

CES 2014 Wearable & Fitness Tech Trends: Going Mainstream

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Executive Summary

CES has changed considerably over the past 10-15 years. As the PC is a piece but no longer the center of the universe, many new technologies touching many industries are emerging and have taken over the buzz at the show. Computerized cars, robots, drones, smart homes, and fashionable music accessories are everywhere. There were even companies like [Yellow Jacket](#) turning your iPhone into a personal Taser. Really? I can just see the application with fitness devices for added motivation. Another major trend growing in the market was a major increase in noise at the show, the trend of wearable computing and technology intersecting the sport, health, and fitness markets. CES 2014 even featured a separate dedicated full day FitnessTech session and Tech Zone on show floor.

This report covers 12 major trends coming out of CES 2014 in the emerging fitness, health, & digital sport tech industry along with my analysis and opinions on these trends.

As a category, fitness & sport tech appears to have gone mainstream as evidenced by the broad set of new players entering and existing players continuing to expand their offerings. While the market has a ton of potential to grow, I'm bit worried investment is outpacing market growth. As such, I expect there to be winners and losers in the market. For wearable devices, customers will demand more than just technology products. Technology innovation is critical, but to drive adoption wearables will need to provide devices that offer rich services targeted at helping a specific user group meet a specific goal. This requires a strong focus on your target customer segment and understanding of their goals and needs. With this focus, successful companies need to build unique differentiated solutions that help them stand-out in the market. Companies that can artfully marry technology innovation with customer intimacy and credibility will be the true long-term winners.

Trend #1: *Explosion of Bands*

CES 2014 saw an explosion of new wearable fitness & lifestyle bands. Everyone seems to want to build one based on the strong growth companies like Nike FuelBand and Fitbit have seen over the past few years. Entrants are coming from all over the place from gaming company Razer, to established mobile vendor LG, to outdoor brands like Garmin & Magellan. Other new entrants included Jaybird (earbud maker), Wellograph (start-up), Casio G-Shock, netamo (for sun exposure), Spree (head mount), MIO (heart rate), Sony, etc. While the fitness and wearable market is expected to grow dramatically in the coming years, it is obvious that the market is quickly becoming quite crowded and not all are going to survive or see broad success.



Voyce Dog Tracker

I believe there are a few keys to success in the market given the saturation:

1. Segmentation – Winning fitness band companies need to establish a tight view on their target market and resist the temptation of trying to address everyone. They should also focus on customer sets that either are under-served today, align well to their current brands, or match to unique capabilities they bring to table (or better the other way around – they build unique capabilities for a specific user group). On the fitness side, this market can be easily sub-divided into goals – e.g. weight loss, want to live general healthy lifestyle, active exercisers, competitive sport enthusiasts (like marathon running or triathlons), etc. Even the difference between health/wellness and fitness is big. In talking with Basis CEO Jef Holove, he sees Basis as targeting the 24x7 lifestyle and health market vs. the fitness enthusiast and has smartly prioritized their watch's feature set as such. Other segments could be demographics like age (kids, younger crowd, 40-somethings, elderly), male/female (like the netamo women's jewel sun detection bracelet), and even pets (yes dog tracker Voyce aims to keep your dog healthy). This is one of the reasons why I struggle a bit to see how LG's new Lifeband fitness tracker will see broad success. They don't seem to have a tight customer segment and don't bring much credibility with any of the users.

2. Customer Needs & Focus – After establishing your target market, it's critical for companies to invest in knowing their customers' cares and needs and focus features and differentiation in areas they care about. Some added features that extend the product's overall appeal are ok, but companies should carefully choose their investments wisely based on things that provide high value to their target customer. If they focus on too many things, nothing will stand-out. In addition, they should try to see themselves as service companies and advisors for the customers they are targeting. Instead of narrowly viewing the financial opportunity as a one-time device sale, they need to consider how they help their customers meet their individual goals on a daily basis. This provides much bigger opportunity than just device sales through things like ongoing services, add-on accessories, etc. I like the way Jef Holove said it to me when he said that Basis did not see themselves as a fitness tracker company but instead a health behavior changing company. If

viewed as just device sales, many companies will be tempted to slowly try to expand their target market to find more revenue opportunity.

3. Differentiation – Fitness band companies should seek to find ways to differentiate and separate from competition vs. copying what everyone has done. A number of the bands I saw looked very



Razer Nabu Band

similar to others before it and offered some of the same tracking features. It's hard to stand out and grab share if you're not unique in a crowded market. Many of the technologies are widely accessible to all players so finding new and different approaches are challenging, but still critical. Garmin, as an example, hit on a common frustration of users around battery life by creating a device with 12-18mos of battery power. Gaming company Razer introduced social band to band connectivity that allows you to use a handshake to initiate things like

LinkedIn or Facebook friend request. LG added 2-way communication with its phones to see messages/alerts or control music on your phone. These are all positive areas of helping influence innovation in market and let them stand-out, so I applaud these vendors. However, just because you have differentiation does not guarantee success. Areas of differentiation need to not come at significant expense of other attributes and most importantly need to provide high relevant value to their customer base. They also need to be full complete experiences. Razer's social connect is very interesting but requires their friend to have same band. With their gaming brand, I'm not sure how valuable it is to this customer set and value of it is highly dependent on broad availability. If they can build out more of an ecosystem with gaming developers, this could have more potential with their target customer set. Garmin's long battery life is likely a great appeal to their user base but downside is that their display is not backlit making it nearly impossible to read when it gets dark (not good for runner).

