

# CONNECTED LIVING 2025



SURVEY ANALYSIS REPORT

## CONNECTED LIVING: HOW TECHNOLOGY COULD IMPACT DAILY LIVES BY 2025

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## About Gemalto:

Gemalto is a global leader in digital security, bringing trust to an increasingly connected world. We deliver easy to use technologies and services to businesses and governments, authenticating identities and protecting data so they stay safe and enable services in personal devices, connected objects, the cloud and in between.

Our solutions are at the heart of modern life, from payment to enterprise security and the internet of things. We authenticate people, transactions and objects, encrypt data and create value for software – enabling our clients to deliver secure digital services for billions of individuals and things.

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# Foreword

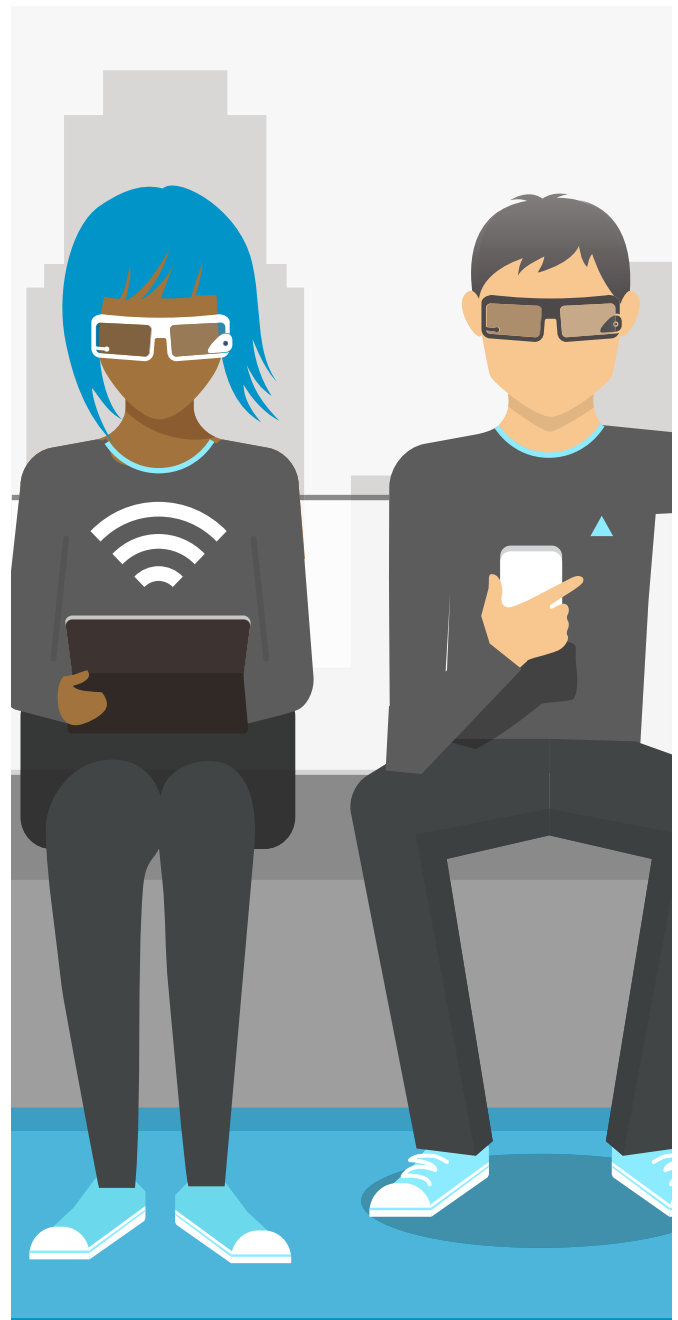
by Rémi de Fouchier, Vice President, Marketing Communications for Gemalto Mobile

No other device today dominates our lives as much as the mobile phone. We would be both figuratively and literally lost without them. We use them to wake-up, to play music on our way to work, to look up facts, plan our social lives, to work, connect with friends, find love, and discover new interests, places and opportunities. This is all commonplace now, in stark contrast to the years before 2000. I'm currently 45 years old and have therefore spent most of my life without a mobile phone; instead, I grew up using paper maps, paper agendas for meetings and appointments, physical notebooks for phone numbers and a Sony Walkman – incredibly heavy by today's standards - to provide me with music on the move. With my paper past behind me, it's been stunning to see the rise of mobile all around us and how it's now woven into almost everything we do.

Every company is now deploying a mobile strategy, and few people would dare to go without their smartphone for a week. So we wondered, if we're so tied to our mobiles now, what do people think will happen ten years' down the line? We polled 1,200 young adults from around the world about their expectations will be for the world of mobile in the future, and what they think (and hope!) the services and features of mobile technology in 2025 will look like.

The results paint a picture of a world populated by smart cities, where people live in a hyper-connected society, using their mobiles for more than many thought possible only a few years ago. There are a great many dreamers too, with huge expectations for the way the world will change in the years to come.

Not only are these insights fascinating because they give a glimpse of what consumers expect in the future, but also because they give insight into how mobile operators, cities, homes and workspaces could evolve as we move into an ever more connected future. We therefore decided to close the report by considering the implications for the mobile industry today.

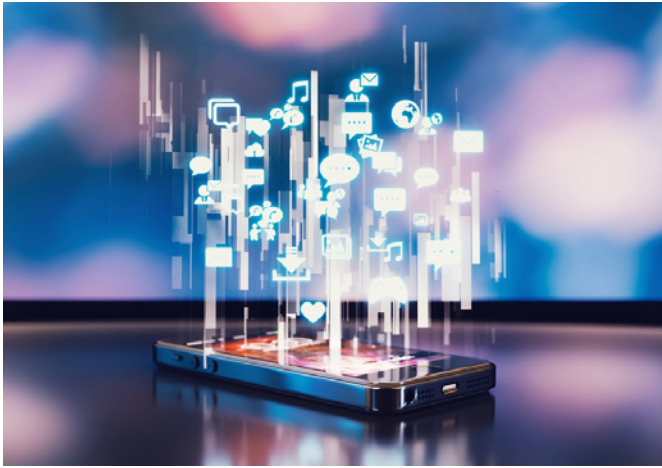


## Methodology:

Just over 1,200 consumers aged 18-30 were surveyed by Smart Survey in an online poll in December 2015, on behalf of Gemalto. Respondents were evenly split (approximately) between Brazil, China, France, Germany, the United Kingdom and the United States. The survey was developed by the Gemalto mobile team, with the support of applied futurist, blogger and media personality Tom Cheesewright.

# Introduction

It's been nine years since Apple kick-started the smartphone revolution. In that time we've embraced apps, and gained access to thousands of services that, prior to the dawn of the smartphone age, would have required all manner of gadgets and real-world resources. Our relationship with other technology, from MP3 players, to digital cameras, and the humble printed map has been transformed by the smartphone, and as the technology develops, more and more is becoming possible, from healthcare to atmospheric monitoring.



This transformation has resulted in a huge demand for mobile data. Over time, as mobile technology improved and consumers became accustomed to using their phones to go online, mobile internet usage caught up with fixed connections. In 2014, mobiles overtook desktops, and since then have only continued to rise.

One important element in the rise in mobile data consumption is the introduction of smartphone apps. Since the launch of the iPhone App Store in 2008 (followed by many similar stores), apps have evolved to turn our phones into devices as powerful as most PCs. With the world now at our fingertips, it's no wonder consumption has grown so quickly. And as apps continue to increase in diversity and compatibility, it's only a matter of time until mobile phone internet penetration goes over 60% worldwide. In fact, the figure is expected to grow to 61.2 percent in 2018<sup>1</sup>

In parallel to the evolution of mobile technology, technical advances have rapidly altered what is possible over the Internet. We have secure, fast networks able to stream HD video, and the industry is constantly pushing the boundaries of what's possible.

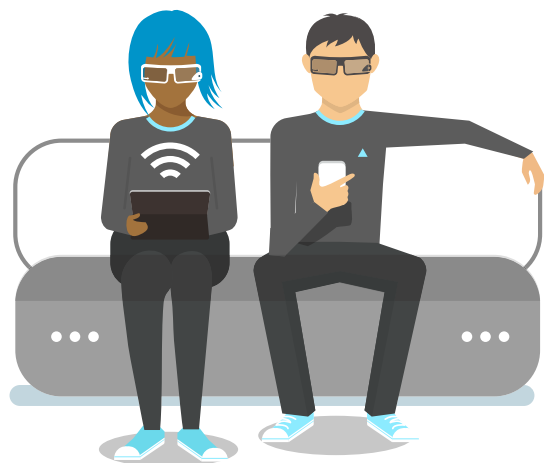
**Table 1: Source:** Akamai State of the Internet Report [www.stateoftheinternet.com](http://www.stateoftheinternet.com)

Average broadband speed	Q3 2007	Q3 2015	% growth
France	3195	8154	255%
UK	3268	12974	397%
Brazil	698	3646	522%
China	673	3687	548%
USA	3672	12572	342%
Germany	3208	11528	359%

In the last 8 years alone, average Internet speeds in the six markets surveyed alone have risen more than 400%. What the next 10 years can bring, we can only imagine, especially if the promises of 5G – which should be coming onto the market by then – come to fruition.

## In the last 8 years alone, average Internet speeds in the six markets surveyed alone have risen more than 400%

Those we surveyed therefore describe a world in which the leap from only ten years ago to that of 2025 seems insurmountable. The rate of change seems improbable, but as with many future gazing projects, we may actually find that our projections are too conservative.



<sup>1</sup> Source: Mobile phone internet user penetration worldwide from 2014 to 2019 - <http://www.statista.com/>


# General trends for the future of mobile

In our survey, respondents were incredibly positive about what the future of mobile holds. On the connectivity and content front, 87 percent believe access to any content they want will be seamless, and 61 percent believe that Wi-Fi offloading will be commonplace.

The recent breakout trend of mobile payments is also expected to be widely embraced, with half of respondents thinking it will be simple to make any type of payment, be it real-world or digital, through a card loaded on your smartphone or carrier billing. Indeed a big theme in the report is the frictionless nature of mobile. People expect that all the kinks into today's world will have been ironed out to deliver an experience that just works, no matter what you want to do. This frictionless expectation is also reflected in how future users envisage core device functionality, such as how we unlock our phones. It's apparent that a blend of convenient, but highly secure solutions will be in demand.

