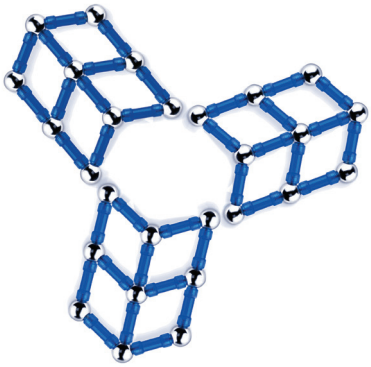
Deloitte.

Wearables: the eyes have it



Deloitte predicts that smart glasses, fitness bands and watches, should sell about 10 million units in 2014, generating $3 billion. Of these wearable computer form factors, smart glasses should generate most revenues, from sales of about four million units at an average selling price (ASP) of $500[12]. Smart fitness bands should sell four million units, at an ASP of $140; smart watches should sell about two million units at an ASP of $200[13].

Smart glasses are go

The mass launch of smart glasses is likely to be met by skepticism and delight, as is customary with the launch of each new digital form factor[14]. And the first models of smart glasses are likely to appeal to, and be purchased by, a niche[15]. But at a global level the volume of early adopters in 2014 may well number in their millions, with demand increasing to the tens of millions by 2016 and surpassing 100 million by 2020.

This may seem an unlikely outcome for what is considered a new and slightly eccentric form factor, which has significant and fundamental constraints: smart glasses have to be transparent, may never work well in direct sunlight, and because they have low contrast are not suitable to long form video. The visible display size will always be small, for safety reasons, with fewer than 10 words readable at a time[16]; and the physical space available for a battery on the temple of the glasses is so constrained that adding cellular connectivity will be challenging[17].

But smart glasses are the next stage in the roll-out of digital connected screens in our professional, social and private lives. They represent continuity, not a brand new start, much in the same way that tablets were simultaneously new and familiar when launched in 2010. Consider that in 2014, billions of us will glance trillions of times at connected screens, from vast digital billboards to computer screens, and from car dashboards to smartphones. The addition of a tiny screen which is permanently in line-of-sight will complement the array of screens we already use: it may enable some of us to stay permanently updated with the flows of information we crave.

The initial price point for the sale of smart glasses in 2014 should be between $400 and $600, which for most people is a significant sum of money for a device whose benefits are largely unproven. Some units will cost thousands of dollars, but demand for these will be minimal.

Nonetheless, in 2014 there are likely to be tens of millions of individuals who would consider paying an average $500 for the first generation of smart glasses and millions who will actually purchase them.

These include: early adopters, for whom being at the bleeding edge of innovation is of paramount importance, even if the user experience in terms of interface and reliability requires further refinement; wealthy individuals for whom $500 would be a relatively small amount to pay (there are about 12 million people with investable wealth of $1 million in the world)[18]; and professionals whose job is to investigate the potential of new products such as smart glasses for increasing productivity.

Usage of smart glasses in 2014 is likely to focus on consumer applications, with enterprise usage become more prevalent later as the product specification improves.

The most common consumer usage of smart glasses is likely to be any screen-based application that frees up the user's hands for other tasks. A typical usage should be navigation. For business travelers, a few instances of smart glasses helping the owner to arrive without getting lost – and being able to brag about it – may justify the purchase price[19]. For tourists, smart glasses will allow them to take photos and video by winking[20]. There may also be some video games applications, but the appeal of these will be limited by smart glasses' small screen size. Sports and fitness may also provide a rich context for usage, allowing participants to view performance metrics in real time, and analyze their performance as they play, bike or ski[21].

12 For a discussion on possible price points, see: Why Google Glass costs $1,500 now and will likely be around $299 later (Updated), Gigaom, 8 August For a discussion on possible price points, see: Why Google Glass costs $1,500 now and will likely be around $299 later (Updated), Gigaom, 8 August 2013:http://gigaom.com/2013/08/08/why-google-glass-costs-1500-now-and-will-likely-be-around-299-later/

13 We are neither the most bearish or the most bullish of commentators on the market. There is a wide range of perspectives on market sizing for 2014 and beyond. For example, see: Smart Glasses and Other Wearable Devices to be worth over $1.5bn by 2014, finds Juniper, Juniper Research, 31 October 2012: http://www.juniperresearch.com/viewpressrelease.php?pr=347 ; Smartwatch Market Forecast To Reach 15 Million in 2014, Forbes, 27 September 2013: http://www.forbes.com/sites/michaelwolf/2013/09/27/smartwatch-market-forecast-to-reach-15-million-in-2014/; Over 5 million smart watches to ship in 2014, Canalys, 16 July 2013: http://www.canalys.com/newsroom/over-5-million-smart-watches-ship-2014; Our Forecast For Smartwatches — A $9 Billion Market In Five Years, Business Insider, 30 August 2013: http://www.businessinsider.com/the-smartwatch-market-grows-to-9-billion-2013-8; Google Glass paves the way, IDG Business Media GmbH, 22 October 2013: http://www.computerwoche.de/a/google-glass-bereitet-den-weg,1237959

