Wearables: 10 Trends to Watch

Published 3Q 2015
SECTION 1
INTRODUCTION

The wearables market is a combination of multiple device types, applications, and use cases. The breadth and diversity of the market makes it unique, and unlike any other consumer electronics category that has existed before. The common thread across wearables is that the device is attached or worn on the body. Wearables can be sensor-infused devices, clothing that is reading vital biometric data off the body, or simply a body-mounted camera or a pair of smart glasses that allows for hands-free operation. More importantly, wearables in their various shapes and forms are reinventing the way humans interact with computers, in the process getting a better understanding of their bodies and their immediate environment.

Wearables like fitness trackers and, more recently, smart watches have received a lot of attention. It is easy to limit one’s view of the wearables market through the lens of these devices and form impulsive opinions about their future. Tractica’s extensive coverage of the market has found that, unless you view the market as a whole and understand the micro trends within each device segment, application area, and world region, it is difficult to have a comprehensive view about wearables.

While Apple, Google, Motorola, Huawei, LG, Samsung, Sony, and other well-known consumer electronics and smartphone players reveal their wearable products, it is easy to miss the activity on crowdfunding platforms like Kickstarter that has spurred on companies like Pebble, now a major force driving smart watch innovation, or Sproutling that is leading with intelligence first and device second, as it launches its baby monitor anklet.

It is also a common misconception that North America is where all the wearable action is concentrated. While North America has the largest concentration of wearable companies and an audience that is much more open to experimenting and trying new products than anywhere else, it would be unwise not to look at China and the wearable activity brewing in that region. Top e-commerce site Alibaba is launching a wearable payment service in partnership with Xiaomi, while Baidu has its own smart glasses and a smart watch operating system (OS) platform called DuWear. The race is on in China to dominate the platform end of wearables and the question is who, among Huawei, Baidu, Xiaomi, and Apple, will emerge the winner. Also, Japan has been a trailblazer in wearables, as mobile network operators like SoftBank and NTT DOCOMO have launched wearables as a service, possibly acting as a blueprint for operators in the West.

Beyond sports and the consumer segment, the quantified self is giving way to the quantified enterprise, as corporate wellness programs adopt wearables as a tool to incentivize employees to lead healthier lives. The enterprise adoption of wearables is also growing beyond early devices like Google Glass, with companies like DAQRI, Atheer Labs, and Meta having redefined augmented reality (AR) glasses and leading with 3D and 4D immersive features. But the most exciting revolution taking place is the birth of the next big computing platform after smartphones, largely personified in revolutionary devices like the Microsoft HoloLens and the elusive Google-backed Magic Leap device that has yet to launch.

This Tractica white paper captures all of these important trends and more, piecing together a well-informed and broad view of the wearables market and its future.
SECTION 2

10 KEY WEARABLE TRENDS TO WATCH

2.1 WEARABLE MARKET IS MORE THAN JUST SMART WATCHES AND FITNESS TRACKERS

Computing has moved from the PC and laptop into the smartphone and tablet, bringing the industry to a point where human interaction with computers and the web is moving closer to the body. The advent of wearable computing is upon us and we are just beginning to see the first glimpses of how this revolution will shape the future of human interaction with technology. The wearables market is a mix of a number of device types, all of which are worn or attached to the body to serve a specific purpose or provide a utility. The wearables range from devices worn on the wrist, back, chest, head, foot, or clothing, and can serve a range of purposes like tracking health and wellbeing or recording events to simply providing notifications.

The year 2015 has seen one of the first mass-market consumer wearables hit the market, with the Apple Watch. The wearables market has lacked a true “hero” device until now and Tractica believes that Apple will provide the momentum and scale to drive this market to success in the long term, just like it did for smartphones and tablets. However, the wearables market is bigger than just the smart watch and Apple, with its long tail of applications, and use cases are emerging around enterprise, sports, industrial, healthcare, and public safety. The overall market is estimated to grow from 17.9 million shipments in 2013 to 196.9 million shipments in 2020, representing a compound annual growth rate (CAGR) of 25%.

Chart 2.1 Wearable Device Shipments by Device Type, World Markets: 2013-2020

(Source: Tractica)
Smart watches will be the lead device category within wearables, driven by the Apple Watch. By 2020, smart watches are expected to still make up 48% of total shipments, growing at a CAGR of 71% between 2013 and 2020. Fitness trackers will be the second biggest device category, with 44.5 million shipments expected by 2020, but growing at a much slower 23.2% CAGR between 2013 and 2020. GoPro will drive most of the wearable camera market, again targeting the sports enthusiast. Wearable camera shipments are expected to reach 30.6 million by 2020, growing at a CAGR of 34% between 2013 and 2020.

The other device categories of body sensors, smart glasses, and smart clothing will experience high growth rates, but are expected to have limited appeal as mass consumer devices compared to smart watches or fitness trackers. Some technologies like smart glasses and smart clothing need time to mature, both from the perspective of functionality and pricing. The failure of Google Glass as a consumer device and the issues surrounding privacy and compelling use cases have demonstrated that, while new computing platforms are necessary, they have yet to be successfully shown as being consumer-grade technology, just like the PC or smartphone first experienced.

The recent announcement about the Microsoft HoloLens has rekindled the industry’s focus on smart glasses, particularly for AR uses cases in enterprise, industrial, and consumer settings. The impending launch of the Google-funded AR glasses company Magic Leap is another factor that will impact how the smart glasses category will grow. Overall, Tractica expects a lot of activity in this space over the coming years, with everyone trying to make a device that is compelling and at the right price.

The body sensor and other wearables categories are a combination of different devices, most of which are expected to experience growth in the long term, although they represent the long tail of wearables that have niche use cases. Body sensors include a range of devices, including heart rate monitors (HRMs), baby and pregnancy monitors, headbands, posture monitors, and 3D trackers. While chest strap HRMs are likely to see a decline in demand, due to the growth of heart monitoring in smart watches and fitness trackers, this decline will be countered by growth in the other devices. Within the other wearables category, location trackers, including pet, elderly, and child trackers, are expected to see the highest growth as their price points decline and they have a clear value proposition targeting the safety of pets and family members.

2.2 **Unlike Smartphones, Wearables Will Grow Beyond Just Apple and Google**

In the smartphone world, Android controls roughly 85% of total smartphones today (including both Google and non-Google Android), with iOS taking 10% and the rest made up of Microsoft, BlackBerry, and others. While Apple is low on volumes, it controls the higher end of the market and a large share of network traffic, with a higher dollar value attached to its app ecosystem, while Android controls the mid- and lower-end markets.

Overall, Apple and Google are comfortable in their respective positions and things are unlikely to change drastically in the near term. We have reached a plateau in the smartphone market, at least in the developed world, with parts of the developing world like China and India still seeing a degree of growth and churn. In 2015, it will be 8 years since the launch of the iPhone, and possibly the end of an era that reshaped the mobile and computing landscape forever. We are now at an inflection point where the focus is shifting from smartphones to wearables. Both Apple and Google have ambitions of dominating the wearables market just like they do in the smartphone space.
Apple has made its foray into wearables with the Apple Watch and the accompanying WatchKit platform. The company also has big ambitions of being the mobile healthcare go-to platform with HealthKit, which is likely to have a deep integration with WatchKit. Apple will continue to leverage its high-revenue iOS user base and draw them into the WatchKit ecosystem. Google’s Android Wear platform should follow on the heels of the Android smartphone, having a large ecosystem of partner devices that can port its OS. As things stand, one could say that we are headed for a replica of the smartphone market with Apple and Google dominating the platform landscape. However, the wearables market has some unique characteristics that make it very different from the smartphone market, reducing the chance of market dominance.