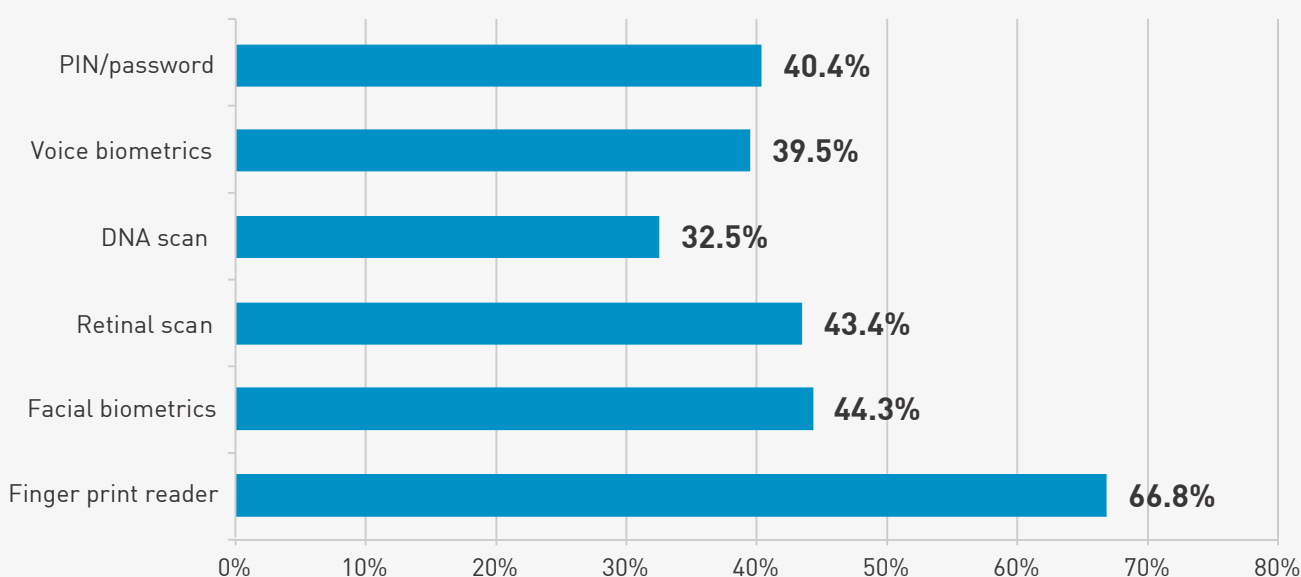
We also asked how people thought we might unlock our future phones. Respondents rate fingerprints as still

being the most popular choice in 2025, with two thirds favouring this method. Given how much we stare at our phones (and not just for selfies!), it probably shouldn't come as much of a surprise that facial recognition (44 percent) and retinal scanning (43 percent) beat out the more traditional PIN/password (40 percent). More interestingly, nearly a third think that our phones will come equipped with a DNA scanner to ensure only you can unlock your phone.



**61%** expect always on mobile data and seamless wi-fi offloading wherever they are

**Fig 1:** How do you expect to unlock your device in 2025?



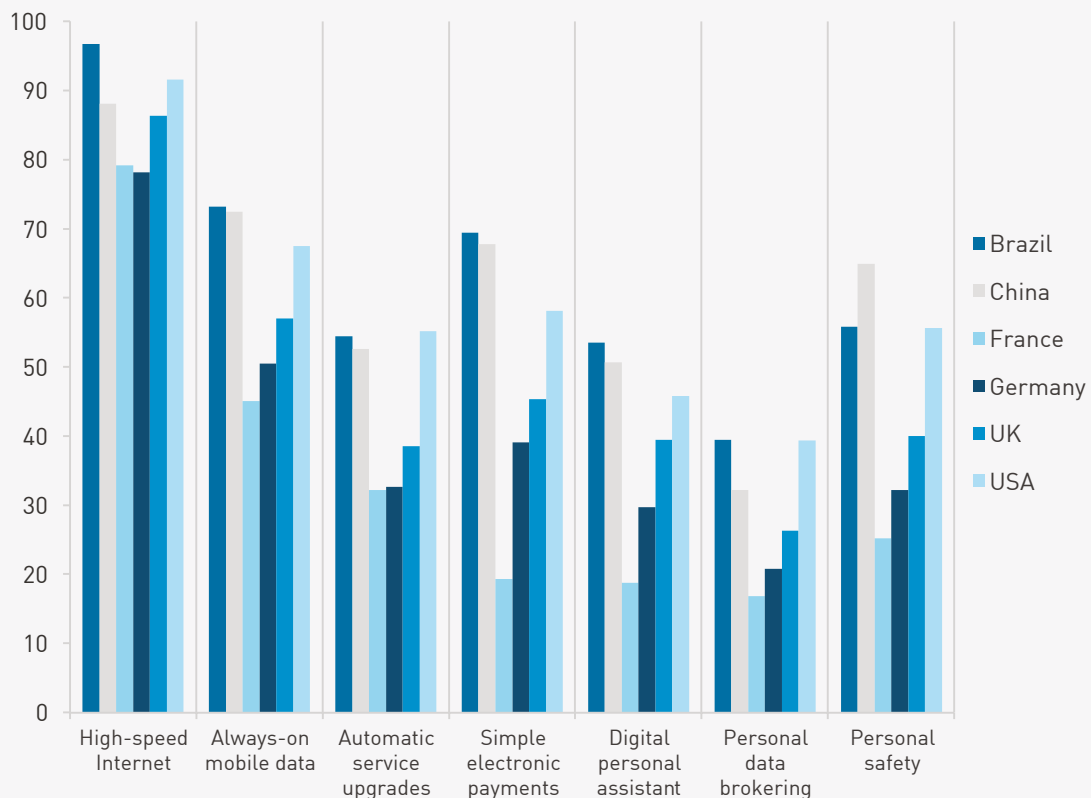
## International trends

French and German youth are least optimistic about all these services; with some tremendous gulfs in the responses; for example, only 19% of French respondents expect simple electronic payments from their mobile provider (vs 69% of Brazilian respondents and an average across the sample of 50%); similarly for digital personal assistants (19% for France vs. 40% average). In contrast, Brazil and China are at the opposite end of the spectrum, perhaps illustrating the developing countries tendency and expectation of 'leapfrogging' technologies in rapid development spikes. The Chinese and Brazilians are also those most in hope that DNA scanning will become a reality (47% and 36% of respondents respectively, vs. an average of 32%).



Only **19%** of French respondents expect simple electronic payments from their mobile provider.

**Fig 2:** What services would you expect from your mobile operator in 2025?



# Smart Cities

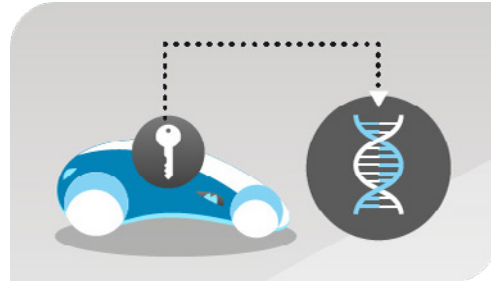


Much has been made of how the Internet of Things will forever changes our lives. From the industrial IoT using sensors to breathe life into manufacturing and make industrial equipment in oil & gas, mining, and transport safer and more efficient, to the more accessible consumer focused IoT that simplifies our daily routines, there seems to be almost limitless potential.

Few areas have seen more hype than Smart Cities. From sewer systems linked to transport grids, so that a burst pipe that floods a street will see the city automatically reroute traffic to avoid any congestion, through to environmental monitoring for flood protection. A city

that syncs multiple infrastructure layers is certainly an attractive idea, and our respondents certainly buy into the idea that the getting about will be much simpler.

Our survey touched on a few key areas.



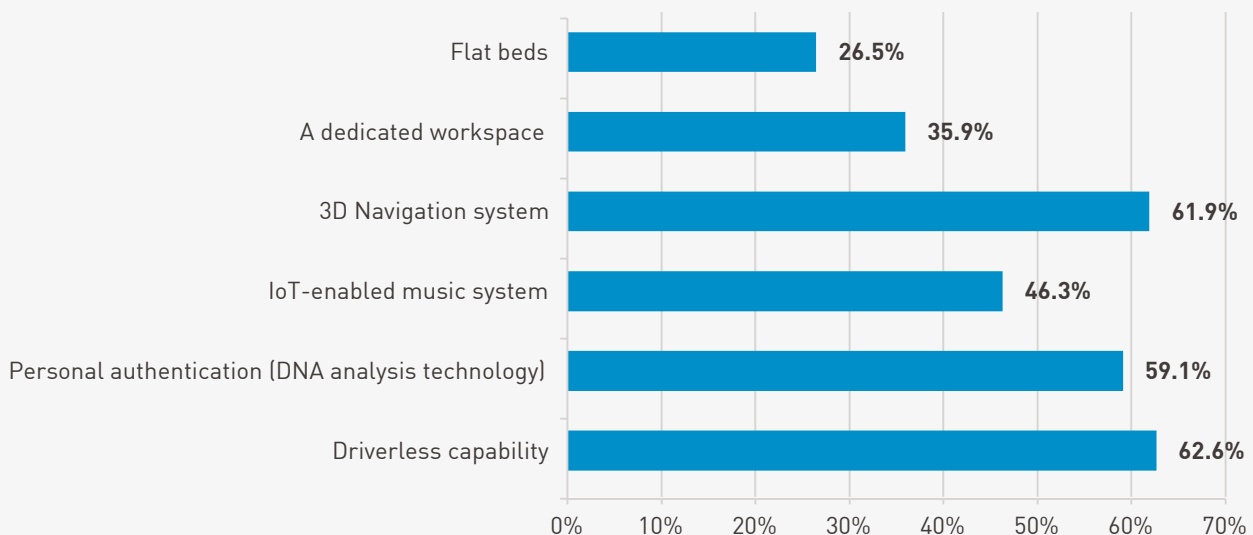
## The rise of the driverless car

While Google, Tesla and a few others are running autonomous car trials as you read this, almost two thirds (63 percent) think that by 2025 cars will be driverless. But their appetite for innovation didn't end there. 60 percent think car keys are a thing of the past, with access to your car granted by a simple touch – thanks to DNA sensors.

Of course the interior of the cars that roam the smart cities will also be updated. 62 of people thought that 3D maps will be displayed in front of you as you drive so you never get lost.

And there are some very optimistic youth amongst our sample, with 27 percent thinking that flat beds will be an option, allowing you to catch a few winks while the driverless-car whisks you around town. More than a third (36 percent) thought that cars would become places you could catch up on your workload.

