The Rise and Fall of Wearable Fitness Trackers

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Abstract

Wearables are becoming increasingly popular in different industries for various purposes. It is suggested that the market will reach 30 billion USD in 2020, containing a variety of products made by different companies. Yet one of the current issues is the large attrition rate of consumers no longer wearing their device. Current business models are built on technology push and therefore do not succeed in matching the technology to consumer needs. Previous studies have either focused on the technological features or adoption potential of wearables. Yet, little is known about the elements leading to attrition. Therefore the purpose of the paper is to identify the key determinants from a consumer perspective leading to dissatisfaction and eventually wearable attrition.

Keywords: Wearable, Adoption, Attrition, Technology

Introduction

Mobile computing has evolved from devices that you can carry with you to technology that can be worn on the body, better known as wearable technology. It refers to garments or accessories that are created and enhanced using electronics (King, 2011). Their appeal lies in the information and entertainment they promise to potential users (Buenaflor & Kim, 2013). The available wearables provide various functionalities such as communication to a multitude of devices and features such as a pedometer, heart rate monitor, etc. (McIntyre, 2014).

Compared to traditional mobile technology, they are perceived to be better at monitoring the user and its surroundings (Svanberg, 2013) because they are designed to be unobtrusive and to blend well in everyday life (Casson, Yates, & Smith, 2010). The applications of wearable technology are increasing and popular in domains where they can serve specific goals. In the security/safety sector, for example, functionalities such as remote monitoring are important, while in the wellness sector, the focus moves to functionalities such as sleep tracking. Many wearables have appealing characteristics, increasing the likelihood of broad consumer adoption: visual appeal, smooth integration with body and smartphone, feedback loops, easy customization and relatively simple set up. In the near future they are expected to become an important part of a user's life (Karahanoglu & Erbug, 2011). Consequently, many companies are developing and launching wearable devices, hoping to win market share in this very competitive consumer electronics market (Page, 2015).

Wearable technology can be divided into two categories: wearable computers, where electronics are integrated in a fashion accessory such as bracelets or headphones, and smart textiles, where the electronics are woven in the fabric (Page, 2015). This paper will focus on the first type of wearables and more specifically activity trackers, because they are commercially integrated in consumers' everyday life (Rackspace, 2013).

Although the potential of wearable electronics is expected to grow (Kipkebut & Busienei, 2014), challenges continue to exist in effective long term use and adoption (Shih, Han, Poole, Rosson, & Carroll, 2015). While some of the users have positive attitudes towards these new products, some users may reject to use them for several reasons. First impressions, i.e. the perceived qualities, can trigger product adoption (Karahanoglu & Erbug, 2011) while experience will determine continued use (Shih et al., 2015). The key for companies fostering adoption of wearables will lie in the efforts to understand the consumer's adoption factors and manage expectations accordingly to avoid dissatisfaction during use (Anderson & Lee, 2008).

Despite their popularity in the research community, little is known of how users perceive and interact with these devices. Additionally, many devices have failed to become commercially viable (Hunn, 2015). This is not surprising, considering consumers often find their experiences with personal technology to be ambivalent. On the one hand they enjoy the benefits of the technology, but on the other hand they get irritated by it (Johnson, Bardhi, & Dunn, 2008). Literature often focuses on positive drivers of technology use, such as performance, ease of use, speed, and control, but does not sufficiently address the paradoxical nature of consumer experiences with technology and the way it influences the consumer's evaluation (Johnson et al., 2008). Nevertheless, understanding these negative experiences is vital as eventually they can lead to technology avoidance (Mick & Fournier, 1998). Think of the Google Glass and its recent failure. Initially, the glasses got hyped up, but Google was not able to bring the glass out of beta. Google overpromised certain features, creating expectations for its potential clients, which would eventually lead to disappointment. One of those promising features was the full-view overlay, while in reality there the information was displayed in a small rectangle just above the eye. This made one of the main features, reading professional emails, difficult because the text was too small. Additionally the device would heat up very fast where the battery is located, on the side of the head, making it very uncomfortable to wear. In other words, the expected benefits were not met, leading to abandonment of the device.

A recent commercial study on activity trackers or fitness wearables showed that 30% of consumers stop wearing their device after 6 months and half the people who ever owned a wearable stopped using it altogether (Endeavour partners 2014).

