

Chapter 13



INVISIBLE TECHNOLOGY



What's the Non-Obvious Trend?

The more sophisticated technology gets, the more it is able to anticipate needs, protect us and provide utility while increasingly blending unnoticeably into our daily lives.

Scott Jenson describes himself as a “battle tested veteran of the software industry.” He has worked at Apple, holds over 20 patents and currently leads a group at Google focused on the mission of making everyday physical objects capable of broadcasting information to the web. This project, known simply as “Physical Web” has a broad mission statement to allow people to “walk up and use anything.”

The idea that any object or place can broadcast content is on many levels an inevitable consequence of the Internet of Things (IoT). The difference between the Physical Web and IoT is that the objects and locations use something called a Bluetooth Low Energy (BLE) beacon to broadcast content over Bluetooth – thus removing the need for Internet connectivity.

In the process of evangelizing how this technology works, Jenson delivers keynote speeches to events filled with User Interface designers and is fond of telling stories. One of his favorites looks backward in history at the evolution of the car steering wheel and how the very first designs for cars were inspired by boats. As he told one audience at an event in 2014, “the first cars that were invented had the engine in the back ... and the first steering wheel wasn’t a steering wheel, it was a tiller.”

He uses the tiller to make an analogy about how we often approach innovation. We usually start by creating something based on what we already know rather than something that works best. It was only when the tiller concept was replaced with a steering wheel that the popularity of cars started to take off and they realized their full potential.

The “technology tiller” analogy illustrates the problem of trying to merge new ideas with old systems, but also how important interface design has always been to the adoption curve for innovation. As technology gets more sophisticated and able to better predict human behaviour – a revolution in technology design is coming where new interfaces are more intuitive than ever, often becoming so seamless they can justifiably be described as *Invisible Technology*.

How To Balance Technology And Humanity

According to Yves Béhar, the award winning Swiss industrial designer, the days of touch screen interfaces may be numbered. In a recent interview, Béhar had the following to say about our growing addiction to smart phones and the tiny screens that accompany them:

“The smartphone is the greatest technological phenomenon of our time ... the screen provides a sense of immersion that is irresistible to us. There is an immediate side effect, however: this eternal access means we no longer have to go searching. We can now see almost anything from our smartphones. We can text or check someone’s social-media feed rather than make a personal visit. Until now, that’s the direction technology has taken us – living and gorging on screens with our heads down in our phones... we know something

is wrong. The loss of humanness is very real. We also know that technology has the profound potential to enhance our experience of the world around us, rather than distract us from it.”

So if technology *were* to enhance our experience of the world as Béhar suggests, what would it do? Would we really leave the distraction of technology behind, skip the convenience of social media and actually choose to see one another in person instead?

Béhar is among a growing group of technologists and designers who believe that we will indeed find this balance with technology – with the tipping point perhaps coming from the design of technology itself. In 2017, technology will continue to become more seamless, simple, voice-controlled and integrated into the backdrop of our lives.

We are about to enter the age of *Invisible Technology* and what you don’t see never looked so good. Here is what the shift may look like, in Béhar’s own words:

“As people long for meaningful experiences, for interactions, for presence, there will be a shift toward fewer screens. This is not a shift toward less information. In fact, more information will be communicated in the subtle ways that make us so very human. It is not that different from the way we orient ourselves in nature: we look at the Sun to understand how much daylight is left in the day; we feel a breeze and turn towards it to scan the horizon for the sign of a storm.”

This vision is one he specifically talks about in relation to one of his newest projects, the August Smart Lock – a product that is designed to sense your proximity and open your front door automatically when you get close without the need for any interface interaction at all. This type of screenless interaction is one companies need to consider innovating around for every consumer interface currently using a button to enable action.

Predictive Protection Continues

In 2014 I read and wrote about a book called *Addicted By Design* which featured fifteen years of research from anthropologist Natasha Dow Schüll into how casinos and gambling machine makers had created devices that induced a trancelike state known as the “machine zone” where “gambling addicts play not to win but simply to keep playing, for as long as possible—even at the cost of physical and economic exhaustion.”

The gambling industry is no stranger to criticism like this – but recently some in the industry have been making moves to address this problem of addiction inspired by an interesting question: what if gambling machines could actually help *prevent* people from developing a gambling addiction.

Last year, researchers at the University of Brescia in Italy found that online gamblers who lost big tended to bet in a predictable “sawtooth pattern.” A team led by Harvard Medical School psychiatrist Howard Shaffer partnered with online gambling sites to use their data to create algorithms that “can intervene when people show a risk of becoming problem gamblers.”

