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"WEARABLE TECHNOLOGY INDUSTRY: CHALLENGES AND
OPPORTUNITIES IN THE EUROPEAN MARKET"

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Chapter 1: Introduction & Acknowledgements

1.1 Acknowledgements

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In addition, I would like to thank my family, my boyfriend and friends who have always supported me during this path.

1.2 Reason for research

Wearable technology is a new field of innovation which is under the spotlight in this decade. Technological innovation is advancing at an unexpected pace and this encourages divisions and hi-tech companies to develop new devices which can transform our life.

Smartwatches, activity trackers, augmented reality devices, smart textile are entering in the mass market and these new technologies attract different targets of customers but especially Millennials generation. What is lacking in these hi-tech devices is the attention for design and style which is hidden by their functionalities.

The aim of this research is to sift through this industry and understand its connection with fashion. In fact, many brands have understood the importance of the aesthetic part in attracting a wider range of customers. Through win-win partnerships, these devices are transformed in fashion devices in which sophistication and class are recognizable.

The choice to analyze and to describe as much as possible the European market is due to the fact that most of fashion houses were founded in Europe where style and prestige in fashion are unique. In addition, in Europe, wearable technology still registers a flimsy growth due to the misinformation thus, it has the potentiality to be a fertile field where this kind of innovation can succeed. These devices have countless applications in different sectors and in the next future, their usage will become a natural part of daily routine.

This industry is evolving day by day and advancements can develop unlimited features which will benefit the entire population.

1.3 Structure of the research

The thesis is organized in six chapters.

The first one refers to the introduction and the structure of the work, and it explains what are the main reasons for this research.

The second chapter describes the overall situation of the fashion industry. The challenges and the opportunities which are characterizing this period and the main projections are introduced in order to have a general picture of the dynamics which are influencing fashion business, especially in Europe. Customers' target has changed and their needs represent the main purpose to achieve for companies which should understand their preferences. The major innovation in last decades is Internet which influences every aspect of an individual's life. Social media are becoming the main tool of communication and fashion is conveyed by its massive usage in several ways.

The third chapter focuses on wearable technology. What is wearable technology and a brief history of the main innovations which have been developed to reach the actual technologies are defined. In addition, it provides a series of data about this new flourishing industry to see what is the impact of this technology and it defines relevant possible functions of these devices. For health and fitness purposes, these devices have been introduced to the mass market but they can be exploited as means of communication in educational environment or as tool to improve home management.

In the fourth chapter, the relationship between fashion and technology companies is analyzed. The motivations which encourage companies of different industries to work together in a common project are investigated. Then, the chapter looks also to the opportunities and potential problems which the companies will face and the perceptions of customers about these new technologies.

The fifth chapter takes into consideration some examples of these devices in order to examine what is offering the market and what are the big players in this industry.

The last chapter includes conclusion, bibliography and webgraphy of all sources used.

This research can be defined as an insight of this new technological industry which has relevant potentialities to improve welfare and technological advancements of human beings.

Chapter 2: The current situation of the fashion industry, target customers and the digital revolution

According to Steel and Major (2013), fashion is “the style of clothing and accessories worn at any given time by a group of people.” In the broadest sense, fashion encompasses the systematic changes in style that occur across all cultures which are reflected through individuals clothing and accessories. These changes are revealed in individual appearances and other various forms of expression. Since mankind exists, many scholars have sought to understand the essence of fashion and its connection with the society, feelings and media of expressions. About 2000 years ago, Roman philosopher and statesman Seneca began this line of study by analyzing the tangled relationship between fashion and emotions. He concluded from his observations that humans live not according to reason but according to fashion. He also observed that fashion is not only about functionality but also about impulses and desires. Therefore, people dress not only because they need to but also because they want to. Fashion is the *fil rouge* between the past and the future. In fact, brands take inspiration from the past. They reshape products, integrating elements of contemporary style.

A crucial aspect of the relationship between fashion and society is technology. Due to the various forms of technological advancements, people have not only changed the way they communicated but they have also changed their ways of living. Surveys have shown that technology largely influences the leisure activities and mindset of the young generation. It has proven to be an indispensable source of human advancement in all spheres of life and people are becoming increasingly connected and dependent on it.

2.1 Fashion market: portrait of the current situation

The fashion world is involved with more than the production of clothing and accessories. Fashion is more than dresses and shirts as Coco Chanel said “Fashion is not something that exists in dresses only. Fashion is in the sky, in the street, fashion has to do with ideas, the way we live, what is happening.” The fashion world is not limited to some sketches but it is inspired by global occurrences. It can represent feelings and statements to report social and political issues around the globe and it constantly evolves in order to adapt to the desires and lifestyle of the people. Fashion deals with more than design and aesthetics. Instead, it is a mean by which didactic themes are conveyed to the masses, which in turn, have a positive effect on human society. It is a necessary tool to give a message, a teaching, a theme on which

people can reflect or simply create an extraordinary experience to live for some hours. The latest Diesel campaign announces “Make love not walls” in opposition to the current atmosphere filled with spreading feelings of hate and separation. The campaign theme focuses on dissuading the people from imbibing the negative beliefs brought on by happening and impending wars, American president Trump’s possible erection of a wall between U.S. and Mexico, the influx of refugees, national emergencies, xenophobia against foreigners and so on. The campaign aims at embracing unity and love in order to create a better future. In the world of today, fashion is one of the most powerful media by which people can demonstrate to the world who they are and who they aspire to be. Emotions, feelings, needs, wants, wishes can be expressed and it portrays new concepts related to the reality and the critical issues around the world. These expressions are rendered more effective using social platforms such as Instagram, Facebook, Pinterest and many more. The world is chaotic and it is constantly in motion and also fashion changed its *modus operandi* adapting to the new timing. One of the recent modifications in the fashion world is the fast fashion and the increase of collections. Collections come not only twice in a year but they have been doubled in order to give a wide range of choices at a lower cost. Fast fashion offers customers the possibility of wearing outfits like those worn by the models on the runway at an affordable price. This new interpretation of fashion is affordable to everyone, giving the chance to ordinary people to become trendsetters, quickly responding to the new habits and lifestyle.

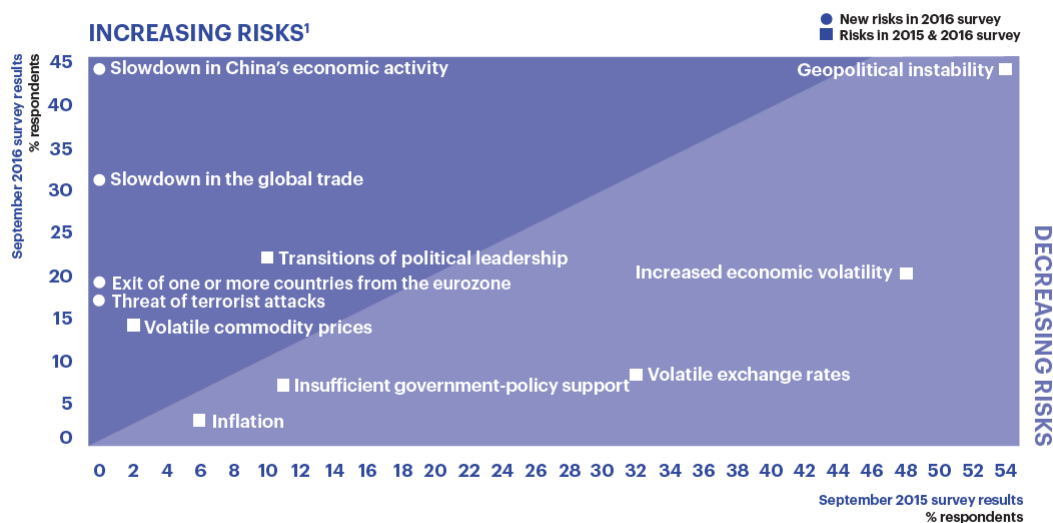
Technology has also played an important role in the implementation of innovations in the fashion world. It acts as a portal through which ideas are exchanged between customers and producers. Also, it is a mean through which people are kept abreast of the latest updates. New fashion styles are appraised through fashion blogs and reviews in order to give more access to customers and respond rapidly to demand with only a click. Thus, this mechanism is giving everyone the chance to become a celebrity and an income earner through his or her posts on social platforms. In turn, this affects the fashion industry in various ways. The major effect lies in the purchase of new fashion releases. Negative reviews lead to a low profit and vice versa. Also, positive recommendations result in a positive public outlook of a fashion brand.

2.1.1 Challenges and obstacles

Fashion is one of the key player in the global economy. If it was a country, it would possess the seventh largest economy in the world for its high GDP. The industry of fashion has transformed over decades for various reasons; some of which include the new markets of emerging countries, distributional channels online and offline and especially the

transformation of consumers' needs. The industry has faced several challenges in the year 2016 as result of issues from different facets such as political, operational, social and cultural matters. Companies, which want to be on the crest of the wave, battle with challenges such as the oversaturation of brands offered on the market, the decreased time available for customers and the fixed salaries connected to higher costs of living. Unfortunately, the situation in the industry has worsened. According to the 67% of a mix of top fashion executives, creatives, investors, and other industry insiders interviewed with the question "how do you think conditions for fashion industry have changed?" (BoF, 2017). 19% believe that the situation became better while 14% thought it has remained the same. This sentiment is supported by a McKinsey's survey carried out among over 1,600 international CEOs with the question "What risks to economic growth will be present in the global economy over the next 12 months?". Various risks have been listed such as economic volatility of prices and exchange rates, inflation, political transactions and support. In addition, destabilizing forces such as terrorism attacks, political issues like Brexit and U.S. elections and economic matters have affected the fashion industry's productivity. For example, the volatility of Chinese stock market has increased the concerns of producers and investors. Fashion industry is dynamic so it is always exposed to the volatility of these events. Furthermore, the fear of terrorism attacks has really affected the frequency of which people travel. As result, the sales and gains of countries like Paris and Milan have dropped due to the reduced number of tourists.

Figure 2.1: Main perceived risks of global economy



¹ The risk matrix represent the % of respondents that voted for a particular risk. The area above the dividing line indicates decreasing risk while the area below indicates increasing risk in September 2016 vs. September 2015.