There are several key reasons why we should see more fragmentation in the wearables platform market compared to smartphones:

- **Innovation**: If you are an existing app developer for Apple or Google, you possibly do not care and would welcome the continuation of the smartphone status quo. But innovation does not happen when things are stable or follow predictable patterns. Innovation needs radical, disruptive changes like the iPhone, to shake up the existing hegemony and create new opportunities. Some of this is taking place with wearables emerging from the Kickstarter economy.

- **Multiple Devices vs. Single Device**: Unlike the smartphone market, which relies on a single type of device, the wearables space includes everything from smart watches to body sensors and smart glasses. This makes the overall opportunity much bigger than the smartphone, as it is a collection of multiple markets, rather than one market. Therefore, instead of a “one size fits all” platform, we need the opposite, or a bunch of specialized platforms based on device type, application, etc.

- **Design**: The user interface (UI)/user experience (UX) for wearables is very different from a smartphone and, therefore, needs a new batch of developers and designers who can introduce new ideas and experiences. Are we basically limiting their toolkits to two generic platforms? Or would it be better to allow this new group of developers and designers to dictate their own platforms without any caveats or limitations? The wide range of devices on offer in wearables is likely to create more opportunities around design and UI.

- **Data Security and Privacy**: Both the Apple and Google platforms rely heavily on the cloud and security is a big concern for wearables that constantly feed health and fitness data into the cloud. The latest security breaches at Sony and the threat of health data becoming the next target for hackers illustrate that it is wiser for the data to be distributed in multiple platforms, rather than just a couple. Also, can we trust Apple and Google not to monetize our personal health data from their cloud servers? Facebook and Amazon heavily interlinked with the Apple and Google platforms, but what guarantees do we have that this data will not be cross-leveraged? There is a growing section of consumers that have issues with trusting all of their data with Apple or Google, which should create new open platform opportunities.

- **Offline Usage**: If we rely on the Apple and Google wearable platforms, it is hard to imagine wearable apps working in offline mode. How does an Android Wear developer create contextual apps without having application programming interface (API) access to Google Maps or Google Now? Similarly, Apple’s WatchKit is designed as an extension of iOS, which has limited functionality in offline mode.
In the smart watch space, we should not forget companies like Pebble, which was providing some competition for Apple and Google, until the Apple Watch launch offered the largest number of apps available on a wearable device. Also, Samsung is slowly branching off its own Tizen OS, part of the new Gear S watch and the SAMI healthcare platform. Baidu in China has announced its own DuWear Watch platform, which should spark competition with Xiaomi. Mozilla has given indications of entering the wearables space and the need for a more open platform. Microsoft is also known to be building a platform around its Band wearable device.

**Chart 2.2**  
Smart Watch Market Share by OS, World Markets 2013-2020

At the end of the day, for any ecosystem to flourish and grow, the industry needs a variety of “hero” platforms that can drive the market forward. One could argue that the success of the smartphone ecosystem would not be what it is without Apple and Google. The same could hold true for the wearables ecosystem; however, it would be much more beneficial if the “hero” platforms could go beyond the two available today.

2.3 **Market Focus Will Move to Wearables UI and Analytics**

The initial focus for wearables, both from a vendor and consumer standpoint, has been centered on the look and feel of the product, its comfort factor, and whether it is worthy to wear in the first place. Whether it is fitness trackers, watches, or any other body sensor device, attractive female models or aesthetically crafted product photos are typically used to market wearables. Apple has personified this in its marketing campaign for the Apple Watch, positioning it as a fashion accessory first, rather than a new kind of computing device. While we can admire the way Apple’s design chief, Jony Ive, talks about the technology, precision, design, personalization, durability, and other features that really make the watch desirable, the long-term success of Apple Watch will depend on its ease of use and its utility as a body-worn device. Once the early adopters have had their fill of the Apple Watch and the other new wearable devices hitting the shelves today, the mass market will only be convinced if something else is on offer that makes the wearable device valuable.
Tractica believes the value of wearables will move beyond look and feel, focusing more on the UI and analytical insights that can be gained from the data that is being captured on these devices. Because most wearables lack a large screen to interact with, the majority of interaction is likely to be performed through a Bluetooth-enabled smartphone. The UI of the wearable is essentially the mobile app in most cases. In the case of smart watches, it is slightly different, as the user interacts directly with the watch screen, in addition to using a smartphone. Other wearables like fitness trackers, headbands, posture trackers, or even smart clothing have a mobile app that accompanies the wearable, which is possibly more critical than the actual wearable that is shipped. Today, barring a few select wearable vendors, most have not paid attention to it, or have chosen not to bring those aspects out in their product marketing. Apple and Google have spent a lot of effort defining their watch UI design guidelines, although there is still a lot of inefficiency in the interactions, and the watch UI will take time to mature. With the market being flooded with "me too" wearable devices, especially fitness trackers and smart watches, the quality of the UI is bound to suffer.

There are encouraging signs, especially from some of the independent small companies that are emerging on crowdfunded platforms like Kickstarter and Indiegogo. Some of these companies understand the value of UI and analytics and have decided to put it at the very center of their value proposition; one such company is Sproutling, a California-based startup. At first, this seemed like yet another wearables company in an overly crowded market, but this time selling to over-anxious, sleep-deprived parents of newborns. When looking at the product a bit deeper, one realizes that Sproutling is more about the insights and meaningful changes that it can bring about in parents’ lives. This runs counter to most wearable marketing you see today, which talks about how smartly cut or polished the wearable device is, or the number of colors in which it is available.

*Figure 2.1 Sproutling Baby Monitor Mobile App UI*
Sproutling is one of the few wearable devices that puts intelligence first and device second. The product comes with a wearable ankle band for the baby, a charger, and a mobile app. Sproutling has the right marketing approach with the product being positioned as a “sensing, learning, and predicting” baby monitor. In other words, it goes beyond just monitoring your baby.

While wearables for most of us mean shiny new gadgets, when done right they can become the “invisible technology” in the background that assists at the right time with the appropriate information. In Sproutling’s case, it lets you know the quality of the baby’s sleep and provides an approximate timeline of when the baby might wake, also letting you know if the baby is calm, fussy, or angry when awake. It also alerts you when it senses an abnormal heart rate or if a baby has rolled over. Like any other wearable worth its mettle, there are multiple sensors on it. However, rather than highlight those, Sproutling talks about the machine learning algorithms in the background that can relate that sensor data to context and provide specific meaningful insights and has a well-designed intuitive UI that presents the insights clearly.

Sproutling only began shipping its product in early 2015 and one can question the validity of these claims. Maybe there is a lesson for other wearable vendors who need to bring out the specific insights and intelligence that can be gained from the device, apart from how well engineered the hardware and design is. All wearables have a connection to our bodies in some shape or form. Yes, they need to look good and be designed appropriately. They can also gather multiple data from the embedded sensors. However, what makes wearables invaluable is how that data is put into context. That context might be a use case, location, time, or even personal identity.

2.4 NORTH AMERICA IS DRIVING ADOPTION, BUT LOOK OUT FOR CHINA

North America will lead the wearables market, with most of the wearables companies based within the region, and with user education and interest in wearables being the highest compared to any other world region. The United States will make up the majority of the North American market and the majority of wearable devices will be launched first in the United States. The Apple Watch will drive the big jump in North America in 2015, with growth stabilizing beyond that.
Tractica forecasts that Europe will be the second biggest regional market, but Asia Pacific is likely to become the second biggest market after North America by the end of the decade. Within Europe, the majority of the activity is expected to be mostly limited to the United Kingdom, France, Germany, and the rest of Western Europe. In the Asia Pacific region, countries like Japan, South Korea, and Australia are seeing early adoption of wearables, with Chinese demand picking up in the latter half of the forecast period, as smartphone saturation begins to set in and Chinese companies like Xiaomi and Huawei expand their wearables portfolios. Tractica expects the involvement of Chinese device makers like Lenovo, Xiaomi, and Huawei to eventually drive strong growth in the Asia Pacific region, ultimately putting it ahead of the European market by 2019. Xiaomi is known to have sold more than a million fitness trackers in the first 3 months of their debut toward the end of 2014. Xiaomi is expected to launch a smart watch, possibly later in 2015. This is because its closest Chinese rival, Huawei, recently launched a smart watch and the Chinese web search engine Baidu announced a smart watch OS known as DuWear.

