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CONSUMERLAB



WEARABLE TECHNOLOGY AND THE INTERNET OF THINGS

Consumer views on wearables beyond health and wellness

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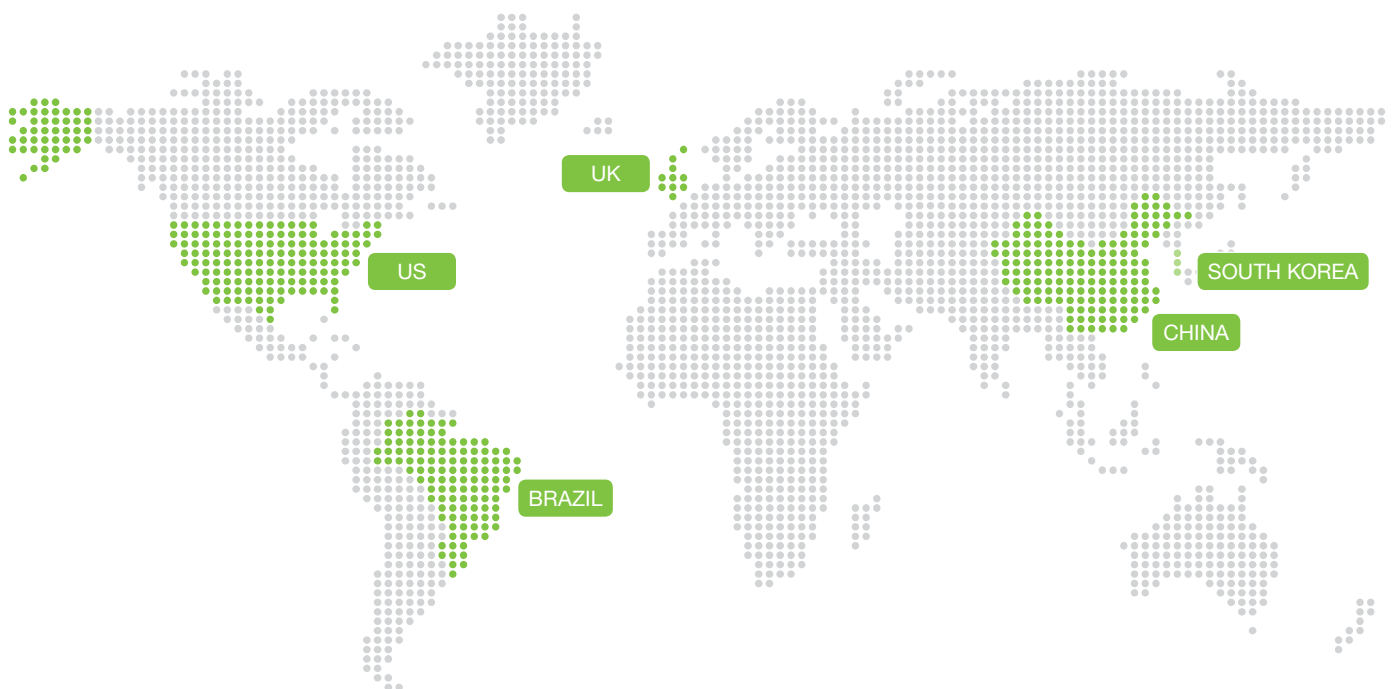
METHODOLOGY

Expert interviews

Telephone interviews were held with 10 wearables experts and industry watchers. These interviews focused on discussions around existing wearable devices, as well as new device concepts being worked on by the industry. The aim was to gather views on emerging wearables categories, beyond health and fitness.

Quantitative study

In March 2016, Ericsson ConsumerLab carried out an online survey of 5,000 iPhone and Android smartphone users, aged between 15 and 65, of whom 2,500 were also existing wearable technology owners. The participants were based in Brazil, China, South Korea, the UK and the US. Their views are representative of the opinion of 280 million smartphone users across these 5 markets.



THE VOICE OF THE CONSUMER

Ericsson ConsumerLab has more than 20 years' experience studying people's behaviors and values, including the way they act and think about ICT products and services. Ericsson ConsumerLab provides unique insights on market and consumer trends.

Ericsson ConsumerLab gains its knowledge through a global consumer research program based on interviews with 100,000 individuals each year, in more than 40 countries – statistically representing the views of 1.1 billion people.

Both quantitative and qualitative methods are used, and hundreds of hours are spent with consumers from different cultures. To be close to the market and consumers, Ericsson ConsumerLab has representatives in all regions where Ericsson is present, developing a thorough global understanding of the ICT market and business models.