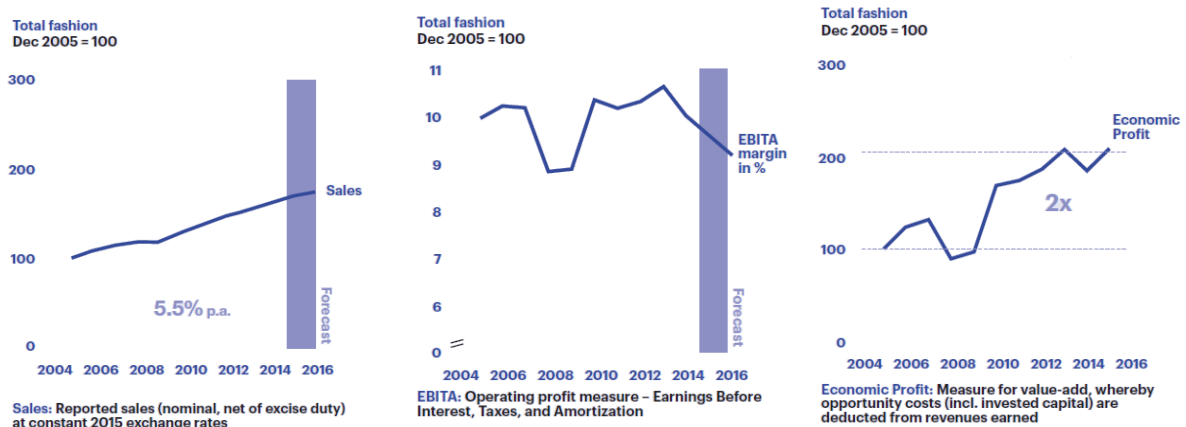
Source: BoF-McKinsey State of Fashion 2017

The figure 2.1 shows that the executives are distressed by slowdown of China and the geopolitical instability. As a result, stringent measures have been taken, brands have decided to close stores and reducing the brand portfolio to cut production costs.

These steps have a domino effect on the security of the industry. All these events intensify the insecurity on the industry, influencing demand and sales. Due to all these, sales growth closed in 2016 at 2-3% with stagnating profit margins. The fall in sales can be regarded as an expected result because the fashion industry was weakened by a massive hit after the financial crisis of 2008 and 2009. Other challenges which hamper the industry’s progress include the competition from online players and the push against the discounting.

The consulting company has formulated an index in order to have a clear picture of the industry, the MGFI (McKinsey Global Fashion Index). The index takes into consideration three main variables: sales, operating profit, and economic profit from the year 2005. It monitors economic profit as “a measure of value creation to determine how much each company had to invest to generate its performance”. These variables are analyzed for six price segments (luxury, affordable luxury, premium/bridge, mid-market, value, and discount) and six product categories (clothing, footwear, athletic wear, bags and luggage, watches and jewelry, and other accessories). The company provides a sales prices index, assigning prices for every category. Through these elements, it is possible to give a benchmark tool for the entire industry to control performances of peer companies and understand the relevant activities to create value.

Figure 2.2-2.3-2.4: Sales, operating profit (EBITA), economic profit of the industry



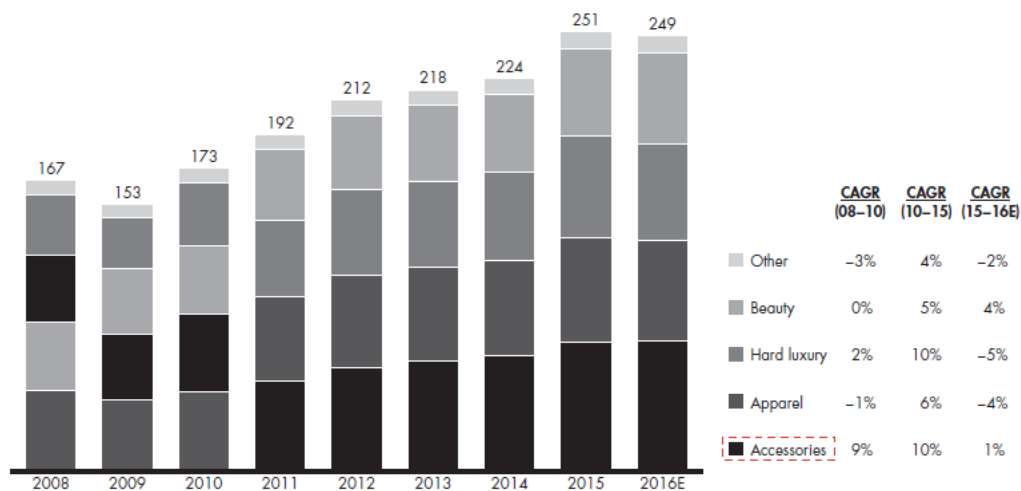
Source: BoF-McKinsey State of Fashion 2017

As the McKinsey Global Fashion Index shows, the last decades arrived with the slowest growth that fashion industry has ever experimented. This contrasts with the growth which it

experienced in the late 20th century; the fashion industry was recorded to have consistently outpaced global GDP growth. Currently, the industry is facing a major slowdown after years of stable growth. It has declined from a 5.0 % growth in 2015 to 2.0–2.5 % growth in 2016. Despite monetary policies of the European Central Bank, investment remains weak and unemployment high, especially for Southern countries like Italy, Greece and Spain. The Eurozone economy is growing at a moderate pace and according to the newspaper “Il Sole 24 Ore”, Europe passed the test in the first half of the 2016. Fashion exports to Europe are increased +2,2% in EU (€9,7 billion) reaching 56% of the total share: the specific share in each country are Germany (+2,7%), France (+2,2%), UK (+3%) and Spain (+4,4%). Italy is in the first row, overcoming France’s sales, gaining €17,3 billion against €17,1 billion of *la ville lumière*. In 2015, the fashion industry growth was about 9,4% with a turnover of € 62,6 billion.

According to the data provided by Bain in the “Luxury goods worldwide market study”, the accessories category has gained a fair share of the market by 2011 with a CAGR of 9-10% in past years. The apparel category has fought to maintain its share but it lost -4% CAGR in 2015/2016 as the figure 2.6 shows.

Figure 2.6: Personal luxury goods market by categories (€B)



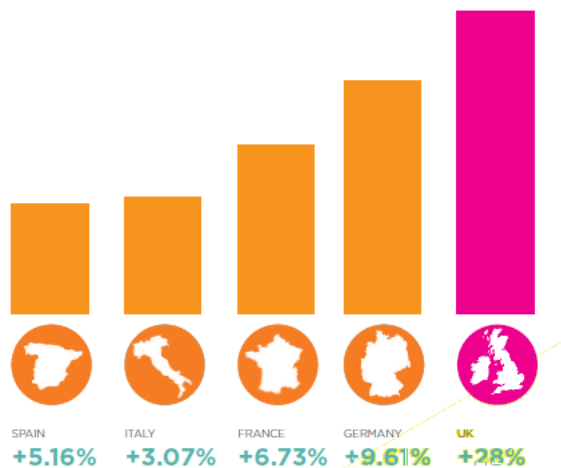
Source: Bain’s luxury goods worldwide market study 2016

According to McKinsey, most of the industry value is captured by a small percentage of players, with the top 20 % creating all sum of total economic profit and the bottom 20% contributing an economic loss of 18 %.

2.1.2 Europe's insight

Even if the hardest years have passed, the recovery is slow and it differs from each country. As the figure 2.5 shows, every European country is trying to push consumers' spending high but it depends on characteristics and situation of countries. UK is growing together with Germany which has a very speed recovery. Tourism and a favorable exchange rate are helping to maintain the rate of growth even if modest. The Brexit consequences will be crucial for the structure of the industry in UK and for the other European countries.

Figure 2.5: Rate of growth of consumer spending on clothing, footwear, and accessories in local currency 2010-2015



Source: Inside Retail 2016

- United Kingdom

UK is a structural hub for luxury in Europe, thanks to its established customer base, its pool of creative talent, and the heritage of many British brands. London is a fashion city, home to one of the four major fashion weeks and with a diversified system across arts, fashion and design. The financial flows in and out of London make it also one of the global capitals of finance, with many wealthy consumers and visitors. Surprisingly, the sector also embodies a significant paradox. Across all company sizes, the British luxury industry stands behind other European countries in number of brands. In fact, the number of brands which have a revenue mark over € 110 million is the smallest between the other countries. France has 55 brands,

Italy has 47, Germany 30, but Britain has only 16. This aspect underlines how UK has huge opportunities to expand their growth, through their solid investments' possibilities.

The date June 23rd, 2016 will be printed in history books because it has signed a new era in the European history; the referendum voted by British people which defined the exit of Great Britain from European Union. Brexit's consequences can damage different aspects. According to The British Fashion Council, the exit can lead to "effectively closing down London Fashion Week as a platform to promote British businesses, meaning if designers or companies had to register and show their designs in the EU first to benefit from its intellectual property protections, this could make London Fashion Week an uncompetitive option"¹. The main hope is that a free trade agreement with the EU will be defined, in order to maintain the free movement of fabrics, textiles and finished garments between the UK and Europe, and let the establishment of rules unchanged. UK's clothing market only values in 2010 approximately € 40 billion while in 2015 it reaches € 57 billion (Inside Retail,2016). In the months following the Brexit vote, luxury prices rose by as much as 10%-15% to adjust to sterling devaluation. UK luxury companies continue to assess how to adjust their business models which are exposed to the risk of economic and political developments. However, as reported also due to inbound tourist numbers, luxury goods expenditure has been even stronger than usual as UK has become the most affordable luxury market in the world in which to shop. This explains the potential of British market with the higher consumer spending of EU area.

In 2016, the European Union accounted for 74% of UK exports, considering Britain as the biggest export market for textiles and apparel. Additionally, the value of UK apparel and textile exports was reported to be worth € 10 billion in 2016, up from €9.4 billion in 2015. Obviously, for UK, it is essential to sustain its status of global hub for creative services. This can be possible if there will be a review of tax incentives for companies based in UK and the government support in order to revamp growth. British products are cheaper for export but all raw materials imported from Europe have increased their prices since Britain voted. British pound is becoming weak and the market volatility is dangerous for all sectors, especially for luxury one. "This could easily lead to protectionism and import duties and that will not only affect world exports of clothing (approximately € 380 billion), but also the position of many

¹ L. Hoang, *Triggering article 50 what does Brexit mean for fashion*, 2017, "Business of Fashion", www.businessoffashion.com/articles/intelligence/triggering-article-50-what-does-brex-it-mean-for-fashion

companies and workers worldwide”². British fashion labels are trying to keep their economy flourishing, but most fashion brands produce entirely in Europe because they need skilled labor which is present only in European factories.

One of the main characteristics of British brand is the importance of iconic products. For many successful brands, most of sales comes from a single product that encapsulates the brand. 35% of British brands gain more 60% of their revenues from their iconic products.³ Successful luxury companies are maintaining a focus on these products, which could be a raincoat, a bottle of Scotch or a famous handbag. “Brands must nurture and emphasize the importance of these items, as they are more than just a product; they tell people what the brand stands for. Once a product has achieved iconic status, the brand needs to develop marketing that reinforces that status”³. UK needs to take advantage of its leading position in e-commerce to exploit their potentialities to achieve growth.