Another area that will see a lot of traction in China is wearable cameras. Cheaper versions of the sports-focused GoPro cameras have already flooded the market, and the demand for police body-worn cameras is also increasing. China has one of the largest police and law enforcement forces in the world with 1.6 million police personnel. This represents a large market opportunity for local wearable camera companies and other established players from North America and Europe.

Apart from homegrown Chinese products, Tractica expects products like the Apple Watch to do well on the back of Apple becoming one of the leading aspirational brands with over 40 Apple Stores in the region expected by the end of 2015, drawing a large following, especially among mid- to high-income young people in China, who are less concerned about the value of a product and more interested in owning an Apple-branded watch. Apple has been quick to recognize this and, even before it launched a marketing campaign in the United States, it had the Apple Watch on the cover of Vogue China back in October 2014. Another good sign for Apple is the fact that there is a large population of compatible iPhone 6 users that can...
adopt the Apple Watch. The 1Q 2015 results from Apple had China becoming the largest market for iPhones, surpassing North America.

2.5 CORPORATE WELLNESS IS CREATING THE “QUANTIFIED ENTERPRISE”

The history of health and wellness within the corporate environment began in the 1960s and 1970s with full medical exams being offered to employees, as well as the introduction of company gyms. However, the big moment came in 1984 with Boeing banning smoking within select buildings. Boeing can be regarded as a pioneer in the corporate wellness movement with official company policy being “to provide the cleanest, safest and most healthful environment possible for its employees.” The idea of corporate wellness has always been to promote the wellness and health of employees, which, in return, has a positive impact on their productivity and satisfaction at work.

The advent of wearables like the fitness tracker that can track activity levels or even stress levels has provided a unique opportunity for employers to promote a healthy lifestyle, and possibly detect and solve workplace-related health issues in advance. This also makes financial sense for companies looking after their employees by lowering insurance costs. Studies from organizations like Health Enhancement Research Organization (HERO) have shown that a quarter of total employer medical costs are related to tobacco use, diet, and exercise.

Contrary to what many would assume, enterprise wearables are very much alive and kicking. This new market has moved beyond the trial stages, with wearables embedded into employee benefit packages and factored into insurance premiums. The enterprise wearables market has moved beyond the simple tracking of steps, with the ability to monitor blood pressure, heart rate, stress levels, and nutrition levels, with wearables aiding, if not providing the full data feed. Fitness trackers are driving most of this trend today, with the leading companies like Fitbit and Misfit having dedicated programs focused on corporate wellness. Large companies like BP, Red Bull, Activision, and Autodesk are participating in these programs and have provided fitness tracker devices to their employees to encourage healthier lifestyles.
In addition, new players like Jiff have emerged that offer corporate wellness platforms, which are device-agnostic and work hand in hand with other benefit software platforms. Jiff is using wearables as a tool to create unique mobile and web experiences in order to incentivize and gamify health within the workplace. Using the Jiff platform, employees can obtain wearable devices of their choice, either free or at subsidized rates, and can use Jiff apps to track their own activity levels. Jiff uses a number of techniques to make wearables more fun. One is to incentivize users to achieve a certain goal, in return for a financial reward or voucher. A second approach is to use gamification techniques to build challenges for teams where employees can compete against their colleagues to achieve a fitness goal. Another technique is to use social media to gain kudos and encouragement from their online circle for specific fitness tasks.

And the results are quite impressive. In 2014, Jiff already had close to 250,000 employees on its platform using wearables on a day-to-day basis. By the end of 2015, Jiff expects that number to grow to 1.5 to 2 million. The dropout rate of employees who abandon their wearables is fairly low. Jiff is one of several companies innovating in this space. Other companies include Welltok, Welbe, and Limeade, and, therefore, there is a much larger population of enterprise wearables beyond the Jiff user base going into the multiple millions. There are also data analytics specialists like Big Cloud Analytics, which partnered with Intel’s Basis smart watch to provide detailed enterprise analytics capabilities for corporate wellness programs.

One of the key contributors to this massive growth could be the sensible set of data privacy policies that Jiff and other corporate wellness companies have adopted. The employee owns their wearables data and the employer only sees the data at an aggregate level. Companies like Jiff are basically adding value on top of the wearables device and competing in the kind...
of experiences that one can create around health in a corporate environment.

The next step is scaling the platform, possibly using a wider range of wearables like smart glasses or smart clothing. In addition, body sensors like posture sensors or headbands that can measure stress and help with mind-related exercises should also play a role in corporate wellness, as employers start to explore the advantages of different types of wearables. This should give a more holistic view of employee wellness, albeit with an expanded set of issues around user experience and privacy issues.

The ability to quantify employee wellness and the overall health of a company through wearables is a powerful factor that should find increasing adoption in the workplace. This is part of a larger trend of people analytics within companies where big data and machine learning is being used to enhance human resources functions, such as hiring and retention, sales, and employee satisfaction.

Machine learning will play a more prominent role as the data sets become larger, with platforms like Jiff being able to learn individual employees’ fitness or activity patterns and suggest appropriate actions, such as additional exercise or medical treatment.

2.6 CROWDFUNDING WILL CONTINUE TO PLAY AN IMPORTANT ROLE FOR WEARABLES

Crowdfunding sites like Kickstarter and Indiegogo have helped bring wearable technologies into the spotlight. Oculus and Pebble are among the best known crowdfunding success stories, with Facebook acquiring Oculus in 2014 for $2 billion and Pebble among the best-selling smart watches today. It is estimated that more than 80% of the total crowdfunding money raised has been for hardware projects, with wearables making up close to 25% of that. The rest includes smart homes, 3D printing, and other accessories.

If you follow the wearable space, it is hard to ignore the latest campaigns on Indiegogo or Kickstarter. It almost feels like peering into a crystal ball to see what is coming next. There is no question that crowdfunding has helped hardware-based entrepreneurs raise money and accelerate their businesses without having to sacrifice equity with venture capital (VC) or an angel investor. The crowd can choose the amount of money they want to contribute toward a project, in return securing an early release of the product, scoring some merchandise, or simply being part of something cool.

So, is this the start of a radical movement where innovation and funding begins at the grassroots? What impact will the crowdfunding economy and innovation have on the larger technology companies like Apple and Google? Will the best wearable ideas emerge from crowdfunding platforms? Here are some possible answers to these questions:

- We live in a multi-disciplinary world today and, as MIT Media Lab’s Joi Ito says, innovation is happening at the edges or the grassroots. The coming together of the Internet, open development platforms, and low-cost hardware (Arduino, Raspberry Pi) has played a big part in unleashing a wave of innovation. Crowdfunding platforms are funneling some of that multi-disciplinary grassroots innovation to the masses.
- The crowd is an important aspect both in terms of the projects that need funding and the backers that fund these projects. A large portion of these projects will fail and be below par. At the same time, it is likely that backers will miss something truly unique and worthwhile. This is a function of the crowd. Quality is not always guaranteed with a crowd.
• Marketing is a big part of a crowdfunding campaign, with a lot of effort spent in creating the perfect video pitch and website, so much so that many projects falter in the execution stage. While a host of specialist companies design crowdfunding campaigns, this has also given rise to post-crowdfunding startups like Unbits, which help crowdfunding projects scale that difficult step between crowdfunding and distribution.

