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Smart-Home Security Report 2016: The Growing Market for Smart-Door Locks



Smart-Home Security Report 2016: The Growing Market for Smart-Door Locks



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Electronic access control was once the sole preserve of commercial buildings. It quickly found a niche in hotels; it's rare these days to find any large hotel that still uses mechanical keys.

Later, electronic access control became a fixture in apartment blocks, though typically only at main entrances with intercom systems. The technology wasn't convenient enough to secure

the entrance door to every flat too. At the single homeowner level, only those with gated mansions had electronic locking. Regular homes relied on the tried-and-tested mechanical key, even long after the 'digital revolution' had taken off in many other areas of everyday life.

But as the 'internet of things' gains traction, could we finally be on the cusp of a major shift in the residential market for digital locks?

The smart home – or 'home automation' – market is expected to reach \$58.68bn by 2020, at an estimated CAGR of 17%, according to research published this year by MarketsandMarkets.com. Protecting everything from the front door to cupboards and garden sheds, digital locks are sure to play a key role in that growth.

So, the global access control market will grow not only from upgrades in commercial premises – which remains a healthy segment, with Frost & Sullivan projecting CAGR of 10.6% to 2020 – but with new installations in homes, replacing or augmenting an 8,000-year old technology in the process.

In this survey – a joint effort between ASSA ABLOY and IFSEC Global.com – we polled hundreds of would-be adopters of this rapidly maturing technology from all over Europe, the Middle East and Africa.

What kind of functionality would they consumers value in a 'smart' digital door lock? Would they prefer to unlock their front door with a card or fob, to use a PIN code or smartphone? How much are they willing to spend?



The uptake of IP-connected appliances – which can now encompass everything from the HVAC system to the coffee machine or fridge – was long hampered by a lack of common technical standards. Demand for so-called 'smart home' products actually fell 15% in the US between May 2014 and May 2015, according to a report by Argus Insights.

But many experts believe the smart home's time is finally upon us.

CONTENTS

1 What should a digital door lock do?	3
2 Digital versus mechanical security	4
3 App functionality.....	5
4 Who gets in – and how to change it	6
5 Installation.....	7
6 Powering the lock	8
7 Where to buy?	10
8 Concluding comments & key facts.....	11

1 What should a digital door lock do?

It's not exactly an earth-shattering revelation that security would be valued as the most important consumer concern. An emphatic 99% rated it at least 'somewhat important' and 90% as 'very important' in any purchase decision. This is, after all, a lock's whole point.

Beyond that, having the ability to override the digital lock to open a door mechanically – for example, if software malfunctions or power is lost – was ranked as 'very important' by about three-quarters of respondents. Just one in 25 thought it wasn't important at all.

Managing access rights at the door lock was the third-most important potential function, with only 10% of those polled saying it didn't matter at all.

In fact, every single one of the eight features and functions suggested to customers was seen as 'very important' by at least half of respondents.

The least important feature to those polled was 'remote access from a phone, tablet or laptop'. And yet, even then, 87% of respondents consider remote access to be at least 'somewhat important' and a large proportion (50%) rate it as 'very important'.

We've all experienced that nagging anxiety after leaving the house (*did I forget to lock the door?*). It's understandable that this kind of functionality would provide peace of mind. Remote access also means parents can grant access to their children, if they've lost a smart card or run out of phone battery, from afar.