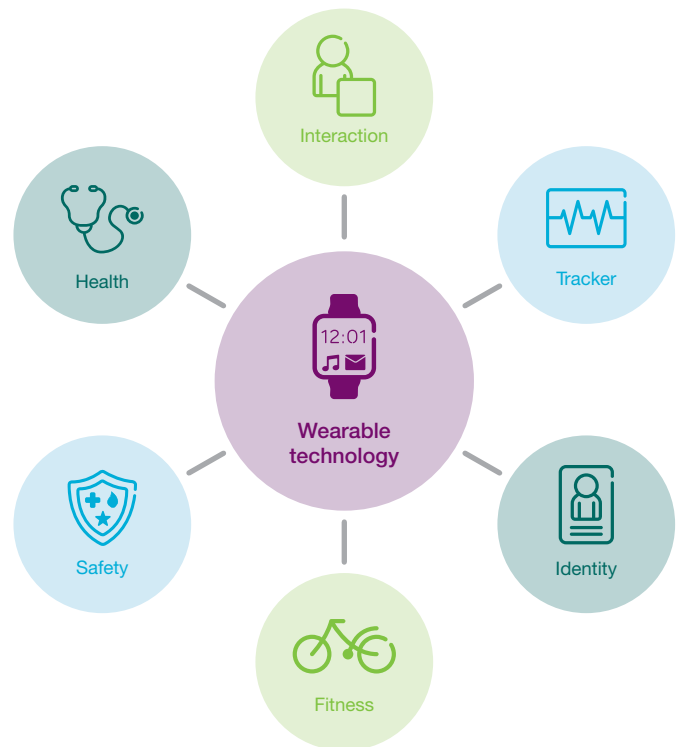
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WEARABLE FUTURE

From the chunky mobile phone wristwatches of the late 2000s to today's fitness bands, wearable technology has dramatically evolved in recent years. Now, wearables, as they're known, are changing the way consumers interact with the environment, and their popularity is growing.

For instance, when compared to 2015 Ericsson ConsumerLab analysis, current research indicates that ownership of wearables among smartphone users in Brazil, China, South Korea, the UK and the US has doubled in the past year.

However, the wearables market is still in the early phases of expansion, and currently dominated by health, wellness and activity tracking devices – despite industry developments pointing to an increasing number of use cases. This report explores consumer views on if, how and when wearables might break beyond health and wellness scenarios and cover more diverse needs.



KEY FINDINGS

Wearables become the most personal devices

- > Two in five users of wearables say they feel naked when not wearing their device, with one in five even sleeping with it on
- > Despite this, a quarter of those who have bought wearables in the past three months say their expectations have not been met

Consumers predict the wearables inflection point to be beyond 2020

- > 6 out of 10 smartphone users are confident that wearables will have uses beyond health and wellness
- > Consumers predict that most wearables ideas will only become mainstream beyond 2020. However, current users of wearables believe the development will be much faster

Wearables manufacturers as personal data brokers

- > 70 percent of users of wearables perceive wearables manufacturers to be very serious

about protecting their data. In fact, users of wearables are more likely to share their data with wearables manufacturers than with doctors, insurance companies and internet companies

A new role for smartphones in the wearables future

- > 43 percent of those surveyed believe smartphones will be replaced by wearables, while 40 percent of smartwatch users already interact less with smartphones today. As wearables get smarter, the smartphone may become a secondary screen

Internet of Things (IoT) future shaped by wearables

- > 74 percent believe multiple wearables and sensors will help them interact with other devices and physical things around them, whilst 1 in 3 smartphone users believes they will wear at least 5 wearables beyond 2020. Thus, a setback in wearables adoption might delay the overall adoption of the IoT among consumers

THE DEMOGRAPHIC DIVIDE

The composition of users of wearables is evolving. In this report, Ericsson ConsumerLab identifies the ages of both new and experienced users, as seen in Figure 1. Factors such as their gender and fitness levels were also examined.

In the US, one of the leading markets for wearables, the majority of existing users of wearables are adults in the 25–34 age bracket. In this market, smartwatch and fitness tracker owners are similar in terms of affluence and age but not gender. Whilst females are more likely to own activity trackers, 63 percent of smartwatch owners are male.

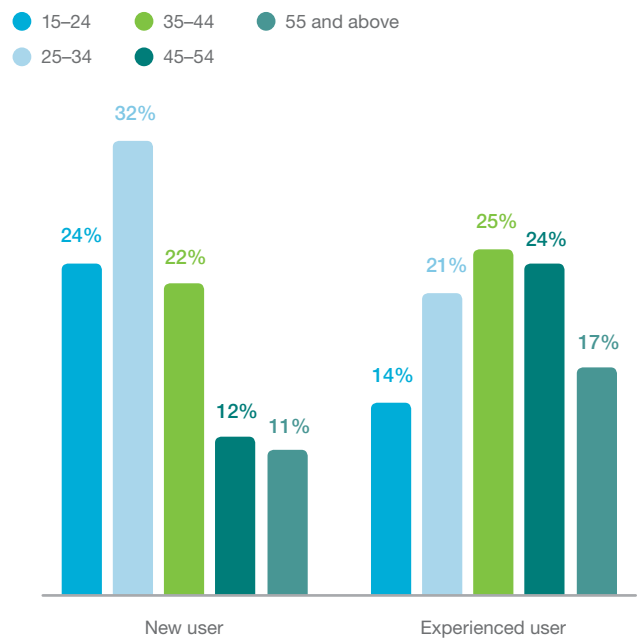
Whilst wearables still continue to attract adults, younger generations appear to be the new users of these devices – around 24 percent of surveyed smartphone users across 5 markets who had adopted wearables in the last 3 months were 15–24 years old.