The fact that these algorithms might help save gamblers from themselves is also an example of a trend I first wrote about in 2015 that I called *Predictive Protection*. The trend explored the many ways that technology was getting more advanced at protecting us from any type of harm – from small conveniences like Google’s popular “Undo Send” feature, to the far more serious like the filters for automated credit card fraud detection used by banks to protect users against unauthorized charges.

In the coming year, examples like this use of algorithms from the gambling industry will continue to be an example of *Predictive Protection*, but also an example of the broader value we are getting from the role *Invisible Technology* is taking in our lives – and in our society as a whole.

Self-Healing Machines

An ideal example of the societal value of *Invisible Technology* was on display in the middle of a 2015 Royal Society meeting in London when a

team from the University of Bristol led by Professor Duncan Wass presented the results of more than three years of research trying to do the impossible.

The project, described by researchers involved as “verging on science fiction,” was aimed at producing aircraft wings that could fix themselves. Apparently this is terrifyingly more necessary than you might imagine. During the normal course of flight, there are tiny undetectable cracks that form in an aircraft’s wings and fuselage.

To create their healing technology, the science involved adding tiny hollow “microspheres” to the carbon material usually used for plane wings. These microspheres look like a powder, but when a crack is detected, they break on impact to release a liquid which hardens and “heals” the wing.

The inspiration for the entire project was the way the human body bleeds, scabs and heals itself. Why couldn’t materials be created to do the same thing?

And airplane wings could be just the beginning. Professor Wass and his team are looking at applying their research to everything from bicycle helmets to mobile screen phones.

If this idea of self-healing tech seems like something you’ve heard before, you might be one of the over 1 million people who have seen a popular 2012 TEDx talk from Dutch “experimental micromechanics pioneer” Dr. Erik Schlangen introducing the road of the future built from “self-healing asphalt.”

In the talk he breaks a block of asphalt into two and then places them side by side in an industrial microwave while the audience watches them magically bond back together. The secret is simple: mixing steel wool into the traditional formulation for asphalt. When heated, the steel wool melts and binds the asphalt back together.

Together, this range of self-healing innovations are a perfect example of *Invisible Technology* allowing roads to repair themselves, airplane wings to magically fix cracks and perhaps one day for the objects all around us to slowly fix their own damages without our intervention – and eventually even without our knowledge.

The economic implications of these technologies are profound. As

this innovation reaches into healthcare, manufacturing, technology, and even space travel – this is already driving the next trillion dollar industry of the future.

Smart Cities

Every year *Fast Company* magazine publishes an annual list of the “Smartest Cities In The World” looking at a combination of 62 indicators to name the world’s most forward thinking cities. Each year a similar elite group of cities are typically at the top of the list including Barcelona, Singapore, Copenhagen, and Helsinki.

While you might expect that each makes the list based solely on their adoption of technology and connectivity for citizens, the ranking actually considers a range of far more seemingly unrelated metrics such as the number of bikes available for sharing or the number of civic engagement events held each year. Technology as a part of smart cities has started to fade into the background with a growing sense that the more invisible it can be –working silently in the background to make us happier, healthier, safer and more mobile – the better it is.

In the latest edition of *Fast Company*’s compilation of smart cities, Singapore was near the top of the list for responding cities who submitted to be considered for the list curated by urban strategist Dr. Boyd Cohen. The city-state’s bold “Smart Singapore” strategy unveiled a broad ambition to use technology to “sense” the city and deliver real time information back to the government and citizens seamlessly.

When asked about Singapore’s vision for why the world needs smart cities, leader of the ETH Future Cities Laboratory Professor Gerhard Schmitt recently said:

The word ‘smart’ is used a lot for cities already, but that’s limited to technical data -- sensor inputs, control systems, apps. Cities need to be responsive - this is a human-focused approach, where citizens can give feedback on the functioning of the city to those who run it ... citizens should be involved in design of their cities. Technology will just extend and support human sensors.

As smart cities continue to evolve, this priority of making technology seamless with the environment is a growing priority. It's not enough to use technology or to innovate with it. A growing number of people are realizing that we also need to innovate to find the right balance of fitting that sophisticated technology into our lives while also making it invisible enough that it doesn't intrude.

Zero UI and Ultrahaptics

Nowhere is this apprehension about the intrusiveness of technology more apparent than if you consider how people are using the many screens in our lives. The television screen keeps us cocooned at home. The mobile screen keeps us distracted from life unfolding in front of our eyes. The ills of technology overuse are well defined, and they typically involve at least one screen.