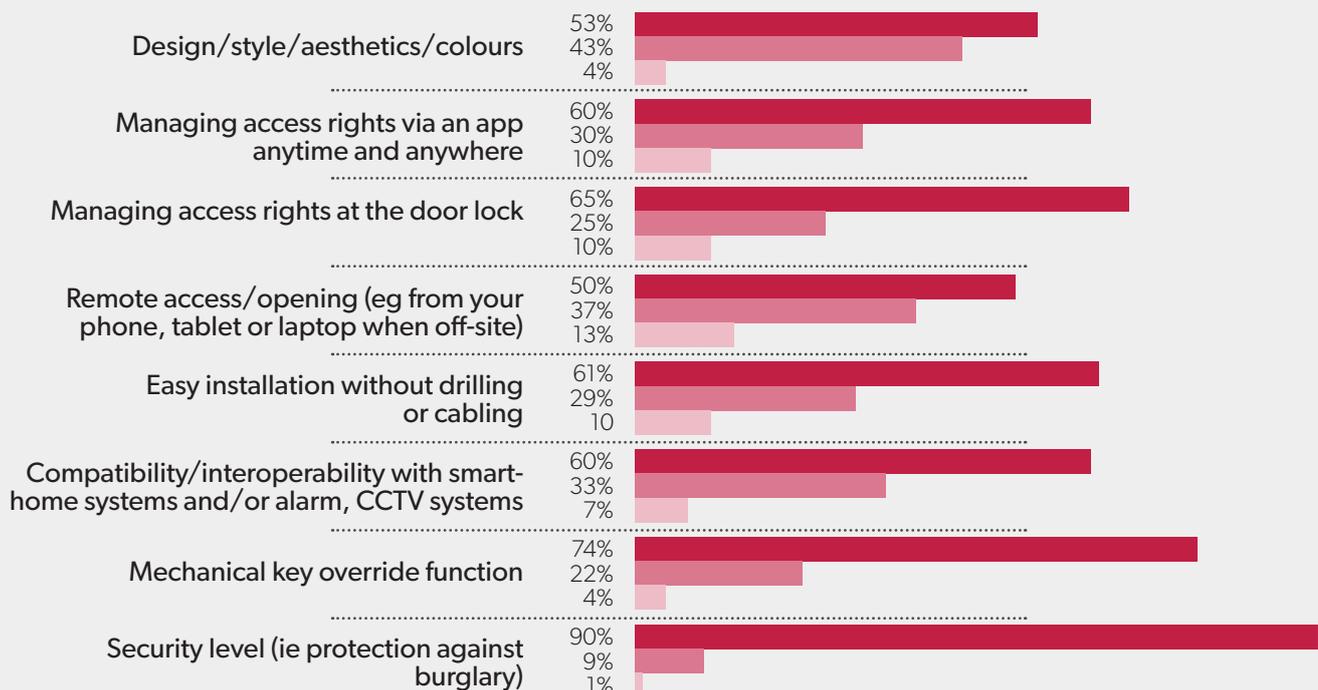
So the consumer is very demanding when it comes to what they want from a smart lock. Even the aesthetic or design qualities of a lock were at least 'somewhat important' to the vast majority of our respondents.

Offered the chance to suggest more potential functionality, respondents also suggested the following:

- "DDA compliancy; works when there is a power outage"
- "What can be offered for disabled people and people with learning disabilities?"
- "The security is very important – I have seen a biometric lock where all the data was held on the non-secure side of the door"
- "A functional thumbprint device"
- "The lock has a pinhole camera and can send an alert to the app whenever a mechanical key is used"
- "Battery life very important unless mains powered. Security of any software/app also critical – should not have any back doors!"
- "Car-style remote to unlock the door"
- "Cyber security has to be the highest level"
- "Parts easily available in local market"
- "Needs to fit common door types and be vandal-resistant"

How important are the following features when choosing digital locks for your home?

Very important % Somewhat important % Not important %



2 Digital versus mechanical security

As digital locks move beyond offices and into the home, what do people think about augmenting or replacing their mechanical locks with digital technologies *from a security perspective*.

A majority of respondents judged cards, fobs and PIN codes all to be more secure than traditional keys: "Digital door locks are more secure than traditional keys as traditional locks can be easily broken into by external forces," elaborated one. Another: "With the digital door lock one can be sure of the safety of his house."

Security managers have long had a choice between smart cards, key fobs and PIN codes. But the smartphone's proliferation to the point of ubiquity has provided a new option. What do homeowners think about locking or unlocking a door to their home with a mobile phone?

A similar majority to those who endorsed the other three access mediums agree that smartphone access is more secure than traditional keys. Nevertheless, sizeable proportions say security levels are about the same or even worse. One person talked of "enhanced convenience" but believes that "security levels are likely to be similar." Short-lived battery power – a notorious disadvantage of the smartphone – is not so convenient, although innovations are in the pipeline to alleviate the problem.

Cyber vulnerabilities are also highlighted as worrisome:

- "Somebody can access smartphone data"
- "[A smartphone is only secure] if the authentication is on the phone and not in the lock"
- "[At least] with keys you will see evidence that a door was broken into when forced"

By contrast, one person says, not unreasonably: "Your phone is as safe as a key, probably more so as I don't let mine out of sight."

Why might security not be improved by installing a digital technology? All access mediums, like all technologies, are flawed. "You can open electric easily if you don't mind blowing a fuse," says one respondent. Another warns that, "PINs can be divulged to others outside

the household, eg by children without their parents' knowledge."

Another commenter notes that "any physical device such as a fob or smart card can be lost. Most smart devices have additional security measures which protect against theft; smart cards and fobs do not."