The fitness levels of users of wearables are also changing. The 2015 Ericsson ConsumerLab report ‘Living Longer: Wellness and the Internet’ found that technology adoption would start with the fittest, who were more willing to try new healthcare approaches. In this study, we see wearables adoption moving beyond the early adopter group and no longer confined to the fittest, with 43 percent of those who have bought wearables in the past 3 months either doing moderate or no exercise. As a result, the wearables demographic divide is narrowing.

Wearables getting intimate

Wherever we go, the smartphone is always with us. In this sense, it has long been the most personal device we interact with. In 2015, research by Ericsson ConsumerLab indicated that half of smartphone owners use their phone in bed in the morning and during the night.

Figure 1: Experienced and new users of wearables by age group

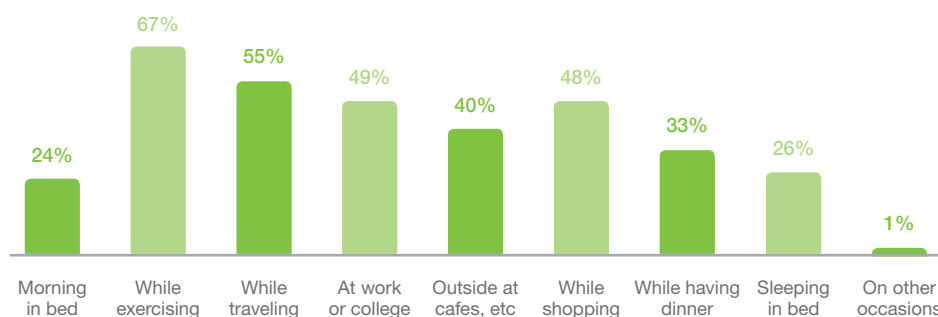


24 percent of new users of wearables are aged 15–24

Source: Ericsson ConsumerLab, Wearable Technology and the Internet of Things, 2016
Base: Smartphone users owning wearables, Brazil, China, Korea, UK and the US

However, as wearables become more common, they appear to be replacing smartphones as the most personal device. Two out of five users described themselves as feeling ‘naked’ if they didn’t wear their device for a day. Two out of five also have their wearables switched on all the time and one in five even sleeps with them on.

Figure 2: Occasions when wearable devices are worn across the day



Two out of five users feel naked when they don’t have their wearables on, whilst around a quarter even sleep with them

Source: Ericsson ConsumerLab, Wearable Technology and the Internet of Things, 2016
Base: Smartphone users using smartwatches or fitness bands

RISING EXPECTATIONS

Wearable technology adoption is rising. This study shows that users of wearables are becoming increasingly discerning – and they expect more from their devices than ever before. Analysis suggests that even new owners, who purchased their device in the past three months, are disappointed with the current generation of wearables.

Of all the users of wearables surveyed, around 1 in 10 said they no longer used their wearable devices, with one third of these owners abandoning them within a couple of weeks of purchase.



A quarter of new users of wearables indicate that wearables today fail to meet their expectations

Whilst abandonment rates are reducing, users' expectations around the functionality of wearables are still rising. A common cause of dissatisfaction is feeling tethered to their smartphone.

For example, among those who have abandoned wearables, 14 percent did so because wearables were lacking standalone connectivity. In fact, 83 percent of all smartphone users surveyed expect wearables to have some form of standalone connectivity. When asked what

form they would expect this connectivity to take in the future, around 40 percent of existing wearables owners and 46 percent of non-wearables users preferred Wi-Fi and cellular connectivity, with existing users expressing a two times higher preference for built-in cellular connectivity compared to non-users of wearables.