4. Partnerships – To build credibility for their customer target, winning fitness band companies are wise to build strong partnerships that build on their credibility with targeted segment. Wearable success requires broad capabilities and most bring a limited set of expertise to table. Sports, fitness, and health brands bring strong credibility with customer, but tend to lack technology innovation expertise. Large technology experts bring scale, quality & manufacturing expertise, and technology experience, but lack fashion and customer segment expertise. This is why companies like LG are building an open platform to support established fitness apps. They should consider tighter relationships with some key partners that provide better together experiences. Finally, start-ups tend to bring an innovative spirit, quick reaction, and targeted segment, but lack scale, manufacturing expertise, and customer segment credibility. This is why I think Fitbit's announcement of new



Basis Smartwatch with Advanced Sleep Analysis

bracelets and pendants designed by Torrey Birch is wise move. It allows them to build more credibility with fashionable design. Even if you have a fashionable design, that might not be good enough if coming from unknown brand. Basis announced a new Carbon Steel Edition with Advanced Sleep Analysis which was done through partnerships with researchers at the University of California, San Francisco (UCSF), Veterans Administration (VA) and the Northern California Institute of Research and Education (NCIRE). Basis is hoping to differentiate on sleep (saying they have the most comprehensive picture of your sleep) using added intelligence and tracking from their unique set of sensors (heart rate, body temperature, and perspiration in addition to activity) and the partnership with these recognized researchers to add credibility to the analysis and recommendations. Smart.

5. Routes to Market – As fitness band companies determine who they are targeting, this can have major implications on targeted routes to market. They need to go where their customers are vs. simply placing everywhere or going to electronics stores. This became overly clear to me when I was talking with A&D Medical who grew up in the telemedicine space and is expanding to direct to consumer self-health segment. One of the top channels they were targeting was Walgreens. This makes sense given their target market is the people who go into a drugstore to check their blood pressure. It's obvious they have clear view on their target market and an optimized full solution (not a product company), but have a well thought out route to market plan as well. Corporate Wellness routes to market on the other hand require heavy focus on simple features and low price. Fitbug who grew up in this space has been appealing to that segment with a very simple device priced at only \$49. They are now expanding to direct to consumer but target the beginner fitness user and according to their CEO Paul Landau who I spoke with see themselves more as a service company. Their new Kik fitness program gift cards are priced at only \$19.99 and have very targeted plans like helping moms who just had a baby get back in shape. Not only does this idea do good job of targeting a specific customer, but with their unique gift card and low price I could easily see this in a Target near the check-out lines. Even placement in channel can make big difference in standing out.



Fitbug Kik Fitness Programs

Trend #2: 2-Way Communication

A number of devices introduced at the show are building connectivity and interaction with other devices. 2-way communication technology allows devices interact and work with each other for a unified experience. My belief is that wearables are not replacement devices but provide more optimized experiences that extend your digital life. To be successful, they need to seamlessly interact with other devices.

For the most part, early fitness wearables were output devices alone collecting and then sharing their data to a cloud or mobile device. A number of new devices like the new LG Lifeband Touch now provide



LG Lifeband Touch Fitness Band

2-way communication by not only allowing output of data but also input of content and ability to interact with other devices. The Lifeband can track fitness data and synch like most devices, but also can receive alerts from your smartphone or allow you to control the music on your phone. Lifeband can also connect to their optional heart rate monitoring earbuds and view data through Bluetooth. This

added interactivity makes the user experience simpler and more valuable.

By utilizing the capabilities of each of the devices and allowing simple interaction, the overall experience is better. Take the example of running. Many people run with their phone for music and GPS capability. However, most people don't want to carry the phone in hand when running. Placing it in a pocket or on an armband though restricts access to controlling the device (e.g. changing music track) or seeing the data on it. Yes, audible queues are provided by most to provide things like mile splits, etc, but the data is not always available when you want it (or what you want).

Others are experimenting with 2-way communication. Garmin with their new Vivofit wearable band provides access to view data from a connected heart rate monitor strap. Jawbone also recently announced ability for their UP band to buzz with an incoming phone call or text. This is why I was a bit disappointed with the MIO Alpha and their new Link band. While they seem to have great solution for active use heart rate tracking (more on this later), their products cannot interact as 2-way devices. As an example, MIO Alpha chooses to focus on only being a heart rate tracker watch with integrated optical heart rate sensing. They have traditional stopwatch and clock capabilities, but do not have integrated accelerometer or GPS for tracking distance. They do this to optimize the experience for heart rate monitoring saying they expected their users to rely on other devices for other purposes. I applaud their focused approach, but the glaring issue here is they do nothing to tie these experiences together. Why not allow their watch to see the distance data from their phone or control music like LG does with Lifeband? Magellan seems to get this and announced an interesting smartwatch that builds on this exact concept. In order to not go head-to-head vs. Garmin and Polar who have much bigger market share with a built-in GPS watch, they decided to build a smaller and cheaper solution that leverages the integrated GPS in someone's phone and allowing viewing of the content. Smart.