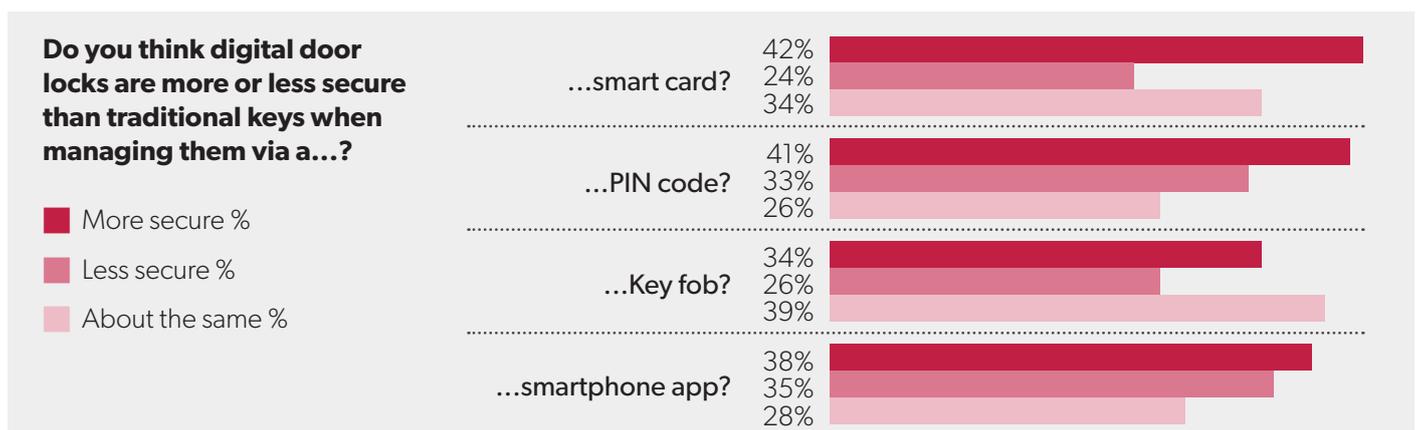
But this applies equally, of course, to the humble, traditional key. And at least, as one of those polled puts it, "fobs and cards cannot be easily copied, and if a card is lost, stolen or given to an unauthorised person, it can be disabled."

Numerous respondents confess to being unsure about the relative security levels of each medium. One says "it depends on the power scenario", while another surmises "there are a number of variables" impacting on security.

Several think a combination of technologies would be the preferred solution from a security point of view:

- Only the combination of mechanical locking and electronic locking could bring 'more security than traditional keys'"
- "Combination of two or more technologies will make it more secure"
- "If the mechanical locking portion is not of good quality then the other 'extras' will count for very little"

Another suggestion for enhanced security is a "two-factor authentication for access permission management [which] would obviously be more secure. The smartphone app should require separate authentication to unlocking the phone."

