



THE HUMAN CLOUD: WEARABLE TECHNOLOGY FROM NOVELTY TO PRODUCTION

A social study into the impact of wearable technology

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Introduction

We have witnessed an exponential rise of smart devices over recent years as cloud computing and ubiquitous Internet connectivity connects consumers to information, anytime, anywhere. This demand for smart, portable devices has seen sales of smartphones and tablets skyrocket. However, the world of technology moves quickly and we are already observing the emergence of a new kind of portable device which can be worn on the body.

Google Glass, due to be generally released at the end of 2013 or in early 2014, is the most high profile of these wearable technology devices. However, there are already examples of wearable technology on the market. The most recognisable are health devices including the Nike+ FuelBand and Jawbone UP, which capture the wearer's activity data in the cloud and provide fitness analysis. Others include wearable cameras such as Autographer, which enable users to 'lifelog', capturing their daily experiences.

Wearable technology has the potential to be both useful and entertaining. However, how interested are we in using these devices? Can they enhance our lifestyles or will they just cause more stress as users suffer from information overload? And will concerns around privacy hamper consumer adoption of these devices? Finally, do we need more cloud infrastructure to support these devices, managing and analysing the huge volumes of data that will be created?

In collaboration with experts in the field of social studies and technology at the Centre for Creative and Social Technology (CAST) and supported by quantitative research among over 4,000 UK and US adults, Rackspace analysed how 26 everyday people use wearable technology.

The result is a social study, *The Human Cloud: Wearable Technology from Novelty to Productivity* which reveals our attitudes to wearable technology and examines how cloud computing is enabling this new generation of smart devices.

The report outlines:

- Take-up of wearable technology and how these devices are enhancing users lives
- Emergence of six distinct profiles of wearable technology users
- The data generated by wearable technology will form part of a Human Cloud, hosting consumer insights that will be used by private companies and public bodies to improve services.

Key Finding One: Cloud-powered wearable technology is enhancing people's lives

“We are at the beginning of massive mainstream uptake of wearable devices, with the launch of Google Glass set to further boost adoption,” said Robert Scoble, Startup Liaison Officer and Technology Evangelist at Rackspace. “However, it is important to note that wearable technology and the cloud go hand in hand – together they provide the rich data insights that help users better manage many aspects of their lives. Cloud computing is powering the wearable technology revolution. It allows the data generated by wearable devices to be captured, analysed and made readily accessible whenever users need it.”

While this technology is new to the market, adoption rates are substantial with 18 per cent of Brits and Americans already using wearable devices. The study revealed that 82 per cent of wearable technology users in America and 71 per cent in Britain believe that these cloud-powered devices have enhanced their lives.

Devices plus cloud data are driving demand

The appeal of wearable technology is down to the rich data generated by the devices, which is stored and analysed in the cloud. The ability to access these insights from the cloud - anywhere, anytime - enables wearable technology users to boost their intelligence, confidence, health, fitness and even their love lives.

Rise of the bionic human?

This cloud data, delivered via wearable devices is leading to a new level of technology-enabled personal development. The study found that 47 per cent of British and American wearable technology users felt more intelligent and 61 per cent felt more informed. 37 per cent stated that wearable technology helped with career development while 61 per cent claimed that their personal efficiency improved. Given these advantages, it is perhaps unsurprising that 13 per cent of wearable technology users never remove the device with another seven per cent admitted to checking the device at least once every five minutes.

Cloud-powered wearable technology is helping UK and US adults enhance their lives:

- 81 per cent of UK respondents and 87 per cent of US respondents claim that wearable technology has boosted their personal abilities
- 63 per cent of UK and 71 per cent of US users state that wearable tech has improved their health and fitness
- Wearable tech has boosted self-confidence for 46 per cent of respondents in the UK and 54 per cent in the US
- 53 per cent of respondents from the UK and 60 per cent of those from the US believe that wearable tech helps them feel more in control of their lives
- 27 per cent of UK respondents and 36 per cent of US respondents use wearable tech to enhance their love lives.