Garmin Vivofit Fitness Band

Wearables are great extension devices and note replacements. Companies that continue to build great interactive experiences with other devices that extend experiences or making them simpler will see success. Enabling 2-way communication with an ecosystem of devices (including 3rd party) is key step in differentiating in the market.

Trend #3: *The Heart Rate Debate*

Companies are all pushing to add more and more sensors to their device. One of the most common added sensors is heart rate detection. To me, the key here is starting with who your user target is and what their goal is vs. just adding more sensors. By starting with the needs and problems of your users, you can then make decisions around the best technologies and sensors you should use to optimize for those experiences.

For heart rate, I believe there are a number of major benefits and advantages of this data for fitness training and even health assessment. Too many trackers today focus too much on steps taken/distance traveled. If your target user is interested in weight loss or is buying device to help them become leaner and more shapely, low intensity aerobic training (as tracked through steps) will not help them much with their goals. If you're not able to help people reach their goals, you risk long-term sustainability of your platform. High intensity interval training (HIIT) is a much better method for burning fat (vs. muscle) by increasing your glucose levels and raising your metabolic rate (which is a much more efficient way to burn calories than any physical activity alone). A great tool to aid interval training is heart rate zone training. Heart rate monitoring is also good for other goals/desires like seeing your overall conditioning and helping aid sleep characterization. Based on your goals though, there are different technologies that might be valuable to you.

At the CES show, there were a lot of announcements on heart rate detection with new technologies for detection and new locations like wrist, ears, and even forehead. All of these offer new benefits, but come with trade-offs. And depending on who you talk with, there were many different opinions on the various technologies.

Polar who has been a leader in heart rate monitors for many years, uses traditional ECG-accurate



MIO Link Heart Rate Band

monitors through a chest strap. The transmitter detects the electrical activity of your heart just like an ECG. The problem with this solution is that it's uncomfortable to wear during a workout and certainly not something you want to wear all day long. New detection technology uses optical heart rate detection (which uses light waves to see the blood in the skin) to solve this problem and allows new placement of the monitor. Companies like Basis and MIO have developed integrated hear rate wrist solutions that eliminate the need for chest strap. However, not all implementations and

technology providers of optical are the same. Given the requirement for light waves, performance can suffer significantly especially in higher active uses like running as the unit is jostling around. Basis openly admits this and claims active workout heart rate training is not their goal. Instead, they are focused on 24x7 tracking for general fitness/conditioning observation and aiding their sleep analysis. MIO on the other hand focuses more on workout heart rate training and uses different technology from Phillips that allows better performance in active situations. They claim performance is as good as or very close to that of chest straps, something Polar executives heavily debated when I talked with them. Polar also claims that heart rate variability (another key heart rate training metric) is also much better with a chest strap solution and downplayed the comfort issue of a strap. They did admit though that optical solutions are promising long-term but would not go there unless they felt the data quality was of the highest standard.

There were many announcements on optical heart sensors built into earbuds/headphones. LG partnered with Valencell and their PerformTek technology for an optional earbud solution for the Lifeband fitness band. Intel also announced an earbuds heart rate solution. In-ear is claimed to provide a great location for detection and also has benefit of leveraging a device that most exercisers already use – a headset for listening to music. I think this is a great idea since most people working out or doing a sport want less gear (not more) and most listen to music. I'll hold my final verdict though until I see the performance of this given my earbuds are always falling out during a work-out. Finally, Spree Sports headset is a unique approach to this by using a headband solution. They claim this is much more comfortable than chest strap, but provides a great accurate location for detection. Personally, I'm not a big fan of adding another piece of gear and not ready for the stares from wearing such a silly looking device.



LG Lifeband Optional Heart Rate Earbuds

To summarize, I think heart rate monitoring has big potential with fitness trackers. Step counters alone offer too many limitations. For individuals looking for more advanced fitness tracking or even weight loss, heart rate offers great benefits. The key here is to understand your target user base and optimized right solutions that match their goals. Behavior impacting coaching solutions with this.

Trend #4: Algorithms & Industry Expertise

There is a lot of talk about algorithms being a key to activity trackers. Most companies are using the same sensors and have access to some of the same technologies. Companies can differentiate themselves though through unique algorithms that enable new and different capabilities. It's not clear to me yet if these algorithms can be protected IP or if they can truly deliver accurate results for some of the new use



Atlas Wearables Tracks Your Workouts

cases that are claimed to be delivered, but I believe a key requirement to utilize this differentiation opportunity is building deep user understanding for target use case. Algorithms after all are simply a bunch of if/then statement rules. Smart software developers can create fairly complex ones, but they need someone to provide the rules and use cases they are trying to solve. This requires deep customer understanding. Babolat recently announced a sensor based Pure Drive tennis racket powered by technology sensor company Movea. In talking with both of them, I found that this was a great example of partnership marrying a tech company with a sports company who deeply understands the tennis player. Movea could create really complex algorithms, but were not tennis experts and did not know what things tennis players would value or

things like proper stroke technique. Atlas Wearables who early last week launched their Indiegogo campaign is building a solution targeting tracking exercise routines automatically. They have been working with trainers to build their algorithm and believe this will be key to their differentiation. I am meeting with them separately to learn more about the solution and anxious to test to see if the can truly perform as advertised. If so, this seems to be a unique area that current trackers are not focused on.