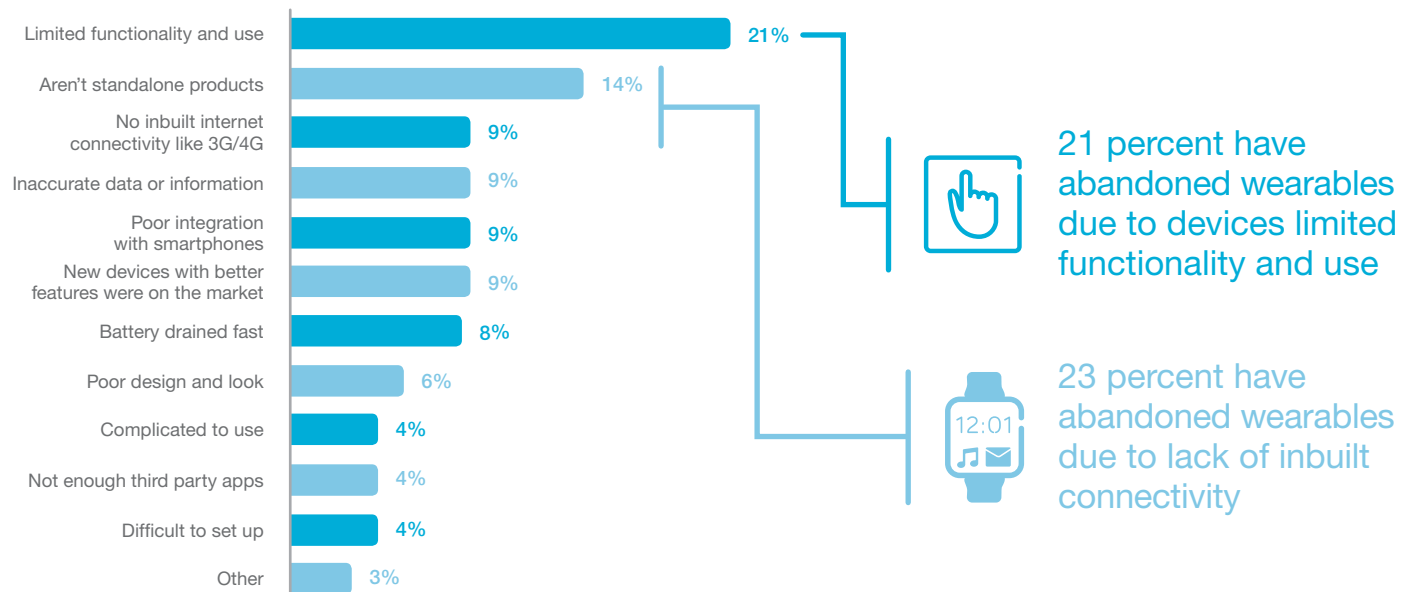


83 percent of all smartphone users surveyed expect wearables to have some form of standalone connectivity

Significantly, however, despite this increase in expectations around connectivity, one third of non-users of wearables stated that the cost of keeping digital devices connected is a key reason why they haven't invested in wearable technology. Thus, the way in which service providers charge for wearables connectivity would have to evolve, in order to meet consumer expectations regarding price.

Unfortunately, early feedback hasn't helped wearables manufacturers to improve the functionality of first generation wearables. What is clear, however, is that there are huge opportunities for wearables manufacturers to improve functionality, and hence customer satisfaction, in the future.

Figure 3: Reasons for abandoning wearables



Source: Ericsson ConsumerLab, Wearable Technology and the Internet of Things, 2016
Base: Smartphone users who abandoned wearable devices

CONSUMER PATH TO WEARABLES

Despite the need for improved functionality, the message from the research is clear: an increasing number of consumers are interested in using wearables. This creates opportunities for manufacturers to diversify their wearables offerings and overcome the issues highlighted by consumers.

In order to gain an insight into the possible future of the industry, we asked smartphone users across all 5 markets to assess over 20 wearables ideas and concepts, within the following 3 categories: safety and security; smart garments and accessories; and non-verbal communication.



We asked smartphone users across all 5 markets to assess over 20 wearables ideas and concepts

All of the ideas took inspiration from products that already exist in the market today, or that are currently prototypes, highlighted by the experts interviewed. They all also go beyond health and wellness use cases, with the exception of current generation wearables, such as fitness bands and smartwatches.

Safety and security



Wearable panic buttons

Can be built into jewelry or clothing, allowing you to quickly alert a pre-designated circle of trusted contacts, as well as the police, when in distress.



Safe driving internables

Ingestible pills with sensors, which measure blood alcohol content. This could then communicate with your car, rendering it useless if you exceed the legal limit.

Smart garments



Slow wash garments

Garments with inbuilt sensors that alert you when the garment needs to be washed, helping you to save water and energy.



Exact measure garments

Equipped with built-in sensors that send your body's measurements to an app, which then recommends clothes online that match your requirements.



Non-verbal communication



Embrace

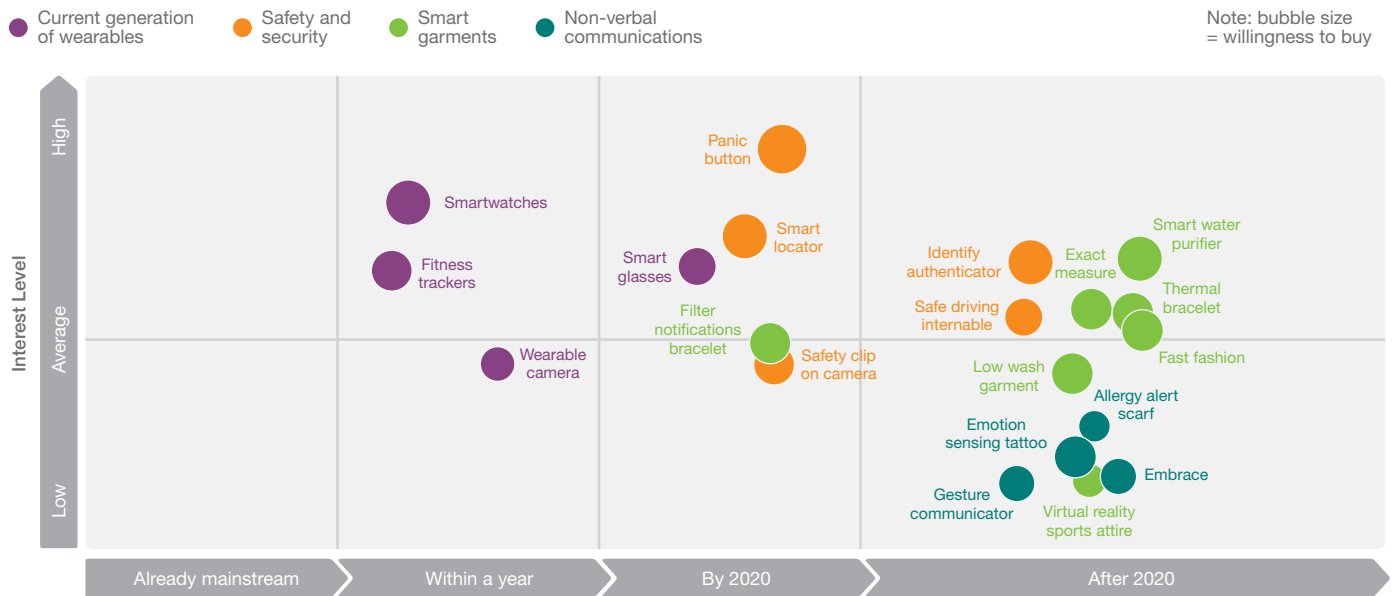
A smart garment that allows physical touch to be transferred wirelessly between couples and recreated on their skin.



