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The Influence of Perceived Health Increase on Activity Tracker Usage

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Abstract

Activity trackers collect a broad range of physical activity data and other health-related data. In this article, we postulate that Perceived Health Increase has a positive influence on activity tracker usage. After collecting 115 completed online questionnaires and applying a structural equation modeling approach, our findings indicate that activity trackers are at least partly hedonic technologies whose usage is influenced by Perceived Enjoyment. Furthermore, Perceived Health Increase has a significant direct positive influence on the Behavioral Intention to Use activity trackers, as well as an indirect positive influence on Behavioral Intention to Use through Perceived Enjoyment. These findings suggest that activity tracker manufacturers need to emphasize the hedonic benefits of their devices as well as promote their devices' capacity for enhancing users' health.

1 Introduction

Wearable devices — i.e., "electronic technologies or computers that are incorporated into items of clothing and accessories which can comfortably be worn on the body" (Tehrani and Andrew 2014) — have gained momentum in the marketplace over the past years. According to IDC (2015), 26.4 million wearable devices were shipped in 2014 and IDC predicts that by 2019 this number will have grown to 155.7 million per year. Moreover, forecasts predict that the revenues of wearable devices will exceed 9 billion Euros in 2018 in Europe alone (Statista 2015). Wearable devices come in a variety of forms, from earpieces and watches to belts, glasses and clothes (Poslad 2009). This diversity of products means that wearable devices have a wide range of applications, and they have already been introduced to the fields of health and medicine, fitness, sports and business (PwC 2014).

One of the most popular forms of wearable devices are activity trackers. They are usually worn on the wrist and provide users with several functions for tracking physical activity data and health-related data such as heartbeat, steps taken, and number of hours of sleep (Miller 2015). However, the factors that drive peoples' activity tracker usage are largely unknown.

Whereas research has often studied the potential negative health consequences of technology usage such as the development of illnesses through radiation (e.g., Burgess 2002; Myung et al. 2009;

Seigneur et al. 2010; World Health Organization 2013), activity trackers might actually exert a positive influence on individuals' health by enabling users to achieve a healthier lifestyle (cf. Miller 2015). For example, activity trackers can motivate users to exercise more (e.g., Seiler and Hüttermann 2015). Also, by providing users with the possibility of monitoring health-related metrics, activity trackers enable users to notice potential irregularities and thus to take specific timely measures to counter these irregularities.

One important driver of activity tracker usage might hence be Perceived Health Increase, which we describe as the degree to which a person believes that a certain behavior — which, in this case, is 'using an activity tracker' — has positive consequences on his/her health.

After collecting 115 complete online questionnaires about one specific activity tracker, GoBe, and applying a structural equation modeling approach, our findings indicate that activity trackers are at least partly hedonic technologies whose usage is influenced by Perceived Enjoyment. Furthermore, Perceived Health Increase had a significant direct positive influence on Behavioral Intention to Use as well as an indirect positive influence on Behavioral Intention to Use through Perceived Enjoyment. These findings suggest that activity tracker manufacturers need to emphasize the hedonic benefits of their devices as well as promote the device's capacity for enhancing users' health.

In the next section, we will present background information on activity trackers, introduce Perceived Enjoyment as an influence factor of hedonic technologies, and also present the theoretical foundations of Perceived Health Increase. Following this, we will present our research model and research design. We will then reveal and discuss our results before summarizing our findings, presenting their theoretical and practical implications, and provide an outlook on further research.

2 Theoretical Background

2.1 Activity Trackers

Activity trackers are devices that are typically worn on the body (for example, wristbands), or are attached to shoes, clothes, or other wearable accessories. They usually contain multiple sensors (for example, accelerometers and gyroscopic sensors) that allow them to track physical activity data and health-related data such as heartbeat, steps taken, and number of hours of sleep. The analyses functions of this data are usually done on separate, more powerful devices such as smartphones or PCs (Barcena et al. 2014; Miller 2015).