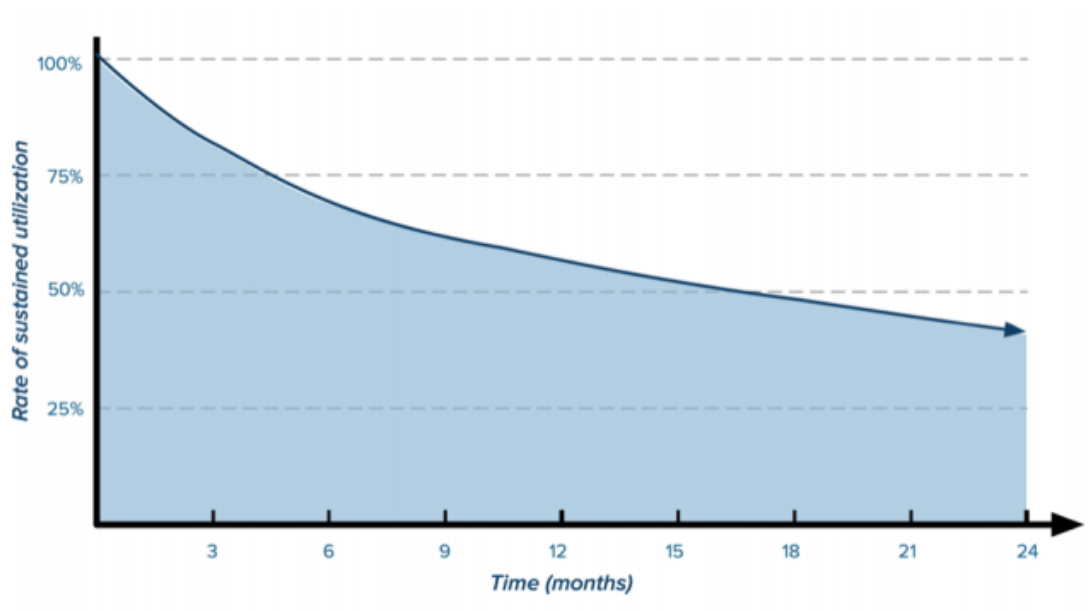

Figure 1: Declining Rate of Sustained Activity Tracker Use Ownership Adopted from Endavour Partners, September 2013

Understanding the needs, experiences and evaluations of these ex-users can be an interesting source of information, providing useful input to improve the innovation process (Schuurman, Mahr, & De Marez, 2012) so that it might lead to longer-term adoption of the technology. In the case of fitness wearables, it is important to understand the elements that led to dissatisfaction and eventually avoidance of the device to improve consumer loyalty. Therefore, this paper provides some preliminary insights into how wearable technology could be improved from a consumers' perspective by means of netnography, applied on Reddit.

Technology Acceptance and Attrition

Existing research often focuses on either the technical, use or adoption challenges related to wearables (Choe, Leite, Seedah, & Caldas, 2014; Consolvo et al., 2008). Initial research was mainly done by engineers, focusing on the technical challenges, while current research acknowledges the importance of personal and contextual elements influencing the adoption and use of the technology. This shows that research is slowly moving to a more user centered design approach. Rooksby, Rost, Morrison and Chalmers (2014) for example suggested that research should pay more attention to personal preferences and individual characteristics. In

this work, we try to uncover use and adoption challenges that ultimately lead to attrition. But to understand attrition, one must first understand the expectations that are present at the time of adoption.

Several theoretical models have been proposed to research the technology adoption process, but one of the most widely used models is the Technology Acceptance Model (TAM) (Davis 1992), studying end-user acceptance of technology products (Venkatesh, 2000). TAM is an extension of the Theory of Reasoned Action originally developed by Davis (1989). It replaces the attitude measures of Theory of Reasoned Action (Ajzen et al., 1980) with technology acceptance measures, namely perceived ease of use and usefulness. Both theories assume that if someone has an attitude towards behavior and they form an intention to act, they will eventually do so. The acceptance of the system is in other words determined by the intention to use the system, which itself is influenced by the beliefs towards usefulness and ease of use. Perceived usefulness is the extent to which a user believes the system will enhance the user's performance, while perceived ease of use refers to the degree to which the user can use a system free of effort (Lin, Shih, & Sher, 2007). Initially, the model was developed to apply in work environments (Davis, 1989), but has proven its relevance in commercial environments as well (Lin et al. 2007).