Mood detector

Skin-colored patch or tattoo-like sensor that tracks your mood throughout the day and recommends actions to take.

Figure 4: Consumers predict wearable technology inflection point to be beyond 2020



Source: Ericsson ConsumerLab, Wearable Technology and the Internet of Things, 2016
 Base: Smartphone users across Brazil, China, South Korea, UK and the US

Wearable tech inflection point

Figure 4 illustrates how consumers in the surveyed regions feel about the different categories of wearables, and in particular, when they believe these wearables will become mainstream.

Across the 5 markets surveyed, of the 62 percent of smartphone users who do not own any wearables today, 35 percent are interested in buying fitness trackers and smartwatches. Purchase intention is highest in China, where half of smartphone users are planning to buy these devices. Whilst smartphone users in most markets predict that it will take at least one year for the first generation of wearables to go mainstream, smartphone users in the US already think that fitness bands and activity trackers have gone mainstream. In addition, South Koreans see smartwatches as having gone mainstream already this year.

The majority of consumers predict that most of the concepts tested will not go mainstream until after 2020. However, existing users believe wearables development will be much faster, with 60 percent predicting that blood alcohol monitoring ‘internables’ and smart garments will be mainstream by 2020.

Personal safety wearables are sought after

Significantly, of the 20 concepts tested, wearable devices related to personal safety and security were rated highly by smartphone users, with 50 percent on average very interested in ideas like panic buttons and wearable location trackers.

Our survey reveals that the feeling of safety drops by 20 percent among consumers from day to night. Women in particular feel vulnerable in situations such

as waiting for public transport at night. And whilst smartphones do lend a sense of safety, with 17 percent of users already using security-related apps, consumers desire a discreet way to send an alert for help.

This high interest can be explained by the fact that, on average, a quarter of smartphone users surveyed across the 5 markets said they have been the victim of a crime in the past 12 months. In Brazil, 43 percent reported being a victim of crimes like smartphone theft, burglary or molestation and, perhaps as a result, a huge 78 percent of smartphone users are interested in wearable SOS/panic buttons.

Figure 5: Victims of crime in the past 12 months



Source: Ericsson ConsumerLab, Wearable Technology and the Internet of Things, 2016
 Base: Smartphone users across Brazil, China, South Korea, UK and the US

SMART CLOTHING BEYOND FITNESS

Today, the majority of wearables are fitness-focused, and so most smart clothing provides benefits such as fitness metrics and detailed analysis of workouts. However, consumers also see smart clothing playing a role, beyond fitness tracking.

For instance, 40 percent of the smartphone users surveyed are interested in wearables ideas like “exact measure”; a dress or shirt that is equipped with built-in sensors that take thousands of measurements of your body. An app can then recommend clothing online that exactly matches your shape.

Smart accessories are also popular with consumers. In the US, 42 percent are interested in a thermal bracelet, which provides climate control for the body by sending hot and cold pulses through the wearer’s skin to improve overall thermal comfort.

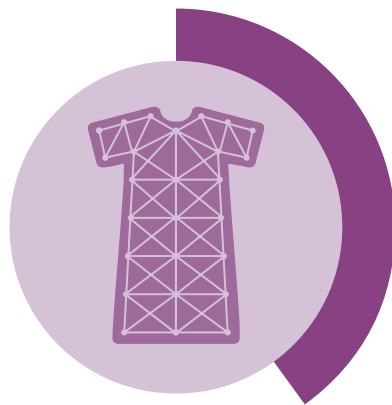
While interest seems to be high, consumers also believe that smart clothing faces some challenges, with 43 percent concerned that having technology embedded in clothing means that they will not be able to replace the item as easily. As a result, most feel that such clothing might not appeal to the masses and will go mainstream only beyond 2020.