As shared earlier in this chapter – designer Vyes Béhar has a different idea for how to create technology that fits into our lives. His passion for removing the screen and creating sensory experiences instead is at the heart of the movement towards “Zero UI” which has been credited as a major force behind the innovation on everything from Amazon's launch of the in-home voice-activated Amazon Echo device to voice assistants like Apple's Siri or Microsoft's Cortana.

While Zero UI remains a popular idea among designers of web and mobile experiences, when it comes other types of experiences – some tactile interface is helpful. That doesn't mean, however, that it needs to be on a physical screen.

Tom Carter is the co-founder of Bristol based startup Ultrahaptics, which has pioneered a technology that uses an array of speakers to produce “ultrasounds” which are decoded by algorithms to create the sensation of touch in mid-air without actually touching anything. Automaker Jaguar has already signed on as an early licensee of the technology, aiming to eventually offer a touchless dashboard for car users.

When it comes to automakers in particular, from parking assist features to automatic braking – the technology integrated into human driven cars in the short term is steadily becoming more and more invisible even

as drivers learn to rely on it more and more.

At the same time, the emergence of autonomous driving vehicles will spur additional innovation with *Invisible Technology* to make the products and devices we use safer.

There are many signs that this same type of *Invisible Technology* is likely to dominate another category we are all equally familiar with: our clothing.

MIT DuoSkin and Wearable Technology

A functional skin tattoo called DuoSkin recently announced by MIT researchers allows you to control a smart phone or other device simply by sliding your finger above the skin tattoo. Less sexy but no less promising has been the rapid evolution of wearable technology from an expensive idea only used in concept clothing for fashion shows to non-obvious innovation being put into use by some of the most forward thinking brands.

Many sports apparel brands including Under Armour and Nike have announced plans for some type of wearable technology embedded in clothing and startup Wearable Technologies launched a “Fan Jersey” last year to allow fans to feel haptic vibrations via the shirt as they happen in a game.

The list goes on with startup shoe line Thesis Couture making waves this past year when former SpaceX head of talent Dolly Singh brought together a rocket scientist, an orthopedic surgeon, a mechanical engineer and an Italian shoemaker to “reengineer the stiletto.” The resulting prototype was first launched in a limited edition of 1500 pairs and has a waiting list of more than 10,000 names.

Beyond clothing and skin tattoos, my research indicates that 2017 will bring these innovators together with the efforts of several companies to develop textiles that can be easily repurposed by the fashion industry.

Google’s Project Jacquard has spent the past year developing a new type of conductive yarn and launched a prototype jacket with Levi’s called the Commuter X in May of 2016. The vision of the project is to offer “a blank canvas for the fashion industry. Designers can use it as they would any fabric, adding new layers of functionality to their designs, without having to learn about electronics.”

It is this intersection of not only smart technology but seamless application to design by non-technologists that will lead to the greatest innovations in wearable tech. As our clothes get smarter, *Invisible Technology* will blend unnoticeably into a sleeve or button on your jacket and offer an experience that will (at least initially) feel indistinguishable from magic. As any true innovation should.

Why It Matters:

For many years, the consistent challenge with technology and user interface design in general has been to try and make it more intuitive and human-centric. Usability experts have been trying to optimize websites, for example, for decades. Touch screens have emerged in the last decade and have widely taken hold as a better way to do everything from control smartphones to self-checkout kiosks at grocery stores. Over the past year and moving into 2017, the rise of devices that use smart automation, artificial intelligence, and voice control will grow the category and trend of *Invisible Technology* – where interface design increasingly becomes more intuitive, predictive and able to function without human intervention.

How To Use This Trend:

- ✓ **Collect human insights** – In order for technology to truly become more insightful, it requires a greater understanding of human behavior. What this means for any organization or leader is that the collection and use of human insights becomes more important than ever. When cars drive themselves, do people still need a steering wheel in order to feel emotionally at ease – even if the wheel is non-functional? The challenge with *Invisible Technology* will continually be more than just making the technology work. Every company designing a product or delivering an experience must employ experts in making sure this *Invisible Technology* is accepted by the humans it's meant to serve.

- ✓ **Show what is working** – As technology becomes more invisible, one of the challenges I have seen emerge is what type of feedback needs to be built into it to demonstrate how and *if* it is working as expected. The feedback loop becomes critical for acceptance – particularly when that *Invisible Technology* is used in more serious life or death situations.