**Fig 3:** What features would you expect from the connected car of 2025?



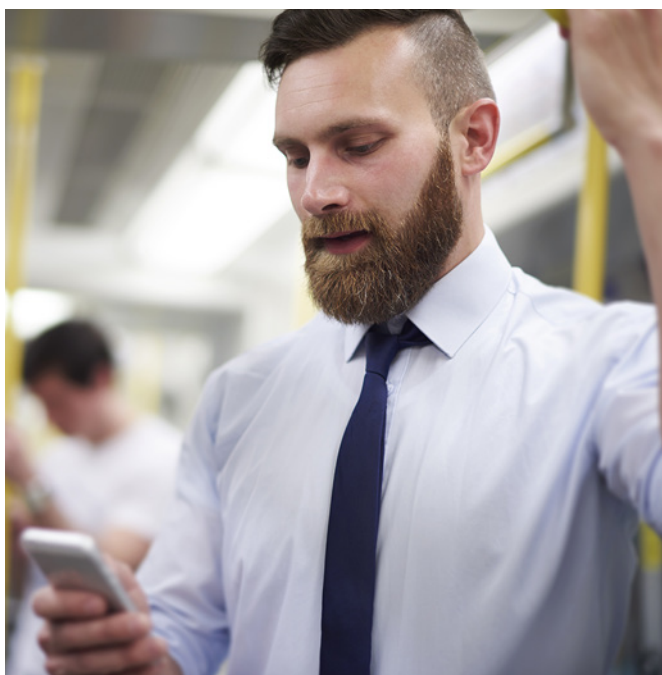
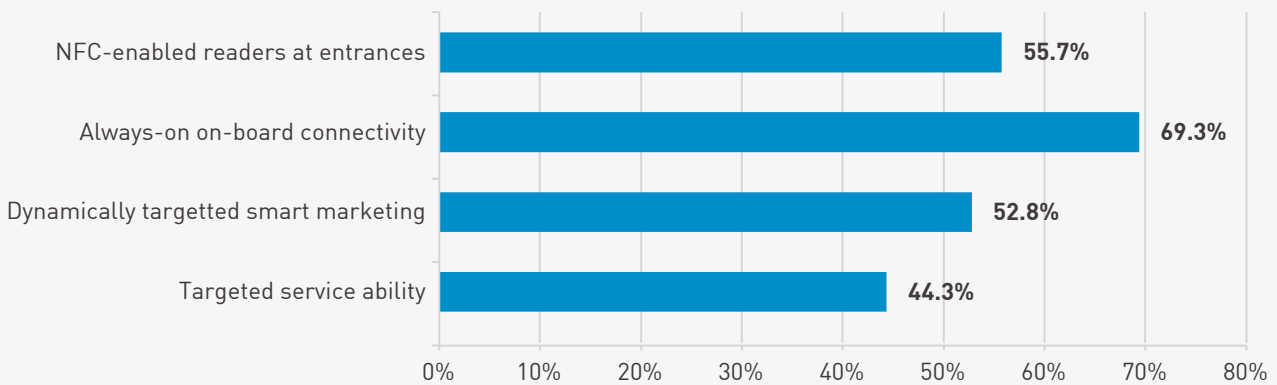
## Public transport

If there is one thing this survey can tell the decision makers are public transport authorities, it's this; people expect high-speed connectivity even when travelling underground. Nearly 70 percent of respondents think that by 2025, we will all be able to watch our favourite shows while zooming through the tunnels. It also looks like printed tickets are a thing of the past, with 56 percent thinking NFC will be the de facto ticketing option.

People expect high-speed connectivity even when travelling underground



**Fig 4:** What do you expect from a connected transport system?



Also interesting is the idea that the transport systems in tomorrow's smart cities will be intelligent. 44 percent agree that public transport networks will be able to gauge demand and increase or decrease the frequency of service. This could hugely benefit not only the environment, reducing nearly empty trains and buses, but also allow one-off events like concerts or sports events in a particular part of the city to be better served.

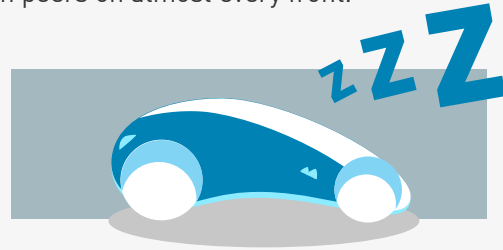
Waiting for a bus or train will also be more interesting in the future. 53 percent believe that screens will dynamically display personalised offers, allowing passengers to fill the time on their journey by checking out the latest concerts happening that day, or booking a table at a new restaurant.



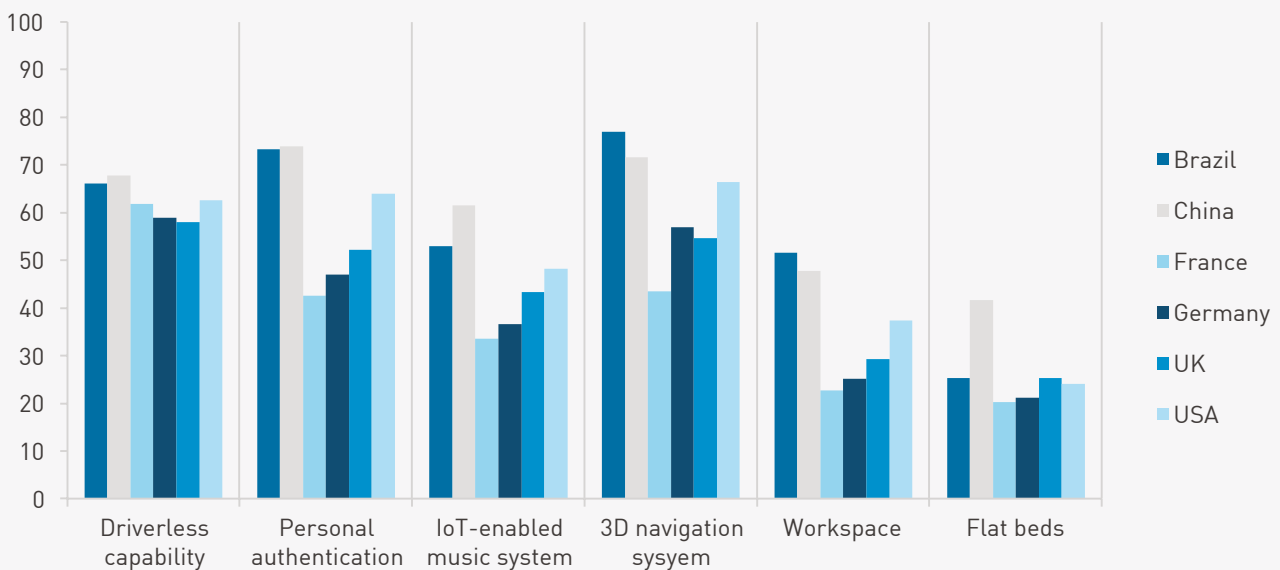
## International trends

On the connected car front, again, the European countries in our sample saw much more conservative expectations on almost every front, and the Brazilian and Chinese youth without exception were significantly above the average response rate in each area surveyed. In particular, it's worth noting that 52% and 48% of Brazilian and Chinese respondents respectively expect the connected car to act as a workspace in the future (vs an average of 36%) and an astonishing 42% of Chinese expect to be able to have a nap in flat beds in their cars. In general, the US respondents were also more optimistic than their European peers on almost every front.

42% of Chinese expect to be able to have a nap in flat beds in their cars

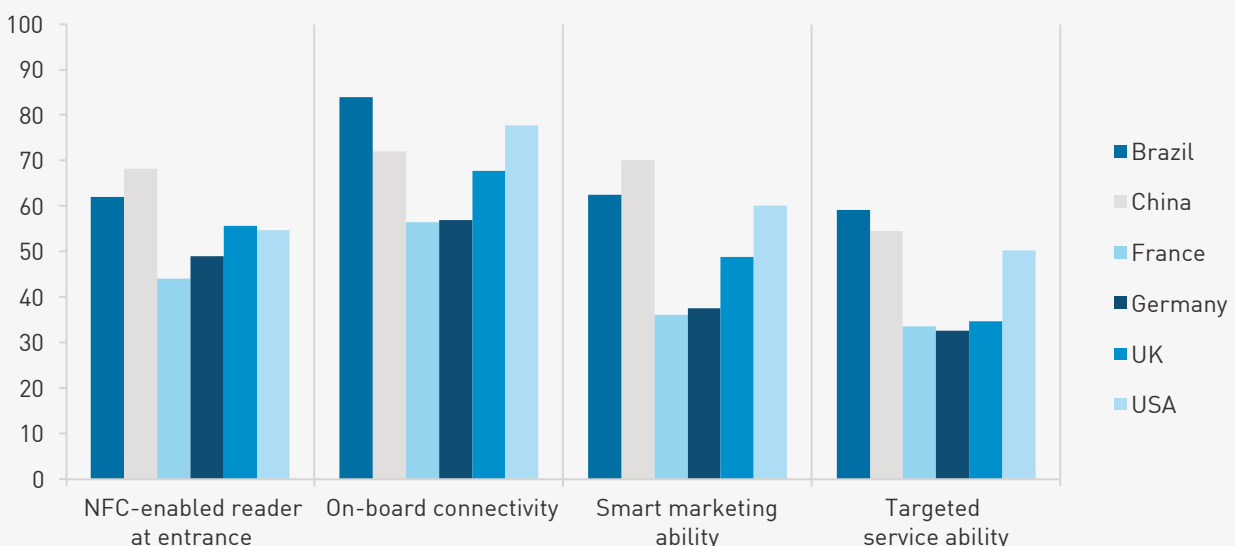


**Fig 5:** What features would you expect from the connected car of 2025?



It's a similar story on the urban transport side, although this time the British respondents also have high expectations, perhaps buoyed by the already evident innovation in London's transport infrastructure which supports NFC card and smartphone payments already.

**Fig 6:** What do you expect from a connected transport system?



# Hyper-Connected Society


With the launch of wearables over the past few years, we have embraced the concept of the quantified self. For a relatively low cost people can now keep up to date with all sorts of health data such as their heart rate, blood pressure, daily steps-taken, and their sleep patterns. Soon you will be able to track your blood sugar levels to get an even more detailed view of your health.

## Health

The prospect of telehealth resonated well in the survey. 63 percent of people think heart-rate monitors will evolve to the point of being able to show you a 3D display of your heart, with daily reports telling you how you are doing.

A fun use of the IoT comes in the form of a connected toothbrush that will show a detailed 3D display of your teeth on your smart glasses. The image will highlight the areas where plaque has built up, dramatically reducing cases of gum disease, and the toothbrush will also connect to your dentist to schedule an appointment if a problem is sensed while brushing. Also, no more missing that check-up as your toothbrush just made the appointment you've been putting off for months.