14 For a discussion on initial reactions to the iPad, see: Steve Jobs was 'annoyed and depressed' over initial reaction to iPad launch, Apple Insider, 21 October 2011: http://appleinsider.com/articles/11/10/21/steve_jobs_was_annoyed_and_depressed_over_initial_reaction_to_ipad_launch

15 There are multiple smart glasses products available. See: Five Face-Saving Alternatives To Google Glass, ReadWrite, 30 October 2013: http://readwrite.com/2013/10/30/five-face-saving-alternatives-to-google-glass#awesm=~oq8bfN6q73MlzU

16 There are devices in the shape of glasses, such as Oculus Rift, that provide a full, immersive screen for each eye, but do not enable the viewer to see anything in front of them. They are more akin to television screen or monitor replacements to be used in video games play. For more information see: Oculus VR, http://www.oculusvr.com/

17 The battery in Google's Glass product is 2.1 Wh (570mAh). See: Thorough Google Glass teardown reveals 570mAh battery capacity, Engadget, June 2013: http://www.engadget.com/2013/06/12/google-glass-teardown-battery-capacity/

18 A record-breaking number of millionaires in the world, The Telegraph, 5 July 2013: http://www.telegraph.co.uk/finance/personalfinance/expat-money/10158420/A-record-breaking-number-of-millionaires-in-th percent e-world.html

19 For more information about navigation using smart glasses, see: Google Glass: Navigation Review, Phandroid, 9 May 2013: http://phandroid.com/2013/05/09/google-glass-navigation-review/; Google Glass, inspiration for the creation of apps in a Spanish company, RTVE, 14 December 2013: http://www.rtve.es/noticias/20131214/google-glass-fuente-inspiracion-para-creacion-apps-empresa-espanola/820640.shtml

20 Blink to take pictures using the new Google Glass firmware?, Pocket-lint, 17 October 2013: http://www.pocket-lint.com/news/124438-blink-to-take-pictures-using-the-new-google-glass-firmware; Google Glass controlled by winking – code, hardware and official google info, Google Glass APPs, 22 April 2013: http://glass-apps.org/google-glass-controlled-by-winking

21 Recon Jet is the $499 Google Glass alternative for athletes and exercisers, Gigaom, 27 June 2013: http://gigaom.com/2013/06/27/recon-jet-is-the-499-google-glass-alternative-for-athletes-and-exercisers/

Industries most likely to benefit from smart glasses in the medium term include manufacturing, oil and gas. Analysts have estimated that smart glasses could save companies up to one billion dollars per year by 2017, through displaying instruction guides, relaying photos and videos, and interacting with remotely-located experts[22].

These devices may provide another insertion point for advertising, whose messages may be linked to the user's location, product in line of sight, or a bar code.

Wearing a screen to the right of one's nose may appear a little strange at first. Talking to one's spectacles may also seem eccentric.

But talking on a phone in the street, and more recently talking via hands-free kit have also seemed strange, as has taking photos with a ten-inch tablet. Yet these behaviors have subsequently become accepted as normal.

The price of smart glasses will be a function of the bill of materials and the margins that vendors want to make on the product. We expect that initial component costs will be at least $200[23]: miniaturization does not come cheap. If the first batch of smart glasses sells out, we are likely to see ultra-cheap versions sold at $100, mirroring trends seen in the early days of the tablet and smartphone markets. But these devices are likely to be as good as the components they are built on, and sell in modest volumes. As for the likely margins, we would expect that some vendors may trade high margins for other benefits, such as income from applications and the rich stream of consumer data, such as location, that these devices will generate.

The hundreds of millions of people who have contact lenses or have had laser surgery are likely to consider smart glasses, despite having invested in removing the need for spectacles to correct vision. There is after all a significant market in sun glasses, items which can cost hundreds of dollars per pair, and may last only a single season before requiring replacement[24].

Smart fitness bands: moderately healthy

The smart fitness band, a form of wearable computing typically worn on the wrist, should enjoy reasonable demand in 2014; but the market for such devices may never be mainstream. Smart fitness bands measure a range of activities from paces walked to hours slept, and tap into the trend for the 'quantified self', whereby many aspects of one's activity and being are measured[25].

Interest may not become mainstream, even in the medium term.

There are likely to be two categories of buyers for these devices. One is sports enthusiasts who already undertake a lot of exercise and wish to track their activity. They are likely to focus on high-end devices that provide highly accurate measurement of a range of functions. The second and much larger category is individuals who may buy, or be gifted, a fitness band in order to effect a change in their behavior, hoping that by measuring the exercise they take, they will exercise more.

