Last modification: 29-01-2019 / 05:06 pm GMT+01:00

DIGITAL KEYLESS ENTRY

UNLOCKING NEW BUSINESS MODELS

SUMMARY

The automotive fleet industry is going through rapid change. Traditional business models are making way for new ones, driven by internet connectivity and the cloud, with the term ‘Shared Mobility’ becoming commonplace. Just as the taxi industry has had to compete with the emergence of car hailing, traditional vehicle rental is now being challenged by the relatively lower cost, flexibility and convenience of car sharing. This has prompted the rental industry to look at ways to evolve, and the car sharing industry at ways to continually differentiate itself.

In this paper, we will show how an unlikely area, mobile device-based keyless vehicle access, can be an enabler of the new business models necessary for future success in the fleet industry.

TABLE OF CONTENTS

CHALLENGES IN THE FLEET MARKET

- **Cost control.** For fleet businesses, whether it be individual vehicle rental or car sharing, lost vehicle keys are a common occurrence and represent a major headache, not only in terms of replacement costs but also vehicle downtime.
  With car sharing, where margins are squeezed by the costs of supplying not only the vehicle but also the insurance, fuel and servicing/cleaning, an out-of-action vehicle is a serious issue. Similarly, with rental, a higher-end vehicle sitting in the bay waiting for new keys to be delivered can mean the loss of a lucrative multi-day rental contract if no other similar vehicle is available.
- **Commoditization.** Competition leads to margins being squeezed, with differentiation purely on price alone. Innovative ways are required that allow rental organizations to offer differentiated services to attract and retain customers.
  In addressing commoditization, the car sharing industry is redefining the customer experience through connectivity. Traditional rental processes such as check-in queues, signing forms, vehicle drop-off, etc. have all but been removed.

MEETING THE CHALLENGES

We will now look at the areas that need to be addressed in order to meet these challenges. As mentioned previously, the car sharing industry leads the way in applying some of these principles. Both the sharing and traditional rental markets need to adopt and refine these for continued success.

Improved user experience

Satisfied customers mean repeat business and more predictable revenue. The following are ways this can be achieved in both car sharing and car rental.

"... car sharing can still improve its user experience."

- **Tailoring the in-vehicle experience** to the individual needs of the customer, even before they pick up the vehicle – from IVI preferences to vehicle settings and so on – helps customers feel valued. For car sharing, even with relatively small, basic vehicles in urban areas, giving the customer the option to set, for example, their radio preferences in their profile and then have their favourite station playing as they start up the vehicle can delight them. The same sense of personalization applies with car rental, especially with renting high-specification models. Supporting this at the vehicle requires appropriate integration by the OEM.
- **Efficient pick up/drop off.** Customers can be directed by the information delivered to their phone to the pick up and drop off points. This is where most people might say car sharing has the advantage over renting in terms of convenience, with no shuttles, no desk attendants and no signing papers. However, a typical drawback still remains – customers need some sort of membership card or barcode on their phone; it needs to be scanned by a reader on the car windshield to access the vehicle and lock it when the customer is finished with it. Clearly car sharing can still improve its user experience.

Flexible pricing models

The notion of paying only for what you use is gaining ground with flexible pricing models. Examples include:

- **Driver profile** - Establishing a user profile based not only on driving behavior, but also geo-location, time of day, and so on. For car sharing, this could be applied in addition to charging by the hour or minute, resulting in a more tailored price and a service differentiator. A similar principle could be implemented for the rental market.
- **Premium charges** - Customers sometimes extend their use of the vehicle. This can lead to lost revenue if a further multi-day rental has been scheduled with another customer. Having the customer immediately accept the additional charge (possibly a premium) and easily applying it to the keyless access policy means the revenue loss can be mitigated. The same can be done for adding additional drivers and creating additional digital keys.
- Related service industries, such as insurance, can also benefit from this concept of flexible pricing. The fleet operator who can adopt these services will differentiate themselves from the competition.

> "... the chief motive for cyberattacks on connected vehicles is financial gain."

DIGITAL KEYLESS VEHICLE ACCESS – AN ENABLER

Having seen ways in which the challenges of the fleet industry can be addressed (via improvements to user experience and flexible pricing) let's look at what many might consider to be an unlikely enabler for these – digital keyless vehicle access.

Early vehicle access systems

Vehicles have come a long way from the days of the leather key chain on which, alongside the house keys, dangled a car door key and an ignition key. Early innovations included having the same key for ignition and doors, followed by central locking systems, where the key or switch inside the driver's door could unlock all the doors electronically. Around the same time, in the early 1980s, keypad-based entry was introduced on some vehicles, as were the first remote keyless systems; these used an infra-red beam to communicate with the vehicle. This was superseded by short range radio transmission from the key fob, with widespread availability by around 1989.