Commercial fitness wearables or activity trackers like Apple Watch, Fitbit, MyFitnessPal and Jawbone are designed to support consumers in accomplishing a healthier level of physical activity. In other words, the perceived usefulness of activity trackers lies in supporting behavioral change by wearing the device. For younger people, the appeal is to focus on fitness optimization, while older people are looking for improvement of their overall health and life extension (Endavour, 2014). According to Endavour (2014) several criteria are important to accomplish ease of use and drive initial adoption of activity trackers: selectability/adoptability, design/aesthetics, out-of-box/setup experience, fit/comfort/form

factor, quality/robustness, user experience, API/Integrability, lifestyle compatibility and overall utility. Selectability/adoptability refers to the uniqueness of the value proposition. Most users have no experience with these types of devices; making the selection process stressful because they do not know which one they should choose. Unique features can help them to choose a certain device Design and aesthetics are vital because the wearables are visible to other people. The quality of the initial experience (=out-of-box/setup experience) should be pleasant and idealized. Also the fit and overall comfort of the device will be critical to use the device for longer periods in time. This goes beyond the comfort of wearing the device, but is also related to the extent in which they intervene with daily behavior or activities (e.g. typing). The wearable should also be of quality/robust and have a high degree of resistance to wear and tear. The user experience should be intuitive and should transcend the device, app, web services and overall support. One should be able to access the data via other services (e.g. using an API) to enhance the user benefits and as such the overall experience. Lifestyle compatibility refers to the change that the device requires in order to simply wear it. The less change is required, the more likely it is to drive long-term engagement. Overall utility means that the device should be built around the goal they want to accomplish and have a clear intent on how they will help the user (e.g. through habit formation). Nowadays activity trackers try to accomplish this by monitoring activity data such as number of steps taken, distance traveled, speed and pace, calories burnt, heart rate, skin temperature, perspiration level, hours slept, dietary information, etc. This creates awareness and allows users to observe their progress. But simply providing data to the user will not be enough: wearables also provide users with feedback in the form of information and/or notifications tailored to their activity levels. Examples are the haptic feedback through vibration of a bracelet when reaching 10.000 steps or the reminders sent to users to get up and

move when they have been sitting for too long. Another example is a possibility to compare the accomplished results with others (Shih et al., 2015).

Despite previous studies providing insights in what qualities activity trackers should have to improve adoption and usage (Buenaflor & Kim, 2013; Karahanoglu & Erbug, 2011; Shih et al., 2015), the attrition rates of consumers that no longer use their device are high. This can be attributed to the fact that consumers often have ambivalent experiences with personal technology. The evaluation of those experiences is the result of whether the real experiences meet the initial beliefs about technology (Johnson et al., 2008). On the one hand they can enjoy the benefits of the technology, but on the other hand they can feel frustrated. As an example, smartphones provide the benefits of constant connectedness to the outside and online world, which can be a positive experience for consumers. However, this can also cause irritation, as it also means that they are never disconnected from work and their private and professional lives become intertwined. Another example can be found in the usage of Facebook. A positive experience is the ability to stay in touch with long lost friends or people that one does not see often anymore and stay updated on their lives with limited effort. As a negative experience, several studies have shown that the regular usage of Facebook can cause 'depressed' feelings, as people feel their lives are less interesting or social compared to others. There is known to be a dynamic, ambivalent and paradoxical nature of consumer experiences and the ways in which experiences influence the evaluation of the technology (Johnson et al., 2008). These experiences can undermine the satisfaction and eventually lead to attrition and or avoidance of the technology (Mick & Fournier, 1998). Failure to recognize these experiences can impact the marketing strategies and other efforts intended to create loyalty (Johnson et al., 2008).