Trend #5: Battery Life & Charging

Battery life and battery charging has been top concern in the mobile industry for many years. With unique nature of wearables, this is even more critical since users don't want to remove a device and adding too big of a battery makes the device bulky and ugly. A number of advances and announcements in this area seem promising and hopefully can lead to dramatically improving the user experience.

First let's talk about battery life. Garmin announced their new Vivofit wearable fitness tracker with a unique full year of battery life. In talking with them, they say this is conservative case and think it will actually go for 18mos. It's also powered by two watch coin sized batteries that you can easily buy at the store. I think this is great differentiating feature given people don't want to remove the device for charging and if it goes dead there is strong risk that people lose interest in the device and stop using it all together. This is top concern from Corporate Wellness providers who deploy these especially with those users where their motivation may not be as high as more advanced fitness enthusiast. This is why companies like Fitbug (who activity participate in this market) have a coin cell battery lasting for months as well. For Garmin's band, they had to do a lot of power optimization but also had to make trade-offs to get there. Most notably, they use a display without backlit which is nearly impossible to read in dark conditions.

Energy harvesting is another interesting opportunity. In talking with Heapsylon CEO Davide Vigano, maker of Sensoria smart sock, they have been experimenting with energy harvesting generated from the motion of someone's foot. It's yet to be seen if this can work or how big the impact would be, but seems very logical and exciting if they can produce results. For shoe manufacturers like Nike, Adidas, Under Armour, Reebok, etc, this seems like a natural idea to explore to differentiate.

One of the most promising opportunities though is in wireless charging technologies. With limitations in battery technology, making it simpler and easier to charge devices can provide major user experience



A4WP Wireless Charging

improvement. A lot of major advancement has happened in this area that is now starting to make it a real viable option. Old technology required direct contact with coils with exact positioning on a mat, high cost, and major impact to the device form factor. New technologies like magnetic resonance solves a lot of the old issues and provides many benefits like 1) range of charging (freedom of x & y placement, charging through materials like case, etc), 2) multi-device support (can charge at different power frequencies so you can charge laptop and phone at same time), 3) consideration of real-world scenarios like keys and coins, and 4) use of existing Bluetooth technology (so form factor impact & cost is limited).

However, one key barrier stands in the way of progress here – competing industry standards. There are three main standards being pushed in the industry: 1) Wireless Power Consortium (WPC) or Qi, 2) Alliance for Wireless Power (A4WP) or Rezence, and 3) Power Matters Alliance (PMA). WPC has broad member set and products on market today, but lacks key players like Qualcomm and Samsung. A4WP uses advanced technology but not on market today. Power Matters was created by Duracell (P&G) with their Powermat and has had major players like WiTricity join them. Lack of single standard could prevent broad adoption due to device compatibility issues and availability of charging stations. Similar industry standard battles like Blu-ray vs. HD-DVD or Betamax vs. VHS have also hampered growth. I expect consolidation to happen here in time and the industry has hinted to this. Companies looking to implement wireless charging though might be slower to adoption due to uncertainty of the winning standard.

Battery life and battery charging is a key area I'd recommend wearable and fitness/sport tech companies to invest in. This is major pain point for consumers today and can be big enabler to growing the overall wearable category/connected device market. Wireless charging seems to possess the most promise. While the industry standard issues are near-term issues, I still think companies who invest here early can establish some differentiation on this vector. Compatibility with future standards and other products is important, but this technology has value without it as it's still better than current cabled solutions.

Trend #6: *Connected Sports*

Sensors and technology has a lot of opportunity to aid sport play and performance. A few announcements



Babolat Pure Drive Connected Racket

and new products were aimed in this area. Babolat was the first tennis racket to be introduced last year with integrated sensors and an app to see your play results. Babolat partnered with sensor company Movea on the solution marrying tennis expertise and technology expertise. The key for the solution according to Babolat was to not impact general performance of the racket. The Pure Drive racket is exactly like the non-sensored version on weight, feel, etc. This was critical for Babolat and in testing with some of their top tennis sponsors they claimed players saw no difference in play. The racket has been approved by International Tennis Federation (ITF) for use in tournaments, but active tracking during a match is not allowed. I'm going to test this solution in the coming weeks, but I'm excited that Babolat is pushing

the envelope here and willing to invest in technology to help drive their products.