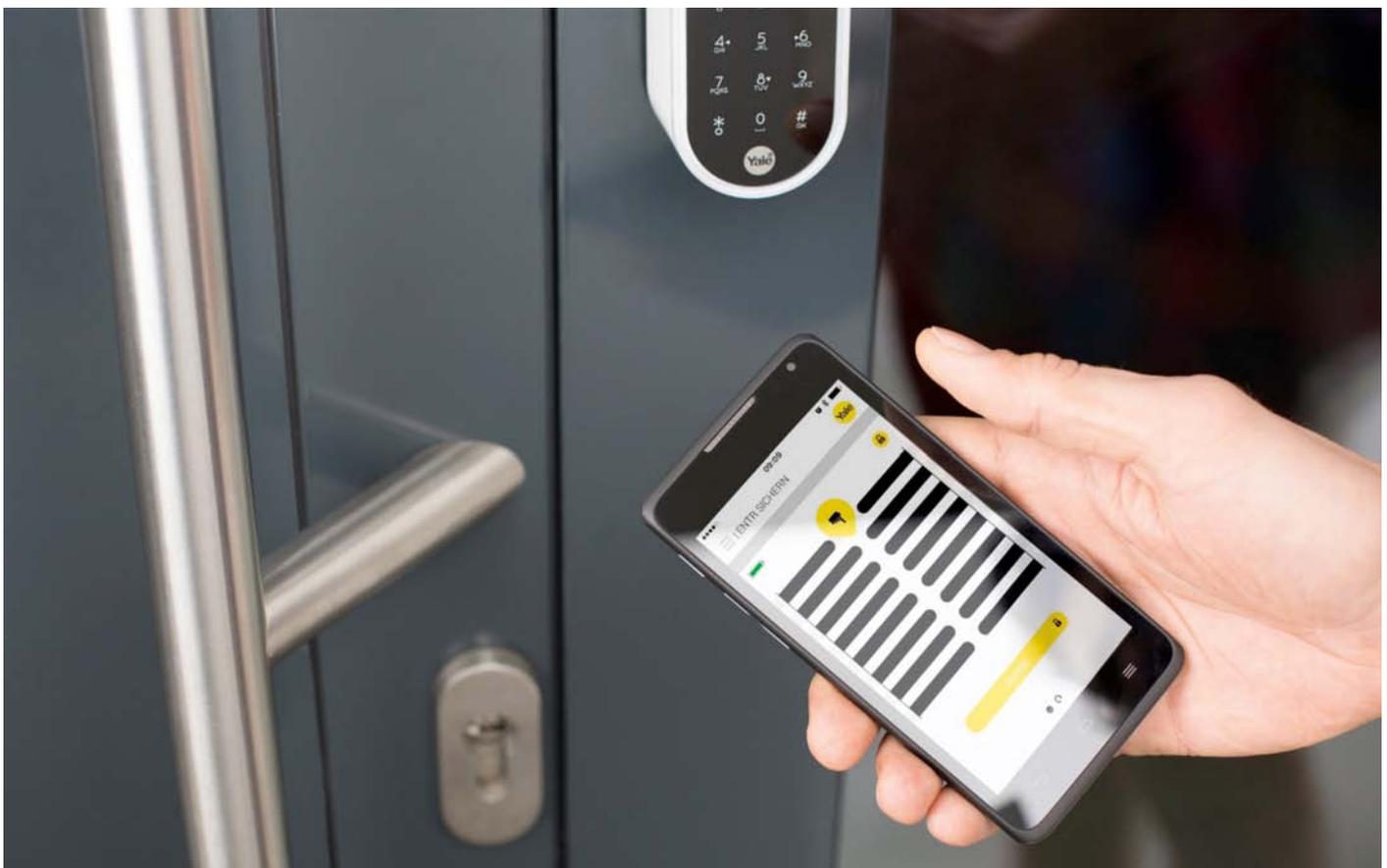
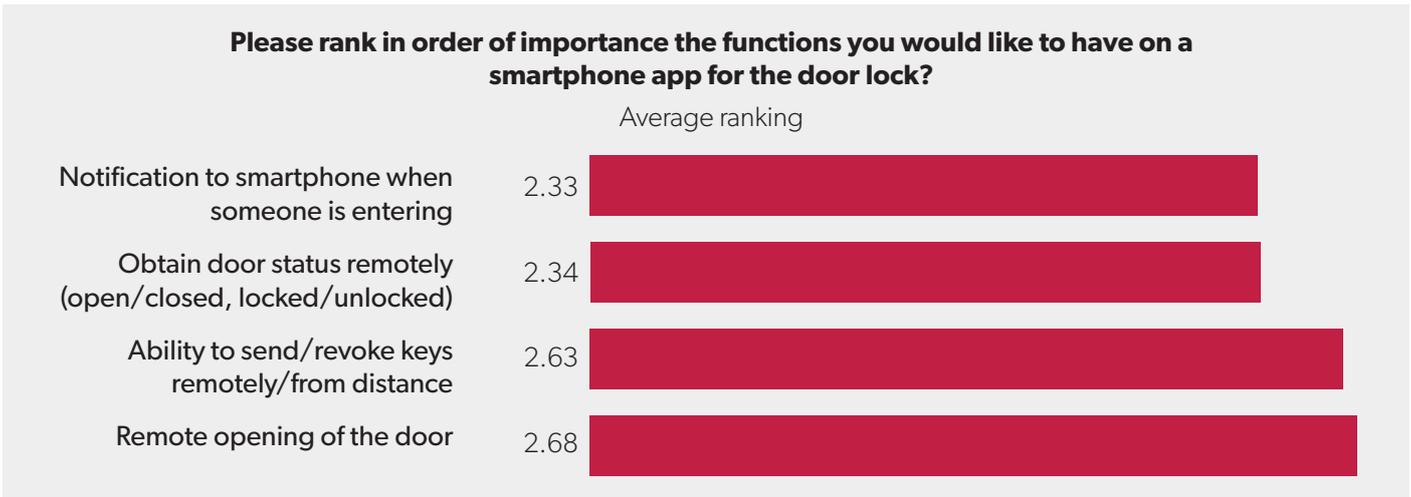


3 App functionality

Respondents were asked to rank in order of importance the functions they would like to have on a door-locking smartphone app. It was a close call between all four presented options. Topping the rankings on average (unsurprisingly, perhaps) is the ability to receive a notification to their phone when someone enters.

The merits of obtaining door status remotely ranks second.