Oliver (1977, 1980) tried to explain this paradox by developing the expectation disconfirmation theory, a cognitive theory which seeks to explain post-purchase or post-

adoption satisfaction as a function of expectations, perceived performance, and disconfirmation of beliefs (Oliver, 1977, 1980). Expectations are the elements or attributes that a person anticipates to find in the technology. They are the expectations related to the perceived usefulness and ease of use that lead to technology adoption in the TAM framework. Expectations influence the perception of performance and disconfirmation of beliefs. Pre-purchase or adoption expectations will be compared against the final technology that is used. The perceived performance is influenced by these expectations and impacts the post-usage disconfirmation of beliefs. The perceived performance is the perception of the actual performance of the technology. The evaluation a person makes regarding the technology is the construct disconfirmation of beliefs. These are made when the original expectations are compared with the actual usage. If the balance is positive it will increase satisfaction, when the product underperforms compared to the initial beliefs, the person will be dissatisfied. It can be assumed that considering the limited focus on user needs in wearable research development, the consumer beliefs of activity trackers got disconfirmed leading to avoidance. One study on wearables for example indicates that lifestyle compatibility, design/aesthetics, user experience and ability to integrate might provide challenges for long term behavioral change with wearables (Shih et al., 2015). The data was gathered from an experiment set up in an academic context with students. Studies that focus on real life settings and attrition of activity trackers are missing, making the results of this research relevant for researchers and manufacturers to improve upon existing technology, increase long term usage and consumer loyalty.

Methodology

Our research data was collected via netnography (Kozinets, 2002, 2010), an online research technique to gain consumer insights. The study was completed on Reddit content, a social

networking, entertainment and news website developed in 2005 to which members of the online community can submit content. People can vote the submissions up or down. These votes are averaged in points and submissions and the higher points are put on top of the page. The content is organized by subdomains, also known as subreddits, which are visible on the front page and include educational, entertainment, discussion based humor, image sharing, self-improvement, technology and meta themes. Members can post comments on submissions by others. Netnography (= online etnography) is an interesting research approach as consumers are increasingly relying on the Internet to make purchasing decisions and to discuss purchased items. These online communities can have a substantial impact on consumer behavior as their members exchange knowledge and their experiences with existing products (Füller, Matzler, & Hoppe, 2008; Jeppesen & Laursen, 2009). In other words, they can provide rich insights for user research. Netnography is a way of capturing and analyzing that data through digital communication. Methodologically, researchers can either choose to participate in the communication or refrain from doing so (Kozinets, 2002). In this research, we implemented a non-participatory form of netnography because another Redditer already posted the question to which we studied the answers.

The approach to netnography is: (1) making a cultural entrée; (2) collecting and analyzing data; (3) ensuring trustworthy interpretation; and (4) following research ethics and providing opportunities for member feedback (Kozinets, 2002, 2010).

In the first step, the **entree**, we identified a community that could be of relevance for the research question. In this case, we found a submission discussing "the attrition of wearables after 6 months", asking Redditers why they stopped using theirs. Members of Reddit are devoted, knowledgeable and innovative and their input can be of value to gather some preliminary insights. Therefore, Reddit seemed a good community for this research, especially because the thread showed rich content, descriptiveness and conversational

participation by different community members (Kozinets, 2002). If participants of an online community are anonymous, the content is publicly available and not psychologically harmful, it can be assumed that their informed consent is implict (King, 1996). Nevertheless, the discussion on ethical conduct is still going on and Kozinets (2002) suggests some ethical conduct guidelines such as informing community members of the research and asking permission to quote. We followed the guidelines of Kozinets (2002) in this research to assure no ethical boundaries were crossed.

Data was directly copied from the community platform and analyzed through **open coding**. This is the process of breaking down, examining, comparing, conceptualizing and categorizing data (Strauss & Corbin, 1998). In December 2015, we identified 153 comments on the question 'Why'd you STOP using your fitness wearable device?'. The data was gathered over a period of 4 weeks on Reddit. After 3 weeks, members' activity nearly stopped and therefore on week 4 we decided to discontinue the data gathering process. The data of each category was compared to other data belonging to the same category, inquiring into their similarities and differences. Each category formed a theme or meta-observation. The categories of data were interpreted through content analysis. Although classification and coding are a tradeoff for symbolic richness, netnography can take advantage of the contextual richness. Netnography is based on the observation of the textual discourse rather than the observed behavior that occurs in ethnography (Kozinets, 2002). To create trustworthy interpretations, we determined the importance of the answers in relation to the research question. Of the 153 comments, 54 were irrelevant for the analysis because the person was either still wearing the activity tracker or they were off topic. When not taking the irrelevant comments into consideration, only 3 people answered more than once in the community, yet did not answer more than twice. This shows no vocational extremists were taking over the conversation. One researcher analyzed the input of 93 unique and relevant participants.