Wearables as relationship tools

In the future, wearable technology could support the creation of an entire user-generated, non-verbal language. With a single swipe, consumers could send a loved one a message they can feel through unique light, sound, and vibration patterns on their wearable device.

The Apple Watch’s Digital Touch feature and other wearables like Smartstones’ Touch already enable consumers to send similar sensory messages today.

However, smartphone users in our survey prioritized other wearables ideas over emotional uses. Just 1 in 5 believes it’s useful to share feelings non-verbally using wearables with others, whilst 60 percent do not agree that displaying or sharing emotions with others using wearables will enable social interaction to be more effective. While such concepts could prove valuable and provide a voice for those with certain disabilities, such as an inability to speak, most smartphone users believe they will remain niche and will not go mainstream as quickly as other wearables ideas.



40%

Interested in smart garments with inbuilt sensors and artificial intelligence that take measurements of your body and order clothes online



42%

Interested in a thermal bracelet, which provides climate control for the body



1 IN 5

Just one in five believes it’s useful to share emotions and feelings using wearables with others

WEARING THE RISK OF A DATA BREACH

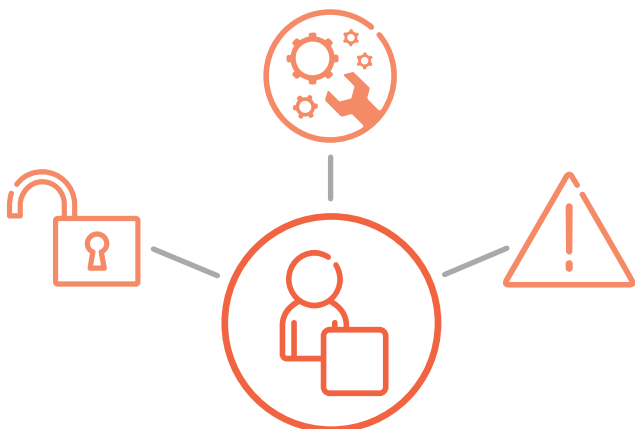
Contrary to expectation, concern over personal data sharing is not a key issue for users of wearables. In fact, users believe in sharing their results and data with friends and family, and this is what motivates them to achieve the goals that wearables help them to aim for.

Half of users of wearables share the data from their wearables online, and 60 percent feel in control of the data they are sharing and who has access to it. To provide actionable insights and personalized benefits, 67 percent are open to having third parties use their wearables data, as long as the process is anonymous and they get some value in return. However, past Ericsson ConsumerLab studies have found that users are less willing to share their data with third parties if it is personal and identifiable.



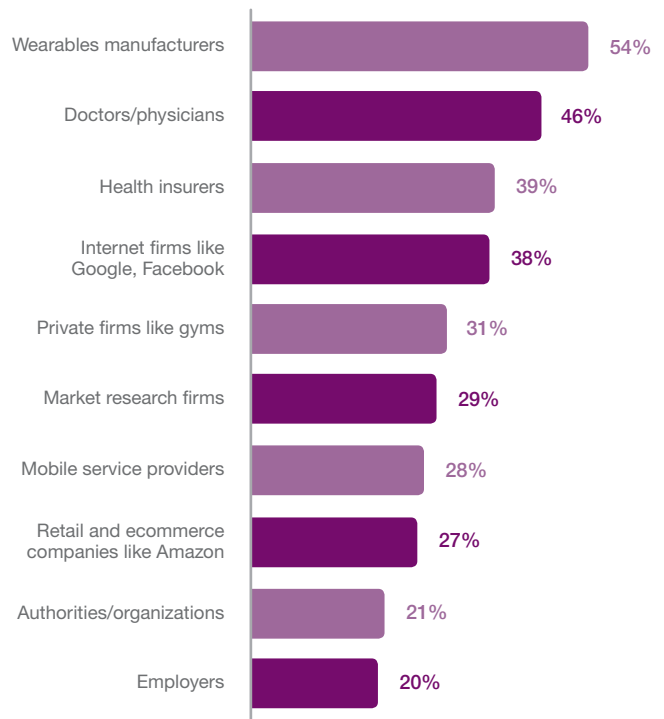
Users of wearables are more likely to share personal data with wearables manufacturers

This willingness does vary, based on level of fitness. Half of those who are fit and exercise often are open to sharing data, whilst only a third of those who are unfit and do not exercise are willing to do so. Therefore, as wearables adoption goes beyond early adopters, we might see a shift in openness to the sharing of wearables data connected to health and wellness.



In the next 5 years, 53 percent of users acknowledge wearables will be vulnerable to viruses, hacking and data breaches

Figure 6: Organizations and entities consumers are willing to share wearables data with



Source: Ericsson ConsumerLab, Wearable Technology and the Internet of Things, 2016
Base: Existing wearables owners across Brazil, China, South Korea, UK and the US

In fact, looking at Figure 6 above, it is clear that users of wearables are more likely to share their data with wearables manufacturers than with doctors, insurance companies and internet firms, with 70 percent perceiving wearables manufacturers to be very serious in protecting their data. This openness can be attributed to two factors: a belief that the insights and services provided are of value, particularly if users have an interest in health and fitness; and the fact that users of wearables seem to be more familiar with online risks in comparison to other smartphone users.