Some studies have already studied factors that drive the usage of different kinds of wearable devices (e.g., Ariyatum et al. 2005; Bodine and Gemperle 2003). For example, Bodine and Gemperle (2003) confirmed in the contexts of smart armbands and backpacks that usefulness and comfort are important positive influence factors of wearable device usage. Moreover, the study of Ariyatum et al. (2005) suggests that usefulness, physical appearance, and lifestyle-fit are key factors for smart clothes usage. However, the factors that drive peoples' activity tracker usage are largely unknown. Indeed, to the best of our knowledge, there is only one article by Seiler and Hüttermann (2015) that has investigated the factors driving activity tracker usage. This empirical study suggests that product design, product quality and the ability to measure one's heart rate are important drivers of activity tracker usage (Seiler and Hüttermann 2015).

2.2 The Role of Perceived Enjoyment on Activity Tracker Usage

Overall, the research suggests that activity trackers are at least partly hedonic technologies that "aim to provide self-fulfilling value to the user, ... [which] is a function of the degree to which the user experiences fun when using the system" (Van der Heijden 2004, p. 696): Seiler and Hüttermann's (2015) findings indicate that activity tracker usage positively influences the practice of sports and exercise. Sports and exercise are often seen as leisure activities and are generally accepted to provide people with hedonic benefits such as enjoyment, fun, etc. (e.g., Côté and Hay 2002; MacPhail et al. 2003; Nielsen et al. 2014; Thedin Jakobsson 2014; Vlachopoulos et al. 2000). In line with the findings of Seiler and Hüttermann (2015), it is highly probable that activity tracker usage is associated with these hedonic contexts.

Moreover, activity trackers regularly use gamification, i.e., "*the use of game design elements in non-game contexts* [emphasis in original]" (Deterding et al. 2011, p. 2), which further contributes to the hedonic value of activity trackers. More specifically, activity trackers such as the Nike+ FuelBand (cf. Nike 2015) let users earn points and be rewarded with badges for their exercise achievements (cf. Hamari et al. 2014). In addition, users can compare their performances with the performances of others, e.g., their friends, and even compete with them for the best ranking in leaderboards. Multiple studies from a variety of contexts suggest that the use of gamification provides users with fun and enjoyment (e.g., Fitz-Walter et al. 2011), further emphasizing the hedonic aspects of activity trackers.

Various studies in multiple contexts have confirmed that Perceived Enjoyment — "the extent to which the activity of using a specific system is perceived to be enjoyable in its own right, aside from any performance consequences resulting from system use" (Venkatesh 2000, p. 351) — is a central antecedent of hedonic technologies' usage (e.g., Van der Heijden 2004). By applying these findings to our context, a person can be expected to use activity trackers if he/she believes that they fulfill his/her expectations with regards to enjoyment.

2.3 Perceived Health Increase

Perceived Health Increase, which we describe as the degree to which a person believes that a certain behavior has positive consequences on his/her health, might be another factor driving activity tracker usage:

As described above, research suggests that activity tracker usage has a positive effect on sports and exercise regularity, performance improvement, and training efficiency (e.g., Seiler and Hüttermann 2015). Sports and exercise can have a positive influence on both the objective health of individuals as well as on individuals' self-rating of their health (e.g., Lamb et al. 1990). Moreover, activity trackers provide users with the possibility of collecting, monitoring and storing physical activity data and health-related data on the devices themselves, on connected devices such as smartphones, as well as in the cloud (Barcena et al. 2014). As a result, activity trackers enable users to notice potential irregularities and thus to take timely countermeasures.

The Health Belief Model (e.g., Janz and Becker 1984; Turner et al. 2004) is one of the most widely used and accepted theories in health research. It postulates that the perceived benefits of a preventive action, i.e., the belief that an action will have a positive influence on his/her health, influences a person's likelihood of doing this action. In other words, if a person believes that a specific behavior is able to improve his/her current health status, the person is likely to engage in

that behavior. As a result, a person can be expected to use activity trackers if he/she believes that they increase his/her health.