In the top 100 luxury goods of Deloitte, UK companies are ten. In in eighteenth pole, Burberry, the iconic brand remains significant with revenues for € 2 billion approximately. Other UK listed companies, Mulberry and Jimmy Choo, have achieved growth of 4.9% and revenues for €163 million and 6.1% of growth for € 330 million revenues respectively. Paul Smith is positioned between high fashion and formal wear and the brand registers positive results. Newcomers such as Ted Baker, shirt maker Charles Tyrwhitt, Barbour have positive growth rates, which underline the promising success of these.

- France

The French market is worth at least €70 billion but terrorists’ attacks have damaged the equilibrium of the sector in Europe. 7% of France’s economic activity is generated by tourists. In the last quarter of 2015, after Paris’ attack, the number of foreign visitors was around 8.7% and it decreases further 2.7% in three months of 2016. “So, if terrorism-related attacks become more frequent in France, and high-spending tourists continue to steer clear from the market, it is likely France’s fashion and luxury sector will continue to suffer over medium-term.”⁴

² L. Leschinsky, *How Brexit will impact the fashion industry in 2017*, 2017, “LinkedIn”, www.linkedin.com/pulse/how-brexit-impact-fashion-industry-2017-leon-leschinsky

³ “McKinsey and Company”, *The British luxury market: Growing sales from £5 million to £500 million*, 2016

⁴ L. Hoang, *In wake of terror attacks, what lies ahead for France’s luxury industry?*, 2016, “Business of Fashion”, www.businessoffashion.com/articles/news-analysis/in-wake-of-terror-attacks-what-lies-ahead-for-frances-luxury-industry-paris

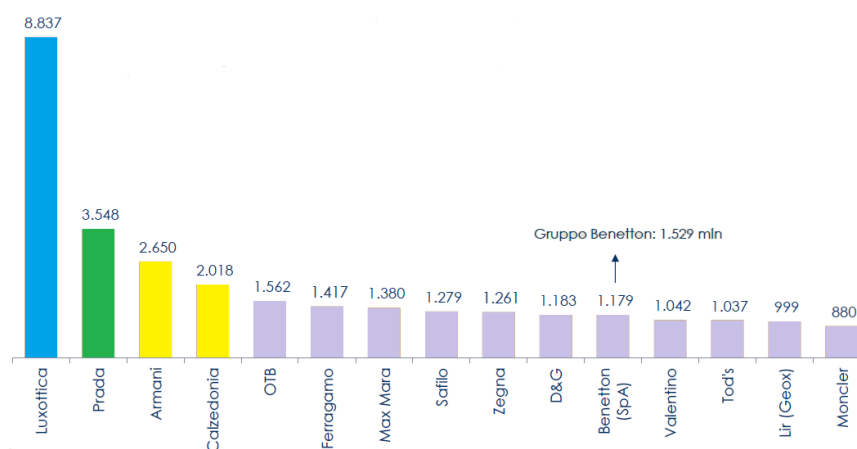
The growth rate in luxury goods sales by French companies has more than doubled. For the second year, it arrived to 14.9%, and the CAGR increased to 10.8 %. This was due to three multinationals, LVMH, Kering and L'Oréal Luxe. Louis Vuitton Moët Hennessy is the group with the highest sales between 100 fashion and luxury companies. The group includes Louis Vuitton, Fendi, Bulgari, Donna Karan, Marc Jacobs, Tag Heuer and other brands and it has reported in 2015 sales for € 20 billion. Kering is another important group in the fifth position which is responsible for Gucci, Bottega Veneta, Balenciaga, Sergio Rossi and others. In the seventh position, L'Oréal Luxe dominates. It owns Lancôme, Biotherm, Helena Rubinstein, Urban Decay and several licensing brands. These three groups represent over three-quarters of luxury goods sales for companies based in France and they have a solid growth. Another relevant brand is Hermès. The brand is gaining market share and it has a high level of growth with CAGR of 13.7 % for 2013-15 period.

- Italy

Italy was again the leading luxury goods country in terms of number of companies, with 26 companies in the Top 100. The Top 15 companies which are the main successful are Armani, Benetton, Calzedonia, Dolce&Gabbana, Geox, Essilor-Luxottica, Max Mara, Moncler, OTB, Prada, Safilo, Ferragamo, Tod's, Valentino and Zegna, according to Mediobanca's analysis⁵. Italian brands recorded total revenues for € 62 billion in 2015, a + 9,4% in growth, which is 4% of the Italy's GDP. The Top 15 represents 55% of the revenues which are around € 30 billion in 2015 with a growth of +8,9%. The most successful companies in the podium are Luxottica, Prada and Giorgio Armani. Luxottica is the top player in eyewear with € 8.837 billion of revenues which are increased of + 42% from 2011. The company includes brands like Oakley, Ray Ban, Vogue and Persol and it has licenses of different brands such as Burberry, Bvlgari, Coach, Chanel, Dolce&Gabbana, Michael Kors, Valentino, Versace and others and it encompasses several retail chains for example Sunglass Hut, Salmoiraghi&Viganò, Gmo, Eyemed, Opsm. It may take a stronger position as result of its merge with the French giant, Essilor which is helping to gain the majority share of the industry. Prada is in the seventeenth position and the second between Italian brands. Its revenues for 2015 were about € 3.548 billion, gained for 65% from global sales.

⁵ "Mediobanca", *Focus sulla moda (2011-2016): Analisi sulle maggiori società della moda*, 2016

Figure 2.6: Revenues of the Top 15 in 2015 (€ million)



Source: Mediobanca, Focus sulla moda (2011-2016), Analisi sulle maggiori società della moda

Prada and its brands Miu Miu and Church's in 2016 registered a decrease in revenues of 10% to € 3.184 million. Armani is third in the list, according its revenues which are about € 2.650 million. Its range of brands such as Giorgio Armani Privé, Giorgio Armani, Armani Collezioni, Emporio Armani (including EA7), AJ (Armani Jeans), Armani Junior, AX (Armani Exchange) represent the brand's values, encapsulated in Giorgio Armani's personality. Most Italian brands were established as family businesses and this gives an authenticity and heritage of "Made in Italy" to attract consumers.

Marcolin is one of the competitor of Luxottica which accounts for revenues of € 435 million in 2015 and a CAGR of +94% in 2011-2015. The company with its licensed brands like Balenciaga, Diesel, DSquared, Just Cavalli, Tom Ford is getting a high growth rate after the acquisition of Viva International. The acquisition has reorganized the distribution networks on an international scale, improving the efficiency between geographical areas and implementing brand portfolio and the geographic presence. A relevant presence is Calzedonia Group which includes Intimissimi, Tezenis, Falconieri and Atelier Eme as brands. Its revenues are more than € 2 million and with its wide portfolio products, it is becoming a strong brand even if it is not between the luxury ones.

- Germany

Germany which is the ultimate strength on the Euro area, is not a leader in the fashion industry. Results are driven especially by Hugo Boss' results. With sales growth of 9.2 %, mainly due to increased sales in its company-owned stores, and assisted by favorable exchange rates. There are several newcomers in Germany which are Marc O'Polo and Marc Cain, Wempe, and Bogner which can promise a higher share for Germany in next years.

- Switzerland

Swiss companies are for the most watchmakers, and the strength of their brands can be seen in their presence in jewelers and other distribution outlets for luxury watches as well as in their own growing store networks. Switzerland's luxury good sales are dominated by their top three players, Richemont, Swatch, and Rolex, which together account for 87 % of 2015 luxury goods sales for the ten Swiss companies in the Top 100. Richemont retained its second position with Cartier, Piaget, which gives 30% of its sales, and Montblanc as main brands. The barriers to entry created by the brand heritage and technical and design excellence of the Swiss luxury watchmakers are difficult to overcome. Swatch is in the 6th with its brands like Omega, Longines and other licensing brands, while Rolex retained its 11th position.

2.1.3 Trends and evolution

Companies steer their efforts towards customers satisfaction in order to adapt to the changes in the industry and customer desires. Nowadays, fashion proposes a lifestyle which is expressed through overall appearance; clothing, shoes, and the use of accessories. According to Cappellari (2016), fashion is also services, added by brands to extend their proposal to customers. Various trends and policies like customization, eco-sustainability, fashion immediacy and so on have helped fashion companies to adapt to the whims and desires of their customers. In turn, the loyalty that customers have for the brands they wear has increased.

One of the main trend that companies try to apply to attract customers and increase loyalty is customization. According to an article of "The Economist 1843", journalist Luke Leitch affirms how this phenomenon was already predicted by Alvin Toffler in 1970. Toffler, a famous writer and futurist of the digital evolution, anticipated the personalization as "antidote to the monotony of mass manufacturing" in a new age where a "prosumer" acts; a "prosumer" who produces and

consumes goods simultaneously. A lot of brands have started to involve customers in the production process. An example is Jimmy Choo (a shoe designing brand) with its initiatives named “Pick & Choos” and “Made-to-order”. These initiatives give the customer an opportunity to choose the shoe style desired from those proposed, preferred color and Swarovski rhinestone of their choice.

Other companies like Gucci and Burberry also customize wears for their clients. Gucci offers a DIY service in which the customer puts tailoring linings and initials on the preferred items. Burberry also offers a personalized monogramming service on tartan scarves and perfumes. However, a Bain survey has showed that customization is not a widespread service. Less than 10% of respondents have tried the options, and only 25% to 30% are interested in trying it. It is, however, important to note that customers who have used the service are more willing to visit the website and be loyal to the brand. Customization represents diversification and a partial shift of the creativity responsibility from directors to customers. It provides companies with the possibility of distinguishing themselves from competitors and also provides an opportunity to get information about the tastes of their customers.

Sustainability is another topic which is getting more and more attention from companies and customers. A lot of fashion brands and groups have an “Environmental regulation” or “Corporate Social Responsibility” report where they put under the spotlight their effort to reduce the impact of goods production and emissions on nature.

From 2013, Kering group creates also the MIL (Material Innovation Lab) where sustainable materials and technical approaches to sourcing and manufacturing fabrics are studied. The group has participated actively in the reduction of energy emission and in the production of raw material such as leather.

