

ATLAS INTERNATIONAL REFEREED JOURNAL ON SOCIAL SCIENCES

Open Access Refereed E-Journal & Refereed & Indexed

ISSN:2619-936X



Vol:5, Issue:22

2019

pp.759-764

Article Arrival Date: 25.07.2019

Published Date: 29.09.2019

THE IMPORTANCE OF WEARABLE TECHNOLOGY IN HEALTHCARE

SAĞLIKTA GİYİM TEKNOLOJİSİNİN ÖNEMİ

Assoc. Prof. Nevin AYDIN

Artvin Çoruh University, Faculty of Economics and Administrative Sciences, Artvin/Turkey

Doi Number : <http://dx.doi.org/10.31568/atlas.356>

Article Type : Research Article



ABSTRACT

Many of the wearable devices such as smartwatch, smartphone and smart clothes have advantages in our everyday lives. For example, smartphones are carried everywhere 24 hours a day. The large screens of smartphones became very helpful in accomplishing many useful and interesting tasks. A limited number of sensors and the location of some of these sensors can restrict the functionality of smartphones. Wearable health devices can help control the health conditions of people. It can serve as a guide for early diagnosis of a disease or the follow-up after a treatment. The revolution in electronic device technology makes it possible to design more reliable and adaptable wearable devices for health monitoring around the world. Wearable health devices measure the following parameters: heart rate, blood pressure, respiratory rate, blood oxygen saturation, blood sugar, skin sweating, capnography, body temperature, motion evaluation. In this study, the importance of wearable technologies in healthcare, the current and future of these technologies will be discussed.

Keywords: Wearable health devices, wearable systems, sensors

ÖZET

Akıllı saat, akıllı telefon ve akıllı kıyafetler gibi giyilebilir cihazların birçoğunun günlük yaşamımızda avantajları vardır. Örneğin, akıllı telefonlar günün 24 saati her yere taşınır. Akıllı telefonların geniş ekranları birçok yararlı ve ilginç görevi yerine getirmede çok yardımcı oldu. Sınırlı sayıda sensör ve bu sensörlerden bazılarının konumu akıllı telefonların işlevselliğini kısıtlayabilir. Giyilebilir sağlık cihazları, insanların sağlık koşullarının kontrolüne yardımcı olabilir. Bir hastalığın erken teşhisi veya tedaviden sonraki takip için bir rehber olabilir. Elektronik cihaz teknolojisindeki devrim, tüm dünyada sağlığı izlemek için daha güvenilir ve uyarlanabilir giyilebilir cihazlar tasarlamayı mümkün kılmaktadır. Giyilebilir sağlık cihazları aşağıdaki parametreleri ölçer: kalp atış hızı, kan basıncı, solunum hızı, kan oksijen saturasyonu, kan şekeri, cilt terlemesi, kapnografi, vücut ısı, hareket değerlendirme. Bu çalışmada sağlık hizmetlerinde giyilebilir teknolojilerin önemi, bu teknolojilerin bugünü ve geleceği ele alınacaktır.

Anakhtar kelimeler: Giyilebilir sağlık cihazları, giyilebilir sistemler, sensörler

1. INTRODUCTION

Wearable health devices are reasonably new technology which allows monitoring of our body metrics in our daily lives such as heart rate, the number of steps we made, etc or more diligent monitoring of an illness that we have to live with such as checking blood sugar levels for diabetes patients. Information and communication technology (ICT) plays an important role in our society. Digitalization is essentially affecting many domains such as social environments, social networks, and so on. Due to the recent improvements of the healthcare related technologies, the lifestyles of the individuals have changed for the better (Birkler and Dahl, 2014). The advances in digital revolution allows individuals to protect their information regarding their health. It is important to point out that we will need multidisciplinary solutions

for digital health including disciplines such as clinical medicine, computer science, public health, etc (Kostkova, 2015). While many people may think that the wearable devices are designed for adults, these devices can be used for children as well (Lupton, 2016). While there are numerous benefits of wearable technologies, there can be few issues and concerns regarding the reliability, safety and security of using wearables in healthcare domain. The researchers from various disciplines need to pay close attention to the potential impact these wearables will have in healthcare in the coming years (Piwek, 2016).

In the rest of the article, we discuss the effects of wearable technologies, the worldwide market of wearables and world's biggest wearable technology buyers.

2. THE EFFECTS OF WEARABLE TECHNOLOGIES

The consumer wearable can measure many personal healthcare parameters such as heart rate, stress, physical activity or sleep patterns, and so on as shown in Figure 1. These measurements are collected through sensors embedded in the wearable devices. Since the size of the wearables are reasonably small, the individuals wear them easily and these days, they come in various styles. The top 5 benefits the individuals come to expect from their wearables include accuracy, value for money, durability, compact, and long-term user engagement (Eberhard, n.d.).