Additionally, health perception is positively linked to hedonic well-being (cf. Lamb et al. 1990), represented by the presence of positive hedonic feelings such as enjoyment, happiness, and pleasure. For example, a person who feels ill will experience less positive hedonic feelings than someone who feels perfectly fine and healthy. In this sense, Perceived Health Increase can also be expected to cause positive feelings, i.e., to positively influence an individual's Perceived Enjoyment.

3 Research Model

In the following section, we will present our research model in Figure 1 and then outline our corresponding hypotheses.

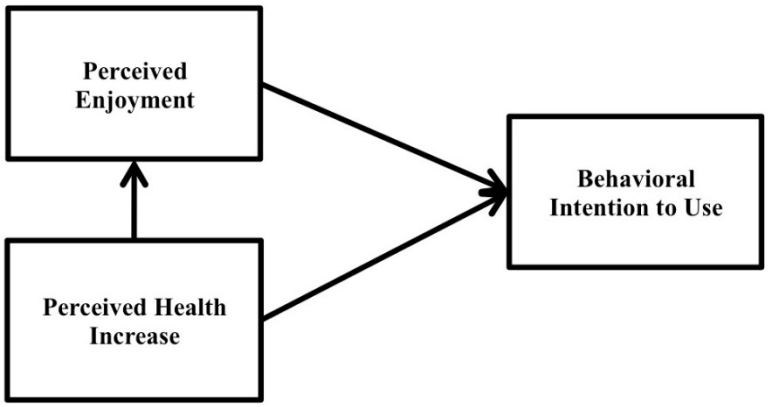

Figure 1: Research Model

As described earlier, activity trackers are at least partly hedonic technologies that provide positive feelings and experiences for their users in the form of Perceived Enjoyment (Van der Heijden 2004). Perceived Enjoyment has been shown to be an important antecedent of hedonic technologies' usage (e.g., Ernst et al. 2013; Van der Heijden 2004). We hypothesize that:

There is a positive influence of Perceived Enjoyment on the Behavioral Intention to Use[1] *activity trackers (**H1**).*

The Theory of Reasoned Action (Fishbein and Ajzen 1975) postulates that an individual's behavior is influenced by his/her particular beliefs concerning the behavior's consequences. In line with this, the Health Belief Model (e.g., Janz and Becker 1984; Turner et al. 2004) postulates that if a person believes that a specific behavior is able to improve his/her current health status, the person is likely to engage in that behavior. By applying these theories to our context, a person can be expected to use activity trackers if he/she believes that they increase his/her health. We hypothesize that:

[1] Since at the time of this study (June 2015), the activity tracker under study, GoBe, was not yet available to the public in Germany, we only included Behavioral Intention to Use, and not Actual System Use, into our research model. Behavioral Intention to Use is a commonly accepted mediator between people's beliefs and their actual behavior. It "capture[s] the motivational factors that influence a [person's] behavior; they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior" (Ajzen 1991, p. 181).

*There is a positive influence of Perceived Health Increase on the Behavioral Intention to Use activity trackers (**H2**).*

Moreover, health perception is positively linked to the presence of hedonic feelings (cf. Lamb et al. 1990). Perceived Enjoyment reflects the hedonic feelings experienced when using technology, such as fun, enjoyment and other positive experiences and feelings (Brief and Aldag 1977; Van der Heijden 2004; Venkatesh et al. 2012). In this sense, Perceived Health Increase can be expected to positively influence an individual's Perceived Enjoyment. We hypothesize that:

*There is a positive influence of Perceived Health Increase on the Perceived Enjoyment of using activity trackers (**H3**).*

4 Research Design

4.1 Data Collection

To empirically evaluate our research model, we collected 115 completed German-language online questionnaires about one specific activity tracker, GoBe, between May 22 and June 3, 2015, by posting the link to the questionnaire in multiple Facebook groups and message boards as well as on two authors' Facebook pages. At the beginning of the questionnaire, we gave a short description of GoBe, including official images and an explanation of its general functionalities. GoBe, which was not yet available in Germany at the time of the survey, promised users it could track multiple activity-related data and health-related data such as heart rate, blood pressure, stress level, hours of sleep, calorie intake and calories burned (Rubin et al. 2015).