Results

The different categories of the analysis were linked to the expectations leading to adoption and usage of fitness wearables mentioned in previous Endeavour research (cfr supra). For one category, we were not able to do this, because there was no link to the expectations, namely for those people who mentioned that they lost their device. The mentions in figure 2 refer to the amount of times community members communicated that their expectations were not being met, leading to attrition. The points in figure 2 are an average number of upvotes and downvotes, calculated by Reddit. This can be interpreted as the average amount of people that agreed with a comment and were added to the relevant categories. Because there are no deeper insights on the amount of people that upvoted and downvoted per comment, the points were merely added to the category and no other calculations were performed.

Figure 2, resulting from the in-depth analysis, shows that the main dissatisfaction can be attributed to wearables that don't fulfill the expectations on the fit/comfort/form factor, selectability/adoptability and overall utility. More specifically, respondents feel that wearables often inhibit their current performance, that the added value in terms of metrics is too limited and that the accuracy of the data is too small to improve their behavior. Additionally, the overall user experience can be improved as well. Manufacturers can learn from this research by optimizing the innovations to match user needs better and marketers can learn to manage expectations based on the link between the optimized product and the user needs.

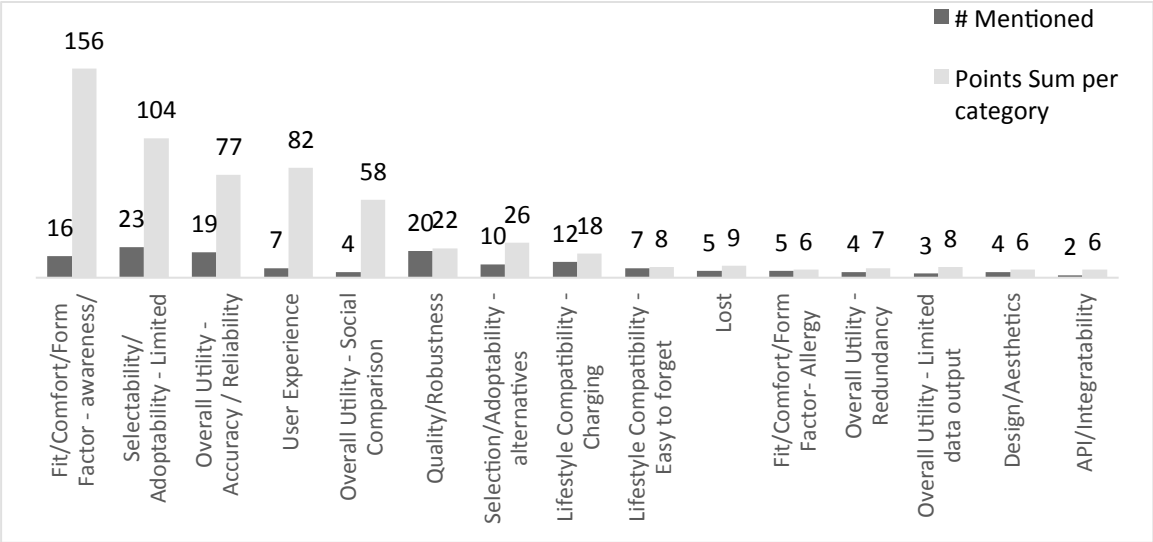

Figure 2: Overview results netnography linked to expectations

Fit/Comfort/Form Factor - Awareness/Inhibiting performance

Although wearables have the intention of being unobtrusive, some consumers still complain that they are not and stop wearing the device because of this. This category consists of two components: psychological and physical awareness. Psychologically, the wearables can make users so obsessed about the device that they no longer enjoy wearing it. Obsession can display itself for example in distraction from daily activities as they keep on checking their phone for progress. For some users it even inhibits their sleep because they are so focused on wanting to sleep well. Additionally, it can make them feel bad if they do not reach the predetermined goals. Physically, the device can get in the way of exercising, especially when lifting weights or in daily behavior, when the clasp gets stuck to their clothes. Additionally, some wearables are not worn on the wrist but under clothes, which is perceived as uncomfortable.