• Manufacturing is the hardest step in the lifecycle of any wearable crowdfunding project as it goes from a prototype to a product shipping in scale. With most hardware and component manufacturing based in Asia, it is critical to have the right machinery in place to be able to execute orders and get them to the distribution stage. Companies like PCH and Dragon Innovation specialize in helping hardware entrepreneurs solve their manufacturing issues.

• With the critical pieces of the crowdfunding value chain in place, including raising money, marketing, manufacturing, and distribution, the barriers to having a successful hardware-based wearable product are getting lower. Until now, what was regarded as the specialist domain of large hardware original equipment manufacturers (OEMs) is now becoming democratized and accessible to everyone. We are still at the very early stages of this revolution with each piece of the value chain likely to mature and consolidate. Expect to see reductions in failure rates for hardware crowdfunding projects.

• In the longer run, it will become harder for companies like Apple and Google to keep up with the pace of innovation. They will be forced to acquire some of these startups, just like Facebook acquired Oculus. This will push more seasoned investors into the game and will give rise to equity crowdfunding platforms for hardware, just like Seedrs and Crowdcube are generic equity crowdfunding platforms.

• Wearables are a package of good design, ruggedized components, smart UI, and intelligent analytics. Most wearables miss out on one or more of these aspects, being good in design but having a bad UI, or having a good UI but missing analytics tools. This is true with most Kickstarter or Indiegogo wearable projects as well. As the crowdfunding market grows, expect to see wearable-focused crowdfunding platforms that bring out more of the non-hardware aspects.

• Also expect to see more hardware incubators like Highway1 spring up, providing crowdfunding expertise and encouraging cross-pollination of projects.

Overall, crowdfunding will continue to play a major role in the wearable space. Value chains will evolve and mature around crowdfunding platforms, and the crowdfunding economy will see a more formalized structure with much more money flowing into it. In the end, it is about building technology for us, by us.

2.7 WEARABLES AS A SERVICE IS ON THE HORIZON

The early-adopter, health-conscious, gadget-oriented consumer has largely defined the narrative about wearable fitness trackers until now. Brands like Nike, Fitbit, Pebble, Sony, and Samsung have focused their marketing around device features, the look and feel, and design in creating these fitness products. The same applies to smart watches, which are increasingly taking the role of fitness trackers, with the Apple Watch being a good example of the focus being on how fashionable the device is or how superb its craftsmanship.

But very few vendors have cared to explain the actual value that consumers can derive from a wearable fitness device. This is because the true value is mostly hidden in the software
and services that work in the backend or cloud. The value in the services can range from extracting useful data from the device and generating actionable insights, or the other way around, with the software filtering relevant and contextual information and presenting it to the device.

In Tractica’s analysis, this has been one of the main reasons for the ongoing disenchantment with wearable fitness devices, with users enticed to buy these devices at first glance, using them for a short period, and then abandoning them shortly thereafter. The big question and hotly discussed issue in wearables: how does one increase the “stickiness” for wearables?

Wearable services could be one answer. Fitbit has had its Fitbit Premium service since the beginning, an annual members-only service, which provides a personal trainer, personalized fitness plans, food and sleep reports, and a peer ranking benchmarking tool. It also allows users to export their data if they want to. However, this has not caused a massive uptick in the sales of Fitbit devices. Of course, $49 per year is a hefty price tag to pay, especially when users are unclear about the value proposition and the benefits of getting access to additional reports and data. The pricing has to come down much further to get people interested in even considering a service model for wearables.

A much more credible services approach is a platform-based approach; Apple’s HealthKit, Samsung’s SAMI, Google’s Fit, and Microsoft’s Health are all service-oriented software platforms aimed at developers. It is up to the developers to build applications and services on top of the health data, which allows the marketplace to decide how to price and offer services. It is no coincidence that all these platforms have been launched in quick succession during the second half of 2014. This suggests that there is surprising consensus in the industry around the timing and need for a services marketplace for wearables concerning health and fitness data.

Figure 2.3  SoftBank’s Fitbit-Powered Healthcare Service

Mobile operators in Japan have already started to offer wearable services and are trailblazers of sorts. SoftBank began offering a Fitbit-powered healthcare service in mid-2013, with a subscription charge of ¥1058 ($9) per month. Service subscribers receive a subsidized Fitbit Flex device, along with a 3G connected Smart Body Composition Scale measuring a number of attributes, including body weight, body fat percentage, body mass...
index (BMI), basal metabolism, visceral fat level, body age, bone level, skeletal muscle level, and moisture content. All the data is stored in the cloud and can be accessed using a mobile app or web browser.

Beginning in December 2014, NTT DOCOMO, in partnership with Runtastic, also launched a wearables service. The monthly subscription service, which costs ¥350 ($3) plus taxes, offers six separate apps for running, biking, squats, push-ups, pull-ups, and sit-ups, along with a selection of 30 training programs. For now, the selection of wearable devices is limited. The service works with a C3fit IN-pulse smart shirt, which measures heart rate and transmits data to the Runtastic apps. DOCOMO expects to open up the service to more wearable devices in the future. While DOCOMO already has a successful healthcare platform and apps, it has chosen to go with an existing specialist fitness app provider like Runtastic.

However, in Tractica’s opinion, the services play or wearables market goes beyond telcos and includes brands, web services, or even retailers. This means that a BMW app could alert users when their wearable data suggests that a user is too tired to drive, a Walmart app could suggest groceries based on activity and diet plan, or Google Maps could suggest a route to work that includes just the optimum amount of walking. Some of these services will be free and some might be monetized like Japanese telcos have done.

We can expect some of the first wearable-oriented applications from developers in the 2015 timeframe, with 2016 being the year when things get really interesting as developers vie to compete with each other on multiple platforms, which is when we might see the takeoff of the actual wearables revolution.

2.8 SMART CLOTHING IS THE ULTIMATE WEARABLE

The age of wearable computing is upon us, with computers that we can wear on our wrists as smart watches or fitness trackers, smart glasses we wear on our faces, and state-of-the-art wearable cameras that we can attach to our bodies to capture and record unique perspectives. The ultimate wearable computer is a piece of smart clothing that one can wear as a garment.

Smart clothing has been around for a decade or more, with the miniaturization of electronics leading to integration within garments. However, most smart clothing has been limited to niche usage in high-end fashion, medical, or military sectors. Only now are we seeing the true confluence of electronics and textiles leading to comfortable fabric-based sensors that can be integrated into a garment, or the advent of conductive yarns that can be woven into a smart fabric.

Today, smart clothing is seeing the greatest levels of activity and adoption within the sports and fitness sector, with apparel that can track advanced biometrics, from muscle activity and breathing rates to heart activity zones, providing professional athletes and fitness warriors a deeper understanding of their bodies and fitness levels. Smart clothing provides better accuracy of biometrics, something one is unlikely to get from a wrist-worn fitness tracker or smart watch. Apart from biometrics, smart clothing can also be used to track physicality like movement, pressure, gait, and other features.