53 of our respondents were male (46.09 percent) and 62 were female (53.91 percent). The average age was 25.93 years (standard deviation: 5.18). 5 respondents were apprentices (4.3 percent), 34 were currently employed (29.6 percent), 70 were students (60.9 percent), and 6 selected "other" as a description of themselves (5.2 percent).

4.2 Measurement

We used existing reflective scales in order to measure the Behavioral Intention to Use the activity tracker and its Perceived Enjoyment. For Perceived Health Increase, we adapted the prominent Health Outlook scale by Ware (1976). For example, whereas the original scale used items such as "In the near future, I expect to have better health than other people I know", we measured Perceived Health Increase by using items such as "In the near future, I expect to have better health if I use GoBe". Table 1 presents the resulting reflective items with their corresponding sources. All items were measured using a seven-point Likert-type scale ranging from "strongly agree" to "strongly disagree".

Construct	Items (Labels)	Source/Adapted from
Behavioral Intention to Use	I intend to use GoBe in the next 6 months (BI1)	Hu et al. (2011) Venkatesh, et al. (2003)
	In the future, I am very likely to use GoBe (BI2)	
	I predict that I will use GoBe in the next 6 months (BI3)	
Perceived Enjoyment	Using GoBe would be exciting (PE1)	Davis et al. (1992)
	Using GoBe would be enjoyable (PE2)	
	Using GoBe would be fun (PE3)	
Perceived Health Increase	In the near future, I expect to have better health if I use GoBe (PHI1)	cf. Ware (1976)
	By using GoBe, I expect my life to be healthier (PHI2)	
	If I use GoBe, I think my health will be better in the future than it is now (PHI3)	

Table 1: Items of our Measurement Model

5 Results

We used the Partial-Least-Squares approach via SmartPLS 3.2.0 (Ringle et al. 2015). With 115 datasets, we met the suggested minimum sample size threshold of "ten times the largest number of structural paths directed at a particular latent construct in the structural model" (Hair et al. 2011, p. 144). To test for significance, we used the integrated Bootstrap routine with 5,000 samples (Hair et al. 2011).

In the following section, we will evaluate our measurement model. Indeed, we will examine the indicator reliability, the construct reliability, and the discriminant validity of our reflective constructs. Finally, we will present the results of our structural model.

5.1 Measurement Model

Tables 2 and 3 present the correlations between constructs along with the Average Variance Extracted (AVE) and Composite Reliability (CR), and our reflective items' factor loadings, respectively: All items loaded high (.784 or more) and significant ($p<.001$) on their parent factor and, hence, met the suggested threshold of indicator reliability of .70 (Hair et al. 2011); AVE and CR were higher than .76 and .90, respectively, meeting the suggested construct reliability thresholds of .50/.70 (Hair et al. 2009). The loadings from our reflective indicators were highest for each parent factor and the square root of the AVE of each construct was larger than the absolute value of the construct's correlations with its counterparts, thus indicating discriminant validity (Fornell and Larcker 1981; Hair et al. 2011).

	BI	PE	PHI
Behavioral Intention to Use (BI)	.936 (.978)		
Perceived Enjoyment (PE)	.536	.766 (.907)	
Perceived Health Increase (PHI)	.518	.556	.883 (.958)

Table 2: Correlations between Constructs [AVE (CR) on the Diagonal]

	BI	PE	PHI
BI1	.966 (122.486)	.491	.506
BI2	.967 (89.517)	.553	.515
BI3	.969 (146.062)	.509	.483
PE1	.373	.784 (15.702)	.332
PE2	.487	.925 (45.375)	.464
PE3	.524	.909 (26.795)	.611
PHI1	.508	.558	.941 (72.057)
PHI2	.485	.529	.964 (125.623)
PHI3	.465	.475	.913 (34.124)

Table 3: Reflective Items' Loadings (T-Values)

5.2 Structural Model

Figure 2 presents the path coefficients of the previously hypothesized relationships as well as the R^2s of both endogenous variables (** = p<.01; *** = p<.001). Perceived Enjoyment was found to have a significant positive influence on Behavioral Intention to Use (β=.359, p<.001), confirming hypothesis 1. Also, Perceived Health Increase was found to have a positive influence on both Behavioral Intention to Use (β=.319, p<.01) and Perceived Enjoyment (β=.556, p<.001), confirming hypotheses 2 and 3, respectively.