Currently, the wearables are mostly bought and worn by the individuals with health lifestyles. Many of the major wearable manufactures such as Nike, Jawbone and Fitbit advertise their devices as a “must-have” to further improve the physical performance at any age with an appropriate use. The devices are programmed in a such way that it encourages the individual to continue exercising and provide virtual rewards for completing certain set of activities in a given day, a week or a month. Family and friends can be connected socially through these devices sharing their accomplishments in which further encourages each other to continue utilizing these devices (Piwek, 2016). Some of the wearable users are looking for self-discovery through personal analytics, called Quantified Self (QS) movement (Swan, 2009). The current empirical data is not quite conclusive that wearable devices single handedly improve the health lifestyles of the individuals or improve individuals' behavior. More research studies are needed to make more conclusive findings.



Figure 1. Wearable devices: benefits, features, and measurements (Eberhard, n.d.).

The expectation is that with the development of wearables in healthcare domain, many interesting opportunities in health services will be provided to the individuals (Wu et al., 2016).

3. THE WORLDWIDE MARKET FOR WEARABLE TECHNOLOGIES

Figure 2 presents the top 5 wearable companies worldwide where Apple remained the leader among the top 5. Apple reported that the wearables market has increased 31% in the last quarter of 2018. The company report states that out of 16 million wearables shipped, 10 million of them were Apple watches. The smartwatches grew in numbers for the other major vendors as the smartwatches took almost 30% of all wearables. IDC expects that Apple's growth in wearables will continue due to Apple Watch Series 4. Xiaomi took the second place with a 12.6% market share compared with Apple's 27.4% thanks to the sales of its Mi Band 3. Huawei came third although it grew by 248.5% due to Huawei and Honor phones combined with wearables and other products. Fitbit and Samsung were placed in the last two slots with similar market shares. Most recently, "ear-worn" category of wearables includes wireless headphones allowing users to make a call. Apple's AirPods, Google's Pixel Buds, and many others are considered in this category. The growth of the wearables is also attributed to these ear-worn wearables (Perez, 2019; Sun, 2018).

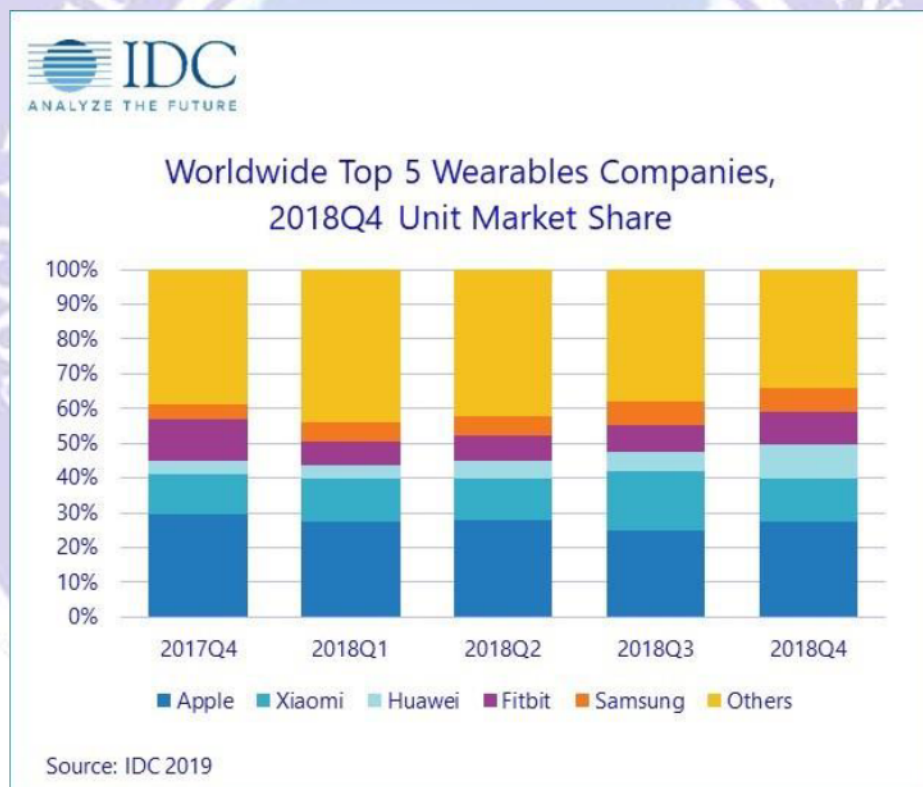


Figure 2. Worldwide wearable market share (Perez, 2019).