One area that surprised us was the respondents' positive attitude to connected implants. Six in ten thought we would have a one that would monitor our blood

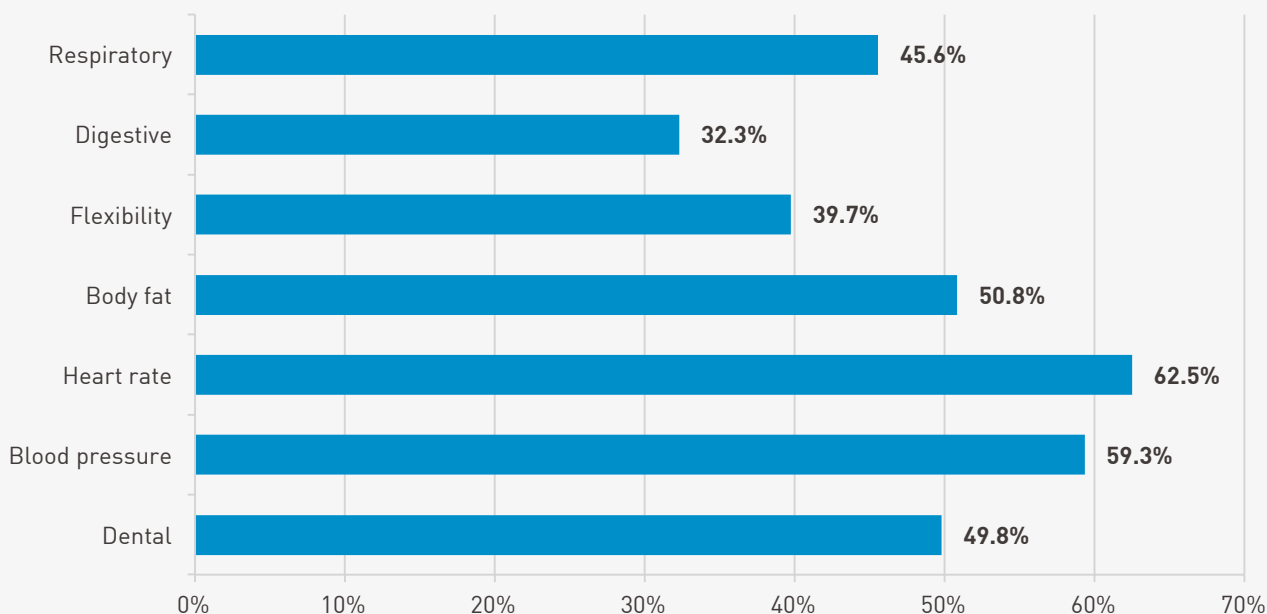


**63%**  
expect healthcare trackers to show you a 3D display of your heart

pressure in real-time, helping to diagnose problems long before they become serious. A further 51 percent thought another implant would do the same for body fat, syncing readings to our smartphones which in turn would recommend a healthier diet to follow.

46 percent thought that we would have a pulse and oxygenation monitor built into your smart watch that combines with a peak flow meter you blow into occasionally checks your lung performance. Finally, one third thought that smart toilets would be able to analyse our waste to pick up any symptoms of disease.

**Fig 7:** What health data would you expect technology to help collate, assess and support you and your healthcare adviser?



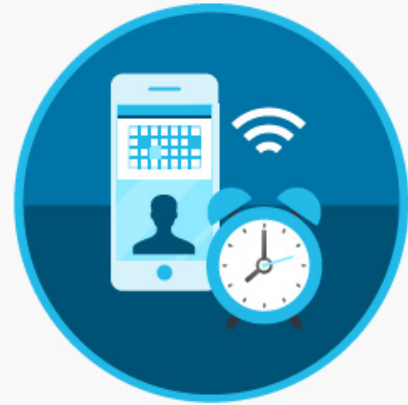
## Personal Assistants

Technology in 2025 will also help us plan our daily lives better. We are slowly getting used to speaking to our phones, whether that is Apple's Siri, Microsoft's Cortana or the Google App. But in ten years' time, our relationship with these personal assistants will be far more developed. 62 percent think that these virtual PAs will make sure we never miss a meeting as they will analyse emails autonomously and produce a detailed daily schedule, taking into account all our personal, social and work commitments.

These personal assistants will also become invaluable recommendation engines, with 56 percent thinking they will help us discover new things. 43 percent think they will negate the need to search for new entertainment, instantly serving up what we want.

These assistants will also be much more useful than today, with over half agreeing that they will manage all of our IoT devices and services. So while you can set your heating to come on when you leave the office now, in the future as soon as you leave your desk for the day, your personal assistant could start getting the house ready for your return without you lifting a finger.

43 percent also believe these helpers will know so much about us, that they buy the things we like on our behalf autonomously. Perhaps it will be drones delivering these

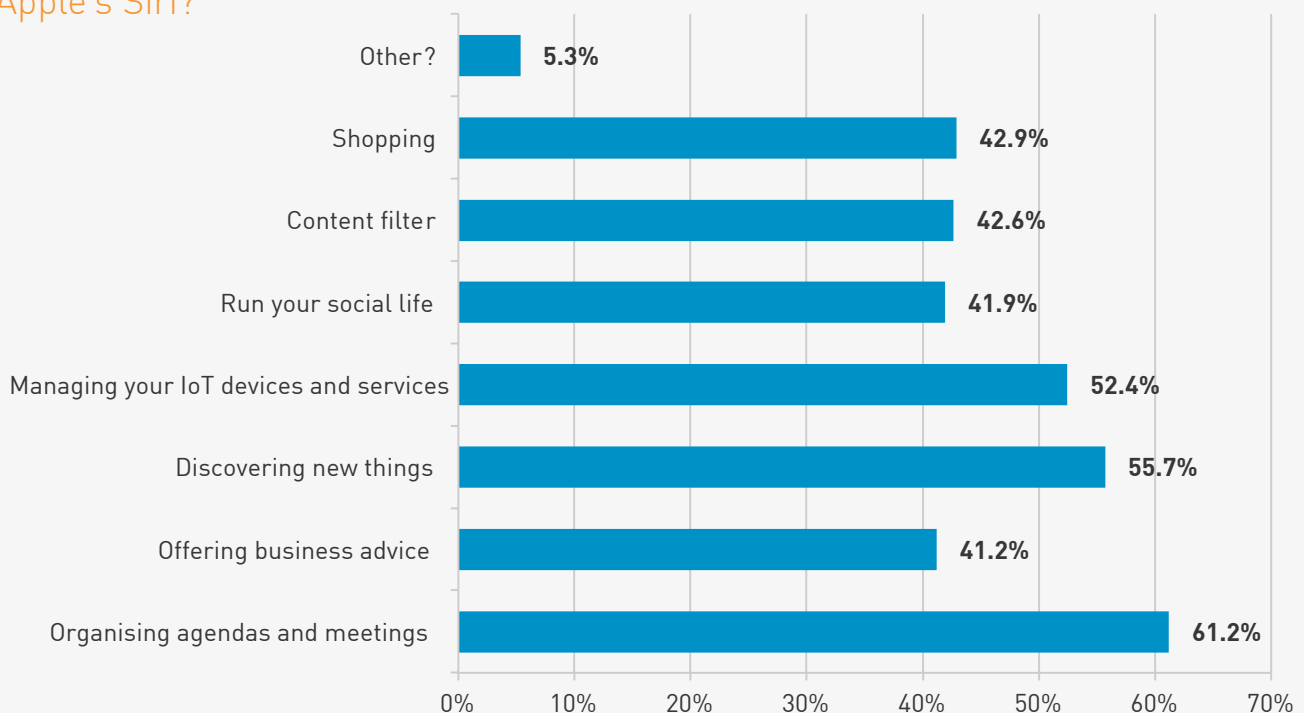


**61%**

think they'll never miss a meeting in 2025 thanks to virtual PAs organising their schedule. 42% expect them to plan their social lives too!

items to our homes, and even returning them if we don't need or like them. And just over four in ten (42 percent) think they will also take the hassle out of managing our social lives, with our free time mapped out with the latest our smart cities have to offer. Equally 41 percent think the future Siris and Cortanas will be able to offer sound business advice on company plans.

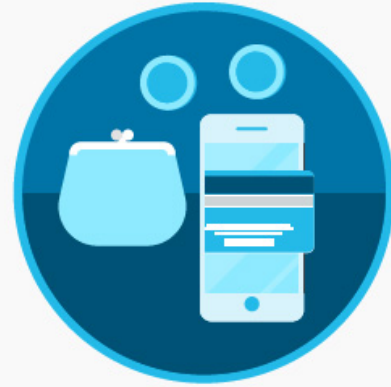
**Fig 8: What services would you expect from a virtual Personal Assistant like Apple's Siri?**



## Contactless Payments

The payments industry is undergoing a radical period of change with the twin pillars of mobile and contactless payments revolutionising how we pay for goods and services. When we asked people about the future of payments, the most striking finding was that almost a third (32 percent) think that there will be no coins used in 2025, with bank notes also increasingly rare. Such has been the pace of adoption of contactless and mobile that this is one prediction that just might come true.

Fraud prevention also figured prominently in the results. 70 percent of all respondents think that dynamic cards with details that frequently change will greatly reduce cybercrime. And with the ease of use of these new payment technologies, people envisage an era of zero-restriction with their payments. 42 percent think we will be able to buy anything at price with just one mobile tap. Of course the experience will be seamless too, with almost two thirds (63 percent) agreeing that payments will take place instantaneously.

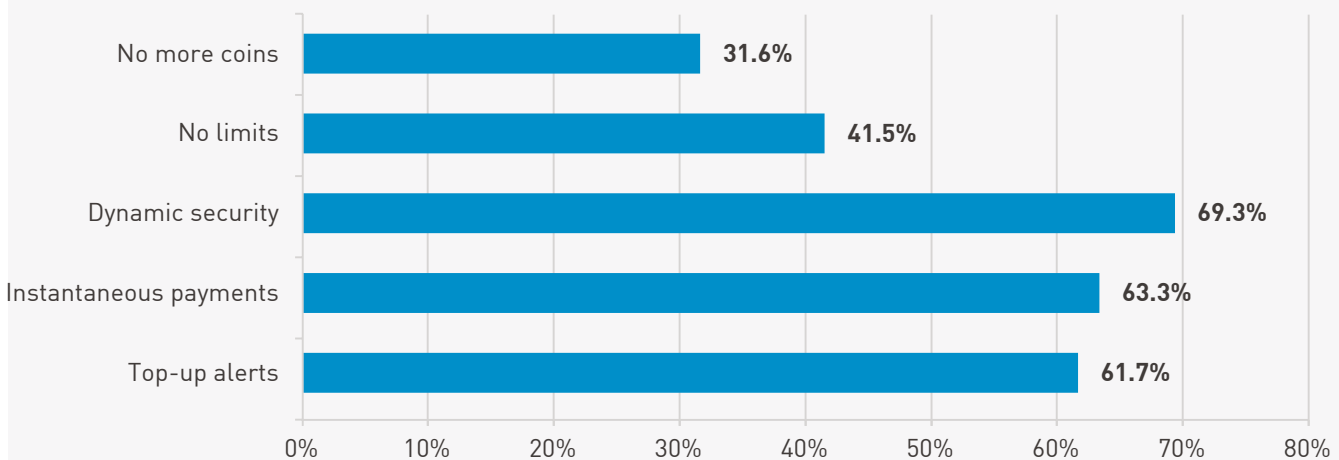


# 32%

expect coins to be a thing of the past.  
42% expect to be able to buy anything  
with their mobile, and 69% expect to be  
using dynamic smart cards whose  
details change every minute