Another engaged designer is Stella McCartney. She employs the use of an Environmental Profit and Loss (EP&L). This is a form of natural capital accounting that records for 2015 a profit of €5.5 million. This document gives a transparent and quantifiable picture of the environmental impacts produced across supply chains. This process makes it possible to be more conscious about decision making in different level of the supply chain, from the production of raw materials to the sale of products. The implementation of these policies has led to a reduction of 35% in the average environmental impact per kg of raw material. Obviously, it is fundamental to promote the sustainability and to transmit the value added between customers so they can accept the price premium of these items, especially in new generations. Studies have shown that Millennials gives more attentions to products which are “cruelty free” (products that don’t use raw

materials from animals) and 30% of them cares about fibers and their origins⁶. Environmental-friendly fibers are viewed as products of high quality and environmentally respectful. Another tool used to monitor ecological balanced is the ESG (environmental, social and governance) criteria which are kept under control by investors and consumers. Criteria are useful indicators to prove progress and to show the level of commitment and the transparency of the brands.

Sustainability speaks to the heart as it plays on “a connection for the greater good” (Purt, 2014). Customers carry out the collective responsibility of ensuring that earth’s resources are not depleted and people are encouraged to go for 100% organic materials. In addition, brands, which exploit manpower, receive negative publicity and third-party certifications are used to verify a product’s social and environmental claims. However, eco-sustainability could have some negative effects on fashion market. The most debilitating is the isolation of non-organic market segments. Customers who value the principles of environmental respect and human right defense tend to focus only on some areas of the market and leave others out.

The 21st century has arrived with a new cultural shift which promotes health and physical care. This new crave for a healthy living has led to the development of Athleisure movement. This concept can be regarded as a parallel of eco-sustainability and fast-fashion and according to the Merriam Webster dictionary, it is defined as “casual clothing like yoga pants, sweat pants, and hoodie designed to be worn both for exercising and for doing (almost) everything else.”

Athleisure has grown into a € 242 billion market and it is predicted to grow at 8.0–8.5 %, faster than as any other category. It has come a long way from its former CAGR of 10% and due to the change in consumers’ lifestyle, it is expected to increase in sales by 23% within the next 10 years (Trendlytics, 2016). This category continues to grow and it competes on equal levels with other forms of clothing and footwear, particularly in the mid-market and premium segments. In 90’s, the brands which can be defined as Athleisure were Ellesse and Fila which were popular brands for youth. Now, it is having a second lease of time. In this decade, fashion houses have switched again on this trend. Chanel in its Ready-to-wear show in 2014, launched its sneakers line and then others like Dior and Louis Vuitton followed the line. This fashion category has gained more popularity due to the endorsement by celebrities such as Rihanna who co-branded with Puma and produced a line called “Fenty”, Kanye West and his

⁶ G. Bolelli, *Cotton USA: Millennials italiani poco sensibili agli abiti vegani, ma attenti a fibre, etica e provenienza più dei brand*, 2017, “Fashion Network”
www.fashionnetwork.com/news/Cotton-USA-Millennials-italiani-poco-sensibili-agli-abiti-vegani-ma-attenti-a-fibre-etica-e-provenienza-piu-dei-brand/

collaboration with Adidas which led to “Yeezy Boost” shoes, Beyoncé’s capsule sold by Topshop and a production of a sport line called “Ivy Park” among others. Also, records have shown that online searches for the term “athleisure” have increased more than 250% within the past two years. With sneakers and athletic bras by being the most sought-after items. Companies specializing in athleisure such as Lululemon, Under Armour do not sell only apparel but a lifestyle. Storytelling behind the brands attract customers who buy at higher price because of the perceived message. The Canadian brand with its moto “Breathe easy, it’s on us” has created a community. It is specialized on yoga items but then it has enlarged their business, to fitness wear. Through their manifesto, it expresses values, inspirational goals to achieve such as wellness and happiness which are shared by devotees around the world. Under Armour mission is “to make all athletes better through passion, design and the relentless pursuit of innovation”⁷ and their need is to express the motivation to perseverance and determination for their customers. Athleisure brands are successful because they build emotional attachments. Customers feel as a part of all stories and values transmitted which can inspire them. Fashion concepts centered on healthy living help to build a connection from collective responsibility.

As result of slow sales, companies have tried to reshape their core operations and review their store networks. Fashion designers have reconstructed the industry’s systems by adapting to the demand shift, reducing the fashion cycle and increasing the number of collection, lastly, favoring fast fashion which appears primarily in the mass-market. Luxury brands increase immediate availability through the “see now-buy now”. Burberry and after Tommy Hilfiger were the first fashion houses to announce a realignment of its show calendar by combining men’s and women’s collections into twice-annual seasonless shows. “It’s always felt a little alien, inviting people from around the world to tune in and to watch, to Instagram, share and like and all of those things, but then not be able to buy it, or look at it, until four to six months [later]. I found [the shift to fashion immediacy] great — a natural thing,”⁸ declared Christopher Bailey, the chief creative officer and former chief executive officer of Burberry. While some industry leaders, based mostly in New York and London, believed in a rapid change, the French and Italian designer establishments prefer to maintain their situation.

This process pushes companies to increase new digital system in order to give access to customers in a click and to respond more rapidly to consumer demand.

Brands can perceive fashion immediacy as an attractive potential growth lever to serve the needs of a global consumer. In addition, it can be viewed as a natural progression for fashion

⁷ Under Armour.Inc site, www.uabiz.com/company/mission.cfm

⁸ Business of fashion, *The State of Fashion 2017*, 2016, pp. 78-82

brands. “We listened to the consumer and understood that [what] they are demanding is instant gratification and experiences,” said Tommy Hilfiger. The rise of B2C fashion shows, photo-sharing social media apps and e-commerce have already shifted consumer preferences toward immediate gratification and heightened expectations for newness (BOF, 2016). On the other hand, this immediacy can have an impact on the creativity. Collections can become too much commercial and predictable, eliminating the sense of excitement that has sustained fashion marketing for decades. There are also severe consequences due to the urgency of production. All members of the production teams are under high-pressure and have intense work schedules. Publicists, photographers, art-directors, make-up artists, hair stylists, models all work in a frenzy. This could lead to high tension and sometimes poor presentations. Nevertheless, fashion immediacy strategies could be an opportunity to increase competitive advantage as seen in the case of Burberry. The British brand “join all of the dots, so that audiences around the world avoid a transactional relationship whether they be in store, on social platforms, or elsewhere”⁸ as Bailey explained.

In the context of fashion, urbanization can be regarded as an opportunity to provide additional shopping hubs. Highly-valued developments such as the provision of digitalized infrastructures in fashion stores lead to a more fast-paced growth in the society and fashion industry. McKinsey’s report states that cities will be the major point of interest for fashion growth; this will be seen in the rapid progress of emerging markets. In McKinsey’s opinion, in 2025, there will be 60 mega cities, which is more than twice the amount of the number of urban centers present today. Companies will develop and focus on customers’ needs in big cities to create a competitive advantage. Figure 2.7, below, shows the list of major cities that will be the nexus of the industry. They are divided into two highly profitable markets, mid one and luxury.

The graph underlines the importance of the emerging cities of the East, especially in the midmarket. Therefore, companies still need to understand the specific demographics and increase the assortment of products available at a city level. In addition, growing urban centers will be filled with fashion players who should create and strengthen local relationships with clients. Also, fashion producers will pay more attention to the possible local competition which might increase yearly.

As cities become the nexus of fashion growth, retail development will be crucial. Retail will be reintroduced in a new light and shopping will be more than an act to buy something that people need. Shopping has become an experience to live; customers will be a top priority with personalized services at 360°.

Figure 2.7: Fastest growing cities



1 Ranked by absolute growth from 2010 to 2025

Source: Fashion Scope: Unleashing fashion Growth city by city

This practice of personalized services is hard to implement and technology plays an essential role. Surveys have shown that consumers that buying luxury goods both online and in-store spend approximately 50% more per year than in-store only customers. Online stores give customers the opportunity to order goods which are out of stocks and receive them at home and return their purchases in exchange for another.

As it is possible to see on figure 2.8, stores have still high influence for brands but it is declining to give space to digital world. Its presence is increasing for LVMH and Burberry. Analyzing 57 flagship stores and 4 department stores of 34 brands, in December 2015, ContactLab defines the brands which are more digitally integrated in store. It evaluates 3 categories such as in store technology, relationship with digital clients in store, online promotion in store which consider 21 variables like the presence of screens, open WIFI, interactive mirrors and touchscreens in stores, appointment in store via app/website, client recognition via technology, online evidence of in store “made to order” or “monogramming”, e-commerce invites and online orders in store. From ContactLab’s analysis, Ralph Lauren is the brand which is the most digitally innovative in store. Currently, it has the higher number of connection between online and offline services. It is followed closely by Bergdorf Goodman, Burberry, Louis Vuitton and department brands such as Saks, Macy’s, Barney’s which possess high tech and interactive features.

Figure 2.8: Count of word “store” (left) and “digital” (right) in annual reports



Source: *The Digital Frontier for Luxury Goods Exane BNP Paribas 2017*

This is part of the implementation of a omni-channel strategy. Brands need to create a customer journey to maximize the engagement and the attraction of all possible buyers. From their cell phone, to the desktop, to an in-store visit, customers have access to products and a click or a like on social media should express the uniqueness of brands. Integration of online and offline channel is fundamental to survive in the industry. New opportunities in the distribution channels should be developed to strengthen the relationship with customers. They need to create an intimacy with customers, interpreting desires and needs at an early stage and deliver “made to desire” products and services. In addition, data mining can be a fundamental tool to understand what customers want and need. Consequently, brands knowing their customers’ profiles, can shape their products’ portfolio.

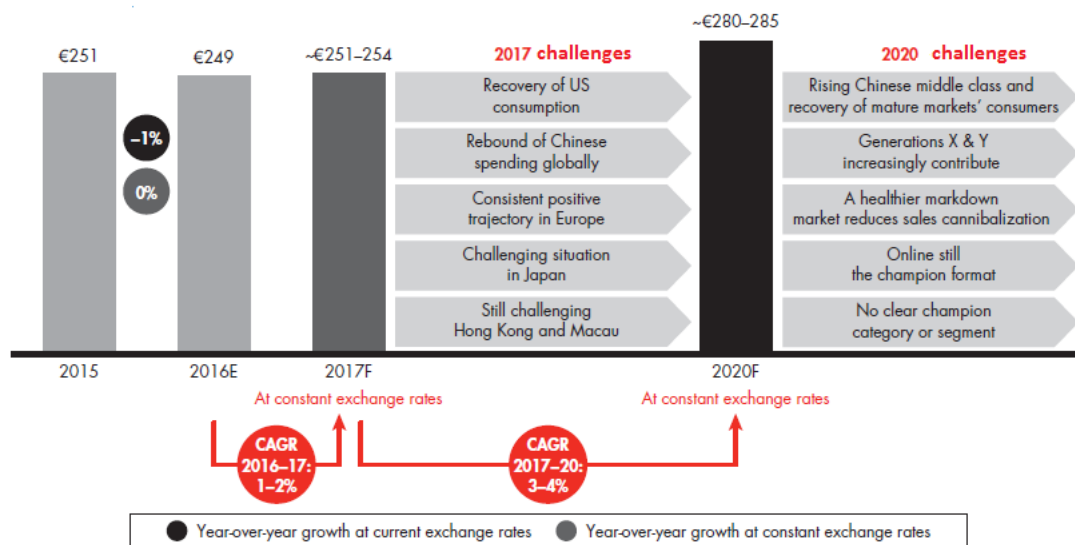
2.1.4 Projections of the industry

BOF presents some predictions and data which will mark the path of the industry during the year 2017. The projections for the future are positive and growth is expected to have a 2.5-3.5 % increase. However, the predicted growth of the year 2017 is very low in comparison to those of 2005-2015. Also, Business of Fashion predicts that some fashion brands will struggle to defend their market share against value players and discounters. Publicity, promotional sales and discounts will be presented to customers using multiple channels. Athletic wears are expected to remain the winning category and they maintain sales growth of 6.5%-7.5%. This percentage means a slower growth than that of the year 2016. In addition, the watches and

jewelry segments will likely see a single-percentage point increase of 2.0–3.0 % in the growth rate.