Data capture and analysis needs to improve:

While wearable technology is already being adopted, we are at an early stage when it comes to the devices on the market, with plenty of room for improvement. The qualitative research conducted by CAST revealed a common frustration with the quality and accuracy of data provided by wearable technology devices. As the market matures, the clear winners will be the manufacturers who manage to resolve these data issues to gain competitive advantage.

Paul Boag, a 42 year old web strategist, trialled the Jawbone UP and was originally impressed with the device because it looked good, had a simple design and was light to wear. However, frustration set in once he starting monitoring the data tracked by the device. He found analysis around his calorie consumption inaccurate. Additionally, he was frustrated that the device did not track all of the fitness activity he engaged in – for example weight training was not monitored. Additionally, he was annoyed that the information he entered manually to track his mood was not included in the data analysis provided by the vendor. Overall he was critical of the data presented to him and grew bored of the device quickly.

The experience of our social study participant demonstrates that wearable technology is only as good as the data it delivers. It is accuracy along with the insight provided by the data that will keep consumers engaged. Moving forward we will see device and cloud vendors working together more closely to enhance the quality of data capture and analysis. As the market matures, the vendors that succeed will be the manufacturers who manage to resolve these data issues to gain competitive advantage. A key area for development will be the personalisation of data these devices monitor, creating a bespoke experience for users.

Privacy concerns

Despite the many benefits that wearable technology is set to deliver for both consumers and governments, there remain serious concerns about privacy, with over half (51 per cent) of respondents citing it as a barrier to adoption. Almost two thirds (62 per cent) think Google Glass and other wearable devices should be regulated in some form while one in five (20 per cent) are calling for these devices to be banned entirely.

Jack Higgins at Law Firm Sheridans said: ““As with all new products that are cutting edge, there is always the question of how current laws, combined with consumer expectations, fit in with the product”, says John Haggis, digital media lawyer at London-based media law firm Sheridans. “Wearable Technologies face the same challenges as any other new product that represents a change in consumer activities, albeit that in the digital age the challenges can seem more daunting. On the one hand, some wearable technologies do not represent any privacy or any other rights issues as they interact solely with the user. On the other hand however, when wearable

technologies interact with other people and the environment around the user, then potential privacy or copyright issues can arise, although it's important to remember that these issues already exist but the new technology typically makes it easier to happen.

The challenge for manufacturers of wearable technologies is ensuring that where the device has the potential to infringe another person's rights, that the user is made aware of how they should be using the device (so as to not record a film in a cinema for example) and also for other people to recognise when the device is being used in a manner which they may object, such as surreptitious videoing or photographing of people.

Hopefully manufacturers will take the lead in this area so that new regulations are not needed, but irrespective of what happens, there will always be those who misuse technologies for their own benefit."

Key Finding Two: Six distinct profiles of wearable technology users

1. Curious

The first profile identified in the study had no particular health, fitness, food, mood or emotional need for wearable technology. They are simply interested in what happened when they 'played' with these devices. These users are intrigued with data about their behaviour but are unlikely to use it in an analytical sense.

Key Characteristics:

- Primarily twenty-somethings in university or at the start of their careers
- Those using fitness devices were pleasantly surprised by the amount of activity they managed. This changed their behaviour in simple ways: taking the stairs rather than the lift, walking instead of catching the bus
- Not competitive rather motivated by the joy of trying something new.

Challenge to Business

- To keep the curious motivated to become regular users of wearable technology, vendors must focus on simplicity of use, attractive design and a consistently fun interface. This category requires something easy to wear and use to keep them interested.