The next two are not far behind, with mean average rankings (on a scale of 1–4) of 2.63 and 2.68, respectively. The ability to send or revoke keys remotely enables users, for instance, to grant access to a neighbour while on holiday, or to strip a builder of access rights once a job is finished. They may also want to remotely open a door if they need to grant a lodger access to a room which they are normally restricted from entering.



4 Who gets in – and how to change it

When it comes to how respondents want to change lock access rights, there was not a huge difference in preference between a smartphone app and using the device on the door, with the former a more popular option. The notoriously brief battery life of smartphones perhaps prevents a more emphatic superiority for what is in many ways a more convenient method, with apps offering remote access.

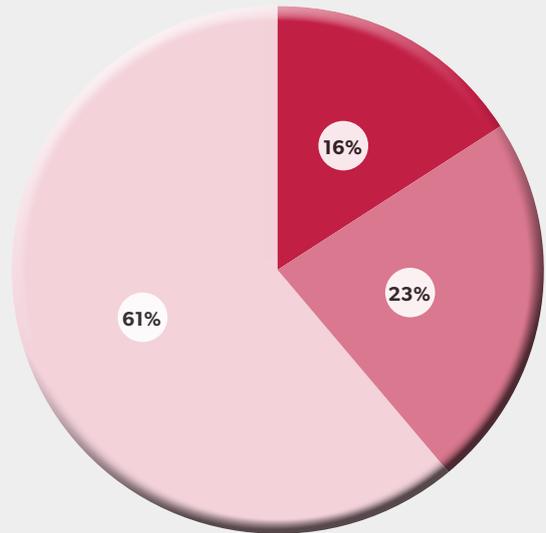
It's perhaps surprising that only 61% want the flexibility of having both options. One respondent's reply – that "the app and off-site stuff is of no interest at all and I see it as potential security weakness through inadvertent/unintentional operation and or theft of device" – offers a possible explanation.

"In fact, phone-based access is already well-established in the security-conscious commercial lock market," says Omer Sagi, business development director for smart door locks at ASSA ABLOY EMEA.

"At the enterprise level, ASSA ABLOY's mobile platform Seos makes no compromises on security. It has been adopted in sensitive sectors like education, healthcare and energy. Those kinds of customers would not be interested in an unsafe product," he continues.

How would you ideally like to change access rights to your door lock(s)?

- At the device/door **16%**
- Via a smartphone app **23%**
- Combination of both **61%**



5 Installation

Who wouldn't want easy installation with minimum door modification and without drilling at the door?

"ASSA ABLOY has found ease of installation to be a key advantage of wireless electronic locking for commercial customers," says Omer Sagi, business development director for smart door locks at ASSA ABLOY EMEA. "We even posted a video on [YouTube](#) showing one of our cylinders being fitted, start to finish, in under two minutes."

However, easy and drill-free installation apparently are not important to 29% and 47% of potential domestic smart-lock customers, respectively.

"Drilling a few holes is not an issue, but the cabling is the point," says one of those polled. "This is the greatest challenge – the fight between the reliability with drilling and cabling and 'easy to install'." Another: "Depends on the type of existing lock – replacing a standard cheap mortise lock might be better if installed with some form of drilling etc." Most succinctly of all, one respondent claims: "it is a rule: easy installation does not bring security."

"That, unfortunately, is a common misconception," says Sagi. "We have many years of experience with easily installed wireless locks in commercial premises. Several of these products are fully certified and CE marked for use on high security doors.

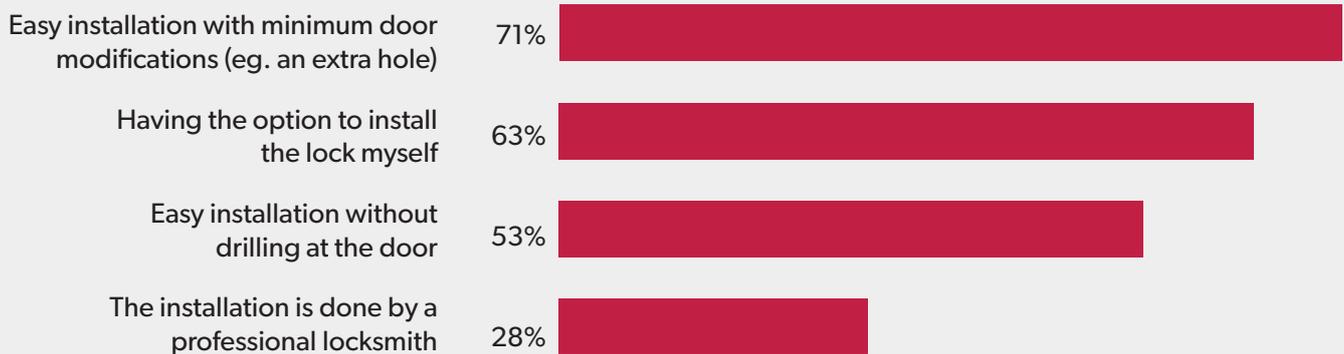
It is possible, and desirable, to combine easy installation and high security in a single product. We build products like the ENTR domestic smart lock with this exact ethos."