Technology in professional sports has a lot of opportunity as well. Reebok and technology company mc10 were showing their Checklight impact sensing beanie as such. In an interview with mc10 executive Isaiah Kacyvenski who played in NFL for 8yr for Seattle Seahawks, St. Louis Rams, and Oakland Raiders, they hope to see this technology used in the NFL in 2014 to aid in reducing head injuries. However, some interesting challenges need to be overcome on access to the data. Players unions are likely to have issue on who can see this type of data as it could impact a player's value with an organization and signing a contract. If a team can see how many hits you have taken and compare to others, they may be less willing to sign contract with a player who has more wear & tear. These will be overcome though and I think technology will have huge impact on professional sports watching and safety in coming years.

I see big opportunity to aid athlete performance in sport through technology. Success here will be predicated on starting with the goals the technology will provide. Just adding technology for technology sake or providing data to user, will not lead to long-term sustainable interest. Integrating technology needs to lead to helping the athlete get better at their sport. It should involve coaching services and recommendations tailored to the individual. To get this right, I believe marriages of sports companies and technology companies (like Babolat and Movea) is a critical path for success. Sports companies help provide deep understanding of the athlete while the technology company brings expertise in technology innovation.

Trend #7: Glass-Enabled Sports

Google Glass continues to gain excitement as Google comes closer to releasing direct to public. Many fitness and sports companies are looking at applications of Glass to ride the trend and utilize the unique



Recon Snow2 Ski Googles with HUD

device. For the right application, I believe Glass can provide huge benefits and solve major pain points. Recon is a great example of this. Recon currently sells a heads up display unit for skiing and snowboarding called the Recon Snow2 and one optimized for cycling called the Recon Jet (coming in Spring). Both of these sports are highly intense and involve fast motion and accessing gear while you're in middle of them is nearly impossible. The Snow2 provides a great solution to this problem by providing a small display at the bottom of your snow goggles (while not blocking your normal view) that allows you to see your stats, know where you (or your friends) are, get alerts on phone calls & texts, and control

your music. Access to information is much simpler and it leverages something you are already wearing. This is where Glass solutions in sports can succeed. Implementing Glass for technology sake will be met with resistance.

For Glass solutions to succeed in the fitness and sports markets, I think there are a few things companies need to consider:

1. Solves a Problem – Companies need to ask themselves what problem does Glass solve if implemented in my sport. Implementing technology just because its new technology will likely lead to failure. Recon demonstrates this by solving a clear problem in motion sports like skiing and cycling. The athletes want access to data in the middle of the sport, but prior technology was hard to view when your hands were busy or your in midst of highly intense activity.
2. Integrating into Gear Already Owned – Active sport users do not want more gear to wear. It slows them down, hinders performance, and is generally uncomfortable. Companies need to focus on integrating into gear they already wear. For Recon, leveraging a skiers goggles or cyclists sunglasses is natural place for technology. This integration though needs to not impact performance or comfort. It should disappear into the gear.
3. Simple & Intuitive – For sports, athletes want to focus on the sport, not the technology. As such, integrating requires a simple and intuitive user experience. You don't want a long learning process or complex control mechanism. These things will likely only hinder the benefits the technology brings to the table.

I saw two new Glass solutions at CES for the fitness & sport markets. One, like Recon, showed an application that meets my criteria for success while the other falls short. First, Heapsylon, maker of Sensoria smart sock, announced a partnership with Glass software developer Race Yourself which uses a Glass heads up display tied into their sensor socks. The solution allows a runner to compete in a virtual race vs. themselves and even race against zombies all while seeing your stats real-time. This solution solves problem of screen access while running and provides benefit of making runs more fun and aids motivation to beat your time. Most runners also already wear sunglasses so no need for more gear. Another solution announced at CES was Technogym's Glass solution for their line of treadmills. This implementation is less obvious to me. Treadmill runners currently don't wear head wear so it's a new device to strap on and buy. In addition, screen access is already fairly accessible on the machine. Technogym also adds voice controls to control your work-out, but I'm not sure how many people want to be talking to their treadmill in public in the gym. Plus, I suspect there might be issues with accuracy with all of the ambient noise in a gym. I don't see the problem they are solving with this solution.



Heapsylon Sensoria Race Yourself

Trend #8: Kids

A number of wearable companies are emerging to focus on kids market. Per my earlier comments on market segmentation and customer targeting, I think this is smart. Kids are a major market and targeted solutions offer great opportunity to meet their unique needs. Kids are different than adults in their needs from the device design (style, fashion, durability, wearability), price points, and service needs and motivations. Companies like GeoPalz with their ibitz tracker, Zamzee, Filip, and Sqord recognize this and are targeting this space.

I had chance to talk with Filip CEO, Jonathan Peachey. I wrote a report on this solution back last year. I still feel like Filip has great concept and focused in a unique area – child safety. Filip is smartwatch that allows parent of kids aged 5 to 11 to track where they are (through GPS) and easily get in touch with them while they are out playing (with integrated call capability). I think this helps encourage activity by helping parents feel a bit less worried and giving kids more freedom to get outside. Filip says the call capability has actually been the most valued feature of the device as it's a simple way to reach your kids to see where they are or tell them it's time for dinner. Different than giving them a full phone, it is much



Filip Kids Smartwatch

more cost effective and less likely to be lost. In asking them about adding activity tracking, they are looking at this and I suspect this will be added in future. However, they are focusing now on the key area they are trying to differentiate on – child safety. I think this is wise. I'll be testing the device soon and will have more analysis on this then.