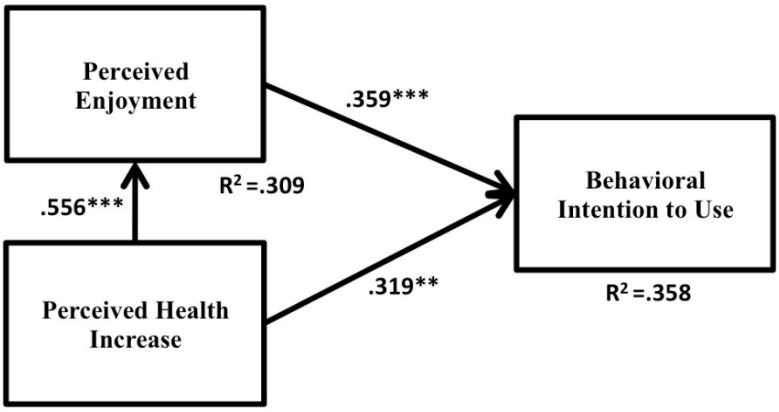

Figure 2: Findings

Our research model included two predecessors of Behavioral Intention to Use (Perceived Enjoyment and Perceived Health Increase), and one predecessor of Perceived Enjoyment (Perceived Health Increase). By taking this into account, the explanatory power of our structural model is good, since it explains 35.8 percent of the variances of Behavioral Intention to Use as well as 30.9 percent of the variances of Perceived Enjoyment.

6 Conclusions

In this article, we evaluated the potential influence of Perceived Health Increase on activity tracker usage. After collecting 115 complete online questionnaires and applying a structural equation modeling approach, our findings indicate that activity trackers are at least partly hedonic

technologies whose usage is influenced by Perceived Enjoyment. Furthermore, Perceived Health Increase had a significant direct positive influence on the Behavioral Intention to Use the activity tracker as well as an indirect positive influence on the Behavioral Intention to Use it through Perceived Enjoyment.

Our findings have important practical implications. Indeed, they suggest that activity tracker manufacturers should heavily promote the hedonic benefits as well as the health functions of their devices. For example, they could collaborate with respected medical experts or ask well-known, health-oriented athletes to provide testimonials about their activity trackers and to use the devices during their sports activities, in order to convince people that their health will be positively affected. Also, they could include everyday people in their advertisements who would provide short stories about their device usage such as how much fun they had using the activity tracker and how the device positively influenced their health.

Our study has some limitations. First, our empirical findings are based on only one specific activity tracker: GoBe. Therefore, the results found for this particular activity tracker might be very different from studies that use other activity trackers. Additionally, GoBe was not yet available to the public in Germany at the time of this study (June 2015). Hence, our respondents did not have any hands-on experience with the device and could only state their guesses based on our product description as well as on information they might have gathered on their own. Moreover, since we only surveyed German-speaking people, our results might not hold true for non-German speaking people. Also, our sample individuals were relatively young (mean: 25.93 years; standard deviation: 5.18). Hence, differences might be found for other age groups. More specifically, the influence of Perceived Health Increase on the Behavioral Intention to Use activity trackers might be even higher for older people, who suffer more often from illnesses than young people do. Finally, our survey was only conducted online and, hence, excluded people that do not use the Internet (which might also explain the lack of older people in our sample).

