WEARABLE TECHNOLOGY

A comprehensive overview of market trends, adoption rates, key industry players and benefits of wearable electronics as well as challenges faced by the Industry, the impact of IOT and future prospects

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Introduction
For a long time, the wearable technology has been little more than an intriguing concept. We already augment our bodies with various accessories, using watches to tell the time and glasses to protect our eyes or correct our vision. But what if those devices, and others like them, can do even more for us? What if our watches, glasses and jewelry could do what our smartphones do, and perhaps even more? The terms “wearable technology”, “wearable devices”, “tech togs”, “fashion electronics” and “wearables” all refer to electronic technologies or computers that are incorporated into items of clothing and accessories, which can be comfortably worn. These wearable devices can perform many similar computing tasks as mobile phones and laptop computers. However, in some cases, the wearable technology can outperform these hand-held devices entirely. The wearable technology is more sophisticated than the hand-held technology because it can provide sensory and scanning features not typically seen in mobile and laptop devices, such as biofeedback and tracking of physiological function.

Market trends
According to Transparency Market Research, the market size of global wearable technology was around $750 million in 2012 and had swollen up to $20 billion by the end of 2015. Furthermore, according to another report by MarketsandMarkets, the trend is definitely positive and the market size is forecasted to continuously grow to approximately $31.27 billion by 2020.*

Adoption rates
The above mentioned massive growth in wearable market size is a clear indicator of high adoption rates, primarily driven by rising awareness among the global populace regarding their well-being, reflected in the hierarchy of the market, as the medical and healthcare end-use sector enjoys a dominant market share. Fitness and wellness followed the healthcare sector as the largest end-user of wearable electronic devices. The continuous glucose monitor segment is also a significant segment in the medical and healthcare sector owing to the growing prevalence of diabetes in the emerging economies of Asia Pacific and Latin America. Insulin delivery devices also play a major role in the dominance of the medical and healthcare sector in the global wearable technology market. Geography-wise, the global wearable technology market is divided into North America, Asia Pacific, Europe, and Rest of the World. North America is expected to remain the leading regional segment of the global wearable technology market, due to a large chunk of the population in the US and Canada being tech-savvy, health-conscious, and affluent enough to purchase and use wearable devices.

Key industry players:

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Key Product</th>
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<tbody>
<tr>
<td>Active mind technology</td>
<td>Game golf</td>
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<td>Adidas</td>
<td>Smart run</td>
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<td>Agent</td>
<td>Agent smartwatch</td>
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<td>Attree</td>
<td>Attheer labs</td>
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<td>Athos works</td>
<td>Athos Hi – Tech wearable clothing</td>
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<td>Basis science (Intel)</td>
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<td>Bionym</td>
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<td>Brilliant services</td>
<td>Mirama digital glasses</td>
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<td>Casio America</td>
<td>G-Shock GB-6900</td>
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<td>Epiphany</td>
<td>Epiphany eyewear</td>
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<td>Epson america</td>
<td>Moverio BT-200 AR Display</td>
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<td>fitbit</td>
<td>flex Wrist band</td>
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<td>Google</td>
<td>Google glass</td>
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<td>Motorola</td>
<td>Motoactv</td>
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<td>Nike</td>
<td>Nike+ Sportwatch GPS</td>
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<td>Qualcomm connected experiences</td>
<td>Toq smart watch</td>
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<tr>
<td>Samsung electronics</td>
<td>Galaxy gear</td>
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<tr>
<td>Sony</td>
<td>Core waterproof smart wrist band</td>
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Benefits of wearable electronics:

- **Health monitoring:** Fitness wearable technology and sports watches are becoming more and more popular, to name a few: Fitbits, Basis Peak, and Mio Fuse. With heart, calorie, sleep and activity monitoring within many of the wearables, we can make sure we’re healthy during the daily grind. This could reduce employee sickness days and motivation in general within the office environment.

- **They are faster:** The usage of many apps often requires some planning ahead of time. If you need information without delay, alternate directions in lieu of a detour; for example, you’d better already have the app you require booted up and ready to go. Otherwise, you might be in for a bit of a wait. On the other hand, the wearable technology can, hypothetically, provide you with the information you require immediately, responding to your

*Sources:
www.marketsandmarkets.com/PressReleases/wearable-electronics.asp
environment and keeping you updated with whatever you might want to know on the fly. There is no need to waste time sifting through your phone for apps or even getting it out of your pocket and unlocking it.

