beneficial. This smart use of commercial space is a key part of the journey towards smarter parking.



KEY TAKEAWAY

Off-street parking has a big future, and it offers a unique opportunity for parking brands to test new technical innovations on their own patch. We can expect a more integrated experience, smarter use of data, and value-added services for parking customers.

On-street parking

Parking on the street (curbside) currently represents a challenge, especially in European cities where architecture - mainly in the city centres - isn't designed to support modern traffic or modern parking requirements. Several initiatives are being put in place to optimise traffic and reduce congestion.

Trend 1: Reforms in European city centres

Many European Cities are banning the use of cars in their city and historic centres. Old architecture has been designed for pedestrians, and is often not friendly towards a high volume of vehicle traffic. Furthermore, municipalities want to create a greener inner-city environment, with less air pollution and less noise. This space is being given back to the community, for residents to enjoy in safety.

By banning the access for cars, the associated on-street car parking will be affected at the same time. This approach permeates beyond cities and historical centres, with councils and local municipalities looking to manage the volume of on-street parking in a more efficient and pedestrian-friendly way.

Trend 2: Monitoring short-stays using wireless sensors

In Kortrijk, Belgium, Parko has employed technologies provided by Nedap to provide a new policy for Shop-and-Go short-stay parking. They offer drivers 30 minutes of free parking in any designated space, and any car running over that amount of time will trigger an automated system that notifies a parking attendant. This system replaces the inefficient random checks that were in place before. We've also seen the widespread introduction of camera systems, which are considered to be highly reliable. These camera networks cover a wide area, and ensure that short-stay parking is controlled effectively.

Trend 3: Visualising the parking situation

The layout of a city's parking spaces is not consistent, often leaving drivers to be searching for a space for long periods of time. Recognising this problem, the people at Coord took pictures of all traffic and parking signs across the city of San Francisco and created a Curb Explorer map that can be accessed online, summarising the parking opportunities for drivers. Currently, the map is not updated in real-time, but this type of initiative will drive future parking innovation in a customer-centric way.

Trend 4: Optimising payment solutions

There is constant development in the area of parking payments, with an emphasis on ad-hoc payment systems. These are often needed for inconsistent or irregular shorter stays for shopping or day visits. In this context, drivers typically don't use the same parking space on a daily basis – so it's important for stakeholders to offer flexible ad-hoc payment options at all times.

Cashless payments and SMS payments have been around for some years now, but more ambitious technical solutions such as on-location eCommerce payments or subscription deals are becoming more popular. And contactless technology has become an expectation among consumers, wherever they need to make payment. The general trend is that on-street parking operators are opening up to more types of payment, to make sure that everybody can pay in their preferred way.

The potential timeline for smarter parking

As mentioned above, smarter parking depends on the technology available, which can be adapted and implemented to meet the market needs. Below we outline some potential timelines for how the technologies will affect the parking industry.

Current situation

We can clearly see that the smart parking revolution has started in earnest. Technology is improving at a dramatic rate, and CCV is at the heart of what's happening in the payments arena. Cashless payments have been incorporated across on-street and off-street car parks in many countries, and people now have access to multiple payment methods, including smart wearable devices. This is happening now.

There is plenty of development in other areas, too. Data analysis has skyrocketed, and there have been huge investments in technologies like ANPR and tracking systems for availability of spaces. The parking landscape of major cities has been mapped better than ever before, and apps or mobile websites are being seamlessly incorporated into the overall parking experience. Added-value services have already been introduced, and off-street parking locations have opened up to new commercial avenues.

Near future

Seamless payments, which require minimal-to-no user input, will be widely adopted. Those can either be a subscription to a parking operator or third-party partner, an automatic digital wallet associated to a connected car, or even driver verification based on geolocation or biometrics.

Parking suggestions can be adopted in off-street car parks, where drivers are given recommendations about parking via their mobile application. This concept can be easily implemented by using a tool such as Google Maps API. Its real-time traffic analysis capabilities can give suggestions based on

availability of on-street and off-street car parks.

In the near future, we will see a dramatic increase in EV charging stations within car parks and alongside on-street parking spaces. This is already happening, but as the electric vehicle revolution escalates it will become more commonplace. This represents key challenges to the industry in terms of power supply, monetisation models, and optimising the available physical space.

Distant future

It is always hard to speculate how the world will look in the far future. If progression continues to follow the same trends as we see now, two options have the highest likelihood.

In the first scenario, personal cars are still the norm, but parking is fully-automated. Driverless cars are given a destination and they communicate directly to car parks and reserve a space in advance. Drivers would be dropped off at their destination or the entrance to the car park, and the vehicle would either park itself or would be carried by an automated system. Payment is completed in the background.

The second option might follow the direction described by Yuval Noah Harari, whereby instead of every person owning a car and having it sit idle in a car park, cars would be shared and used on an ad-hoc basis. Driverless cars and IoT have the potential to make this a feasible option. Whilst this concept is hard to implement due to severe complexity, factors such as pollution and congestion caused by the high number of cars might tip the balance in favour of this model. However, it's important to note that this would justify a complete redesign of the current parking infrastructure and business model.

Futureproof parking

We've come a long way since the invention of the automobile and the birth of the parking industry. Technology has made the world unrecognisable compared to a century ago, but the core concept of parking has so far remained consistent. People still have to pay to reserve a parking space; often for a determined period of time.

Now we are seeing fast advancements in the industry, and we have a real opportunity to improve the parking experience for everyone. It is a crucial time in which we must look forward to create futureproof, innovative, and sustainable infrastructure. At CCV, we are focused on payment solutions for on-street and off-street parking. We have worked with parking stakeholders such as operators and municipalities to offer modern payments and integrated data feeds.

READY TO KNOW MORE?

Are you ready to explore your opportunities with smart parking?

Please contact our support team at **supportme@ccv.eu** or **+31 88 228 9965** and we will organise a workshop or roundtable to clarify your business challenge and uncover solutions to fit your needs.

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