The most striking finding was that almost a third (32 percent) think that there will be no coins used in 2025

**Fig 9:** What services do you expect from contactless payment technology in 2025?



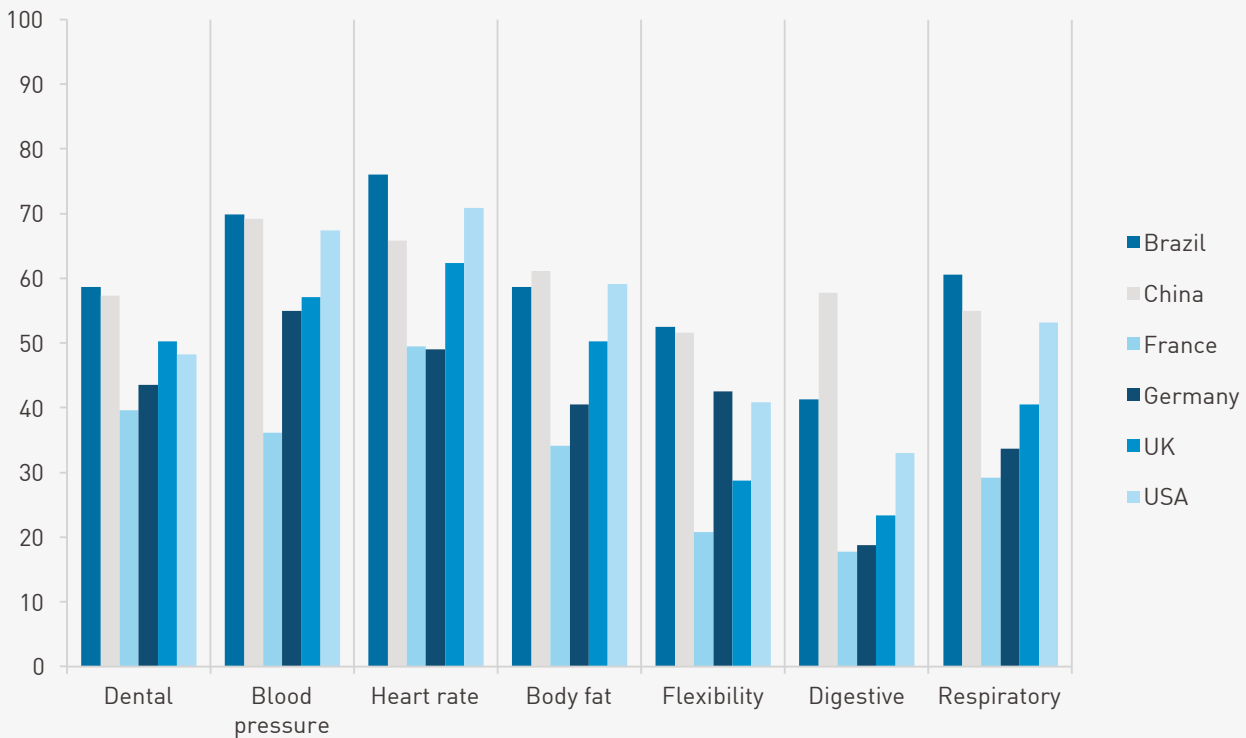
## International trends

Again, Brazilian and Chinese consumers seem more optimistic than their European counterparts about the future of healthcare across the board. However the American respondents polled highly when it comes to blood pressure monitoring (67%), heart rate tracking (71%) and body-fat analysis (59%). Given the USA's privatised healthcare system and the expense of treatment, perhaps it's unsurprising to hope mobile technology can provide some assistance. China was also the country with by far the largest hopes for smart toilets, with almost six in 10 expecting them to become a reality versus an average of a third of all other respondents.

American respondents polled highly when it comes to blood pressure monitoring, heart rate tracking and body-fat analysis

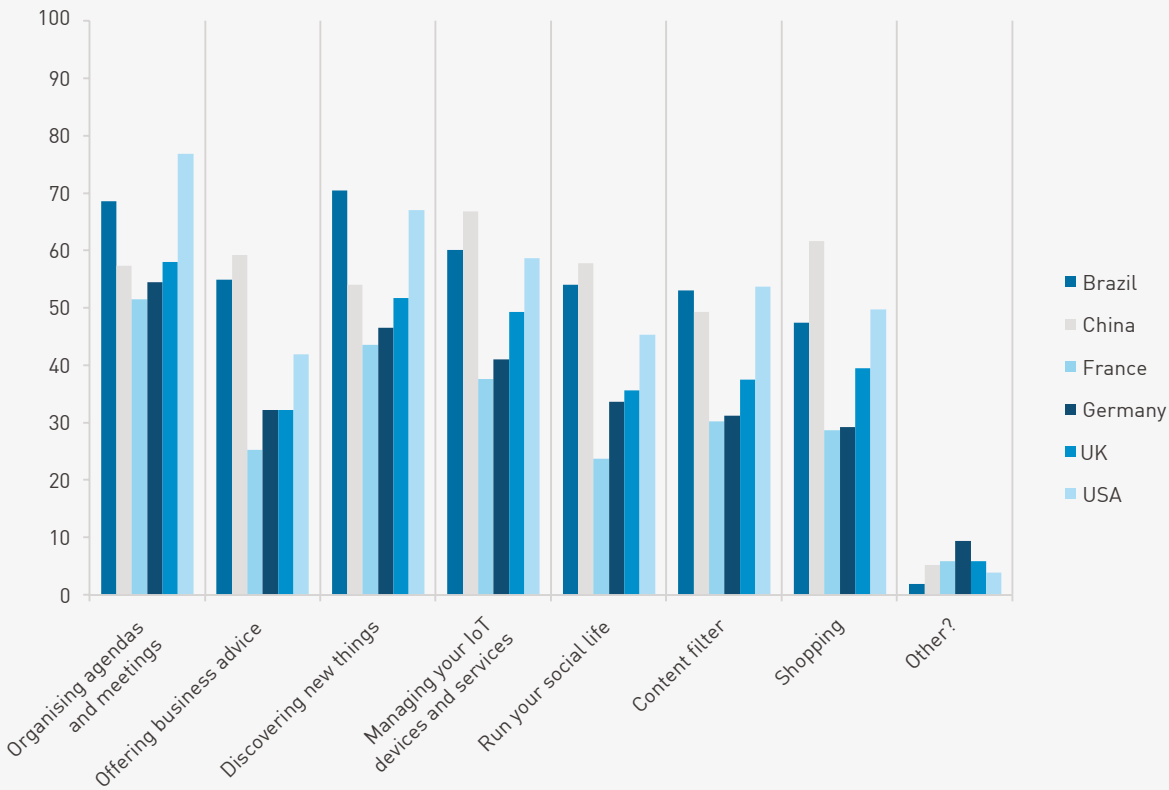


**Fig 10:** What health data would you expect technology to help collate, assess and support you and your healthcare adviser?



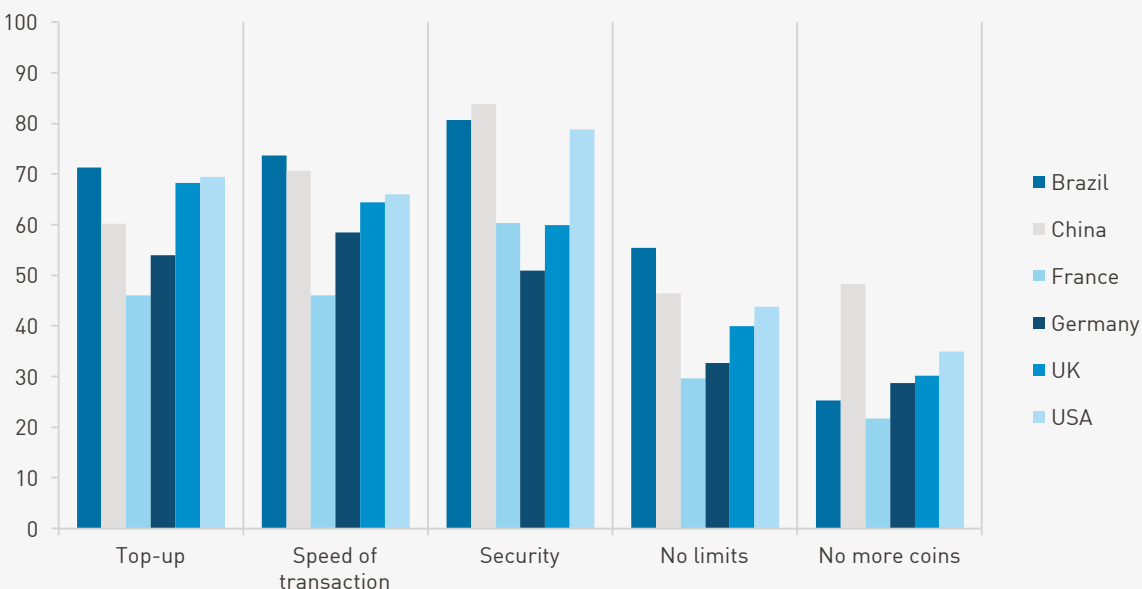
When it comes to help from personal assistants, over three quarters of Americans expect never to miss a meeting versus 51% in France, 54% in Germany and 58% in the UK. Brazilians are most optimistic about using them to discover new things, with 70% expecting instant answers to any question (versus less than half of French and German consumers). The Chinese meanwhile are most expectant of virtual assistants to run their IoT devices (expected by 67%), their social lives (58%) and do their shopping for them (62%).

**Fig 11: What services would you expect from a virtual Personal Assistant like Apple's Siri?**



In payments, almost half of Chinese respondents (48%) don't expect to be using any coins in 2025. This compares with a third (35%) of Americans, the next highest group in the survey. Optimism about cybercrime is greater across the board, with over three quarters of Americans (79%), Chinese (84%) and Brazilians (81%) expecting dynamic cards to significantly improve security. Europeans are less optimistic here, but over half of respondents still expect a big improvement.