2. Controller

The second profile identified in the study will tend to see everything in their life as a selection of parts contributing towards an overall ecosystem. They will only purchase a device once they know that it will do what they want it to do and they can manage their data the way that they want to

Key Characteristics

- Confident and creative people that work in the digital space as entrepreneurs or strategists
- The Controller knows what he wants and looks long and hard to find it
- They strive for a place of balance where they feel most in control of all the variables around them
- The Controller would share their information to create a community, or a team, of shared experience
- Understand technology and how data and personal information can be used
- Sync and check their data often throughout the day, it is an honour system
- Storage is important to this archetype; they definitely back up.

Challenges to Business

- This is the profile to watch when developing second and third generation devices

- Most controllers will use multiple apps alongside of the device to get the most extensive picture. Therefore it is important to create an integrated device that pulls together all of the parts into a whole.

3. Quantified Selfer

The third profile identified in the study has a ‘zoomed in’ focus on tracking themselves as they move through the world. This is not simply for diet or health related purposes, it’s an academic interest.

Key Characteristics:

- Comfortable with the digital sphere, an entrepreneur with an academic inclination
- Zoomed in focus on tracking themselves as they move through the world. This is not simply for diet or health related purposes, rather an academic interest
- Early adopters who reflect their life through the data
- For the quantified selfer, the journey is more important than the end goal
- He or she could imagine sharing his data with others for medical purposes but would probably not be open to insurance incentives and definitely not employer-regulated usage.

Challenge to Business

- The area of quantified self is fast growing and needs to be considered in product and service design: they know what they like and they do it for the love of it
- The quantified selfer is an e-hoarder; he needs to know that his data resides in at least two places (the cloud and another back up) where he can access it when or if the mood strikes.

4. Self Medic

The forth profile identified in the study uses wearable devices to take control over health and well-being. Often a super-user, the Self- Medic uses multiple apps and devices to get an accurate account of her health.

Key Characteristics

- Focused on taking back control of health and well-being in response to a serious illness including mental health issues
- Accurate information is the most important output for the Self Medic
- Technology is a way to keep the Self Medic motivated and focused. This is something they have a hard time doing on their own but need to do to feel better
- They are open people. They share. They are happy to talk about themselves. They believe strongly in transparency and fill the blogosphere with their experiences.

Challenge to Business

- Ensure the “how, when and why” of data collection is transparent. Data needs to be accurate as it is used to manage health conditions.

5. Finish line Fanatic

The fifth profile loves the idea of wearable device and is really excited at the adoption stage. However, once they realise the device needs to be calibrated, charged, synced and sometimes needs them to manually add data, the shine wears off.

Key characteristics

- Young career professionals working in the city
- Curious and excited but turn against the technology when it doesn't go their way
- Self-motivator, competitive and often perfectionists. They are results driven and need the data to be accurate – estimates are not good enough
- Whatever device enters their life needs to be seamless, integrated and unobtrusive.

Challenge to Business

- Ensure the “how, when and why” of data collection is transparent. This user can take or leave the ‘fuel points’ for example. Give them real meaning from the data so that they can challenge themselves and possibly others with true information
- Find a way to capitalise on the initial excitement, and to make the challenge worth it.

6. Ubiquitous Future

The sixth group identified are digital natives that will grow up with the next generation of wearable technology.

Key characteristics

- Primary school students of today are the future users of wearable technology devices
- Keenly interested in what these devices do
- This generation thinks the personal data tracking is cool, but even cooler would be a device to track brain waves and IQ

Challenge to Business

- Privacy is not an issue for this generation. They want to know how these devices can track more personal data to help them boost intelligence and personal skills

Key Finding Three: The data generated by wearable technology will form part of a Human Cloud

With adoption becoming mainstream, wearable technology will form an integral part of the 'Internet of Things' – a growing network of devices – from wearable tech and smartphones to road traffic sensors - that connect to the internet to share data in real time.