The following quotes are indicative of the type of data that was subsumed under this category.

"I actually bought mine mainly for sleep tracking but found that I was actually concerned about quality of sleep so much before I went to bed that it was impacting my sleep negatively. Started sleeping better again as soon as I stopped wearing it."

"The clasp on mine drove me crazy. It caught on everything and would undo itself all the time."

Selectability/Adoptability - Limited Metrics

This theme handles the limited metrics currently provided by fitness wearables. Most activity trackers provide consumers with a step counter and time. Wearables were initially marketed towards the 'fit' people allowing them to track their progress. They initially bought the device for this purpose but soon realized that the functionalities are too limited. When lifting weights, cycling, etc. it will not provide them with sufficient insights in their workout. Because of these limited insights, they stopped wearing their device. Additionally, functionalities such as heart rate measurements and accelerometers are not optimized for workouts. The current metrics are perceived as ineffective (such as step count) to deduce interesting insights from the data relevant to the workout.

The following quotes are indicative of the type of data that was subsumed under this category.

"The more niche the application of the device, the more likely it will be used to track important metrics. I'm a cyclist and a Fitbit owner and as soon as I got a Garmin Edge with a HR monitor to track my rides it just made the Fitbit obsolete. Steps per day isn't an important metric for me to base my fitness on any more."

"My Charge HR got sweat under the screen after about two months, killing it. I reported the problem and Fitbit quickly gave me a replacement...which then broke again within weeks. I don't think it's worth my time even to ask for another one. As everyone else has mentioned, the Fitbit is optimized as a step counter; it's not much good for biking or weight lifting, my main exercises."

Overall Utility - Accuracy/Reliability

The accuracy and reliability of the data can be attributed to the sensors not picking up the right information and not being able to correct for confounding factors. This is for example the case when step counts are being added while standing or sleep is tracked while being awake. Some consumers also mentioned that contextual factors such as sleeping in a different bed could influence the registered data, making its interpretations less reliable.

Consumers within this category stopped wearing their device because they noticed a discrepancy between their behavior and the registered data, which made them lose faith in the overall value of the data.

"After wearing my Fitbit HR for a few months I developed a really good sense for my daily step count, to the point I could accurately estimate it without actually wearing the tracker. Not to within a dozen steps or anything like that, but I can definitely tell when I've done my 10k or not. I also found the heart rate monitor insufficient for work outs and so I still had to resort to a stand alone chest strap model. And the sleep accuracy wasn't accurate enough to justify wearing it just for that. The only thing I really miss about it is the "steps" counter. Thought it was pretty cool to know about how many "steps" I climbed from day to day because I live in the mountains."

"I got mine to track sleep, and quit bothering when I discovered it thought I was in deep sleep even when I was just lying still but awake."

User Experience

User Experience refers to the ease of use in tracking and gathering data. In the beginning, most wearables required to be set up when tracking sleep. But the majority of users forgot to change their settings, making the data irrelevant. Additionally, overall health tracking requires

too much effort from the user. If they want to track how healthy they are by counting calories combined with their activity level, the applications require too much effort because they have to input their activity manually through the application.

"Ha, my issue was I kept forgetting to activate the sleep mode on my Jawbone...ended up selling it online to someone else"

"Its a pain to set up every night. And when you sleep on different beds with different firmness the data is not reliable."

Overall Utility – Social Comparison

Social comparison and status is often mentioned in research as one of the reasons to adopt a wearable device. Projecting the image of being a healthy person can motivate consumers to adopt the device. Yet, it can also be a reason to avoid the device after a while, as other types of consumers one does not want to be associated with, are starting to adopt the device. Additionally, not being able to compare your results with others that have a wearable can be a reason to stop using the device.

"Nailed it. Steps is such a bullshit metric... And it kills me inside when people are like "How many steps do you have today?!?!", and I'm like "6500". And they are like, "OH! I'M AT 7000! I'M WINNING! Guess I can have another donut!" ... But my 6500 doesn't include the 45 mins on an exercise bike, and 45 mins of lifting while on a 2200 cal/day diet. Don't get me wrong, it's a great way to encourage people who tend to be idle, but in no way shape or form is it a proper barometer of overall health and activity. So, I stopped wearing mine, so people would stop asking me."