As a next step, we plan to expand our research and address its limitations. More specifically, we want to rollout our survey to a greater number of countries around the world, focusing on different age groups, on different activity trackers that are currently on the market, as well as on smartwatches (which regularly incorporate the functionalities of activity trackers but also provide additional functionalities), in order to evaluate the potential differences between age groups, countries and devices. In addition, we plan to identify and empirically evaluate additional influence factors of activity tracker and smartwatch usage. More specifically, multiple activity trackers and smartwatches heavily rely on an accompanying smartphone in order to visualize their health data or to function at all. For example, the Apple Watch needs an iPhone in order to provide most of its functionality (cf. Apple 2015). In such cases, where the activity tracker/smartphone is built by the same company as the specific required smartphone, we believe that previous positive or negative experiences with the smartphone, as well as experiences with the brands behind both devices in general, will have an influence on the usage of activity trackers and smartwatches. Hence, we plan to evaluate the potential influences of Past Complementary Product Experience as well as Past Brand Experience on activity tracker and smartwatch usage in a subsequent study.

7 References

Ajzen I (1991) The Theory of Planned Behavior. Organizational Behavior and Human Decision Processes 50 (2):179-211

Apple (2015) Watch. http://www.apple.com/watch. Accessed 2015-09-08

Ariyatum B, Holland R, Harrison D, Kazi T (2005) The Future Design Direction of Smart Clothing Development. Journal of the Textile Institute 96 (4):199-210

Barcena MB, Wueest C, Lau H (2014) How Safe Is Your Quantified Self? Symantec White Paper

Bodine K, Gemperle F (2003) Effects of Functionality of Perceived Comfort of Wearables. In: IEEE International Symposium on Wearable Computers 2003 Proceedings

Brief AP, Aldag RJ (1977) The Intrinsic-Extrinsic Dichotomy: Toward Conceptual Clarity. Academy of Management Review 2 (3):496-500

Burgess A (2002) Comparing National Responses to Perceived Health Risks From Mobile Phone Masts. Health, Risk & Society 4 (2):175-188

Côté J, Hay J (2002) Children's Involvement in Sport: A Development Perspective. In: Silva J, Stevens D (eds.) Psychological Foundations of Sport. Allyn & Bacon, Boston, MA, pp 484-502

Davis FD, Bagozzi RP, Warshaw PR (1992) Extrinsic and Intrinsic Motivation to Use Computers in the Workplace. Journal of Applied Social Psychology 22 (14):1111-1132

Deterding S, Dixon D, Khaled R, Nacke L (2011) From Game Design Elements to Gamefulness: Defining "Gamification". In: International Academic MindTrek Conference 2011 Proceedings

Ernst C-PH, Pfeiffer J, Rothlauf F (2013) Hedonic and Utilitarian Motivations of Social Network Site Adoption. Johannes Gutenberg University Mainz, Working Paper

Fishbein M, Ajzen I (1975) Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research. Addison-Wesley, Reading, MA

Fitz-Walter Z, Tjondronegoro DW, Wyeth P (2011) Orientation Passport: Using Gamification to Engage University Students. In: OZCHI 2011 Proceedings

Fornell C, Larcker DF (1981) Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. Journal of Marketing Research 18 (1):39-50

Hair JF, Black WC, Babin BJ, Anderson RE (2009) Multivariate Data Analysis. 7th edn. Prentice Hall, Upper Saddle River, NJ

Hair JF, Ringle CM, Sarstedt M (2011) PLS-SEM: Indeed a Silver Bullet. Journal of Marketing Theory and Practice 19 (2), 139-152

Hamari J, Koivisto J, Sarsa H (2014) Does Gamification Work? — A Literature Review of Empirical Studies on Gamification. In: HICSS 2014 Proceedings

Hu T, Poston RS, Kettinger WJ (2011) Nonadopters of Online Social Network Services: Is It Easy to Have Fun Yet? Communications of the Association for Information Systems 29 (1):441-458

IDC (2015) Worldwide Wearables Market Forecast to Grow 173.3% in 2015 With 72.1 Million Units to Be Shipped, According to IDC. http://www.idc.com/getdoc.jsp?containerId=prUS 25696715. Accessed 2015-05-22

Janz NK, Becker MH (1984) The Health Belief Model: A Decade Later. Health Education & Behavior 11 (1):1-47