4. THE WORLD'S BIGGEST WEARABLE TECHNOLOGY BUYERS?

The use of wearable devices are clearly becoming more popular worldwide. United States, Spain and Turkey are the top three countries in the wearable ownership (see Figure 3). While fitness tracker are the most popular in US, the fitness tracker is the most popular wearable device in Spain. The smartwatches wins among all other wearables in Turkey. It is also interesting to note that the results show men are more likely to own smart watches while fitness trackers are the winners amongst women (Ipsos, 2018).

Who are the world's biggest wearable tech buyers?

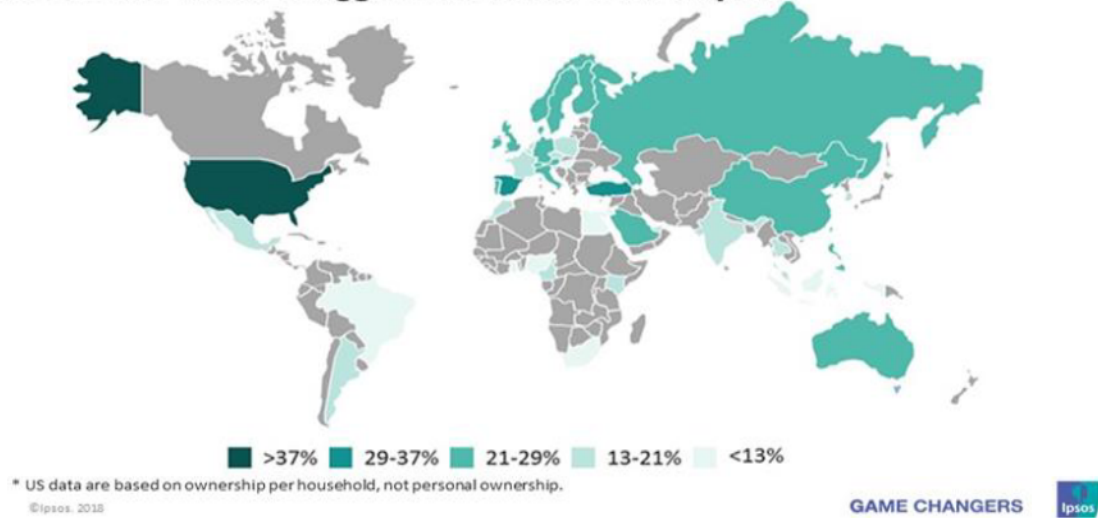


Figure 3. World's biggest wearable tech buyers (Ipsos, 2018).



Figure 4. Wearables battery lifetime (Gershoni et al., n.d.)

The analysis shows that battery life is one of the biggest problems for companies designing and manufacturing wearables (see Figure 4). While more than 40% of wearable consumers show concern for the battery lifetime, only about 10% of products in the market keep the battery life aspect in mind. Basically, the more times per day or per week the individual takes off the wearable device for re-charging purposes, the more likely that they will soon after stop using the devices.

5. WHAT IS NEXT FOR WEARABLE DEVICES?

Wearable technology is expected to grow and include more and more predictive actions based on the specific data gathered from the wearable user. The companies are looking into the user engagement aspect which is one of the top 5 benefits the individuals come to expect from their wearables. The analysis of products in early stage development reveal that leading companies are working on solutions that can test EEG, EMG, stress, emotions, etc (see Figure 5).