Removing the need for cabling wireless operation reduces installation complexity and damage caused by drilling. More than half (63%) want the option of installing the lock themselves. Only 28% feel they need to call on a professional locksmith to install it.

Offered the chance to comment further, respondents made the following points:

- "I'm a systems person and not a carpenter/locksmith. Whilst I could carry out such an installation if absolutely necessary, I would rather it was done by a person fully skilled in this discipline"
- "It would depend upon the situation – budgets are always an issue"
- "[I would want] quick installation with minimal damage to the door structure to ensure security of door in the event of physical attack. Locksmith sets up primary user who then adds codes/devices. Locksmith to have no access after installation"
- "Digital door locks must be carefully installed to avoid alterations"

Which of these features would be important to you regarding the installation of a digital door lock? (Please tick all that apply)



6 Powering the lock

Comparing rechargeable batteries to replaceable batteries is akin to electricity billed quarterly versus a pay-as-you-go meter. There's no venturing out in cold weather to top-up, or being left without power after the shops have closed. And it's cheaper, once the higher initial investment is outflanked by lower long-term running costs.

Many respondents note that rechargeables are more cost-effective and environmentally friendly. One calculated that "only 2% of energy used in creating a non-rechargeable goes into the battery itself." Several think solar power would be ideal, with one respondent observing, "it would most likely be situated on an external door".

Yet not far short of half of respondents say they would prefer to power their digital locks with replaceable batteries. Why do 43% of respondents prefer this option?

Several explanations were offered, most reflecting concerns over the performance and life of rechargeable batteries:

- "Anticipate longer battery usage with replaceable over rechargeable. I don't mind replacing the batteries every nine months as opposed to charging every three months"
- "If rechargeable, power would have to be run to the door for a trickle charge; if not, charging time of batteries would leave the door insecure"
- "Rechargeable batteries can become less reliable over time. Fresh batteries do not have the same issue"
- "Better to have the option of both. Rechargeable preferred to reduce long-term running cost and to reduce environmental footprint. But in an emergency when batteries are low we need option to put in replaceable while recharging the rechargeables"
- "It depends on how long the batteries last – if they last for a long time (longer than one year) then replaceable should be fine. If less than one year then rechargeable"

Survey respondents also made observations about alternative power sources:

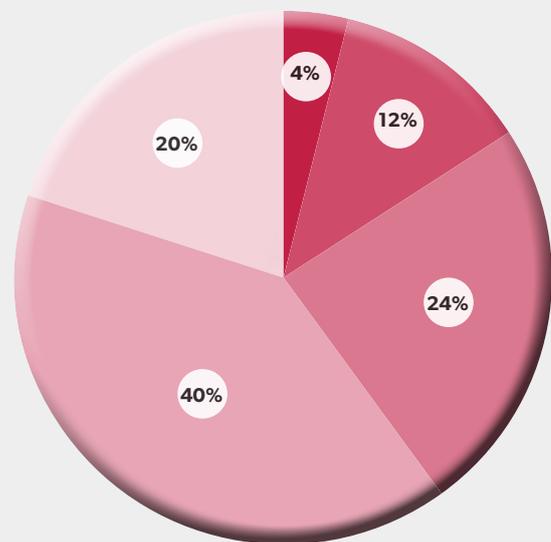
- "Could a Bluetooth or wireless system allow for future-proofing of system?"
- "NiCads last as long as primary cells and do not leak when exhausted. Also could be maintained on a floating charge from a mains-derived power supply"
- "Lock should really be powered with battery back-up. Door to stay in locked position when battery fails, only allowing mechanical key access"
- "[I would like to see] "wireless charging"

Clearly, smart-lock marketers must convince customers that the power supply to their new digital device is both dependable and convenient to replenish.