"The phone app can offer a wide range of functions, limited only by what the OEM offers in the cloud service and what the vehicle supports"

The mid 1990s saw the first examples of additional security added to these devices. Rolling entry codes and encryption were used to prevent signal interception, spoofing and ultimately theft from the vehicle, or the vehicle itself. Until relatively recently, the only refinements of this system included functions for trunk entry, panic buttons that would activate the vehicle horn and, on some vehicles, remote ignition without the need of a retrofit device. Recent innovations include proximity detection, allowing the owner to walk up to the vehicle, keys in pocket, and the vehicle would permit entry, automatically open the trunk, allow push-button start, etc.

Today's keyless entry

For years, people have carried around three things: keys, wallet/purse and mobile phone. Contactless payment systems mean the phone can now replace the wallet/purse. And now, vehicle OEMs commonly offer mobile phone-based keyless entry systems, manageable via their cloud portal. The three items are rapidly becoming one.

These systems use Bluetooth Low Energy (BLE) connectivity between the phone and the vehicle. The phone app can offer a wide range of functions, limited only by what the OEM offers in the cloud service and what the vehicle supports.

Replacing the physical vehicle keys with digital keys – held on the driver’s smartphone, which the Fleet Manager can issue via a secure cloud portal – means lost keys are a thing of the past. Any such solution, however, needs to have the flexibility to cater to multiple users across multiple vehicles.

What if the digital keyless access also unlocked new business models that helped Fleet Managers to address the issues of user experience and flexible pricing?

Such a solution needs two elements:

- **Rich functionality** – supported in the cloud-based management portal, on the mobile device and on the vehicle, the functions mentioned previously, such generation of the digital access key on the user’s device, geo-location, date/time access based on contract, driver behaviour etc.
- **Flexible integration** – with the necessary cloud-based backend services for invoicing, insurance, customer communication and so on.

Connectivity without fear

From a business standpoint, a solution that unlocks new business models in shared mobility sounds attractive. However, with the addition of any new components to a system, a degree of risk is introduced. This risk pertains not only to performance and reliability of the system, but also in the area of security, since the security of any system is only as strong as its weakest link.

Much has been written about organizations needing to treat security as an inherent part of doing business, not merely as a cost at the bottom of a spreadsheet. That’s very difficult to do if, for example, you’re a Fleet Manager, trying to outrun the onset of commoditization, by competing on something other than just price. It’s natural to not want to introduce further business risk, or have to worry about something other than your business goals.

What if you didn’t have to worry? What if you could trust your security vendor’s knowledge and experience?

It is well known that keyless entry systems present one of the most popular ways to steal a car. A report in January 2019 by ‘Which? Magazine’ in the UK, stated that four of the most popular models in the UK are susceptible to theft using relatively inexpensive equipment purchased online. It went on to state that The German General Automobile Club (ADAC) tested 237 models that can be unlocked and started when the key is in close proximity. Of these, 230 could be unlocked and started by ‘faking’ the proximity i.e. making the key seem closer to the vehicle than it actually is. Four other vehicles could either be unlocked or started and only three were not susceptible at all.

> “What if you didn’t have to worry? What if you could trust your security vendor’s knowledge and experience?”

The method deployed above is known as a Signal Amplification Relay Attack (SARA). The thieves use inexpensive ‘relay’ boxes; one placed near the car and the other near where the key is typically located. This ‘lengthens’ the signal making the key seem close to the car. They then open the car, start it and drive away.

The above can be mitigated with proper security. More technically savvy thieves, however, may progress to other methods such as ‘Man-in-the-Middle’ and ‘Man-at-the-End’ attacks.

Having a security vendor that understands what the current attacks are and how the progression to new attacks will happen keeps you ahead of the game

What if your security vendor, based on years of successful deployments in hostile environments, understood that the principal motive for hackers and thieves is financial gain? And that providing a level of resistance, by way of defense-in-depth security, meant that they left you and your assets alone and went looking for softer targets?

CONCLUSION

Security need not be about fearmongering nor doom and gloom; it truly can be about enabling new business models. Security vendors need to recognize the importance of this. They also need to earn the trust of the customer, who can then be left to focus on their core business.

In summary, the following three aspects must be considered:

1. **Profitability** - Commoditization has become commonplace. The combination of connected vehicles and cloud-based services is opening up new business models that can increase profitability.
2. **Flexibility** – In order to support these new agile business models, highly-adaptable integration to the necessary cloud-based backend systems is needed, along with rich functionality for both the fleet manager and the end user.
3. **Security** - Today, cloud-based systems providers recognize the need to secure their systems and customer data. Any system that touches vehicles and integrates with cloud systems must be underpinned by defense-in-depth security from vendors with proven expertise.