Amongst other fashion segments, the discount channel experiences the most growth despite its decrease in comparison to its growth in the previous year. Survey’s respondents state that the most-pressing challenge of the next year will continue to be dealing with volatility of the fashion industry, and the shifts in the global economy, regarding sales and profitability.

Figure 2.9: Personal luxury goods market projections (2015-20F) € Billion



Source: *Luxury goods worldwide market study 2016, Bain & company*

Figure 2.9 shows that Far East and Asia are currently facing challenges, together with the recovery of US consumption and the challenging situation in Japan. However, there are some positive expectations such as the increasing wealth of its middle class, the growth of mobile shopping, and the increase in personal consumption that will be stabilized. Some financial measures such as, low credit requirements and policy support in addition to central bank’s quantitative easing and cutting interest rates have been encouraged by Chinese authorities. Historically, the purchase of fashion goods was enabled by travel and tourisms carried out by people of Far East and Asia. Chinese consumers had to travel to America and Europe, and customers from third-tier cities had to travel to Beijing or Shanghai to seek out fashion goods. China has been acknowledged as the famous “made in” for counterfeit products, where all type of fake (products) can be found (Jiang & Cova, 2012). Chinese culture is condensed to “copy and make” for selling in Western countries. Chinese customers perceive luxury brands as “must to have” in order to show off their social status, thus they do not buy counterfeited

products. The innovation of mobile e-commerce has helped the Chinese population to achieve access to global brands with ease. Websites have sustained customers to get a higher price transparency. For instance, a Louis Vuitton bag Speedy 300 is sold on the Chinese e-commerce site of the brand at ¥ 7,450 (€ 1.019,00) while on the Italian site, it has a price of € 760,00 which is equal to ¥ 5,557. This helps all Chinese customers to understand the price gap and to develop more trust in luxury brands given the clearness of prices. These developments and innovations of various economic stimuli lead to the increase in consumption by the people of Far East and Asia.

In other areas of the world, fashion executives continue to see competition from online players as one of their top three challenges for next year. Fashion companies foresee all the dimensions of their business being affected by changes in customer behavior and consequently in demand, flows of tourism, price adjustments and exchange rate arbitrage, labor and resource costs. As a result, companies will need to change their strategies and adjust inner workings of the entire system. In relations to the concern of customers, brands should focus on a consumer-driven mindset that adjusts in real time to changes in consumer needs. This can be made possible by the increase of operational readiness. This implies that an agile supply chain should be built and equipped to survive downturns. Fashion companies will need to diversify their brands, categories, and geographical portfolios. Therefore, in case of decline of some markets or products, the overall performance would not be damaged and it would be balanced by those growing successfully.

Nevertheless, these challenges are viewed as opportunities for fashion brands to improve their performance. Customers are the key drivers for growth. Key investments are expected to come from omnichannel integration, e-commerce, and digital marketing, consumer relationship management (CRM) and in-store experiences.

In 2017, an organic growth is expected. Growth will not be implemented by store or channel expansions or promotions but brands should put effort on growing through value rather than volume. This strategy will be achieved through a focus on branding and on strong values that can differentiate them from the competitors. Companies can fight the discount mania and reduce dependency on tourism by being more engaged with customers and local clientele. This in turn, saves their brands from being affected by economic downtimes and geopolitical volatility.

2.2 Demand and types of customers

Customers play a fundamental role in the fashion industry. They determine who are the winners and losers by choosing the brand to patronize. In the year 2000's, Chinese population dominates as the major population of customers in the fashion industry. Two-third of growth seen in last ten years was realized by their amount of purchases and as of today, they constitute one-third of the global market. Russians are also present in the market, but there are upcoming nationalities who are gaining purchasing power in the fashion market. Nationalities like Indians, Japanese, Koreans and all habitants of Honk Kong and Macau are newcomers in the industry. Also, they modify all purchasing behaviors. Studies have shown that these nationalities tend to adopt more expensive brands in an attempt to gain exclusivity and prestige.

- Classification of customers according to demand type

Studies identify customers based on the nature and motives behind their demands in the fashion industry. They named them the new rich, old rich, wealthy and aspirational customers. New rich customers are members of the society who have recently started earning above the average income. They are responsible for every increased GDP growth in a country's economy. They prefer to patronize sophisticated mega-brands because they believe that these are representatives of a high social-status and economic power. On the other hand, the old rich customers don't need to flaunt their social status. They are more interested in the exclusivity of the brand and the refined elegance of the fashion items they purchase. Luxury and aspirational customers are members of the society who want to emulate the fashion styles of the wealthy customers. They care about the level of luxury offered by brands they patronize. For these customers, each luxurious experience is a mean by which they fine-tune and develop their fashion taste, become more sophisticated and show off their newly acquired social status. This customer type favors loud styles and very well-known megabrands (Exane Bnp Paribas, 2016). Wealthy individuals have already everything, they don't need to buy anything but they spend to replace their products.

- Classification of customers according to theories

Thornstein Veblen is a Norwegian-American economist. He proposed a theory of "conspicuous consumption" in the twentieth century. The term refers to customers who purchase goods that are costly and of higher value for no practical reason. These goods are purchased for the social status they contribute and according to Veblen, it is wastefulness. He

further states that, the admiration of a product's economic value does not make it more efficient rather than it leads to the ineffective utilization of the society's resources. In last decades, the "Veblen Effect" has gained a new interpretation. Higher the price, more attracted are the customers, who gain renown and prestige between the society. In this context, fashion brands produce items that "should be expensive and recognizable, with a clear logo" (Cappellari, 2016).

Another relevant effect is the "Bandwagon" one. The Bandwagon effect is based on the description of the relationship between demand and effect. In this instance, customers buy something just because others do, thus they can be accepted in a social environment. This is a contrast to the theory of "conspicuous consumption". In the Bandwagon case, customers seek a value that makes them blend in with people. While for the conspicuous consumption, purchasing goods can be a tool for people to stand out and gain exclusivity. The theory of recreation shopping describes all demands and purchases made only with the aim to gain pleasure and satisfaction from the act of shopping and not from the items purchased. This theory also describes people who "window" shop only for the pleasure they get from looking at goods that interest them. People buy for the pleasure and satisfaction from the shopping itself not for the service that product does. These are the main theories that explain how people think and behave when they buy something. In the latest years, the market has changed. Customers are less willing to spend huge amounts of money but without giving up the exclusiveness of brands they patronize.

2.2.1 Characteristics

In order to understand customers' needs and preferences, companies need to consider their generations' targets and its characteristics. In recent decades, brands have Generation X and especially Millennials as target customers. The X generation refers to people who were born during the years 1965 and 1984. This generation is characterized by a shift in societal values which result from increasing divorce rates and maternal participation in the workforce. Members of Generation X are independent, resourceful, eager to learn new skills and self-sufficient and also, they adapt quite well to technology. Fashion brands pay less attention to the Generation X and focus more on Generation Y. The Generation Y which is also known as Millennials includes all youths who were born between the early 1980s as starting birth years and the mid-1990s to early 2000s as ending birth years. This includes all young people who is in the mid-30 and all teenagers who are at least 17 years-old. On a global scale, 85% of them live in emerging markets and they have a spending power of approximately € 2,2 trillion,

which is expected to grow three times by 2025 (BOF, 2016). Children of this generation were highly protected, and grew up with safety measures. They are treated as special and important and they are celebrated in every occasion. This has made them to be confident, motivated and goal-oriented. They always strive towards advancements and they are optimistic towards future. In work, this generation prefers a team leadership and they achieve career's goals through their determination. They are more critical and more conscious to social, political issues that can change their future. "Millennials are the recycling generation, raised on the idea that sorting garbage minimizes waste. They learned about global warming and how dependency on fossil fuels can have a dire effect on the world. They were taught to be conscientious of what they consume and how they live in a way that generations before them were not" (Gailewicz, 2014). Their ability to deal with technology, especially with social media, give them the power to influence the choice of others by broadcasting media contents. This indicates how important customers' experiences are. In addition, they can serve as a useful tool in attracting them. From this social perspective, brands should seek to develop strategy and engaging portfolio products which aim at their loyalty.

It has been observed that the financial crisis and economic uncertainty has not helped their purchasing power. Resources of this generation are financially limited because of the economic downturn. Therefore, they prefer to spend their money on products with medium-low range of prices. The awareness of the economic situation makes the members of this generation spend fairly and wisely. They often prefer to pay for a product that has a value which corresponds to its price equally. This fuels the motivation to get a higher value for money spent. Hence, this is increasing the frequency of off-price sales. Statistics have shown that since 2016, off-price shoppers have accounted for 75 % of apparel purchases across all channels, and some traditional retailers now invest more in outlet stores and discount stores than full-price shops. However, this kind of sales and its pricing is unhealthy for fashion companies because mark-downs and promotions of unfair trading decrease prices, destroying profit margins along with brand value.

According to a report of the Boston Consulting Group, "Millennials passions: food, fashion and friends", U.S. millennials, both men and women, have clear ideas about clothing. 47% of females Millennials do their shopping twice a month. This frequency is higher than that of the non-Millennials females (36%) who shop for fashion items few times per years. The males have a wider difference in the frequency of their purchases. 38% of male Millennials makes purchases of fashion goods twice a month while only 10% among non-millennials. It has been observed that females spend 1/3 more than their real income on clothing per year. This

generation tends to shop with friends or relatives because they place a high value on the opinion of others.