However for this group smart fitness bands may simply confirm, via an app or otherwise, a long-term lack of interest in exercising, and as such the device may cease to be used following an initial burst of enthusiasm[26].

A further, significant barrier to smart fitness bands becoming mainstream is the incorporation of advanced satellite navigation, accelerometer, gyroscope and compass in a growing range of smartphones[27]. Owners of high-end smartphones that offer these functionalities are likely to number in the high tens of millions in 2014 and may decide that they do not need to spend an additional $100 on purchasing a fitness band[28].

Less time for smart watches

We expect smart watches to sell approximately two million units in 2014, typically priced at $150-$300. They are likely to remain specialist devices and be outsold by smart glasses over the long term[29].

This may seem counterintuitive. After all, the value proposition for watches is well established. People have worn watches to tell the time, and to display status or wealth, for hundreds of years. By comparison, attaching a screen to a pair of glasses and then talking to the device may seem unnatural.

But arguably checking information on a wrist is a declining practice, whereas putting information in our line of sight, either via smart glasses or by placing a smartphone in the field of view, is an emerging one. Watches mattered from a practical perspective when they were the only way to tell the time[30]. Today smartphones have assimilated most of the functions of an advanced wristwatch, and synchronize the time with mobile networks which rely on atomic clocks[31]. If users glance at their smartphone 120 times each day, they should already have a pretty good idea what time it is. Further, there are a host of other displays that show the time, from PCs to ovens, and the need for a wristwatch is diminishing especially among young age groups[32].

22 Gartner Says Smartglasses Will Bring Innovation to Workplace Efficiency, Gartner, 6 November 2013: http://www.gartner.com/newsroom/id/2618415

23 Breaking Google Glass Into Pieces: The Costs of Production and Likely Retail Price, NASDAQ, 23 August 2013: http://www.nasdaq.com/article/breaking-google-glass-into-pieces-the-costs-of-production-and-likely-retail-price-cm269835

24 Sticker shock: Why are glasses so expensive?, CBS News, 07 October 2013: http://www.cbsnews.com/news/sticker-shock-why-are-glasses-so-expensive-07-10-2012/

25 For a discussion on the need for smart watches and other wearable computers, see: Intel's Anthropologist Genevieve Bell Questions the Smart Watch, MIT Technology Review, 17 September 2013: http://www.technologyreview.com/news/519351/intels-anthropologist-genevieve-bell-questions-the-smart-watch/

26 Pricey wearable fitness gadgets are the new lapsed gym memberships, The Globe And Mail, 28 October 2013: http://www.theglobeandmail.com/technology/gadgets-and-gear/pricey-fitness-gadgets-are-the-new-lapsed-gym-memberships/article15116572/

27 iPhone 5S sports new M7 processor to handle motion apps, Ars Technica, 10 September 2013: http://arstechnica.com/apple/2013/09/iphone-5s-sports-new-iphone-m7-processor-to-handle-motion-apps/

28 For a view on popular fitness apps, see: The 15 Best Fitness Apps, PC Magazine, 30 December 2011: http://www.pcmag.com/slideshow/story/292474/the-15-best-fitness-apps/15. Another fitness tracking application is Noom which has been downloaded on the Google Play Store between 5,000,000 – 10,000,000 times. See: Noom Weight Loss Coach, Google Play, 15 December 2013: https://play.google.com/store/apps/details?id=com.wsl.noom&hl=en

29 As of November 2013, Pebble, one of the most popular smart watches, had sold 190,000 units. See: With 190,000 Smartwatches Sold, Pebble Boosts iPhone Support, All ThingsD, 6 November 2013: http://allthingsd.com/20131106/with-190000-smartwatches-sold-pebble-boosts-iphone-support/. The overall market for smart watches is expected to reach 2.6 million in 2014. See: IHS News Flash: Fast Facts and Analysis of Today's Smartwatch Announcements, IHS, 4 September 2013, http://press.ihs.com/press-release/design-supply-chain-media/ihs-news-flash-fast-facts-and-analysis-todays-smartwatch-ann.

30 Pocket watches were first used in the 16th century; they were then superseded by wrist watches, which were used in the early 20th century, and which saw a significant uptake in the First World War. See: Pocket Watch, Wikipedia, 2013: http://en.wikipedia.org/wiki/Pocket_watch; The History and Evolution of the Wristwatch..., Quality Tyme, January 2004: http://www.qualitytyme.net/pages/rolex_articles/history_of_wristwatch.html

31 Atomic clock precision could soon be used at home and work, PHYS, 5 August 2013: http://phys.org/news/2013-08-atomic-clock-precision-home.html

32 In a survey of UK respondents in 2010, 14 percent claimed to have no need for a watch. The proportion was double among 15-24 year olds. See: Is time running out for the wristwatch?, BBC News Magazine, 28 October 2010: http://www.bbc.co.uk/news/magazine-11634105

Conversely, integrating smartphone functionality into a device that fits on the wrist is challenging, and entering data on small panels is tricky. Smart watch screens are small relative to those on smartphones, so the smart watch has to act as a companion device to a smartphone. Further, traditional watches trade on their ability to go for long periods without requiring a new battery or winding up, and smart watches that are not based on e-ink may need charging every day.