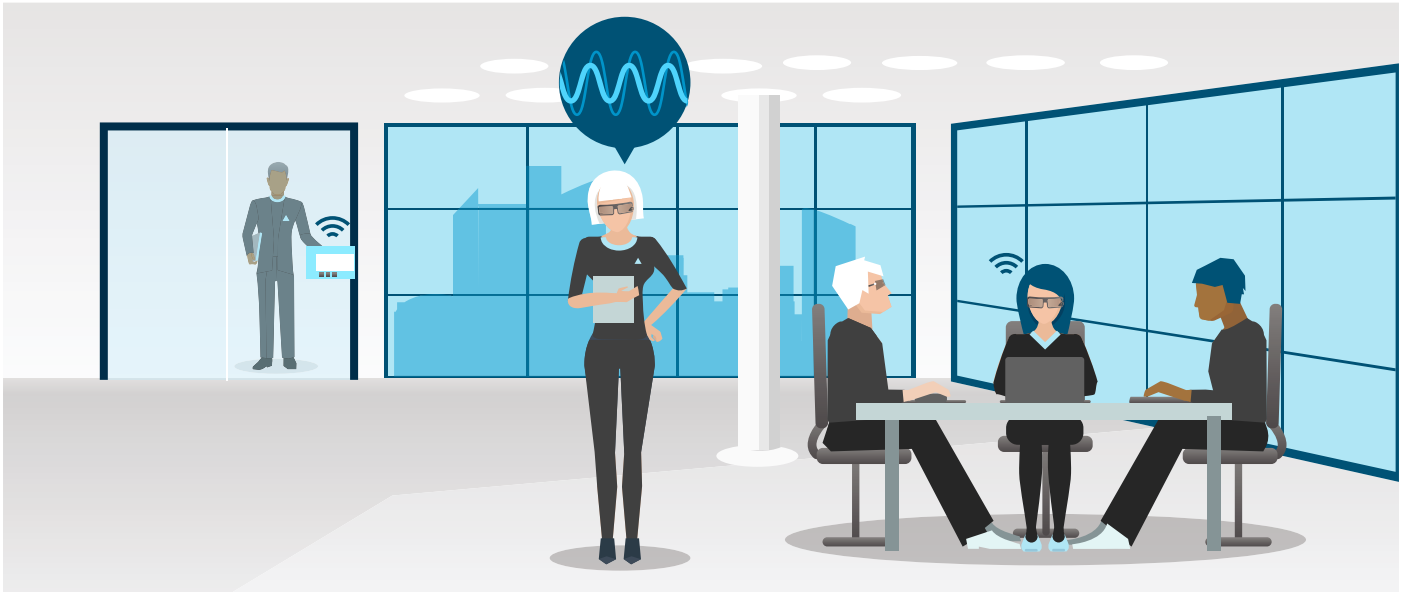
**Fig 12: What services do you expect from contactless payment technology in 2025?**



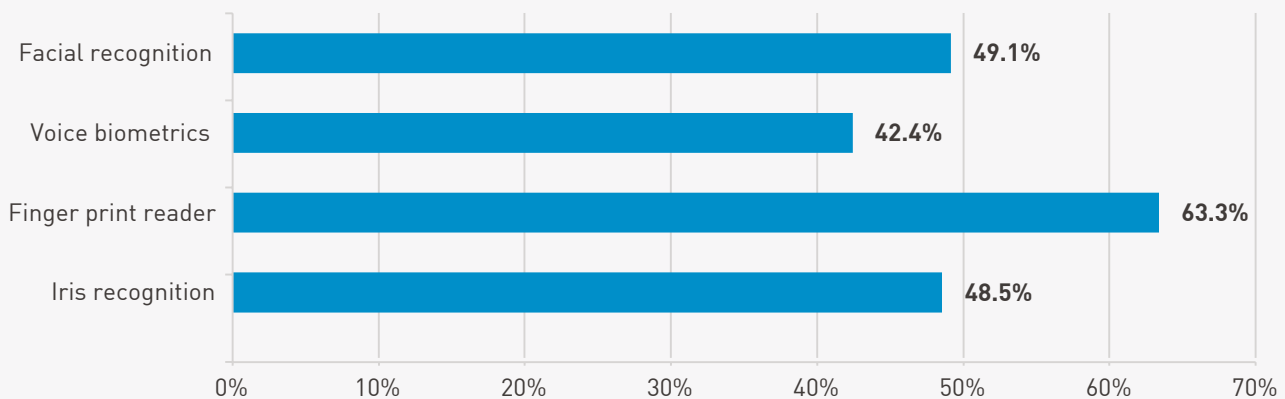
# The Future Workplace

Simply getting into your workplace is going to be a much more interactive experience if the results of our survey are anything to go by. It would appear that the fob or key pass is dead in 2025. 63 percent think we will access our workplace with a scan of our fingerprints. It would appear that our respondents have been watching a lot of sci-fi

programmes lately, as almost half (49 percent) think iris recognition will be used and a further 49 percent think facial recognition will let us in. It's interesting to see something more simple like voice biometrics scoring lower at 42 percent, even though that's how we often identify people when they buzz our bells.



**Fig 13:** What will your workplace entrance pass look like in 2025?



The workplace itself could well be very different to the pods and cubicles we work at today. The most popular device to help us work in 2025 is a pair of smart glasses. While only prototypes now, 59 percent thought they would be commonplace in ten years, as augmented reality enables us to visualise files, simulations and images, enhancing our problem-solving capabilities.

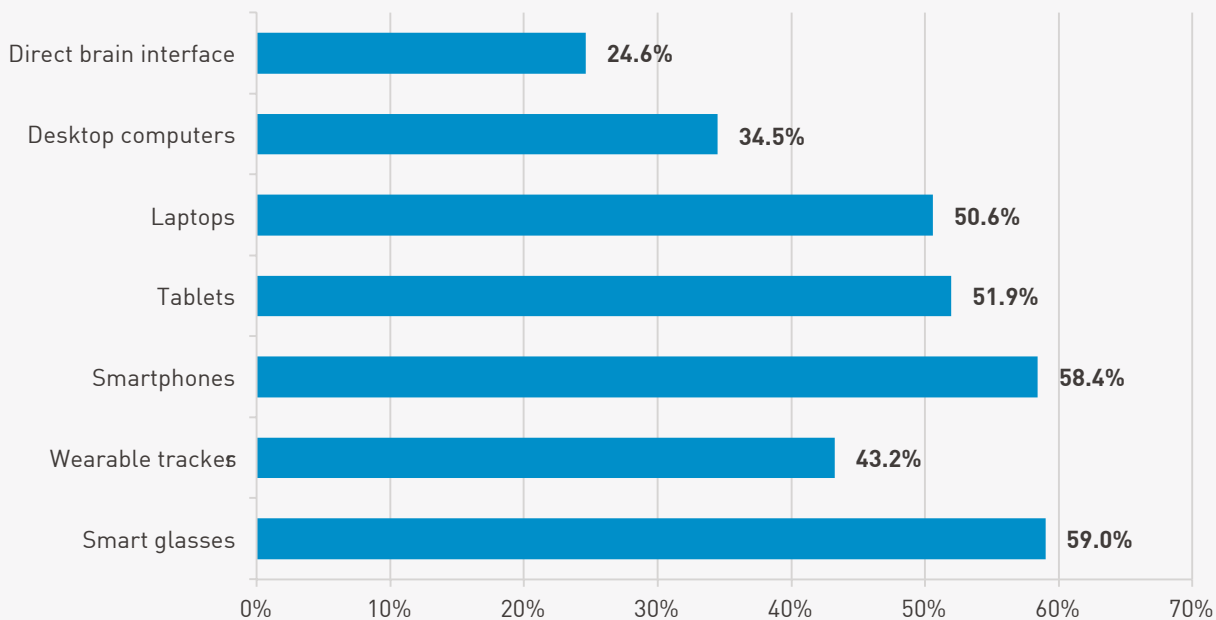
It seems that the desktop PC has finally had its day in 2025, with only 35 percent of people thinking there will still be a place for it. The popularity of the smartphone continues to soar, with 58 percent favouring that over both the tablet (52 percent) and the laptop (51 percent).

There are still some that think technology will radically advance. 25 percent think our computers will pull thoughts straight from our minds rather than waiting for us to type them in. While somewhat fanciful, it shows the faith that people place in those making the devices we use every day.

And finally, 2025 may be a bad year to slack off. 43 percent think wearable trackers will give bosses new insight into their employees' behaviour and productivity, allowing them to assign more personalized, appropriate tasks.

25 percent think our computers will pull thoughts straight from our minds rather than waiting for us to type them in

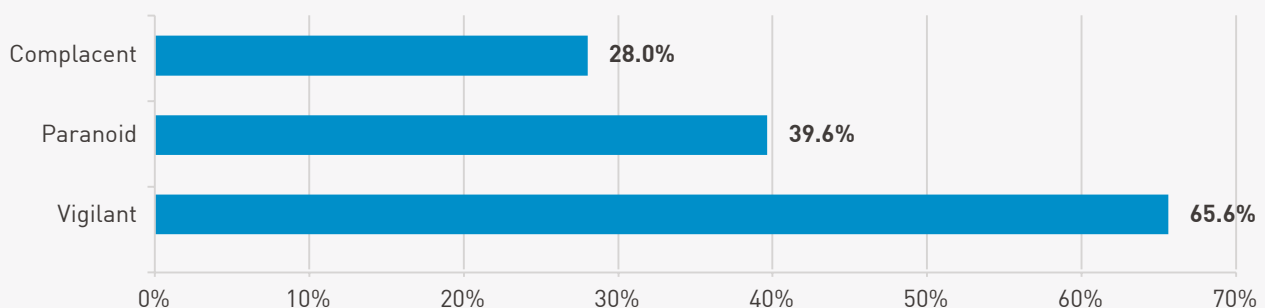
**Fig 14:** What technology do you expect to be using in the workplace in 2025?



2015 was an incredible year for hacks, especially at the corporate level. While consumers are certainly more aware of the threats posed by cybercrime, much still needs to be done to educate people of the risks. Two thirds of respondents think that in 2025 we will be vigilant

to threats, while 40 percent reckon we will be paranoid. Only 28 percent think we will be complacent, suggesting that we are waking up to the dangers of hacking, no longer thinking it is someone else's problem.