They receive and exchange information about trends, products and brands through blogs, retailer websites and social media. Millennials customers become the most direct communication channel through social media and they willing to act as ambassadors of the brands they support. They place a high value on the in-store and online experience. They like experimenting with new innovative and exciting shops where people can be entertained. The Millennials are easily attracted by positive brands values expressed by fashion consultants and personal shoppers who embodies them. This generation is heterogenous; they are people with various characteristics. However, they have some traits in common. The major trait is their global citizenship. They are cosmopolitan and they are travel living in borderless environments. They are a melting pot of culture that brands need to identify in order to be successful in the market.

The Millennials are currently overtaking new fashion dimensions. An instance can be seen in the advent of plus-size apparel which represents a cultural change in body acceptance. The body positivity school of thought is gaining a lot of attention and nowadays, designers create specific collections for a larger range of size. Millennials are open-minded in every sense, in fact, there is a relevant importance of devout Islamic consumers, especially from the Middle East and South-East Asia. Designers such as Dolce & Gabbana have crafted hijab and abaya collections and this sector called “Modest wear” is forecasted to be worth € 293 billion by 2020, according to BOF.

There are six characteristics that define the new customers:

- Better informed through online search, on the demand and in store;
- More demanding, looking forward personalization service;
- “always on” in the sense that they are always connected and in sync but with time constrained;
- More conscious about critical topics and they are searching for authenticity;
- Less loyal because alternative brands are available just in one click;
- Connected to others and they can share reviews, experiences in blogs and social media.

Fashion company can hardly predict the behaviors of customers and they always should keep up with them. All these elements are not easy to keep under control. The availability of information and huge disposition of brands have changed the behavior of customers that can shop across different segments, thus, increasing the complexity of the market. Fashion brands

need to have a global view of their consumers in order to understand what they want, what they like, what they don't like, and where and how they shop (BOF, 2016). This strategy can be used as a leverage of the information to each fashion segment. The changing landscape of the industry reinforces the fact that customer experience is fundamental and this is the focus point for brands.

2.2.2 Perceptions and changes

Generation X laid the political, intellectual, social, creative and personal ground upon which the Millennials today walk, talk and text ⁹. These two generations are connected and what Generation X has created, Millennials have continued but in a different perception. Now, the purchasing power is not dependent on income.

In his book "Marketing della moda e dei prodotti lifestyle", Professor Cappellari states that purchasing power in advanced countries is not dependent on income. People do not make purchase based on their needs rather than they purchase goods, according to their preferences, without a fixed scheme. Therefore, people with high incomes can shop in a discount or in a low-cost retail shop and while, medium-low income earners can decide to spend 800€ to buy an iPhone (Cappellari, 2016). According to Silverstein and other experts, there is a "trading up" phenomenon. Medium income customers decide to buy expensive products for special occasions while in daily routine, they try to save "trading down" some items in order to put aside a sum to buy premium products. This behavior is based on four macro trends which characterize Western customers (Cappellari, 2016). The first macro trend is the increase of income availability as result of the participation also of other family members in the accumulation of wealth. In this new age, women work and contribute to the family's income. This change leads to the second macro trend which is derived from a social change in the family composition. Nowadays, women have become more independent also due to the high rate of divorce and single parentage. Studies have shown that despite the unavailability of spare time, people still have time for leisure activities in the company of their friends and relatives. This increases the level of social interactions and implies a higher expenditure in leisure and relaxing activities. The current generation of customers make purchases based on their favorability and positive relation to all the variables involved. That is, they have a more conscious attitude towards consumption. This attitude is a result of macro trend which is based on the increase of educational level. The rate of enrollment of young people in universities

⁹ C. Henseler, *Millennials and Boomers: Don't Forget Generation X*, 2014, "Huffington Post", www.huffingtonpost.com/christine-henseler/millennials-and-boomers-generation_x_b_5253931.html

and professional schools has increased; people have become more open-minded and willing to undertake new experiences. Customers are more informed and prepared and thereafter, more selective. The last change is about the attitude of people toward consumption. As mentioned before, customers judge and buy more consciously, looking at all variables that are involved in the process. This new consumption is developed to satisfy four emotional dimensions (Silverstein, Fiske 2004). These dimensions are: the need to take care of oneself, stabilize and explore relationships and express a personal style.

The need for sufficient time to pamper of oneself comes from the perception of having less time dedicated to oneself as a result of the high rate of energy absorption by work and other important activities. The “right” to relax, and spoil oneself coincides by buying something luxurious or eating something special and pleasurable.

The second emotional dimension deals with the creation and exploration of relationships between family and friends. It is based on the experience of precious and memorable moments through the act of shopping or patronizing certain services. These acts or purchases are unforgettable and they serve as remarkable timelines in personal history. Furthermore, the act of making conscious purchases of fashion items enriches personal experience, fashion taste and style. The need to show off is not anymore present but there is a “luxury shame”, an embarrassment to show off luxury products because of the considerations and worries about the global economic situation.

In their early 20s and late 30s now, Generation Y consumers are those who are still in college and those who are building their financial stability. In comparison to their parents’ generation, the generation Y consumers are still in the process of building self-identity and they are developing public self-consciousness, then self-concept-related traits. There are two types of self-consciousness: private self-consciousness, and public self-consciousness. The public one is concerned with all feelings which reflect a person’s “awareness of the self as a social and public object”.¹⁰ The self-consciousness has an impact on consumption. The higher the level of self-consciousness an individual possesses, more likely the individual will take steps which will lead to the creation and to the maintenance of a positive and desirable self-image.

Often, individuals with a high public self-consciousness are considered more exhibition-oriented due to their need of approval from others. Therefore, they develop a higher brand consciousness and they are more willing to purchase famous brands as an expression of personality traits.

¹⁰ S. Giovannini, Y. Xu, J. Thomas, *Luxury fashion consumption and Generation Y consumers: Self, brand consciousness, and consumption motivations*, 2015, “Journal of Fashion Marketing and Management”, Vol. 19 Iss 1 pp. 22 - 40

Another important aspect is self-esteem. A large number of people can choose well-known brands so as to gain social approval and increase self-esteem. All these characteristics are related with “conspicuous consumption”. Also, other social factors such as individualism, social visibility, desire to uniqueness come into play during the measurement of an individual’s self-esteem. Generation Y consumers are portrayed as individuals with a high public self-consciousness. They are more concerned about the impression they make on others as a result, they patronize high-end popular brands. Companies need to develop their brand consciousness and how individuals perceive brands and what they represent for them. Brand loyalty is another phenomenon associated with self-awareness. It arises as an after effect of the relationship between brand consciousness and conspicuous consumption motivation, from which derives brand loyalty. Customers who are high-brand conscious, try to find products which can fully express their personal desires. In turn, they seek for a connection with the products they purchase and they buy only from companies that pay attention to their image. The emotional attachment is an essential variable to develop loyalty. The customer’s emotional attachment is underpinned by brand love, brand affection, and brand connection to build a long-term relationship. It is crucial in the creation of a long-term relationship between a fashion customer and a brand. Brand loyalty has an impact on customer preferences and it can represent a value added for the companies¹¹.

Other theories divide the motivations of customers to buy in functional and non-functional¹². Functional are those values with the aim of satisfying practical needs and solving some personal or basic issues. In contrast, non-functional are values which perform a deeper function. They can impart aspects, experiences and characteristics of customers’ identity. Then nonfunctional value perceptions can represent the main driver for purchasing luxury products, especially among younger consumers. Furthermore, analysts have discovered that customers have different beliefs regarding their personal traits. Customers have different beliefs regarding the “malleability” of their personality traits and experts identify two theories: entity theory and incremental theory. Individuals who embrace entity theory believe their personal traits, such as personality, intelligence, and morality, are relatively fixed. They think that they cannot improve or change their personal traits with their own efforts. They

¹¹J. T. So, A. G. Parsons, S.-F. Yap, (2013), *Corporate branding, emotional attachment and brand loyalty: the case of luxury fashion branding*, “Journal of Fashion Marketing and Management: An International Journal”, Vol. 17 Iss 4 pp. 403 - 423

¹²J. Kwon, Y. Seo, D. Ko, *Effective Luxury-Brand Advertising: The ES-IF Matching (Entity-Symbolic Versus Incremental-Functional) Model*, 2016, “Journal of Advertisement”, pp. 459-471

easily draw conclusions on people and brands. In contrast, those who support incremental theory believe their personal traits are relatively malleable if they put effort on change them. Entity theorists tend to develop more positive perceptions of themselves based on their perceived personality traits of the brands they use. They exploit brand meanings as media of personal expressions because they are unable to use their personal characteristics to signal their personality. For example, after using Victoria's Secret lingerie, entity theorists perceived themselves as being more good-looking and feminine, whereas incremental theorists retained the same perception of themselves. Entity theory can develop positive perceptions with strong brand images and it can value more luxury products. This brief excursus has reinforced the fact that customer behavior has evolved and companies have changed their modes in order to adapt to this evolution.