Quality/Robustness

Within this category, issues with Fitbit devices were mentioned the most, but other wearable brands like Nike or Jawbone also broke down on the user. This was the case both for physical elements and technical features. Many users experienced issues with the straps of the devices breaking or wearing out. Additionally, some technical elements caused the device to stop working, like synchronization issues, inability to download or update the application or functionalities that stopped working correctly.

"Because I got tired of my Fitbit Flex bands fucking breaking at the window all the time. Also, having to reset the thing because it won't sync after a run sucks, you lose all your steps."

"Because it quit working properly (Nike Fuelband). It wouldn't charge well anymore and wouldn't connect to the PC I want the new windows one though"

Selectability/Adoptability - Alternatives

Wearables are easy to replace by alternative devices such as smartphones that provide features such as step counting, sleep tracking, etc. or better devices that supersede the functionalities of the previous device. For some devices, the added value and USP is too limited giving for example users that stopped using their wearable because of the limited metrics, a reason to switch devices.

"Would definitely recommend against getting one. I wanted one for a long time and eventually bought myself a Charge HR. It was cool for a while, but then I realized I had spent like 150 bucks on something that can be rivaled by the smartphone I already carry around every day."

"Got a Lumo Lift to help with posture (slouching), and while I awaited the release of an Android app (never came) and Windows (eventually happened), I managed to train myself to

use better posture without much help from Now it just sits in the charger, and has been superseded by my smartwatch in terms of pedometer/movement tracking. Glad I got it, but it hasn't really provided much utility. the device."

Lifestyle Compatibility - Charging

The durability of the battery can be a form of frustration for wearable users. The consumers of wearables that have a long-lasting battery complain that their battery stopped working after a very short time. Still, having the ability to charge it does not go without frustration either. Consumers don't like the fact that they often have to charge their device. Additionally, losing the charger for their device is one of the reasons they stopped wearing the device.

"I had the fitbit flex. Its battery died. Got another one. It died, too. Not giving them a third chance. Just not worth it."

"A friend bought a Fitbit Flex and I thought, "it looks cool, maybe I can get more healthy using it". So I bought one, used it for a while until I realized that I hate charging it once every five days, and after a while the wristband I bought a Garmin vivofit and I'm so much happier, I don't care so much about the amount of steps I take but I use it as a watch instead, the steps are just a bonus.snapped and it stopped charging."

Lifestyle Compatibility - Easy to forget

Some users just forget about their wearable after taking it off and stop wearing it because they don't miss it. The main reasons for taking it off is to charge the device or for workouts during which the wearable is perceived as a hindrance. Forgetting is caused by for example the unobtrusiveness of the device, but also by not being engaging enough to remember.

"i had a fitbit gifted to me and I had fun with it because i was networked to friends and family on their app. I stopped using it because it stopped working correctly and it was easy to forget about."

"My Nike Fuelband kept breaking and I replaced it (under warranty) like 3 times. Then it kept getting in the way of kettlebells, so I would take it off during workouts. I forgot to put it back on and so now it's been sitting so long, I'm like "It probably won't work anyways." So it's still sitting in one of my drawers. Plus, no one has a fuelband so I cant really compare with my friends anyways. I should delete the app."

Lost

Some consumers lose the wearable by misplacing it and forgetting about it. This category is strongly related to the previous category (easy to forget).

"I stopped using my Fitbit because I had to charge it every third day and I'd forget about it and go days with out it. Eventually I just lost it and didn't even notice for a couple of months."

"I lost my FitBit."

Fit/Comfort/ Form Factor – Allergy

Certain consumers stopped wearing their device because sweating would create a rash where the wearable would touch the skin. Only one wearable brand, namely The Fitbit HR, was mentioned as the device causing allergic reactions.

"Had a Fitbit Flex and it died after a few months. I 'upgraded' to a Fitbit HR and developed a nasty rash after a couple weeks. Stopped wearing it and it went away. Put it back on and the rash came back. I followed their recommended washing procedures and would take it off to shower etc. Didn't help. :("

"Got a charge HR, stopped wearing because when I would work out with it on my sweat would react to the band and cause a nasty nasty rash to form. Went back to a jawbone, basic, but it works well enough of me. Mostly like the alarm, and inactive alert."