Lamb KL, Roberts K, Brodie DA (1990) Self-Perceived Health Among Sports Participants and Non-Sports Participants. Social Science & Medicine 31 (9):963-969

MacPhail A, Gorely T, Kirk D (2003) Young People's Socialisation into Sport: A Case Study of an Athletics Club. Sport, Education and Society 8 (2):251-267

Miller M (2015) The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities are Changing the World. Que, Indianapolis, IN

Myung S-K, Ju W, McDonnell DD, Lee YJ, Kazinets G, Cheng CT, Moskowitz JM (2009) Mobile Phone Use and Risk of Tumors: A Meta-Analysis. Journal of Clinical Oncology 27 (33):5565-5572

Nielsen G, Wikman JM, Jensen CJ, Schmidt JF, Gliemann L, Andersen TR (2014) Health Promotion: The Impact of Beliefs of Health Benefits, Social Relations and Enjoyment on Exercise Continuation. Scandinavian Journal of Medicine & Science in Sports 24 (1):66-75

Nike (2015) Explore the Power of NikeFuel. http://www.nike.com/us/en_us/c/nikeplus/nikefuel. Accessed 2015-09-08

Poslad S (2009) Ubiquitous Computing: Smart Devices Environments and Interactions. Wiley, Chichester, UK

PwC (2014) Health Wearables: Early Days. White Paper

Ringle CM, Wende S, Becker J-M (2015) SmartPLS 3. http://www.smartpls.com

Rubin MS, Sokolov YL, Misyuchenko IL (2015) The History and Technology Behind Healbe GoBe. Healbe White Paper

Seigneur J-M, Xavier T, Tewfiq M (2010) Mobile/Wearable Device Electrosmog Reduction Through Careful Network Selection. In: AHIC 2010 Proceedings, Paper 21

Seiler R, Hüttermann M (2015) E-Health, Fitness Trackers and Wearables - Use Among Swiss Students. In: Advances in Business-Related Scientific Research Conference 2015 Proceedings

Statista (2015) Prognose zum Umsatz mit Wearable Technology in Europa von 2013 bis 2018 (in Milliarden Euro). http://de.statista.com/statistik/daten/studie/322222/umfrage/prognose-zum-umsatz-mit-wearable-computing-geraeten-in-europa. Accessed 2015-06-29

Tehrani K, Andrew M (2014) Wearable Technology and Wearable Devices: Everything You Need to Know. http://www.wearabledevices.com/what-is-a-wearable-device. Accessed 2015-06-29

Thedin Jakobsson B (2014) What Makes Teenagers Continue? A Salutogenic Approach to Understanding Youth Participation in Swedish Club Sports. Physical Education and Sport Pedagogy 19 (3):239-252

Turner LW, Hunt SB, DiBrezzo R, Jones C (2004) Design and Implementation of an Osteoporosis Prevention Program Using the Health Belief Model. American Journal of Health Studies 19 (2):115-122

Van der Heijden H (2004) User Acceptance of Hedonic Information Systems. MIS Quarterly 28 (4):695-704

Venkatesh V (2000) Determinants of Perceived Ease of Use: Integrating Control, Intrinsic Motivation, and Emotion into the Technology Acceptance Model. Information Systems Research 11 (4):342-365

Venkatesh V, Morris MG, Davis GB, Davis FD (2003) User Acceptance of Information Technology: Toward a Unified View. MIS Quarterly 27 (3):425-478

Venkatesh V, Thong JYL, Xu X (2012) Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. MIS Quarterly 36 (1):157-178

Vlachopoulos SP, Karageorghis CI, Terry PC (2000) Motivation Profiles in Sport: A Self-Determination Theory Perspective. Research Quarterly for Exercise and Sport 71 (4):387-397

Ware JE (1976) Scales for Measuring General Health Perceptions. Health Services Research 11 (4):396-415

World Health Organization (2013) Non-Ionizing Radiation, Part 2: Radiofrequency Electromagnetic Fields. IARC Working Group White Paper