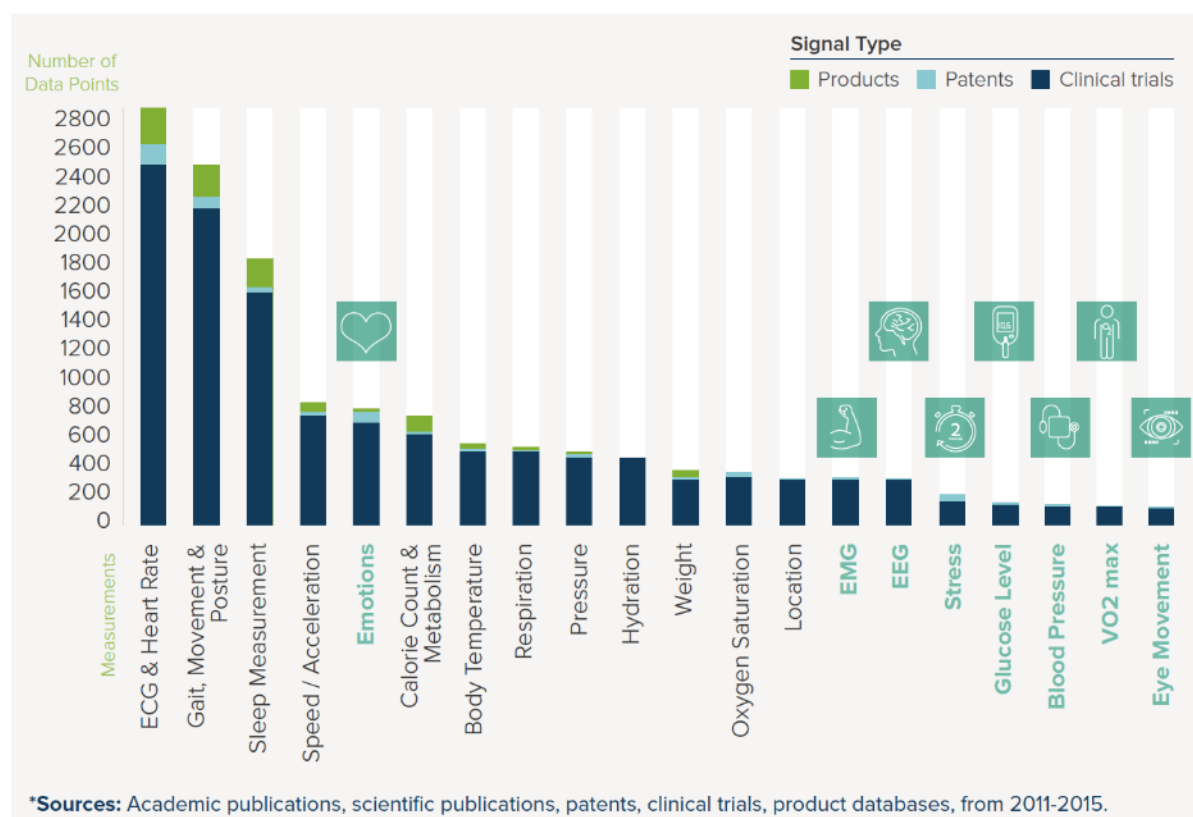


Figure 5. Future of wearables (Gershoni et al., n.d.)

5. CONCLUSIONS

There is no question that wearable devices can provide many benefits towards healthy lifestyle at any age if the individuals see these benefits clearly. The sustained long-term engagement and consumer adoption remained unsolved, the companies are aiming to build products that provide actionable recommendations (Gershoni, n.d.).

REFERENCES

- Birkler, J. and Dahl, M.R. (2014). Den digitala patienten. Liber. 1st edition. Stockholm.
- Ipsos (2018). Who are the World's Biggest Wearable Tech Buyers? <https://www.ipsos.com/it-it/who-are-worlds-biggest-wearable-tech-buyers>
- Eberhard, A.V. (n.d.). Top 5 Benefits Consumers Want In Their Wearable Device, *Signals Analytics*, accessed from: <https://signals-analytics.com/blog/wearable-devices-to-measure-top-5-benefits-consumers-want-0>
- Kostkova, P. (2015). Grand challenges in digital health, *Front Public Health*, 3:134.
- Lupton, D. (2016). The quantified self. John Wiley & Sons.
- Perez, S. (2019). IDC: Apple led wearables market in 2018, with 46.2M of the total 172.2M devices shipped, accessed from: <https://techcrunch.com/2019/03/05/idc-apple-led-wearables-market-in-2018-with-46-2m-of-the-total-172-2m-devices-shipped/>
- Piwek, L., Ellis, D.A., Andrews, S., and Joinson, A. (2016). The rise of consumer health wearables: promises and barriers. *PLoS Medicine*, 13(2): e1001953.
- Sun, L. (2018). Apple dominates the wearables market again: A Foolish Take, accessed from: <https://www.usatoday.com/story/money/markets/2018/09/15/apple-dominates-wearables-market-watch-fitbit/37772497/>

Swan, M. (2009). Emerging patient-driven health care models: an examination of health social networks, consumer personalized medicine and quantified self-tracking, *International journal of environmental research and public health*, 6(2):492–525, pmid:19440396.

Wu, J., Li, H., Cheng, S. and Lin, Z. (2016). The promising future of healthcare services: When big data analytics meets wearable technology. *Information & Management*, 53(8):1020-1033.

Gershoni, K., Tidhar, N., Stone, A., Zuck, A., Sasson, T. (n.d.) The future of wearable technology - human-centered, design thinking, *Signals Analytics*.