Incorporating smartphone capability into a watch is not cheap, and while a $200-$300 smart watch may cost less than smart glasses, there is likely to be little incremental benefit from having a smart watch in addition to a smartphone[33].

Bottom line

Wearable computing is a tantalizing and lucrative market, which is presently characterized by a degree of uncertainty.

A significant grey area is regulation, which has a major bearing on the potential market size. For example, there may be questions about the usage of smart glasses, which potentially enable anything heard or seen by a smart glasses user to be captured, shared and archived[34]. However smartphones already have a similar capability to capture video, stills and audio, so smart glasses' ramifications on privacy are not wholly new[35].

Smart glasses may well get prohibited in some environments – such as in some schools, courtrooms, board rooms and golf courses, where smartphones are already banned – but that still leaves many other places where they could be used. It is worth considering that in some venues, such as restaurants and clothes stores, taking photos is actively encouraged and the quantity of photos taken, shared and rated is considered a positive.

Smart glasses are unlikely to be allowed when driving. In some jurisdictions, current laws make it explicitly illegal to have a monitor capable of displaying video in the field of view of a driver[36]. It is not necessary for the police to prove that the driver was watching video instead of the mapping function: merely wearing a device with the capability is against the law.

A key imperative for all wearable device manufacturers is the need to foster app development: having a large range of apps will be core to the devices' utility[37]. A challenge will be to get developers to create apps for a category of device with relatively few users. For smart glasses, apps would need to be built from scratch: existing apps cannot be used for glasses, which are fundamentally different from a smartphone or tablet. That said, early adopters tend to have high propensity to purchase apps, and so may be a small but lucrative market[38].

As well as apps, another ancillary market will be in complementary devices. For example, one device combines with smart glasses to enable remote control of devices, such as television sets[39].

The capability of wearable devices is likely to improve continually, but expectations should be set carefully. There are fundamental constraints of battery technology, acceptable weight and the bulk of wearable devices. This means that some notions, such as full-screen augmented reality built into a regular pair of sun glasses, priced at $500 and with integrated 4G, is many years off – and may never be realized.

Trends such as the ageing of many nations' populations, widening cellular connectivity, and the move towards telemedicine (for more information, see the 2014 Prediction: eVisits: Redefining the Patient-Physician Relationship) may signal significant opportunities for wearables in the middle and long-term. Wearables may serve as sensors that are always in close proximity to the user, and could become a new communications platform providing larger images to those with dimming sight, or text messages to those with failing hearing. The combination of sensor, actuator and communicator may prove to be a compelling value proposition to patient, physician and insurance companies alike.

33 For a review on a range of smart watches, see: So Far, Smart Watches Are Pretty Dumb, MIT Technology Review, 15 October 2013: http://www.technologyreview.com/review/520236/so-far-smart-watches-are-pretty-dumb/

34 For example, see: Google Glass privacy questioned by six countries and the EU, Infosecurity Magazine, 19 June 2013: http://www.infosecurity-magazine.com/view/33012/google-glass-privacy-questioned-by-six-countries-and-the-eu/; Congress grills Google on Glass privacy, company addresses facial recognition and privacy in fireside chat, The Next Web, 17 May 2013: http://thenextweb.com/google/2013/05/17/us-congressman-joe-barton-and-other-lawmakers-express-concern-over-google-glass-alleging-violation-of-privacy/

35 Privacy Fears with Google Glass are Overblown, MIT Technology Review, 4 March 2013: http://www.technologyreview.com/view/512041/privacy-fears-with-google-glass-are-overblown/

36 US woman denies Google Glass distracted her while driving, The Telegraph, 4 December 2013: http://www.telegraph.co.uk/technology/google/10493254/US-woman-denies-Google-Glass-distracted-her-while-driving.html

37 For a list of apps for smart glasses, see: Google Glass Application List, Google glass apps, 2013: http://glass-apps.org/google-glass-application-list

38 Why Smartwatches, TVs & Smart Home Could Be The Next Big Opportunity For Apps, Forbes, 3 October 2013: http://www.forbes.com/sites/michaelwolf/2013/10/03/why-smartwatches-tvs-smart-home-could-be-the-next-big-opportunity-for-apps/

39 For more information see: What is GlasSees?, Electrical Engineering & Computer Science -Berkeley,2013: http://www.eecs.berkeley.edu/~benzh/glass/#publication

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