To succeed in the “kid” market, companies need to focus on some of the following elements:

- Device Design – Kids will not wear a device if it does not feel comfortable or look cool. I have been testing the Sqord band with my kids and while they have great concept and overall solution, they need to improve device design and comfort for future. Sqord plans to also allow kids to use another device which is smart way to get a device kids love. Durability and loss are also critical factors. Kids are likely to be less careful with the device and put it through more wear and tear. They are also less responsible so you need a solution they will continue to wear and not lose. The GeoPalz and Zamzee solutions are clip on only which I think is limiting. They need to consider a band solution that is easier to stay on the kid.
- Kids Rewards/Motivation – Targeting kids requires services aimed at motivating kids and making it fun for them. Sqord allows you to earn badges, create fun avatars, and even compete vs. your friends (with safety features built-in). These are great for engaging kids. GeoPalz allows parents to direct awards for the kids. To me, this is smart strategy as kids are motivated in different ways and simple virtual awards/badges might not be enough. Getting a \$5 gift card to iTunes or Amazon or a allowing more time playing video games can be powerful tools to help provide added incentives for kids. I'd also look to add more challenges with friends. Adding direct band to band social capabilities (like what Razer announced with their wearable band) could be interesting technology to incent benefits of play with friends.
- Focus on Parents/Organizations - In addition to insuring the offer meets the unique needs of kids, companies need to also appeal to parents who are buying the devices or target youth groups, corp wellness programs, and schools that will also influence purchase.
- Marketing/Go-to-Market – Given the unique focus on kids and parents, the marketing approach needs to factor in both sides. Media outlets and channels need to focus on places where these users are. In addition, while I believe there can be a lot of success in channels that reach parents or organizations who will make their purchase, it's critical to not ignore the kids. They will not use or engage the solution actively without thinking it's cool or fun to have. You want them to wear it.

Trend #9: *Embedded Clothing*

I have written about the potential for wearables embedded directly in clothing in prior articles. I had opportunity at CES and just prior to speak with CEOs from both Hexoskin and Heapsylon. Following these conversations, I'm still convinced of the long-term potential for embedded wearables in clothing, but a number of factors will prevent near-term challenges that need to be addressed before broad adoption.

Hexoskin is an Indiegogo crowd funded start-up that was founded in 2006 by experienced software and electrical engineers including Pierre-Alexandre Fournier their CEO. Currently, they focus on the elite athlete and health researcher markets, but see broader preventive health market as big opportunity



Hexoskin Shirt Running

longer-term. I had chance to talk with Pierre prior to CES and they see themselves as becoming the “Gore-Tex” of the tech sensing market which is common phrase I have heard from other companies in this space. The Hexoskin solution includes a performance compression shirt and removable sensor module for \$399. Added shirts go for \$175. This is quite expensive and as such not surprising that they are targeting elite athletes and researchers first. Pierre fully expects costs to come down over time as they drive scale. The shirt currently tracks breathing volume & patterns, heart rate, and activity. At current state they are selling direct, but long-term see selling their solution to broad set of companies in

the sports and fashion markets. They claim to be in talks with number of major brands as such. I believe this approach is the right one to help drive costs down, provide customer choice, and provide capabilities that are not strengths of Hexoskin. Hexoskin is a technology company and while their Montreal based home provides solid fashion industry influence, they do not have the direct experience with fashion/apparel and the distribution networks established to sell there. By selling the technology solution to these companies, they build those capabilities. Plus, I believe customers want choice of brands for the fashion they wear. They will not want to wear same brand every day. It was hard for me to gather their unique proposition outside of the fact that they have long history (nearly 8years) in market. With others out there, I think they key will be proving out their technology works and is differentiated and can more easily integrate in clothing with limited impact to style, comfort and cost. Quickly establishing major brand partnerships off this demonstration will be critical to gaining a foothold before others create more competition.

Heapsylon another Indiegogo crowd-funded start-up based in Seattle area was started by some seasoned Microsoft executives who were involved with the Xbox Connect and Microsoft Health Vault. I spoke with Davide Vigano their CEO and Mario Esposito their CTO at CES was impressed with their passion and the technology expertise they brought to table. Heapsylon announced their Sensoria smart sock last year and plans to ship this spring. The solution is a force & pressure sensor based sock with a clip on tracker device around the ankle that adds an accelerometer and altimeter. The sock + sensor module is reasonable priced at \$159 with replacement socks coming in at