However, 53 percent of existing users of wearables, and an equal proportion of non-wearables owners, also acknowledge that it is very likely that wearables will be vulnerable to viruses, hacking and data breaches in the next 5 years.

Despite this, in the Ericsson ConsumerLab '10 Hot Consumer Trends 2016' report, 6 out of 10 smartphone users said that their trust isn't affected much by hacks and virus attacks. As wearables move beyond health and fitness, users will reassess the risks involved based on their perception of the received value.

OUTSMARTING THE SMARTPHONE

The current generation of fitness bands and smartwatches are just the beginning of a momentous change. Smartphone users believe that wearable technology will expand in more numerous and impactful ways than smartphones have in the past 10 years. They believe wearables could eventually replace existing items such as the traditional wristwatch, medical equipment like blood and glucose monitors or even house or car keys.

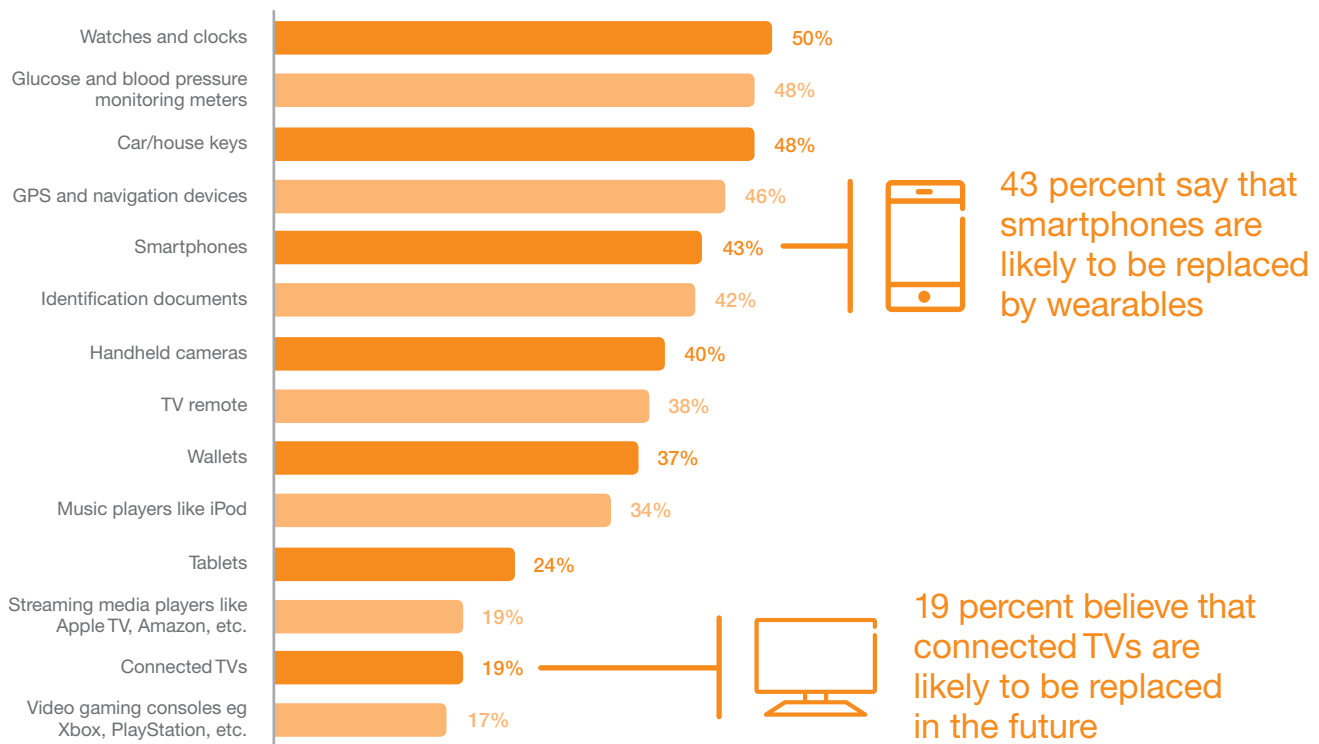
The fact that smartphones have become integrated in every aspect of our lives makes it hard to envisage a future without them. With two in five smartphone users indicating that wearables might replace smartphones,



Smartphone users say they are likely to wear more than 5 wearable devices beyond 2020

it might indeed happen – although it may take some time. Importantly, 38 percent of smartphone users across all 5 markets also believe that wearables will be used to perform most smartphone functions within only 5 years. Equally, however, many think it will take longer.

Figure 7: Gadgets/items that wearables are likely to replace in future



Source: Ericsson ConsumerLab, Wearable Technology and the Internet of Things, 2016
Base: Smartphone users across Brazil, China, South Korea, UK and the US

So far wearables have been a secondary screen to smartphones. However, as wearables become more independent in terms of factors such as connectivity, the smartphone screen may become less significant.