Although the market is still in its early days, Tractica expects the momentum to continue building within the sports and fitness segment, with advanced sports enthusiasts adopting the technology for the most part, but the average consumer also following through as the features become simplified and pricing comes down. Industrial applications like fatigue monitoring of workers are also likely to experience growth in the near future.
2.9 Wearable Cameras Will Ultimately Merge with Virtual Reality

Leading wearable camera maker GoPro recently announced the acquisition of Kolor, a company based in the French Alps that specializes in image and video stitching software. Kolor’s software creates spherical 360-degree panoramic shots or virtual tours that can be viewed on the web, a mobile device, or a virtual reality (VR) platform. GoPro’s goal is to integrate Kolor’s software solutions into its own software platform, making it easy to create immersive panoramic and spherical content that is captured with GoPro cameras. It is about adding spherical content, but it is also a move that could help GoPro lead in creating wearable camera solutions that capture and create content for VR platforms. A lot of the spherical content today is being captured on 3D-printed rigs that can hold multiple GoPro cameras.

GoPro could expand its hardware portfolio beyond the Hero device and create specific hardware for capturing 360-degree spherical content. The fact that GoPro is building its own drone suggests that the company is already thinking along those lines. GoPro’s CEO and founder, Nick Woodman, is becoming interested in VR and the Kolor technology is being embedded into GoPro’s software platform, making drones a great way to create immersive content.

However, this could go beyond drones, with GoPro creating the ultimate 360-degree spherical camera that can be worn on the body. Samsung is already working on its own spherical camera as a part of Project Beyond, which complements the Samsung Gear VR, allowing for content creation as well as content consumption. It is too early to tell if this will be portable or wearable, although the prototype shown by Samsung was on a tripod. Rather than having a fixed camera, it would be useful to attach it to the user’s body to capture live feed. Target applications could include filmmaking, advertising, tourism, and concerts teleporting users into the actual place or event.

As wearable cameras see advances in lens technology, imaging software, and 360-degree video capture, they become ideal devices for creating content for VR. The content could be personal, sports- and adventure-related, or even related to public safety or industrial applications. Any activity during which the user requires hands-free usage, while requiring the capture of video or images, could benefit from wearable cameras that create content for VR headsets, essentially immersing the VR user into the wearable camera user’s perspective. We are headed toward realizing “Being John Malkovich” in real life.

2.10 Smart AR Glasses Are a Precursor for the Next Leap in Computing Platforms

The smart AR glasses market is currently undergoing a transition, since Google decided to go back to the drawing board, redesigning Google Glass, although the original Glass product is still seeing adoption in industrial settings through the Glass at Work program. In the meantime, other vendors have ramped up activity, including Vuzix, Epson, and Sony, releasing second- or third-generation heads-up display (HUD) type smart AR glasses products. Other vendors like Meta, Atheer Labs, and DAQRI are trying to extend the boundaries of AR by providing 3D or 4D features. Most of these products are being rolled out in small pilots and trials for industrial use cases, including warehouses, manufacturing shop floors, and mobile workforce management. At the same time, a small Canadian company, Recon Instruments, has successfully shipped the largest number of smart AR glasses to date, targeting high-intensity sports activities like skiing, snowboarding, cycling, and running. Intel announced that it was acquiring Recon in June 2015.

The two products that have the most promise and are poised to revolutionize this market have yet to become commercially available. These are the Microsoft HoloLens and Magic...
Leap’s elusive and yet to be announced product. These define a new type of smart glasses experience, allowing users to be in the real world, but at the same time, to be immersed in an artificial holographic reality that feels almost real and tangible. Tractica has only seen glimpses of these technologies; more so the HoloLens than Magic Leap, but both are set to become the standard for smart AR glasses technology and will possibly redefine it once they become public.

From an enterprise computing perspective, Microsoft has an opportunity to integrate all of its software, including Windows, Skype, Outlook, and Office, into the HoloLens. It is easy to imagine the HoloLens replacing a traditional desktop screen, with the HoloLens headset becoming the primary workplace computer. Microsoft’s applications and services could flow through the cloud and the user could flow between unlimited virtual workspaces and screens. Rather than having a VR headset with users cut off from their immediate environment and potentially losing their sense of the real world, AR allows users to remain connected to the real world. Microsoft’s holographic technology is able to use surfaces and features to create holograms or screens layered onto the real world to create unique experiences like being transported to a conference room, factory shop floor, or another planet. AR holographic platforms like the HoloLens could enhance productivity and, when connected to the cloud and web, could create virtual meeting places and communication platforms where users could conduct business collaboratively, work in teams, and even transact. Just like web pages are 2D representations of companies and brands, we could be interacting with 3D holograms and environments, something that could change web advertising or browsing habits.

Another reason why these technologies are likely to succeed and be adopted far beyond any other smart AR glasses product is that, in their true sense, they are mass-consumer products. While initial adoption will occur in the enterprise, the main test for these technologies will be convincing users to invest in the next-generation computing platform. Microsoft HoloLens, at its heart, is an attempt to redesign the basic human computer interface. It has been close to half a century since Douglas Engelbart’s “Mother of all Demos” in 1968 when the world first witnessed a keyboard and a mouse being used as an interface to a computer. Since then, we have seen it become the primary human interface for interacting with computers. The next revolution in interface technology came with the iPhone and the iPad at the end of the last decade with the capacitive touchscreen. Google Glass came close to becoming a new computing platform, but so far, it has failed to convince users and is currently in the process of being redesigned.

The HoloLens has powerful capabilities like immersing the user into a half-real, half-augmented world where physical objects can become animated and interactive. The demos at Microsoft’s annual developer conference, Build 2015, showed how the Microsoft HoloLens could bring a living room to life with apps instantiated as holograms. The HoloLens has depth perception technology that can map out a room and allow the user to place virtual markers or objects in the room and interact with them. The living room essentially becomes the screen, with content breaking out from the shackles of 2D screens and existing in real space. Air tap gestures enable users to control these holographic objects, adding an infinite degree of freedom compared to a mouse or a finger zoom on a flat screen. In fact, the HoloLens provides the capability of extending a 2D screen experience into the holographic world.
Modern families are experiencing some form of disengagement at home due to smartphones, tablets, and laptop screens being always on, but there is a chance for a socially engaging technology like the HoloLens to bring families together. Eventually, living rooms could become virtual teleportation hubs with holographic extensions of friends and family visiting our living rooms through Skype. There is immense potential for smart AR glasses technology in the consumer space, especially in the home where entertainment, communication, and gaming could be transformed forever.

Just as the HoloLens is trying to reshape entertainment in the living room, another smart AR glasses technology from Magic Leap is poised to bring innovative experiences not just indoors, but outdoors as well, whether it is the sidewalk, park, public square, or the beach. Magic Leap presents a new canvas for moviemakers, animators, educators, and game creators, and is an area worth watching, as this technology gets released and makes advances over time.

Both the HoloLens and Magic Leap are fundamentally different devices compared to Google Glass and the existing set of AR glasses in the market, as they bring deep immersive experiences and holographic interactions, rather than being simply an extension of smartphone notifications or laptop screens. The smart AR glasses market is expected to transition to these holographic platforms at some point in the future, but, in the meantime, the lack of commercial readiness of HoloLens and Magic Leap will create room for newer AR glasses vendors like Atheer Labs, DAQRI, and Meta to lead with this new wave.
### SECTION 3