Heapsylon Sensoria Fitness Socks

only \$19. They also will have a shirt and sports bra available in coming weeks that allows you to clip on 3rd party heart rate monitor without and traditional band. Like Hexoskin, Heapsylon too desires to become a platform and the Gore-Tex of this market. As such, they have started partnership talks with various sports and other industries to license their technology as their primary route to market. They already have a partnership with smaller running shoe company Vivo Barefoot (a Clark owned brand) and are looking at other segment partners in the orthotics, golf, and even gaming markets. With their Xbox Connect background and the pressure sensor capabilities of the socks, the gaming market is very interesting natural extension for motion games without a controller or board to stand on. The current Sensoria sock prototype is bit crude, but I saw final production sample and looks a lot like a running sock with sensor traces sewn directly into fabric and disappearing. The clip on module seems a bit big still to me and I was bit worried about comfort. They claim though that users and testers so far claim to not feel it and referenced a study by Mayo Clinic suggesting the placement in front of the ankle was ideal to hide the weight of it. With this placement, they have also been experimenting with energy harvesting and believe foot movement is ideal for this purpose. Finally, they see the data (and the analysis of it) as the key benefit behind their solution. Using the data to providing active coaching on form can provide valuable information to a runner to improve performance or prevent injury. In addition, this data could be hugely valuable to shoe manufacturers to provide real-world crowd source testing on their shoes.

For Heapsylon, I'm excited about their potential and liked the team. The cost of their solution is more accessible today and placing sensors on the foot offers unique data that others are not providing today. Like Hexoskin though, I think early engagement and wins with some beachhead partners will be critical to their success. These partnerships can help them drive scale, provide more experience with their technology, provide access to areas like customer credibility/expertise, routes to market, marketing, etc that are not skill sets of Heapsylon, and can be real-world proof points that help generate broader partner adoption. To be successful, they need to be focused on a few high value markets where their technology and unique foot based approach shines rather than attempt to go after too many segments too fast. In addition and given the strategic importance of these beachheads, they should consider subsidization of the technology with these partners ahead of the cost scale curve to help win business and enable the scale.

Trend #10: *Silicon Vendors & Targeted Product Solutions*

Increasingly, you are seeing major silicon chip manufacturers building dedicated wearable devices. Qualcomm was one of the first with their Toq smartwatch announcement and launch last year. Not to be out done (you can also see the increased competitive nature of these 2 by their massive side-by side dueling booths at CES), Intel announced plan to have their own smartwatch and other devices like heart rate monitoring earbuds during their keynote speech. Google, while not a chip maker has also seen the need to increasingly create products direct to consumer with their smartphones & tablets and now with Google Glass.

While this tactic comes with a lot of added investment & risk and might not make sense on the surface, I think it's a smart move by these players. Semiconductor vendors have long created reference design

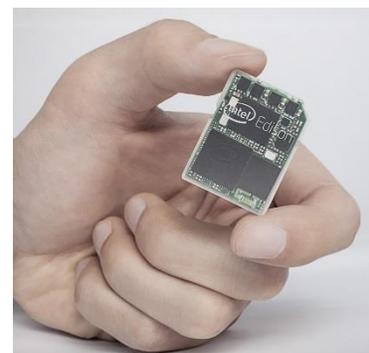


Qualcomm Toq Smartwatch

platforms to speed development of products with their OEM partners, better test chips in a system, and influence market to build innovative designs using their technology. In certain limited cases, I think taking a product fully to market could provide added value. However, silicon companies need to understand the risks and major investment required like channel sales, marketing, and service/support not to mention potential backlash from their OEM customers. This has tripped up some of these companies in past given their lack of experience. I don't believe the goal of this strategy though is to create a competing device business vs. the OEMs they sell to. Instead, the main goal is to build deeper customer understanding (by selling exclusively B2B they miss a lot of the true customer needs), incent market innovation, and allow them

to provide their point of view of the market evolution. This can be accomplished through reference designs, but selling them direct to consumers and driving strong interest takes this much further and allows them to test concepts in the real world. Semiconductor vendors don't have to go fully to market though with these concepts. Instead, another path, which Intel seems to be using, is to announce these "platforms" publicly and then sell designs to partners. This allows them to get market reaction from the designs and build credibility for innovation in this market. I think this path is much wiser in most situations.

For the big semiconductor vendors, I think developing full product solutions are a necessary tactic to drive and grow the new and emerging wearables & fitness tech segment by showing the market what is possible with their technology. This also puts them in higher position of value and seen as the innovators in the market. They need to make sure though that their products are truly innovative, have great designs, and solve real customer problems. Given their heritage of selling B2B vs. direct to consumers, building deeper end customer understanding for each targeted device is critical. They should start by prioritizing top vertical markets like sport, health, and fitness where there is strong use case and appeal to end-users and building focus for their top markets. After this, they can establish deeper customer intimacy with these segments by: 1) investing in their own research, 2) deeper strategic partnerships with brands who have expertise in targeted vertical markets like sport, health, and fitness, 3) hiring talent from device world, or 4) through enlisting others to innovate on their platform. For enlisting innovation from others, Intel's new Edison platform is great example. Intel recognizes that not all of the innovation in this space will come from them. They just want innovation to involve their silicon. As such, they built Edison as full development board platform all in the size of a SD card and have created an innovation challenge with \$1.3M in prizes and dedicated resources for coaching/advice. By making it easier for start-ups who have better understanding of unique customer issues to use their platform, they can capture more of the innovation.