**Fig 15:** What do you expect people's mind-sets around data security to be in 2025?

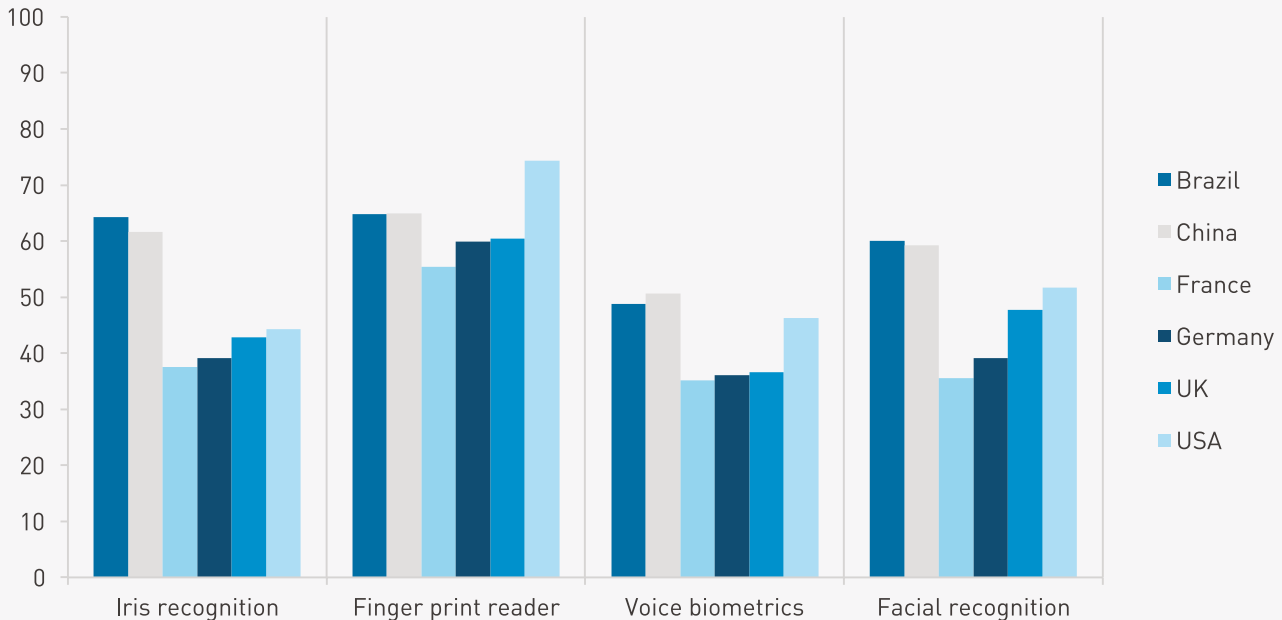




## International trends

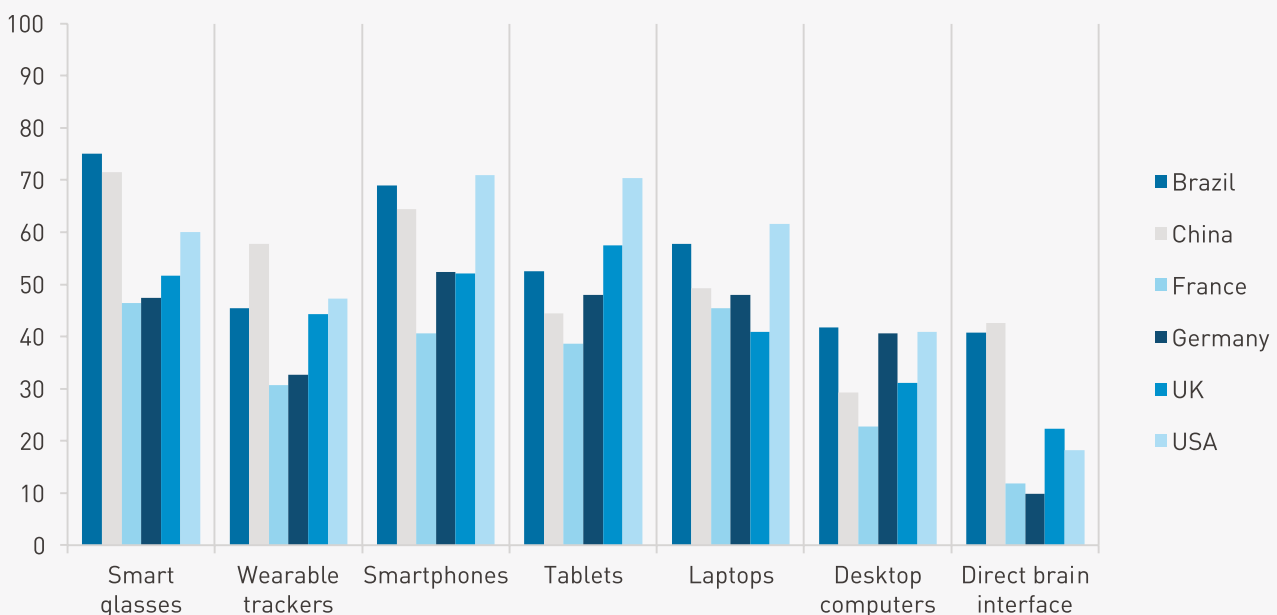
Upon arrival at their office, Europeans most expect finger print readers to grant them access (expected by 60% of Brits and Germans, and 55% of French respondents). Meanwhile, Brazilians and Chinese are by far the most optimistic of iris recognition (expected by 64% and 55% of respondents respectively, compared with 44% of Americans, the next highest response).

**Fig 16:** What will your workplace entrance pass look like in 2025?



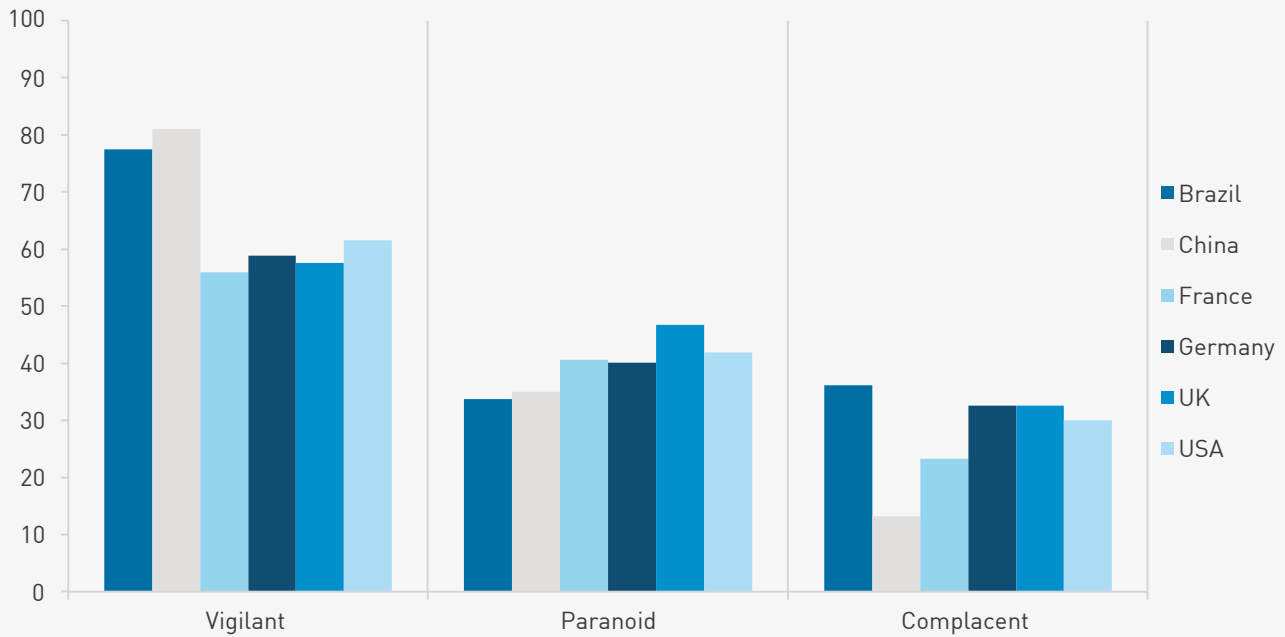
The Chinese and Brazilian respondents again prove to be by far the most visionary about the mind-reading potential of computers, with more than four in 10 expecting direct brain interfaces. They also are the countries who most expect smart glasses to be commonplace in the office of 2025. Americans however are most optimistic that we'll be using smartphones, tablets and laptops (expected by 71%, 70% and 62% respectively).

**Fig 17:** What technology do you expect to be using in the workplace in 2025?



More than half of respondents in all countries expect a vigilant attitude to data security in 2025, with Chinese and Brazilians proving to be the most cautious with more than three quarters expecting a widespread culture of security. Meanwhile more people in the UK expect a paranoid mind-set than in any other region.

**Fig 18:** What do you expect people's mind-sets around data security to be in 2025?



# Beyond the survey

## Insights from Xavier Larduinat, Senior Technologist at Gemalto

The results of the survey show people expect many things for their connected life in less than ten years. But what is the reality from the industry side?

The mobile industry has a long track record of innovation breakthroughs, above and beyond the wildest aspirations ever expressed by users. Device makers need it, because that's their best way to sustain a value model whereby today, a high-end smartphone can sell for twice the price of a PC. In the last ten years, giant steps like touchscreens, accelerometers, gyroscopes, fingerprint

readers and many more were taken, opening a wide range of brand new usages no one would have even hoped for back in the early 2000s.

There is no reason to believe the next ten years till 2025 will not experience further major disruptions like these. In fact, several candidates for these future "wow" factors are already at the incubation phase. It's hard to forecast the winning ones, but it's a safe bet to assume that two of three within the following list (or others missing here) will be game changers.

From pretty straightforward ideas to more far-fetched candidates, here is a sample of future smartphone users' amazing new experiences:



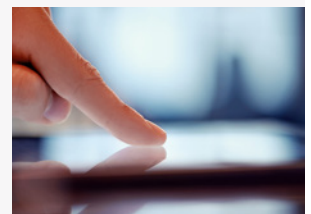
**Direct-ethanol fuel cells** are smartphone batteries capable of providing the 3000mAh power needed for periods ranging from weeks to months. Consumers will love the idea of charging their phone every couple of weeks rather than every night. A sure bet by 2020.

The 3.5mm phone jack is the last design frontier to prevent **fully waterproof smartphones**. This is an easy win the industry will pick up as early as 2016, thanks to Bluetooth low energy headsets. In time, scuba divers will love to bring their smartphones on diving trips and shoot incredible 4K videos.



**Shockproof devices:** that goes hand in hand with waterproofing. Handsets makers can already do this today. They will do it on a wider level as soon as they can be sure you will only have to change your phone every 18 months.

Touchscreens now double up as **3D sensors**, and will soon add biometric readers right-on-the-screen. Security engineers will be able to add an X,Y random screen location to a fingerprint query, offering a 3FA solution.



HD audio will trigger a brand new range of body-bound devices to listen to sounds. Human bones are far more efficient than human ears for low frequencies, deep sound reconstruction. **Bone conduction is a "mature" technology** which could even enable a T-Shirt to be your next audio device. We should see amazing concept products in that field by 2020.

**Holographic 3D displays** will allow you to watch your smartphone video on a 55 inch virtual display, or to visualize an object prior to 3D printing. DLP technology is already available. Small phone, big 3D volumes and large displays - it's a revolution as big as contactless enabling any form factor for future smartphones.





**Facial expression**, tone of voice, heuristic gestures, touch or even skin moisture... If you are not sure about your mood, morale, or more simply which type of content you need right now, your smartphone will tell you.