• **Users are more engaged with their surroundings:** For most part, the usage of a smartphone or a tablet is a solitary activity, the screen forming a dividing wall between you and the outside world. The wearable technology largely eliminates that wall. Sure, glancing down at a watch’s face is similar to looking at a screen, but it’s much less involved. When it comes to devices like Google Glass the level of immersion possible is quite remarkable. Glass and its ilk present an incredibly exciting and revolutionary way of engaging with personal technology. Indeed these pieces are generally just more convenient than smartphones or tablets.

• **More discreet:** For example, a smart watch can alert you about incoming Facebook and WhatsApp messages. It can also alert you about phone calls the you have received. Previously, to learn that same information you would have had to pull out your phone or computer, potentially disrupting the surroundings and earning the scorn of your peers. Now a you can learn essentially the same information in a much quieter, far less obtrusive manner. This is one example of the discreet nature of wearable technology benefiting not only the user, but also their environment as well.

• **Data collection and customer care:** The potential for data collection with wearable technology is beyond belief, making it possible for employees to obtain instant information on their customers, providing insight into user interaction, which is extremely useful for marketers. Devices have been created which track employees or their environment and keeping you updated with whatever you might want to know on the fly. There is no need to waste time sifting through your phone for apps or even getting it out of your pocket and unlocking it.

• **Apps:** The ever-growing wearable technology industry is bringing new and exciting apps, specifically designed for businesses to use. Still an ongoing investment and development process for many large organizations apps for anything from stock control to transaction processes are emerging and creating more benefits for the wearable technology in the workplace. Specialised apps will enable employers to be even more efficient while they’re working; and with them being specifically designed for businesses the options are endless.

• **More fashionable:** One of the most interesting ways that the portable technology that has progressed is in the area of aesthetics. Interestingly enough, many buyers seem to care just as much, if not more in some cases, about a device’s sleek look as they do for its performance or capabilities. Technology companies are keen to make their devices smaller, sleeker, lighter and more intuitive. As such, technologies like pads and pods and, of course, phones have almost become fashionable accessories for some. However, because they are replacing items like standard glasses and jewelry the wearable technology has an even more centralized focus on being fashionable. If these items do not look good their appeal will be greatly limited. After all, who would want to wear an ugly bracelet or a pair of glasses that did not complement their face? Some won’t care much for the look of the pieces and buy them solely for their technological capabilities, but for others aesthetics will be very important, and companies who make these products will need to recognize that.

**industry challenges:**

There is no denying the fact that the wearable technology is rapidly growing and emerging as a major contender for being the most popular in the consumer electronics space. However, the industry has its own share of challenges. Let us focus on a few below.

• **Design constraints:** Design constraints of wearable devices is one of the major challenges faced by the global consumer smart wearable technology market because most consumers use normal wearable accessories such as watches, jewelry, wristbands, and glasses to make a statement about their personal identity. In this case, the wearable item reflects the fashion trend of users. Most smart wearable device manufacturers are currently focused on technology rather than on design. For instance, a majority of smart watches run on processors and components that are designed for smartphones. Thus they are bulkier than a normal watch. Similarly, smart wearable eyewear may not reflect the fashion preferences of users.

• **High power consumption:** One of the major challenges faced by vendors is the high power consumption of smart wearable devices. Most wearable devices use wireless networks, GPS, and other technologies that consume a lot of power. The battery power of wearable devices currently lasts for one to two days. In the case of intensive usage, the battery lasts for less than a day. For instance, the Google Glass battery lasts for 4-8 hours during intensive usage. Thus, the short battery life and high power consumption of wearable devices are reducing usage and adoption. Of course this limitation is expected to hamper the growth prospects of the market during the forecast period.

• **High initial costs:** The high cost of smart wearable devices is one of the major challenges that is expected to curtail the growth of the market during the forecast period. Most manufacturers are launching their products in the premium product category.

• For instance, the ASP of a smart wearable device is US$350-380, depending on the application. The ASP of healthcare wearable devices is US$720-750, while the ASP of fitness and lifestyle products is US$280-350. In
addition, the prices of branded products are very high. For example, Google Glass is priced at US$1,500. As a result, the mass adoption of wearable devices is low because of a general lack of affordability.

• Lack of data privacy and security: Most wearable devices are small in size, but they are able to store a large amount of data. The small size of these devices means that the chances of them being lost or misplaced are high. Since they store a large amount of sensitive information, smart wearable devices can cause work disruption for users.

In addition, wearable devices use GPS navigation systems to receive location-based information. Sometimes, users have to share their location to obtain certain information. For instance, Google Glass users have to share their location while checking-in at Foursquare, which is stored in its database. This information can be retrieved and used by advertisers as well.