Early signs of this change are already visible today, with half of existing smartwatch users expecting that wearables will be standalone devices, without the need for smartphones. In fact, 4 out of 10 smartwatch users in our survey already spend less

time looking at their smartphone screen because notifications are now available on their smartwatches.

However, among the smartphone users who predict smartphones will be replaced, half say they expect to carry multiple connected wearable devices on their body in the future. Today, 25 percent of existing users of wearables already own more than one wearable device, and 1 in 10 already owns 4 wearables.

INTERNET OF WEARABLE THINGS

Body of sensors

Consumers see that smartphones don't have to be the only information device in the IoT era, in which devices and physical objects will be connected via the cloud.

In the future, 74 percent of the smartphone users surveyed believe they will be using wearables to exchange information with other devices and physical things around them. It's also a shift that has been pointed to in Ericsson ConsumerLab's annual trend report, the '10 Hot Consumer Trends 2016', in which we indicated that 85 percent of smartphone users think intelligent wearable electronic assistants will be commonplace within 5 years.

As such, based on consumer opinion, wearables will accelerate the convergence of the digital and physical worlds – bringing people into the IoT.



25 percent of smartwatch owners use their smartwatch to remotely control digital devices at home

While consumers are confident that technology will help them interact with objects in their surroundings, they also say that this technology may not necessarily be devices, but sensors that could be ingestible or wearable. Such sensors might be called internables or implantables rather than wearables. In fact, 60 percent believe that ingestible pills and chips under the skin will be commonly used in the next 5 years – not only to track vital health data, but also to unlock doors, authenticate transactions and identity, and to control objects.

In five years' time, walking around with an ingestible sensor, which tracks your body temperature and adjusts the thermostat setting automatically once you arrive home, may be a reality, according to consumers.



6 in 10 smartphone users believe that ingestible pills and chips under the skin will be used to interact with objects in the next 5 years

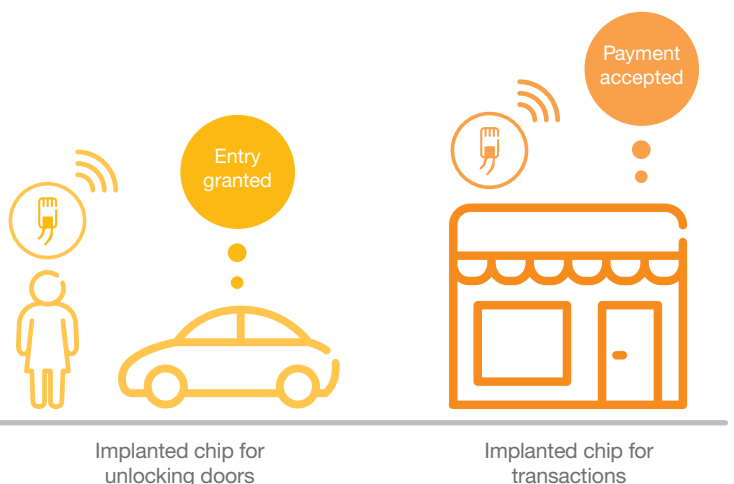
The IoT future shaped by wearables

For now, health and fitness wearables represent the first step that consumers will take into the wearables future. However, consumers are confident that wearables can break away from health and fitness as a category, and also from just extending smartphone and tablet experiences. Consumers are not sure that the wearables industry has found the use cases that will drive mass adoption though; and hence they believe the wearable technology inflection point stands well beyond 2020 today.

Continued experimentation with wearables is important, but are current wearables really adhering to customer needs and wants? And do companies need to explore a different set of partnerships to push wearables into the mainstream? Consumers see wearables as a gateway to the IoT, and hence a setback in wearables adoption may delay the consumer IoT future.

With expectations rising among users of wearables, wireless networks and business models may also have to evolve to cope with a future where consumers will wear multiple devices and expect them to connect to the internet, interact with physical surroundings and receive actionable data and insights – all in a seamless and secure way. As limited functionality and connectivity are the top reasons for consumers to abandon devices, the wearables of the future may even need to be packaged together, or offered in smart bundles with connectivity.

What is clear is that consumers are ready to wear connected devices on their bodies. As a result, despite existing challenges, the future of the industry is set to be an exciting one.



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We are a world leader in the rapidly changing environment of communications technology – providing equipment, software and services to enable transformation through mobility.

Some 40 percent of global mobile traffic runs through networks we have supplied. More than 1 billion subscribers around the world rely every day on networks that we manage. With more than 39,000 granted patents, we have one of the industry's strongest intellectual property rights portfolios.

Our leadership in technology and services has been a driving force behind the expansion and improvement of connectivity worldwide. We believe that through mobility, our society can be transformed for the better. New innovations and forms of expression are finding a greater audience, industries and hierarchies are being revolutionized, and we are seeing a fundamental change in the way we communicate, socialize and make decisions together.

These exciting changes represent the realization of our vision: a Networked Society, where every person and every industry is empowered to reach their full potential.