**Flexible displays:** whenever handset makers decide to break the phablet 5.5-6inch frontier, flexible/folding displays could emerge.



**Real time audio translation** is the future of phone calls, where what you say in English on one end is heard in Japanese on the other side. The universal translator we've seen in many science fiction stories isn't far away from becoming a reality.

**Contextual sensors** capable of anticipating your actions, leading to zero-UI use cases.



## A Generation Positive About Progress

*A view from Tom Cheesewright, Applied Futurist*

The smart phone has been the first device to really blur the lines between our selves and our technology. So much of our personality, memories and skills now exist in the cloud, connected to us via our devices, that it is increasingly hard to determine where one ends and the other begins. Photographs merge in to memories. Knowledge becomes search. Skills of organisation and navigation are inseparable from diaries and GPS.

What this research shows to me is that young adults have a pragmatic optimism about the continuation of this trend. A considered acceptance of technologies that further blur the line between technology and humanity. Glasses that enhance us. Buildings that know us. Vehicles that serve us.

Most telling is the selection of 'vigilance' as a state of mind about security. Not paranoia. Not complacency. But engagement, cognizant of the risks.

This is a generation walking into a technology-driven future with their eyes wide open.

“This is a generation walking into a technology-driven future with their eyes wide open.”



# What Haven't Young People Thought Of Yet

*A view from Dan Kaplan, Growth Marketer and Columnist for Tech Crunch*

It's hard to read much technology journalism and commentary without coming across jeremiads worried about all the bad things the pervasive internet will do to our bodies, minds, and souls. To see that such a large cross-section of young people is so enthusiastic about the potential of emerging tech is interesting. It makes much of the hand-wringing about the downsides of new technology look like angry cane waving and shouts to "get off my lawn, you damn kids!"

That being said, there are some blind spots in their enthusiasm:

- ▶ A.I. automation in this report centers on intelligent personal assistants. While I'm as excited as the next optimistic futurist about powerful, useful bots, how will large scale automation change the landscape of work? While I'm not as concerned about robots coming to take our jobs as some observers, I do wonder about this risk. Maybe young people are less worried and more confident in their ability to adapt than their parents and grandparents, but I'm surprised there wasn't more thought here.
- ▶ The implications of pervasive monitoring also do not seem to register with young people. Devices and technological infrastructure that can tell me all about my body, my productivity, and my day-to-day activity can also empower less-benevolent authorities or even less benevolent criminals. The institutional, regulatory, and political environments under which these new technologies emerge will play a major role in the good and bad ways they get used.
- ▶ Though not a key feature of this report, virtual reality opens all kinds of doors for distributed work, education, entertainment, and socializing, etc. Maybe VR will not catch on or will completely give way to Augmented Reality (think "smart glasses") by 2025, but I doubt it. While AR is/will be an even bigger, more widespread breakthrough, the power of immersive simulations is only likely to accelerate in kind.

**And my final thought on the report is that, I love the brain/machine interface concept. My guess is that human and digital intelligence will eventually end up more deeply intertwined as time goes on, but it'll probably take more than 10 years to get to widespread adoption of neural implants.**

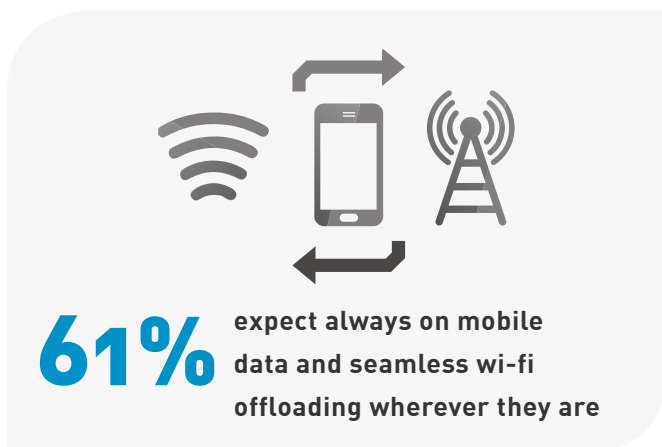
# Challenges in business practices

Mobile operators will not be the only players making the connected world of 2025 a reality. Governments, urban planners, city-states, technology firms, automotive manufacturers and beyond will all be playing a big role in delivering some of the elements that make up the vision the world's youth share. At least, that is as far as we can guess what's coming based on what people want today. After all, as Henry Ford is famously attributed with saying, "...if I'd asked my customers what they wanted, they would have said 'a faster horse'."

Operators today are facing challenges on multiple fronts. These include decreasing revenue per user, the gradual erosion of SMS revenues as phones have become 'smarter', apps and OTT services devaluing lots of operator innovation investments, the cost of infrastructure upgrades and spectrum, the complexity of managing sector regulation and beyond. The Internet of Things really opens up opportunities to develop new fruitful business models. In 2015, almost 5bn Things were already connected (Source: [Gartner](#)). And for 2025, even if it's hard to predict at the moment, the most optimistic people say 50bn Things will be connected, from which a majority will rely on MNOs' connectivity services. So to establish new revenue streams, operators will have to overcome exciting challenges:

## Moving towards dynamic management of the infrastructure

Ubiquitous, high speed connectivity is high on the wishlist of consumers everywhere, be that in their homes, on the subway or beyond. There are boundless opportunities for mobile operators to explore partnerships with local communities, with transport networks, brands and beyond.



To monetize the increasing demand for connectivity within the massive rise of IoT, network infrastructures will have to flex between different needs. Dynamic management of the network infrastructure would be a potential new business model for MNOs. They'll have the opportunity to provide a new aggregation service with a notion of handing over to a different connectivity framework, depending on the connectivity available and the broadband needs of each device.

There are boundless opportunities for mobile operators to explore partnerships with local communities, with transport networks, brands and beyond

The emergence of 5G is the chance for MNOs to regain control of the network, with the possibility to provide fragmented and virtual connectivity services. MNOs will also have the opportunity to adapt their services according to the data consumptions needed – creating a sort of 'network on demand'. For some emerging IoT use cases, low bandwidth broadband at low cost could be provided. For example, connecting an automatic inventory alert service for a fridge will require less data consumption than a connected car.





## Positioning as IoT connectivity aggregator

The IoT is opening up the development of thousands of new services using broadband connectivity; MNOs can play the service transitional role. As connectivity providers, and having full control of their network infrastructures, MNOs are in a powerful position to manage the rights for entering the connected world to new IoT players.

It is also a responsibility to play a “hub” role for the connected world. They are the link between the consumer and their connected activities, and could become the main interface. In this position, operators will have to make the connected world accessible to every service provider. To always provide a seamless connected service to their customers, every service will have to be easy to access from any device through any network, without any friction for the end-user. Standardization will be the key here. For example, as smartphones will probably be the main means for payment, any financial institution will need its service available on any device, without any constraint.

## MNOs are in a powerful position to manage the rights for entering the connected world to new IoT players

As a consequence of the extraordinary rise of new connected devices, operators will have to be able to provide flexible connectivity services remotely, everywhere and anytime, for any device to embed an instant connection feature. For this, it will be necessary to work closely with device manufacturers.

### Taking some risks to enable the IoT

The IoT market is set to grow in excess of 15bn connected devices in 2020, generating a vast opportunity across consumer devices, industry, Smart Cities, cars and connected homes. Making the IoT effective in this context requires significant work on the technology, standards, security and beyond. A wide range of new connected devices or use cases will develop very fast. Operators will need to follow the pace of new trends, and will have to try... and fail.

It will be necessary to set up 20, 50 or 100 pilots or beta test programmes in line with new disruptive connected technologies that could potentially arrive on the market,

and task the business with assessing the ones that could be successful – then develop and market those more aggressively. This requires a bit of (controlled) gambling, but could be worth it.



## Providing next level of Customer Experience

The market is converging to more simplified User Interface models, to reduce the number of actions we make on devices. In the future, our connected devices will be so smart that they will anticipate our actions, based on previous behaviour, for a simpler and more convenient experience. For example, approaching a cashier would automatically activate our mWallet, or our car heater would automatically start when the car detects we're a few minutes away from going for a drive.

This critical mission will involve providing the most reliable connectivity experience to make consumers feel they can easily embrace the new world of mobility. Operators must ensure this quality of experience. And customer services will have to adapt accordingly, with real time problem solving, for the connected dream not to become a nightmare. Anticipation could be a way to provide the best service, by listening to customers through an engagement strategy and data analysis.

## Anticipation could be a way to provide the best service, by listening to customers through an engagement strategy and data analysis

### Developing a marketing service offering

Intelligent marketing is high on the expectation list for the world's youth; and indeed by 2025 they will have no

patience for the spam and unsolicited marketing we see today. We are already seeing this transition happening for many operators today, supporting everything from SMS marketing through to proximity or NFC driven contextual advertising. The continual evolution of smartphone (and mobile smart device) technology will provide many more opportunities down this path in the decade ahead, and the wealth of insight operators have puts them in pole position to capitalize on this with advertisers and marketers.

## Mobile operators hold a wealth of data about their customers, which will enable them to become authorized data brokers

Mobile operators hold a wealth of data about their customers, which will enable them to become authorized data brokers. This puts them in a good position to facilitate exchanges of information of mutual benefit to their customers and themselves; for example, putting together people who travel a lot with the best travel insurance policies that meet their needs, or directing their customers to download apps that might help them with tasks they are carrying out laboriously on their phones otherwise. This will need to be handled with care, and with respect for customer data protection. But knowing the customer profile through their connected life habits will be beneficial for them avoiding marketing message pollution.

### Defending the data and enabling the security of end-users

It's clearly going to be an even more digital world by the time we pop the champagne corks on January 1st, 2025. Consumer expectation in the study is that their providers – including their mobile operators – take a bigger role in securing them and protecting their data. Operators today could start to carve this out as a point of differentiation as we prepare for the connected future. They need to make sure their services are always secure, and build a trusted foundation for the IoT by securing data everywhere. Most new connected devices and services will not use a regular SIM card where data and credentials are kept securely. New types of secure elements, embedded within the device for most of them, will probably emerge. And for data in motion, MNO's will consider setting up secure authentication and encryption solutions to secure communications between devices and the cloud.







## Conclusion

There's no doubt that the predictions of our consumer sample will be wryly amusing to us as we look back on them in 2025. However, the principles for operator innovation will ring true, and there's no doubt that we'll be looking back on a very different world. Whilst we don't have Doc Brown's Delorean, you don't need a flux capacitor to know that change will come, and that the mobile space will be a point of convergence for a dozen industries as the Internet of Things continues to pervade our lives. That said; the insights of our sample highlight some very interesting trends, which whilst they tend to correspond in general, have some interesting regional nuances, be that for the conservative expectations of Europeans or the enthusiasm of the Brazilians and Chinese.

**Here's to the next 10 years.**