Moreover, the data about a subscriber’s location is owned and controlled by the respective network operators, which includes mobile carriers and mobile content providers. With operators privy to such information, end-users are concerned about their privacy, despite legal frameworks to safeguard it.

• Usage restrictions: Though the wearable technology hasn’t been around for long, it has been on many companies’ radars for a while. As we all know, the possibilities are endless for the wearable technology. But while this is great for consumers, it isn’t the best news for businesses that require strict laws and high security to operate. So far, the wearable technology has been banned in casinos, movie theaters, and even some restaurants have disallowed their patrons to adorn wearables.

• An over-reliance on smartphones reduces consumer value perception: Though increased smartphone adoption is fueling the mobile revolution that includes wearable devices, voracious appetite of consumers to use smartphones in all aspects of their lives is actually hindering the market. This is especially true in the case of smart watches, since these devices are regularly marketed as companion or “tethered” smart products. Why would consumers want another device that has similar, if not the same capabilities as their smartphones?

Internet of me – the wearable disruption in IOT

Wearable devices are now at the heart of just about every discussion related to the Internet of Things (IoT), and the full range of new capabilities pervasive connectivity can bring. With more than 35 million connected wearable devices in use by the end of 2014, developers are on the cusp of a technological point-of-no-return, and innovative opportunities are riper than ever. As the connected world spills over into an ever-connected personal lifestyle, the “Internet of Me” will continue to evolve at a rapid pace.

Some of the functions that wearable devices are already delivering are related to identification and security. Maybe you don’t consider the badge you wear at work as a wearable device, but it does provide identification and security features useful within the work environment. Some advanced badges even include some biometric capabilities (such as fingerprint activation, so only the badge’s owner can use it to open a locked door) to improve security. Badges can also include capabilities for location sensing, e.g. in emergencies to make sure everyone has successfully evacuated the building. A wearable bracelet provides a more reliable indication of location since it is less likely to be left in a jacket on the back of a chair.

Health and fitness-oriented wearable devices that offer biometric measurements such as heart rate, perspiration levels, and even complex measurements like oxygen levels in the bloodstream are also becoming available. Technology advancements may even allow alcohol levels or other similar measurements to be made via a wearable device. The ability to sense, store, and track biometric measurements over time and then analyze the results, is just one interesting possibility. For example, tracking body temperature, might provide an early indication of whether a cold or the flu is on the way.

Some additional capabilities of wearable devices are more mundane, but might also provide information that could be useful in adjusting environmental controls. Wearable devices could tell if you have your jacket on in the car or if it’s just in the back seat (perhaps by placing a few stress measurement device threads within the fabric of the jacket). This could be helpful in keeping the car temperature at a comfortable level. If your wristband can measure perspiration levels that can also be used as a data point for adjusting both temperature and humidity.

The above examples could all use a smartphone as the central control for delivering these capabilities, but is that really the most efficient approach? Would it be better if Internet of Things (IoT) devices could communicate directly? You certainly don’t want to be required to use your smartphone to okay every transaction your wearable devices wish to make. Perhaps a better model is that the smartphone can help set up the modes of operation you want to support, as well as the privacy level you wish to enforce. Once the communication “strategy” is in place, all the devices can communicate in the ways you have allowed.

Wearable devices could be allowed to automatically connect to devices around the home too. Perhaps, you have a preferred lighting level when watching TV from a particular chair. You could turn on the TV and your wearable device could help adjust the lighting level from the connected LED lights within the room. An intelligent
house might even support automatically blocking light from windows that created glare on the TV. Even the backlighting on the LCD TV screen could be adjusted and all settings optimized for saving energy, as well as creating the most favorable viewing experience. All these interactions could be done automatically, directly between devices, once the overall strategy has been put in place via a smartphone interface.

No matter in which direction wearable devices evolve over the next few years, it seems that there is a need for a more integrated element in the IoT in order to provide the wide range of features we’re all expecting.

Future prospects:
We see the wearables market as a promising growth market for the next decade. The industry growth rate is majorly driven by the following factors:

- high adoption rate of digital devices,
- convergence of technologies,
- penetration of wireless connectivity.

However, in order to realize its full potential the wearables industry will have to overcome inherent obstacles. The major challenges faced by the industry include:

- lack of design features,
- higher power consumption of wearable devices,
- high initial cost,
- users’ concerns regarding data privacy.

Overall, the wearable electronics market is expected to grow at a CAGR of around 30% over the next 10 years.
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