Intel Edison Development Platform

Trend #11: Gamification

Gamification has been a tool deployed by a lot of activity trackers to incent use. I met with the co-founder of Blue Goji, Kai Huang, who recently released Goji Play. Goji Play takes the gamification of fitness tracking to whole new level by having you play real games while you are working out. Kai and his brother were also the co-founders of Guitar Hero and helped run it at Activision after selling to them. As such, they know a few things about gaming and creating big hits with consumers. They always had a strong interest in fitness and using games to help motivate individuals, but were fairly consumed with running Guitar Hero. After finishing that, they started Blue Goji. You can tell in talking with Kai that he is really passionate about this space. With his background, passion, and smarts, I've got strong feeling they have strong chance of success with the concept.



Goji Play Experience

Goji Play is a gaming system that works with a treadmill, bike, elliptical, etc (either at home or gym). It works through an activity tracker that can be clipped onto your shorts or shoes, 2 controllers that strap on a treadmill or bike, elliptical, etc (you can also easily hold them with 2 foam batons that are included), and an iPad or iPhone as the screen. It's only available for iOS today, but Android will be coming soon. The product was released back in December and sells direct or on Amazon for \$99 for the controllers, tracker, and charger. Once you set it up, you can pick from 12 different games to play that you also download through Apple App Store (nearly all are free). By running you can control the speed of the game (e.g. throttle for water bike or snowboard) and use the controllers for direction or other actions.

I tested the system out with my 8 and 10 year old boys (who were very excited about it) and it is very fun. It's designed more for the casual to beginner fitness user who struggles to be motivated to hit the treadmill. By adding gaming, it makes a 30min workout feel like 5 minutes. For the more advanced fitness guru, it might not be a good fit, but Kai recognizes this and this is not their main target. When your intensity goes up, it becomes much harder to focus on the game and I had some concerns around safety at higher speeds. For the casual user though, I think it's a great concept.

Blue Goji has worked to produce all of the initial games (and the titles are all very good), but their plan is to make Goji Play a true platform where software developers can make Goji Play compatible games. I think this is smart and provides a way to build a broad set of titles that continue to make this fun and engaging for users beyond just the initial few times playing it.

Trend #12: Home Health

The medical and health markets are expanding further and offer huge opportunities for smart wearable and sensor technologies. Regulatory issues will make this longer to develop, but the market potential here seems to likely be higher than consumer markets given the large institutions and money already spent in this space. Also, with the rise in healthcare costs and the Affordable Care Act, there are a lot of incentives for companies to invest. Wearable and sensor technologies promise to deliver major cost savings so provide great opportunity for value based pricing offers that focus on what savings they can drive.

In addition, with lower cost more accurate sensors and cloud solutions, consumers will now have new freedoms of tools and information that allow them to take better control of their health (vs. their heavy dependence today on their doctors). I'm convinced the average consumer wants more control of their health and this can also be big benefit to doctors as well. This is why medical sites like WebMD saw a lot of success. Now, being able to monitor your own data on ongoing basis will provide empowerment unlike any before.

Companies like Scanadu and A&D Medical are positioning themselves to take advantage of this opportunity. A&D Medical started in the telemedicine market where nurses would bring expensive monitoring systems out to patients home, manually record it, and then take it back to doctors. This was not only expensive, but manual and only provided a snapshot view. With new lower cost sensor devices, cloud connectivity, and intelligent analysis of the data, the cost and value goes up dramatically. Cost goes down as the devices are cheaper and no one is needed to administer the monitoring. Data can be tracked more often vs. limited snapshots giving tremendous added fidelity of patient status. And with smart intelligent monitoring, doctors can be proactively alerted when a data variable hits a crucial point. This has the potential to eliminate calls and interactions when a patient is fine, but allows them to set rules to engage patient (how they see best fit) when action is needed.



Scanadu Scout

Scanadu promises to empower patients with their low cost and very small Scanadu Scout that they are working to have FDA approved. Scout allows you to give yourself personal exams by measuring, analyzing, and tracking your key health vitals like temperature, heart rate, oximetry, ECG, HRV, PWTT, UA, and stress all in one small unit. This gives a patient higher empowerment through more understanding of their own body, less need to go to doctor's office, and helps provide more meaningful data you can share with your doctor. I believe this trend is going to explode in coming years and has huge potential to help patients live healthy lives and lower cost of healthcare in major way.

Conclusion

The intersection of technology with health, fitness, and sport is now reaching mainstream tipping point. This was critically evident given the noise and presence at CES 2014. These technologies promise to cut costs and make lives richer. I'm a firm believer that you will see major transformation in the medical/health, fitness, and sports industry as result of these and they truly will make lives better. The market is seeing a flood of new investment and is starting to reach mainstream users. There will be a

number of winners and losers in the space. The companies that succeed will do so with strong focus on their customer, establishment of a unique value proposition, strong partnerships that marry customer domain expertise with technology expertise, and strong leadership to stay focused and execute.

Important Information About This Paper

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