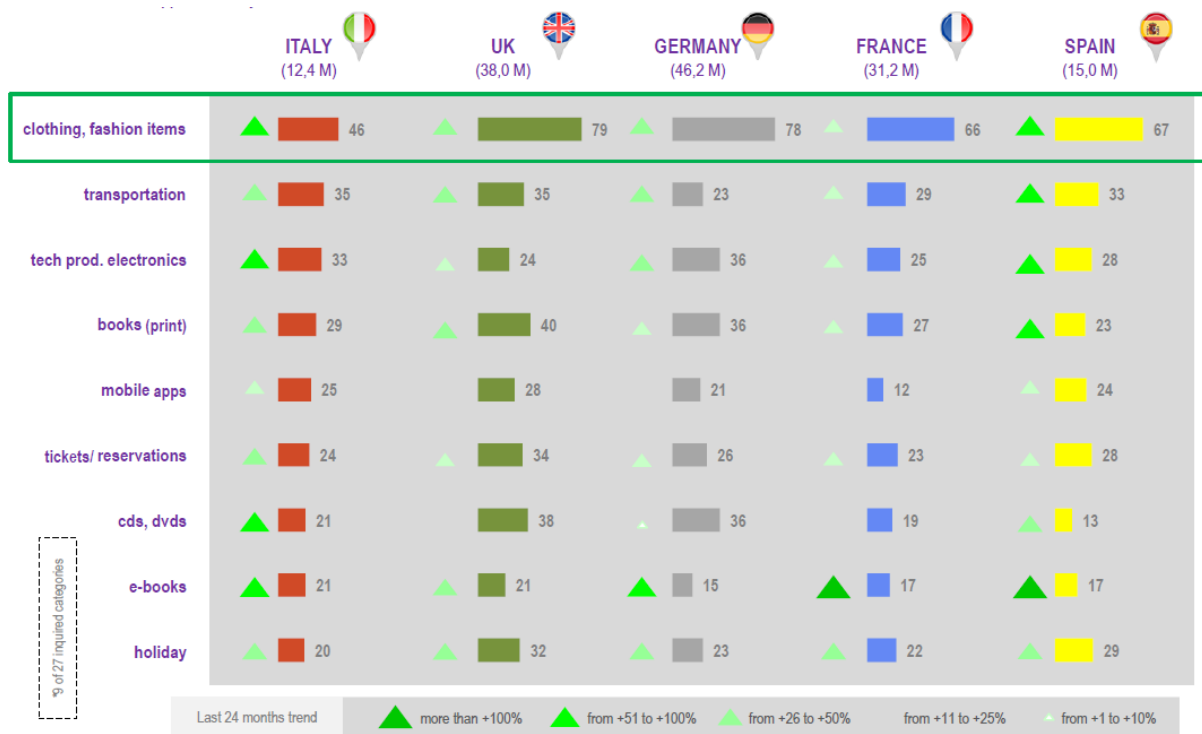
2.3 The era of digitalization

The change in customers' behaviors is driven by technology evolution, which is one of the main improvements that has been made in scientific field. The invention of internet was one of the turning points for the current society. Only half of total global population (3.773 billion of people) has access to an internet connection. Levels of internet penetration varies across each global region: North America 88%, Central America 53%, South America 66%, West Europe 84%, East Europe 67%, Africa 29%, Middle East 60%, Central Asia 48%, South Asia 33% and Oceania 68%. There is an average annual growth of 10% which means that 354 million of people become internet users, according to "Digital in 2017 Global Overview" a report created by "We Are Social" and "Hootsuite". Indonesia, Philippines, Mexico are countries which grow the most (51%, 27% and 27%). Obviously, the main devices used are smartphones (50%), laptops (45%) and tablets (5%).

Figure 2.10 represents the preferences of customers when they look at buying online. Fashion is in the pole position analyzing Italy, UK, Germany, France and Spain. Between 27 categories, the first 9 are taken in consideration. UK customers explore online services more than other countries in every category. According to countries, preferences change but scores are pretty much the same on average.

Figure 2.10: Product categories purchased online yearly and 24 months' trend

Base: Total internet users 16-65 yo%



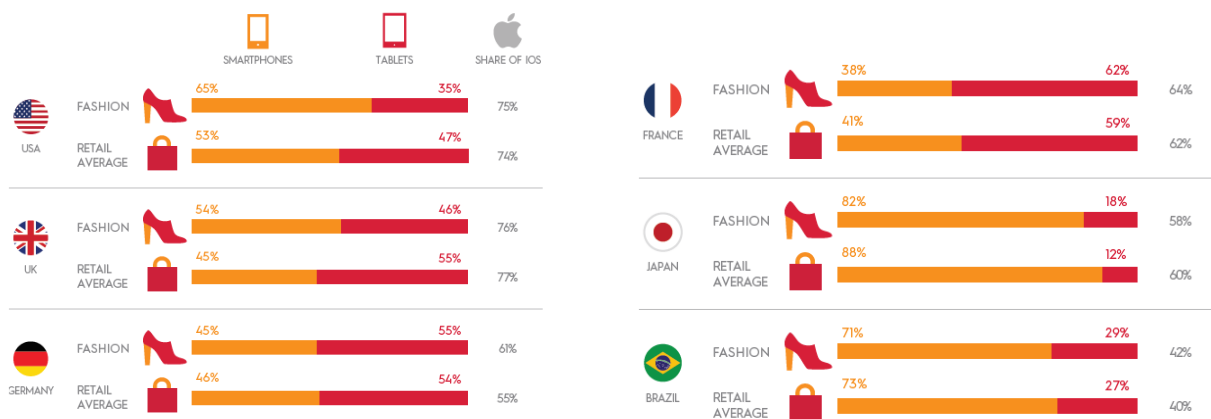
Source: European digital behavior study 2015 on E-commerce & fashion

According to “Statista” report on fashion e-commerce, the global fashion e-commerce market is worth about € 298 billion in 2016 and it accounts for 28% of the total e-commerce market. The European fashion market is the second biggest one with a volume of € 78 billion in 2016. The projections for the future are in line, with a CAGR of +10% in 2021. The clothing categories is the most profitable with a revenue stream of € 287 million in 2016 while bags and accessories registered € 88 million and shoes categories are valued at € 120 million. The main fashion marketplaces in Europe are Zalando, Asos, Yoox-Net-A-Porter and Amazon Fashion. Zalando is considered the top player. The brand has the strongest sales growth (23% CAGR) in comparison to other competitors. The brand has the best possibility of experiencing a high level of growth. Zalando, headquartered in Berlin, was founded in 2008. It started with a strong focus on footwear before expanding its merchandise to clothing and accessories. Yoox Net-A-Porter Group is one of the global leader in fashion luxury e-commerce. The Italian group with strong English roots is the result of the successful alliance of Yoox and Net-à-Porter, two fashion online pioneers since 2000. The group has both online mono and multi brands stores which sell in-season items with Net-A-porter and Mr. Porter while off-season are covered by Yoox and the Outnet marketplaces.

In addition, online flagship stores of iconic brands such as Armani, Cavalli, Kering Group brands and others offer their latest collection on the Internet “Powered by YNAP”.

Another relevant brand is Asos. The English online commerce has 13.4 active customers around the world with more than 200 brands and in 2016 sales reach €1.63 million and sales’ growth of +26%. Figure 2.11 explains what are the share of sales generated by tablets and smartphones in some countries. Smartphones are the most used device in U.S., U.K., Japan and Brazil and mobile covers almost half of sales in every country. iOS accounts for three quarters of mobile fashion sales in the U.S. and the U.K. and six out of ten in Germany, France and Japan.

Figure 2.11: Mobile fashion sales by device type and geography



Source: Criteo’s Fashion Flash Report 2015

According to McKinsey and Altgamma, €200 billion of sales are influenced by online means in 2016. It is fundamental to know that technology conditions are influencing not only how people buy but it also serves as a touch point between customers and brands. In the past, information was gathered between the two parties through print advertisement, TV commercials or simply window shopping to show the latest collection. Now, social media show new collections and website or newsletters can give further details on products. Also, blogs are used to give reviews and hints of the right outfit. As mentioned earlier, the purchasing process has changed. People buy online and through apps and several services are offered as click and collect in store and the delivery at home. Nowadays, people who can’t afford some items don’t need to go to pawn shops. Instead, they buy less expensive or used items on sites like E bay, Amazon and other sites or in discounting shops. Another innovation

is the trend in which fashion items are advertised and showcased. Current fashion producers give fashion influencers new outfits to wear and advertise-on-endorse. Chiara Ferragni, the Italian influencer elected as the first of the “Top World Influencer” by Forbes, in its Instagram’s posts, advertises famous brands, such as Dior, Louis Vuitton, Missoni, Supreme and many others, just by wearing a piece of the collections. “Song of style” is another relevant influencer profile managed by Aimee Song with 4.6 million of followers that advertises with its outfits, brands like Chloé, Dior and others. Now, products don’t need to be at top shelves but there are other ways to show products. For instance, it happens giving the possibility to influencers to wear it. These processes create an engagement between customers and brands, increasing the dependency and the use of internet connection.

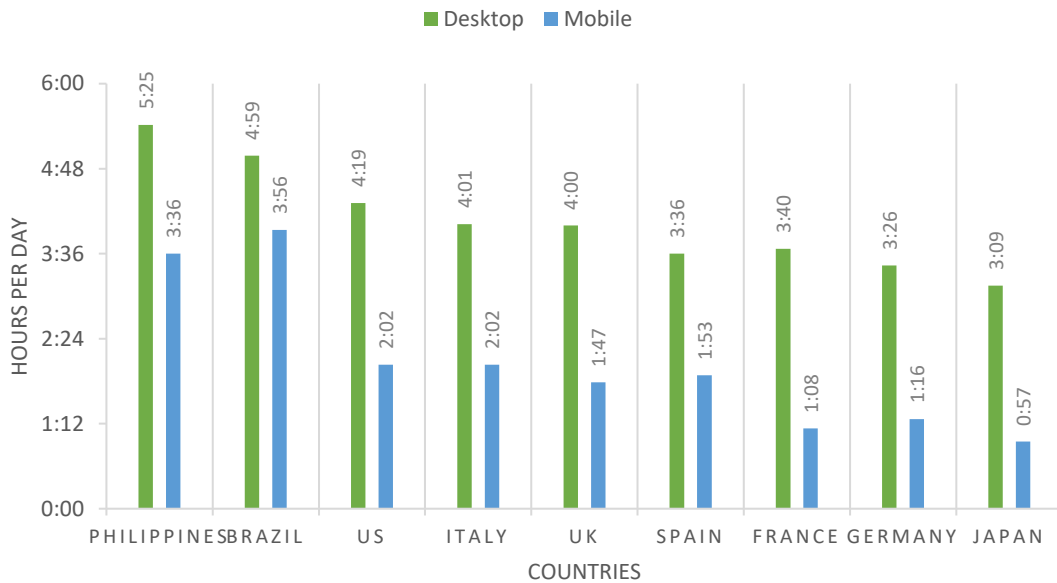
2.3.1 Mobile dependency of users

Around the world, mobile subscribers are about 5 billion and they make up 66% of global population penetration. The growth is about +5% every year; then, 222 million of people have a mobile phone. Projections show that in 2020, 5.7 billion of people will be mobile phones users thanks to a significant contribution of India and China. While active mobile users are 3.448 billion which represent the 46% of population. In Europe, mobile users are 1.101 billion while internet users are 637 million. As result of the wide population of Internet users, there is a general conclusion that all individuals that do not use internet services are old people who do not feel at ease with technology.

The report “Digital 2017” evaluates the time that individuals spend online in different countries. The results are presented as average number of hours spent daily through laptop/desktop and mobile phone. Selecting the most significant results, the figure 2.12 gives a clear portrait of how much time people spend connected. Filipino’s population surfs on Internet for almost 6 hours every day which can be summed to those spend through mobile, and it results in 9 hours daily. Brazil is involved in a similar situation and other European countries have average outcomes while Japan is in the last position.

It is impressive how much time people spend with a smartphone on their hands. By 2018, the time spent by consumers on mobile will be 4 times more than time spent on desktop (McKinsey &Altagamma, 2017).