#### COMPANY DIRECTORY

<table>
<thead>
<tr>
<th>Company</th>
<th>Address</th>
<th>Phone</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alibaba</td>
<td>969 West Wen Yi Road</td>
<td>+86.571.8502.2088</td>
<td><a href="http://www.alibabagroup.com">www.alibabagroup.com</a></td>
</tr>
<tr>
<td></td>
<td>Yu Hang District</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hangzhou 311121</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>China</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="http://www.alibabagroup.com">www.alibabagroup.com</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amazon</td>
<td>410 Terry Ave N</td>
<td>+1.206.266.1000</td>
<td><a href="http://www.amazon.com">www.amazon.com</a></td>
</tr>
<tr>
<td></td>
<td>Seattle, WA 98109 USA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apple</td>
<td>1 Infinite Loop</td>
<td>+1.408.996.1010</td>
<td><a href="http://www.apple.com">www.apple.com</a></td>
</tr>
<tr>
<td></td>
<td>Cupertino, CA 95014 USA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atheer Labs</td>
<td>1975 West El Camino Real</td>
<td>+1.650.933.5004</td>
<td><a href="http://www.atheerlabs.com">www.atheerlabs.com</a></td>
</tr>
<tr>
<td></td>
<td>Suite 202</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mountain View, CA 94040 USA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baidu</td>
<td>No. 10, Shangdi 10th Street</td>
<td>+86.10.5992.7396</td>
<td><a href="http://www.baidu.com">www.baidu.com</a></td>
</tr>
<tr>
<td></td>
<td>Haidian District, Beijing, 100085</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>China</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basis</td>
<td>1200 Folsom St.</td>
<td>+1.415.367.7477</td>
<td><a href="http://www.mybasis.com">www.mybasis.com</a></td>
</tr>
<tr>
<td></td>
<td>San Francisco, CA 94107 USA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Big Cloud Analytics</td>
<td>1401 Peachtree Street NE, Suite 500</td>
<td>+1.404.919.0950</td>
<td><a href="http://www.bigcloudanalytics.com">www.bigcloudanalytics.com</a></td>
</tr>
<tr>
<td></td>
<td>Atlanta, GA 30309 USA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BlackBerry</td>
<td>2200 University Ave. E</td>
<td>+1.519.888.7465</td>
<td><a href="http://www.blackberry.com">www.blackberry.com</a></td>
</tr>
<tr>
<td></td>
<td>Waterloo, ON N2K 0A7, Canada</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C3fit</td>
<td>3713 Highland Avenue, Suite #6</td>
<td>+1.310.545.2110</td>
<td><a href="http://www.c3fit.com">www.c3fit.com</a></td>
</tr>
<tr>
<td></td>
<td>Manhattan Beach, CA 90266 USA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAQRI</td>
<td>1201 West 5th Street</td>
<td>+1.844.327.7443</td>
<td><a href="http://www.daqri.com">www.daqri.com</a></td>
</tr>
<tr>
<td></td>
<td>Los Angeles, CA 90017 USA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epson</td>
<td>3-3-5 Owa, Suwa, Nagano</td>
<td>+81.266.52.3131</td>
<td><a href="http://www.epson.com">www.epson.com</a></td>
</tr>
<tr>
<td></td>
<td>392-8502, Japan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facebook</td>
<td>1 Hacker Way</td>
<td>+1.650.543.4800</td>
<td><a href="http://www.facebook.com">www.facebook.com</a></td>
</tr>
<tr>
<td></td>
<td>Menlo Park, CA 94025 USA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fitbit</td>
<td>405 Howard St.</td>
<td>+1.877.623.4997</td>
<td><a href="http://www.fitbit.com">www.fitbit.com</a></td>
</tr>
<tr>
<td></td>
<td>San Francisco, CA 94105 USA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Google</td>
<td>1600 Amphitheatre Pkwy</td>
<td>+1.650.253.0000</td>
<td><a href="http://www.google.com">www.google.com</a></td>
</tr>
<tr>
<td></td>
<td>Mountain View, CA 94043 USA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GoPro</td>
<td>3000 Clearview Way</td>
<td>+1.650.332.7600</td>
<td><a href="http://www.gopro.com">www.gopro.com</a></td>
</tr>
<tr>
<td></td>
<td>San Mateo, CA 94402 USA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Company</td>
<td>Address</td>
<td>Website</td>
<td>Phone</td>
</tr>
<tr>
<td>--------------------</td>
<td>----------------------------------------------</td>
<td>--------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Huawei</td>
<td>Bantian, Longgang District, Shenzhen, 518129 China</td>
<td><a href="http://www.huawei.com">www.huawei.com</a></td>
<td>+852.21253888</td>
</tr>
<tr>
<td>Intel</td>
<td>2200 Mission College Blvd., Santa Clara, CA 95054-1549 USA</td>
<td><a href="http://www.intel.com">www.intel.com</a></td>
<td>+1.408.764.8080</td>
</tr>
<tr>
<td>Jiff</td>
<td>644 Emerson St. Suite 210, Palo Alto, CA 94301 USA</td>
<td><a href="http://www.jiff.com">www.jiff.com</a></td>
<td>+1.650.323.3500</td>
</tr>
<tr>
<td>Lenovo</td>
<td>No. 6 Chuang Ye Road, Shangdi Information Industry Base, Haidian District, Beijing, China</td>
<td><a href="http://www.lenovo.com">www.lenovo.com</a></td>
<td>+86.10.58868888</td>
</tr>
<tr>
<td>LG Electronics</td>
<td>Twin Tower 128, Yeouidae-ro, Yeongdeungpo-gu, Seoul, South Korea</td>
<td><a href="http://www.lg.com">www.lg.com</a></td>
<td>+82.2.3777.1114</td>
</tr>
<tr>
<td>Limeade</td>
<td>10885 NE 4th Street, Suite 400, Bellevue, WA 98004 USA</td>
<td><a href="http://www.limeade.com">www.limeade.com</a></td>
<td>+1.888.830.9830</td>
</tr>
<tr>
<td>Magic Leap</td>
<td>1855 Griffin Rd., Suite b454, Dania Beach, FL 33004 USA</td>
<td><a href="http://www.magicleap.com">www.magicleap.com</a></td>
<td>+1.954.889.7010</td>
</tr>
<tr>
<td>Meta Glasses</td>
<td>491 Old Spanish Trail, Portola Valley, CA 94028 USA</td>
<td><a href="http://www.getmeta.com">www.getmeta.com</a></td>
<td>+1.650.530.2796</td>
</tr>
<tr>
<td>Microsoft</td>
<td>One Microsoft Way, Redmond, WA 98052 USA</td>
<td><a href="http://www.microsoft.com">www.microsoft.com</a></td>
<td>+1.800.642.7676</td>
</tr>
<tr>
<td>Misfit Wearables</td>
<td>839 Mitten Road, Suite 100, Burlingame, CA 94010 USA</td>
<td><a href="http://www.misfit.com">www.misfit.com</a></td>
<td>+1.650.239.9029</td>
</tr>
<tr>
<td>Motorola Mobility</td>
<td>222 W. Merchandise Mart Plaza, Suite 1800, Chicago, IL 60654 USA</td>
<td><a href="http://www.motorola.com">www.motorola.com</a></td>
<td>+1.800.668.6765</td>
</tr>
<tr>
<td>Mozilla</td>
<td>331 E. Evelyn Avenue, Mountain View, CA 94041 USA</td>
<td><a href="http://www.mozilla.org">www.mozilla.org</a></td>
<td>+1.650.903.0800</td>
</tr>
<tr>
<td>Nike</td>
<td>One Bowerman Drive, Beaverton, OR 97005</td>
<td><a href="http://www.nike.com">www.nike.com</a></td>
<td>+1.503.671.6453</td>
</tr>
<tr>
<td>NTT DOCOMO</td>
<td>Sanno Park Tower, 11-1, Nagata-cho 2-chome, Chiyoda-ku, Tokyo 100-6150, Japan</td>
<td><a href="http://www.nttdocomo.com">www.nttdocomo.com</a></td>
<td>+81.3.5156.1111</td>
</tr>
<tr>
<td>Pebble Technology Corp.</td>
<td>925 Alma St., Palo Alto, CA 94301 USA</td>
<td><a href="http://www.getpebble.com">www.getpebble.com</a></td>
<td>+1.888.224.5820</td>
</tr>
<tr>
<td>Recon Instruments</td>
<td>100-1050 Homer Street, Vancouver, BC, V6B 2W9, Canada</td>
<td><a href="http://www.reconinstruments.com">www.reconinstruments.com</a></td>
<td>+1.604.638.1608</td>
</tr>
</tbody>
</table>
Runtastic
Pluskaufstrasse 7
4061 Pasching, Austria
www.runtastic.com
+43.7323.41060