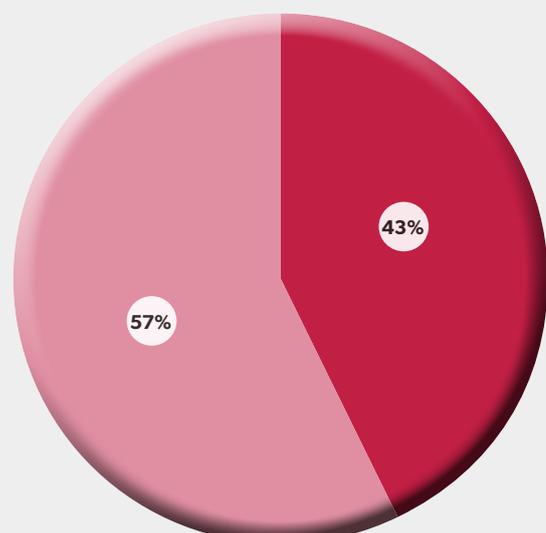
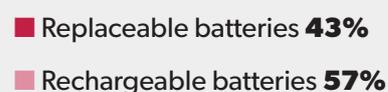
There is, nevertheless, a widespread – and accurate – perception that batteries in digital door locks tend to be long-lasting.

The most popular answer in the survey was 12–24 months, followed then in descending order of duration, with 0–3 months garnering only 4%.

How long do you think the batteries powering digital door locks would typically last?



Digital door locks can run on batteries – which kind of battery would you prefer?



7 Where to buy?

Asked where they would like to buy their lock, nearly a third “don’t mind”, presumably willing to seek value and expertise wherever they can find it.

A ‘smart-home specialist’ fills second place, probably because of the potential advice on offer. The motives, by contrast, for the 14% who want to buy from an online retailer or the 9% from a major electronics chain are probably more cost-based.

Many are eager to buy from what one person called a “reputable source”. Another raised concerns about the risk of locks being “pre-compromised at the retailer”. Of course, these same issues exist with mechanical locks too. Another commenter states that they “always appreciate the expert advice from a locksmith,” while another believes a “locksmith would tend to be more secure.”

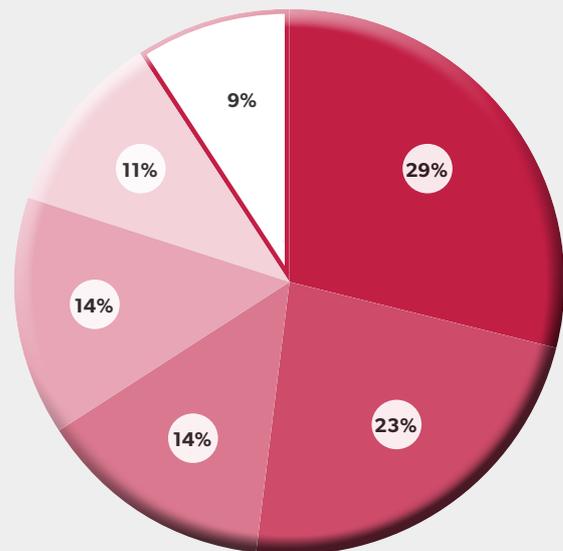
Preferences were also expressed for a “security integrator”, “security companies” or an “alarm system installer.”

Further comments include:

- “I would read reviews on the internet then buy one from a local retailer/locksmith to check if it works. If it does, I would fit the rest of the house with the same lock from the cheapest source (probably Amazon)”
- “You should be able to buy in multiple locations. We don’t have those options”
- “Don’t really care where I buy the hardware as long as it works with my door and can be installed by locksmith”
- “They [the retailer] should be reliable and specialised in door locks”

Where would you ideally buy your digital door lock?

- Don’t mind **29%**
- Smart-home specialist retailer **23%**
- Locksmith **14%**
- Online retailer **14%**
- DIY/hardware store **11%**
- Major electronics retail chain **9%**



Asked how much they are willing to pay for a digital door lock, respondents are typically happy to fork out more for a solution that allows them access via smartphone.

How much would you be prepared to pay for a digital door lock...?

	\$50-\$100 / £33-£66 / €44-€88	\$101-\$200 / £67-£132 / €89-€176	More than \$200 / £132 / €176
...with access right changes at the door	61%	33%	6%
...with access right changes via a smartphone app	30%	51%	19%

8 Concluding comments & key facts

Many survey respondents were excited about the concept of incorporating digital locks into the home. Typical comments include: "This would be an amazing addition to any home"; "digital locks are the future. With the integration of apps for use with a smartphone they can allow emergency one-time access, which will prove invaluable in both home and commercial settings"; and "digital locks are easy to operate and more secure".

Of course, there are dissenting voices. Some express a view that digital locks solve a problem that doesn't exist. "Conventional keys are much simpler to use and manage for the average household," says one. There were legitimate concerns about power outages, particularly for customers in countries with unreliable electricity provision. Unsurprisingly, in an era of high-profile cyber hacks, concerns about vulnerability to network breaches are occasionally raised.

However, a majority of those polled welcomed the emergence of digital access control for the home. Several already know what kind of products they want to see on the market and to install them in their homes.