"The rich data created by wearable tech will drive the rise of the 'human cloud' of personal data," said Chris Brauer, co-director of CAST at Goldsmiths, University of London. "With this comes countless opportunities to tap into this data; whether it's connecting with third parties to provide more tailored and personalised services or working closer with healthcare institutions to get a better understanding of their patients. We are already seeing wearable technology being used in the private sector with health insurance firms encouraging members to use wearable fitness devices to earn rewards for maintaining a healthier lifestyle. It is likely that the public sector will look to capitalise on the wearable technology trend with a view to boosting telehealth and smart city programs."

The research revealed that citizens may be willing to share the data generated by wearable technology with central or local government, enabling authorities to crowd-source insights which can be used to enhance public services

- 19 per cent of Brits and 22 per cent of Americans would be willing to use a wearable device that monitors location for central government activity
- One in three British and American citizens would be willing to use a wearable health and fitness monitor that shares personal data with the NHS or healthcare provider

Wearable technology within the enterprise

The research revealed that a small number of 'early adopter' businesses (6 per cent in the UK and USA) are already providing wearable technology devices for their employees. There is scope for the use of wearable technology in the enterprise to increase with a third of respondents stating that they would be willing to wear devices offered by their employer.

Appirio CloudFit program: CloudFit is a new program that cloud broker Appirio rolled out in 2013 to help get staff active and setting fitness goals. It is an opt-in programme that is part of a wider wellness initiative. Every employee has the opportunity to track their daily activity, body metrics and sleep patterns using Jawbone UP. The organisation has also built its own CloudFit app where employees can share advice and encouragement as well as set joint fitness goals.

To accomplish their collective fitness goals as a team, Appirio also enlisted the help of a wellness coach who is active on the CloudFit Chatter community. The wellness coach helps the company set collective goals as well as personal goals for every participating employee. Appirio has seen high levels of participation in the CloudFit program with staff excited about trialling new devices and benefiting from an additional office 'perk'.

Contributors

Dr. Chris Brauer, Co-Director of CAST, Goldsmiths College is Senior Lecturer in the Institute for Management Studies and the spirit behind the CAST initiative. He works with emergent technologies at the intersections of media, social science and computing.

Dr. Jennifer Barth is a social researcher and lecturer at CAST, Goldsmiths College. She is experienced in qualitative methods and analytical assessment informing policy and practice on ethics and community impact.

Methodology

The CAST research team was immersed for three weeks in online and offline social spaces (digital ethnography) while using multiple and mixed methods to acquire data (Radial Research). As a method of digital ethnography, Radial Research is a unique approach designed by CAST researchers to rapidly obtain credible and transparent findings. Starting from an epicentre, in this case ‘wearable technology’ and/or ‘wearable computing’, the researchers follow lines of possibility found through trend analysis, crowdsourcing, interviews and online interactions to make visible spaces and subjects using wearable technology. Each site is distinct but interacts and intersects with others. From these sources, participants were identified for interviews or to participate in logging their daily use of devices in a private blog (experience sampling). Some of these participants used their own device while others were given a device to trial for a specified duration.

26 participants were interviewed between 6 and 17 May. One year five and one year six primary school students were given Jawbone Ups to use for a day at school and interviewed throughout the day. Nine participants wore a device and blogged about their experiences between 13 and 17 May.

Vision Critical

For the quantitative research, Rackspace commissioned research house Vision Critical to survey 4,000 adults to provide a representative sample of UK and USA adults aged 18 and over.

About Rackspace

Rackspace® (NYSE: RAX) is the open cloud company and founder of OpenStack, the standard open-source operating system for cloud computing. Headquartered in San Antonio, Rackspace delivers its renowned Fanatical Support® to more than 200,000 business customers, from data centres on four continents. Rackspace is a leading provider of hybrid clouds, which enable businesses to run their workloads where they run most effectively — whether on the public cloud, a private cloud, dedicated servers, or a combination of these platforms. Rackspace has been recognised by Bloomberg BusinessWeek as a Top 100 Performing Technology Company, and is featured on The Sunday Times list of 100 Best Companies to Work For, ranking 7th. For more information, visit www.rackspace.co.uk.