Samsung Electronics
Samsung Main Building
250, Taepyeongno 2-ga, Jung-gu
Seoul 100-742, South Korea
www.samsung.com
+82.2.751.7114

SoftBank
Tokyo Shiodome Building
1-9-1 Higashi-shimbashi, Minato-ku
Tokyo 105-7303, Japan
www.softbank.com
+81.3.6889.2000

Sony
1-7-1 Konan, Minato-ku
Tokyo 108-0075
Japan
www.sony.com
+81.3.5448.2111

Sproutling
San Francisco, CA USA
www.sproutling.com
+1.415.738.7730

Vuzix
2166 Brighton Henrietta Town Line Road.
Rochester, NY 14623 USA
www.vuzix.com
+1.585.359.5900

Welbe
1930 S. State Street
Salt Lake City, UT 84115 USA
www.welbe.com

Welltok
1675 Larimer Street, Suite 300
Denver, CO 80202 USA
www.welltok.com
+1.888.935.5865

Xiaomi
68 Qinghe Road
Huaren Wuchaicheng
Beijing, 100085, China
www.mi.com
## SECTION 4

**ACRONYM AND ABBREVIATION LIST**

<table>
<thead>
<tr>
<th>Acronym and Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Programming Interface</td>
<td>API</td>
</tr>
<tr>
<td>Augmented Reality</td>
<td>AR</td>
</tr>
<tr>
<td>Body Mass Index</td>
<td>BMI</td>
</tr>
<tr>
<td>Compound Annual Growth Rate</td>
<td>CAGR</td>
</tr>
<tr>
<td>Four-Dimensional</td>
<td>4D</td>
</tr>
<tr>
<td>Heads-Up Display</td>
<td></td>
</tr>
<tr>
<td>Heart Rate Monitor</td>
<td>HRM</td>
</tr>
<tr>
<td>Operating System</td>
<td>OS</td>
</tr>
<tr>
<td>Original Equipment Manufacturer</td>
<td>OEM</td>
</tr>
<tr>
<td>Personal Computer</td>
<td>PC</td>
</tr>
<tr>
<td>Three-Dimensional</td>
<td>3D</td>
</tr>
<tr>
<td>Two-Dimensional</td>
<td>2D</td>
</tr>
<tr>
<td>User Experience</td>
<td>UX</td>
</tr>
<tr>
<td>User Interface</td>
<td>UI</td>
</tr>
<tr>
<td>Venture Capital</td>
<td>VC</td>
</tr>
<tr>
<td>Virtual Reality</td>
<td>VR</td>
</tr>
</tbody>
</table>
SECTION 5
TABLE OF CONTENTS

SECTION 1 ...................................................................................................................................................... 1
Introduction ................................................................................................................................................. 1
SECTION 2 ...................................................................................................................................................... 2
10 Key Wearable Trends to Watch ............................................................................................................ 2
  2.1 Wearable Market Is More Than Just Smart Watches and Fitness Trackers ................................ 2
  2.2 Unlike Smartphones, Wearables Will Grow Beyond Just Apple and Google ............................... 3
  2.3 Market Focus Will Move to Wearables UI and Analytics .............................................................. 5
  2.4 North America Is Driving Adoption, but Look Out for China ......................................................... 7
  2.5 Corporate Wellness Is Creating the “Quantified Enterprise” ........................................................... 9
  2.6 Crowdfunding Will Continue to Play an Important Role for Wearables ..................................... 11
  2.7 Wearables as a Service Is on the Horizon .................................................................................. 12
  2.8 Smart Clothing Is the Ultimate Wearable .................................................................................... 14
  2.9 Wearable Cameras Will Ultimately Merge with Virtual Reality ................................................... 15
  2.10 Smart AR Glasses Are a Precursor for the Next Leap in Computing Platforms ......................... 15
SECTION 3 .................................................................................................................................................... 18
Company Directory ................................................................................................................................... 18
SECTION 4 .................................................................................................................................................... 21
Acronym and Abbreviation List ............................................................................................................... 21
SECTION 5 .................................................................................................................................................... 22
Table of Contents ...................................................................................................................................... 22
SECTION 6 .................................................................................................................................................... 23
Table of Charts and Figures..................................................................................................................... 23
SECTION 7 .................................................................................................................................................... 24
Additional Reading ................................................................................................................................... 24
SECTION 8 .................................................................................................................................................... 27
Scope of Study .......................................................................................................................................... 27
Sources and Methodology ....................................................................................................................... 27
Notes .......................................................................................................................................................... 28
SECTION 6

TABLE OF CHARTS AND FIGURES

Chart 2.1       Wearable Device Shipments by Device Type, World Markets: 2013-2020 .................................................. 2
Chart 2.2       Smart Watch Market Share by OS, World Markets 2013-2020 ................................................................. 5
Chart 2.3       Wearable Device Shipments by Region, World Markets: 2013-2020 .............................................................. 8
Chart 7.1       Tractica Research Methodology .................................................................................................................. 28

Figure 2.1     Sproutling Baby Monitor Mobile App UI ........................................................................................................... 6
Figure 2.2     Jiff’s Corporate Wellness Dashboard for Enterprises ....................................................................................... 10
Figure 2.3     SoftBank’s Fitbit-Powered Healthcare Service ................................................................................................. 13
Figure 2.4     Living Room Applications for Microsoft HoloLens .......................................................................................... 17
SECTION 7  
ADDITIONAL READING

Tractica's Wearable Devices advisory service covers hardware, software, and services in the rapidly-emerging market for connected wearables. Key categories of focus include smart watches, smart glasses, and wearable sensors for consumer, commercial, and industrial markets. The wearables value chain is examined in depth including detailed analysis of supply-side and demand-side factors, from semiconductors and components to the dynamics of end-user demand for specific device categories. Areas of focus within research reports include market development factors by geography and segment, technology issues, the competitive landscape, and detailed market forecasts.

Wearable Device Market Forecasts
*Smart Watches, Fitness Trackers, Smart Glasses, Smart Clothing, Body Sensors, Wearable Cameras, and Other Wearable Devices for Consumer, Enterprise, Healthcare, Industrial, Public Safety, Sports, and Other Markets*

Published 1Q 2015

[https://www.tractica.com/research/wearable-device-market-forecasts/](https://www.tractica.com/research/wearable-device-market-forecasts/)

This Tractica report examines global market trends for wearable devices and presents 7-year market sizing and forecasts for device shipments and revenues during the period from 2013 through 2020. The comprehensive market model is segmented by device category including smart watches, fitness trackers, smart glasses, smart clothing, body sensors, wearable cameras, and other wearables such as location trackers, smart jewelry, and gesture control devices. The forecasts for each device type are also segmented by world region, application market, and connectivity technology.