Key data points from the survey include:

- Lock security and integrity is essential – and in many ways a given. Potential smart-lock buyers want features and functions that a 'dumb' lock can't offer, including **remote access** from a phone, **changing access permissions** at the door and smart-home **interoperability**.
- Consumers are demanding. They want a **diverse range of functions**; there's no one-size-fits-all feature set. Every single one of eight possible features and functions

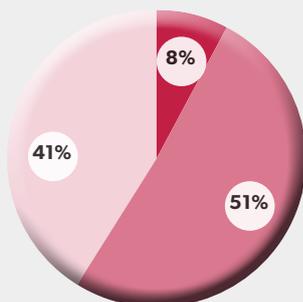
suggested in the survey is seen as 'very important' by at least half of respondents (see Section 1 on Page 3).

- **Power and the reliability of its supply** is a concern, without common agreement among respondents on a solution. Wires, standard batteries and rechargeable batteries are all favoured by a significant number of consumers (see Section 6 on Page 8). Interestingly, 43% of respondents would choose replaceable over rechargeable batteries to power a smart lock.
- The relative security of digital versus mechanical key entry is not a worry for most. A minority of those surveyed (between a quarter and a third) consider each of **smart cards, fobs, smartphones or PIN codes** to be less secure than a traditional key.
- **App functionality** should be broad: all of remote entry, remote door status updates, remote key issuing/revoking and entry notifications are rated as important (see Section 3 on Page 5).
- The ability to **change access permissions on a smartphone** (rather than solely at the door) is seen as desirable by 84% of respondents.
- Customers are willing to **pay a premium** for smart locks that can be fully operated by phone, with a majority indicating a willingness to pay between £66 and £132 for such a lock – and almost a fifth happy to pay more.

Endnote: Survey demographics

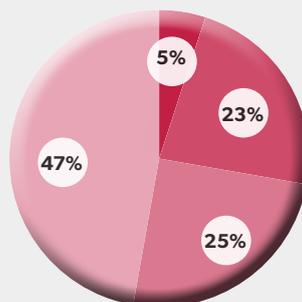
What is your age?

- Under 30 **8%**
- 31-50 **51%**
- Over 50 **41%**



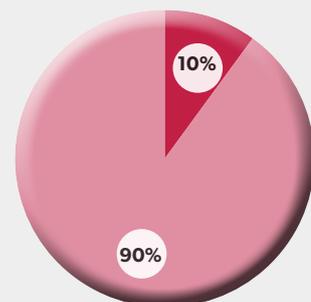
How many people live in your household?

- 1 **5%**
- 2 **23%**
- 3 **25%**
- More than 3 **47%**



What is your relationship status?

- Single **10%**
- In a relationship/married **90%**



A smart home starts with a smart door!

ASSA ABLOY smart door locks offer convenient and innovative door locking solutions for your home, without the need to carry keys. The emergence of the smart home is a major catalyst for the creation of digital door locks and accompanying products designed to integrate seamlessly with smart-home systems or provide convenient standalone access control. Digital door locks offer a convenient and secure alternative to mechanical locking using a key. Instead home owners can unlock their door using the smartphone, a code or tag.

The **Keyfree** and **Keyless Connected** smart locks from **Yale** gives the consumer freedom to secure their home without the need of a key. Simple to use, you now have complete control on how you unlock your door. There's no need to worry if your children arrive home early, or if you're stuck at work with friends on your doorstep. You control who and when people have access to your home. For example, you can set a PIN code that works for 24 hours for a family member or your cleaning person. You choose how you want to open your door. PIN code, remote fob and even from your smartphone when connected to a smart home system. Feeling safe and secure is a must for any home owner. In addition to a tamper alarm and incorrect PIN code feature the smart lock is approved by the Police Secured by Design scheme. The smart lock is powered by 4 AA batteries and it warns you when the batteries are running low. The smart locks can connect to leading smart home systems giving even more flexibility. The locks trigger events such as lights going on and much more including live audit trails.



Transform your front door into a smart one with **ENTR™**. The smart lock combines the protection of a mechanical cylinder together with the convenience of advanced technology – without compromising on performance. ENTR™ is an innovative smart locking solution that provides an easy secure way to lock and unlock almost any door, new or retrofit, without the use of physical keys. The digital lock combines smart convenience and High Security with automatic locking. Customers can control access to their home or office, using any connected device such as a smartphone, tablet, personal code, fingerprint reader or remote control. ASSA ABLOY offers ENTR™ worldwide under several brands, including **Mul-T-Lock**, **Vachette**, **TESA**, **KESO**, **NEMEF** and **Yale**.