Overall Utility - Redundancy

Redundancy is related to the limited metrics category. Once users reach a certain level of activity, the functionalities of the wearable device become redundant. Consumers perceive the wearable as a good device to make them aware of their activity levels and force them to behave more healthily. Yet, once they have accomplished this, they may feel that the device cannot add any extra value to their current behavior, causing them to stop wearing the device.

"I stopped wearing mine because my days are really routine. If you don't have much change in your activity level you get a good gauge that you're doing enough. I now have a solid idea of how much activity I get per day after wearing it adamantly for about 2 months so I don't see much need for it."

"I grew out of it. I was using a fitbit purely for step counting, and making sure I hit 10,000 step a day was really hard work. I done think I would have managed it without those hard numbers. Now I have higher aims, getting my 5k time under 30 minutes, so it isn't useful. I still wear a chest strap when doing cardio, and I find the fitbit heart rate monitor isnt than great. Basically -- fitness wearables are great if the are giving you hard numbers you something you would act on. The is less point when the are just telling you you worked hard (you already knew than!)"

Design/Aesthetics

For smart wearables, hedonic qualities are as important as pragmatic qualities. Indeed, aesthetically pleasing features have an impact on the adoption potential of wearables (Karahanoglu & Erbug, 2011). Simultaneously it can be a determinant for avoidance. Either the wearable does not complement the outfit, or it limits the outfit that can be worn (e.g I am not able to wear a watch and a wearable). In that sense, smartwatches have an advantage over wristbands.

"I like wearing different watches. So having a fitness tracker on my wrist kills the aesthetic"

"I stopped wearing one because it was uncomfortable and looked weird under my clothes (one of the first that came out, went on upper arm). "

API/Integrability

Although only few users mention the openness of the system as a reason to stop using the activity tracker, this will become a more important criterion in the future. Integrability allows users to combine data from multiple devices, improving their overall utility.

"I bought a Fitbit Charge HR for sleep tracking as setting up the phone on my bed was a pain. Then I discovered the sleep tracking on Fitbit is shit. It actually tracks the data, but if you want a nice simple percentage like Sleep Cycle gives you, you have PAY for a fucking report. Its complete bullshit. That said, I found the thing really useful for tracking calories, exercise, heart rate etc. So, ironically, I use it for everything but the original purpose I bought it for. I'm looking forward to something better and more open. The Fitbit is good, but their whole business model is based on locking you into their closed as fuck proprietary system."

Conclusions

The data only provides some preliminary insights in the reasons for wearable attrition and cannot be generalized to the market. Still, it can serve as an indication for future research. Despite the niche focus, cross-consumer interaction in communities can reveal interesting insights on consumption and provides feedback to marketers. Often, such communities are populated by opinion leaders that can yield insights into the perception of users (Belz & Baumbach, 2010; Kozinets, 2002). The results are limited because of the single coder analysis, but can guide future research. This should focus on comparing the degree to which users and non-users dimensions, to make the findings more generalizable. It would also be interesting to have a better view on the type of users (interested in sports, general health improvement, …), their expectations and reasons for abandonment of the device.

One of the challenges in wearable technology is the consistency and accuracy of data. It currently offers a limited user experience between the device on the one hand and the application on the other hand, supporting the device. To be of more value, the device and application will have to capture more accurate and diverse data that can be integrated in a broader ecosystem. Data inaccuracy and access to limited data is mainly a byproduct of mismanagement of expectations of the device's capabilities and its expected usage. Several devices promised features such as constant heart rate monitoring or electro dermal activity measurement (cfr. Jawbone Up3), but upon launch never were capable of offering these services, leaving a lot of consumers hanging. For the Jawbone Up3, for example, customers that pre-ordered could return the device but a lot of customers could not, leading to dissatisfied users.

This work also shows that users need more triggers and reminders to wear the device, but these triggers should also be send out at the right time. Wearables are easy to forget because of their unobtrusiveness. Therefore, the software should remind them to use the device. This can for example be done by simply sending push notifications or integrating more

gamification elements in the applications. The triggers and reminders cannot be overwhelming in that sense that the user becomes too aware of the device. A balance should be found between the experienced levels of awareness and comfort related to wearables. How this should be done can be subject of future research.

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