Smart Watches
*Apple Watch, WatchKit, Android Wear, Tizen, WebOS, and Embedded OS: Global Market Analysis and Forecasts for Smart Watch Devices, Operating Systems, Connectivity Technologies, and Application Markets*

Published 1Q 2015

[https://www.tractica.com/research/smart-watches/](https://www.tractica.com/research/smart-watches/)

This Tractica report examines global market trends for smart watches and provides 7-year market sizing and forecasts for smart watch device shipments and revenues during the period from 2013 through 2020. The report examines the technology issues, market opportunities, and barriers for smart watches and the relevant application markets including consumer, enterprise, industrial, healthcare, and sports. A separate analysis is provided around smart watch operating systems and the implications for watch app developers. Key industry players are analyzed in depth, including assessments of their relative strengths and weaknesses. Market forecasts are segmented by world region, application market, and connectivity technology.
Wearable Devices for Enterprise and Industrial Markets

*Corporate Wellness, Manufacturing, Warehouse, Field Maintenance, Mobile Workforce Management, First Person Communications, Holographic Modeling, Workplace Authentication, and Other Applications*

Published 2Q 2015


This Tractica report provides a comprehensive examination of the market opportunity for enterprise and industrial wearables, analyzing various device categories, their specific roles, and adoption timelines in the workplace. Key device categories include smart watches, smart glasses, fitness trackers, smart clothing, body sensors, wearable cameras, and other wearables. The report also contains market sizing and forecasts from 2013 through 2020, providing shipments and revenues along with segmentation by device category, region, and enterprise and industrial use cases.

Wearable Cameras

*Consumer, Sports, Public Safety, Enterprise, Industrial, and Other Applications for Body-Worn and Mounted Cameras: Global Market Analysis and Forecasts*

Published 2Q 2015

https://www.tractica.com/research/wearable-cameras/

This Tractica report analyzes the market for wearable cameras, providing insights into the drivers and barriers that impact this new market segment, including an assessment of some of the technology issues surrounding market development. The study provides detailed forecasts and analysis of how wearable cameras are being adopted in sports, public safety, consumer, enterprise, industrial, healthcare, and other applications and how the market will grow between 2013 and 2020. The report also provides strategic recommendations for the value chain with a competitive SWOT analysis of the key players in this market.

Smart Clothing and Body Sensors

*Connected Sports and Fitness Apparel, Fashion Apparel, Baby and Pregnancy Monitors, Heart Rate Monitors, Headbands, Posture Monitors, and 3D Trackers*

Published 2Q 2015

https://www.tractica.com/research/smart-clothing-and-body-sensors/

This Tractica report examines the market opportunities for smart clothing and body sensors including a detailed analysis of market drivers and challenges, technology issues, and the industry ecosystem. The study provides global shipment and revenue forecasts through 2020, segmented by device category, application market, connectivity technology, and world region. Key smart clothing and body sensor companies are profiled in depth and the report also includes strategic recommendations for current industry participants, as well as those who are looking to enter the market.
**Connected Wearable Patches**  
*Clinical and Non-Clinical Patches for Patient Monitoring, Treatment, and Health & Wellness Applications: Global Market Analysis and Forecasts*

Published 2Q 2015

[https://www.tractica.com/research/connected-wearable-patches/](https://www.tractica.com/research/connected-wearable-patches/)

This Tractica report examines the market trends, drivers and barriers, applications and use cases, technology issues, and key industry players for connected wearable patches within the clinical and non-clinical environments. It presents forecasts for unit shipments, revenues, ASPs, and segments/use cases during the period from 2014 through 2020. The report focuses on three main use cases for connected wearable patches: medical monitoring, detection, and diagnosis; medication management and treatment; and health, wellness, and prevention.

**Smart Augmented Reality Glasses**  
*Head-Up Displays, Mixed Reality Holographic Displays, and Smart Helmets for Consumer, Enterprise, Industrial, Sports, Healthcare, and Public Safety Applications: Market Analysis and Forecasts*

Published 2Q 2015


This Tractica report covers the various types of smart AR glasses products, from simple HUDs to mixed reality (MR) holographic displays and smart helmets. The different application markets for smart AR glasses that are covered in depth include consumer, enterprise, industrial, public safety, and healthcare. The study includes competitive analysis of the various hardware and software vendors, along with strategic recommendations for players in the value chain. Market forecasts are included for the period from 2013 to 2020, with unit shipment and revenue data segmented by region, application market, and connectivity technology.

**Wearable Payments**  
*Contactless NFC, RFID, and QR/Barcode Payment Technologies for Smart Watches, Fitness Trackers, and Payment Wristbands*

Published 3Q 2015

[https://www.tractica.com/research/wearable-payments/](https://www.tractica.com/research/wearable-payments/)

This Tractica report analyzes the market opportunity for proximity payments or transactions made physically at POS terminals utilizing wearable devices such as smart watches, fitness trackers, and payment wristbands. The report examines the market drivers and barriers, business models, enabling technologies, and key applications for wearable payments. Key industry players are profiled and case studies are provided for notable market trials and deployments. Market forecasts for wearable payment transactions and transaction volume are provided for the period from 2015 through 2020, and are segmented by device type, technology, and world region.
SECTION 8

SCOPE OF STUDY

This white paper highlights 10 key market trends for wearables that are worth watching as the market moves from an early adopter stage to becoming a mass-market proposition. The wearable device categories covered include smart watches, fitness trackers, smart clothing, wearable cameras, and smart augmented reality (AR) glasses. The white paper provides a comprehensive view of the wearables market with its diversified sets of devices and applications that are seeing varying levels of traction in different regions of the world. These trends are based on the ongoing research and analysis that is part of Tractica’s Wearable Devices Advisory Service.

SOURCES AND METHODOLOGY

Tractica is an independent market research firm that provides industry participants and stakeholders with an objective, unbiased view of market dynamics and business opportunities within its coverage areas. The firm’s industry analysts are dedicated to presenting clear and actionable analysis to support business planning initiatives and go-to-market strategies, utilizing rigorous market research methodologies and without regard for technology hype or special interests including Tractica’s own client relationships. Within its market analysis, Tractica strives to offer conclusions and recommendations that reflect the most likely path of industry development, even when those views may be contrarian.

The basis of Tractica’s analysis is primary research collected from a variety of sources including industry interviews, vendor briefings, product demonstrations, and quantitative and qualitative market research focused on consumer and business end-users. Industry analysts conduct interviews with representative groups of executives, technology practitioners, sales and marketing professionals, industry association personnel, government representatives, investors, consultants, and other industry stakeholders. Analysts are diligent in pursuing interviews with representatives from every part of the value chain in an effort to gain a comprehensive view of current market activity and future plans. Within the firm’s surveys and focus groups, respondent samples are carefully selected to ensure that they provide the most accurate possible view of demand dynamics within consumer and business markets, utilizing balanced and representative samples where appropriate and careful screening and qualification criteria in cases where the research topic requires a more targeted group of respondents.

Tractica’s primary research is supplemented by the review and analysis of all secondary information available on the topic being studied, including company news and financial information, technology specifications, product attributes, government and economic data, industry reports and databases from third-party sources, case studies, and reference customers. As applicable, all secondary research sources are appropriately cited within the firm’s publications.

All of Tractica’s research reports and other publications are carefully reviewed and scrutinized by the firm’s senior management team in an effort to ensure that research methodology is sound, all information provided is accurate, analyst assumptions are carefully documented, and conclusions are well-supported by facts. Tractica is highly responsive to feedback from industry participants and, in the event errors in the firm’s research are identified and verified, such errors are corrected promptly.
**Chart 8.1  Tractica Research Methodology**

**Notes**

CAGR refers to compound annual growth rate, using the formula:

\[
\text{CAGR} = \left( \frac{\text{End Year Value}}{\text{Start Year Value}} \right)^{\frac{1}{\text{steps}}} - 1.
\]

CAGRs presented in the tables are for the entire timeframe in the title. Where data for fewer years are given, the CAGR is for the range presented. Where relevant, CAGRs for shorter timeframes may be given as well.

Figures are based on the best estimates available at the time of calculation. Annual revenues, shipments, and sales are based on end-of-year figures unless otherwise noted. All values are expressed in year 2015 U.S. dollars unless otherwise noted. Percentages may not add up to 100 due to rounding.