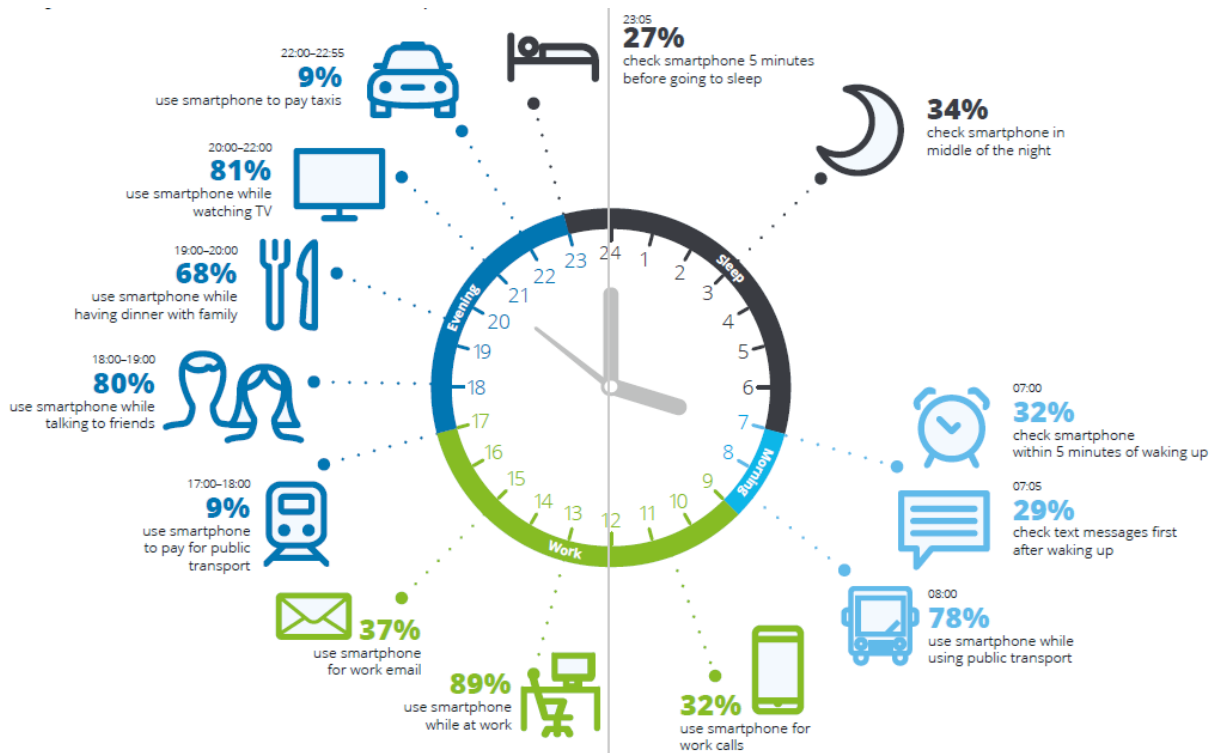
FIGURE 2.12: TIME SPENT ON INTERNET



Source: Digital in 2017 Global Overview

The consulting firm, Deloitte has analyzed mobile habits of individuals on its report “There’s no place like phone: consumer usage patterns in the era of peak smartphone”. According to the report, 10 % of adults of Generation X looks at smartphone immediately after waking up. 33% checks the phone within 5 minutes, while within 15 minutes (52%), within 30 minutes (69%), within an hour (86%), within 2-3 hours (93%) and longer than 3 hours (97%). Approximately, on the same percentages, it is the interval between last check of smartphone and preparing to go to sleep. The main nocturnal activities conducted are checking time, messages and social media notifications and email conducted mostly by individuals between 18-24 years. Figure 2.13 portrays the daily routines that everyone makes with a smartphone in its hands. As the day goes by, the usage of phone increases. 78% of mobile people users are busy with it while taking public transportation and 32% exploits smartphones for work calls. Smartphones are widely used also during leisure activities. 80% of people uses it while they are with friends or watching TV and 68% while dining with family. This phenomenon is striking and it becomes a danger for personal relationships. The main activities which are carried out, include: checking the weather and bank account, control the health status, know new offers of real estates or sales, for example. There is a huge tendency to consult various apps at different times and for different purposes. News notifications are more checked in the morning, maybe while people are making breakfast or waiting at the bus stop.

Figure 2.13: A day in the life of a smartphone



Source: *There's no place like phone: consumer usage patterns in the era of peak smartphone - Global Mobile Consumer Survey 2016: UK Cut*

On the other hand, social media are majorly used in the evening as a mode of relaxing after working activities. According to an article of BBC, in the last years, this phenomenon has become a danger for social and personal relationships. Youths of the current generation are developing an internet addiction. Surveys have highlighted that this psychological degeneration is widely spreading among individuals of 18 to 25-years old. Almost 16% of young people admits spending over 15 hours daily online and this has a negative effect on their personal relationships with friends and parents. Effects of this phenomenon are extreme irritability during the interruption of mobile phone use, isolation from family and friends, sense of panic due to unavailability of interest connection and social ineptness, and inability to carry out face to face conversations.

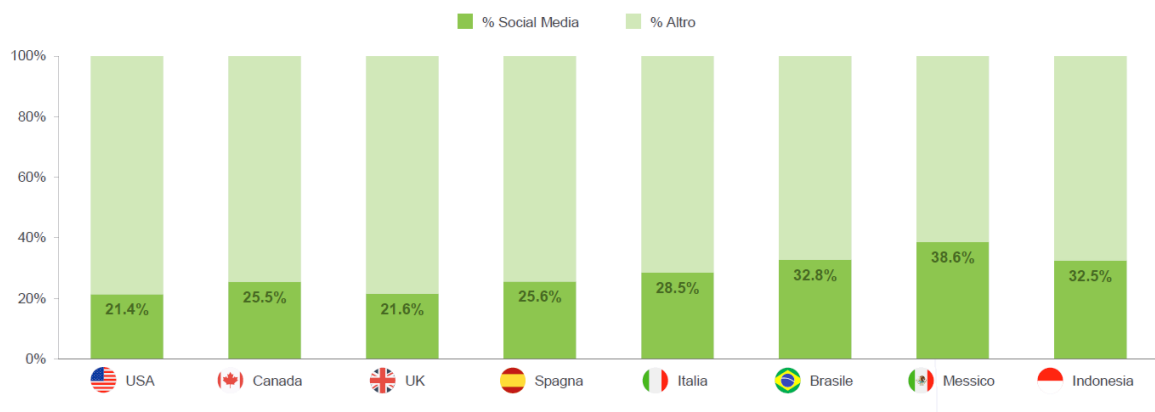
2.3.2 Social media influence

Merriam-Webster dictionary defines social media as “forms of electronic communication (such as websites for social networking and microblogging) through which users create online communities to share information, ideas, personal messages, and other content (such as videos)”. Records state that about 2.789 billion

people have an active social media account and they represent 37% of the total human population. The following statistics represent the population of active social media users in various continents. According to “Hootsuite” and “We Are Social”. United Arab Emirates, South Korea, Hong Kong and Malaysia are the countries with a social media penetration higher than 70%. In respect of continents, Asia has the higher rate of active social media users (East 919 million, South East 306 million, South 264 million) followed by America (South 250 million, North 237 million) and then Europe with 413million, and Africa with only 170 million.

The time spent on social media is approximately one-third of average time in which people use phone. This is shown in figure 2.14 with some countries as points of reference. Philippines, Brazil, Mexico, Argentina, Indonesia are countries in which at least 3 hours are spent every day on social media. At the last positions, there are Germany and Japan; the Germans and Japanese spend approximately an hour in addition to nine minutes and forty minutes respectively.

Figure 2.14: Percentage of mobile minutes spent on social media



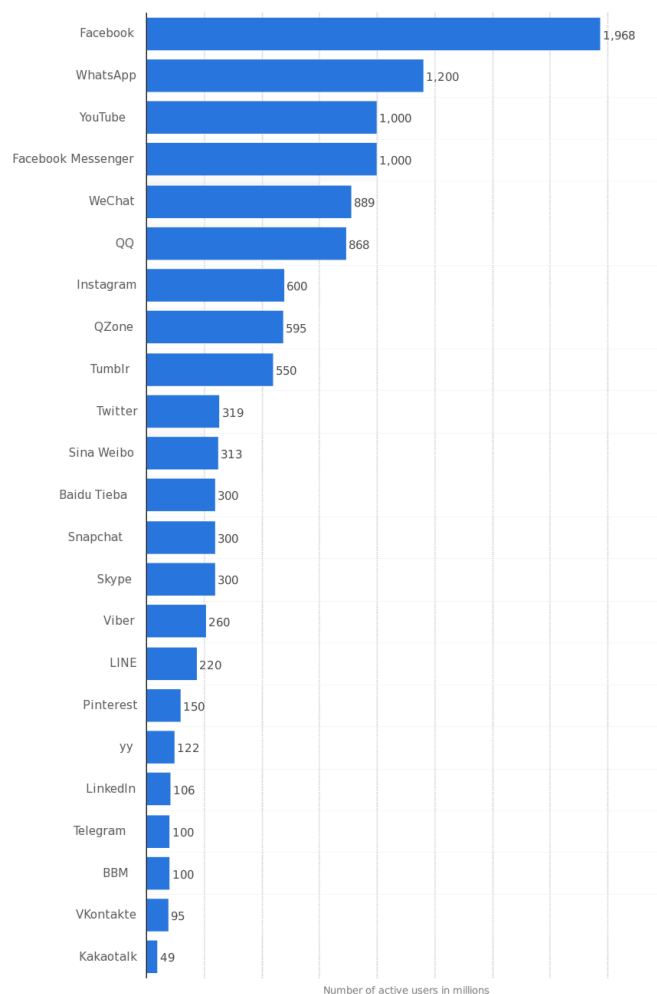
Source: ComScore

It is popular knowledge that as at 2004, Facebook was the ultimate social network and its arrival took the world’s notice. As of today, it is still the most widely used social network with a total number of 1,968 billion monthly active users. 87% of users have access through mobile. Mobile monthly accesses have increased within 2012 to 2016 from 200 million to 1 billion. Most users of Facebook are within the age bracket of 18-34 years old and 55% of global users connect to Facebook every day. This social media is free to join and all it is required for its use an internet connection. Users can share messages though “Facebook Messenger”, exchange links, videos, pictures and follow others based on shared interests or

hobbies. WhatsApp is a cross-platform instant messaging application through which people can share messages in written and audio format, video, pictures, files with delocalization. WeChat and QQ are widespread in Asia, especially in China and in Indonesia. Instagram is a relevant social network especially for fashion industry. It has a mobile app to share photos and videos. Each user has an account through which they follow people and vice versa. Their social interactions are carried out by tagging, liking, commenting, and reposting. They can interact by tagging, liking, commenting and reposting.

Figure 2.15: Leading social networks worldwide as of April 2017

(ranked by number of active users in millions)

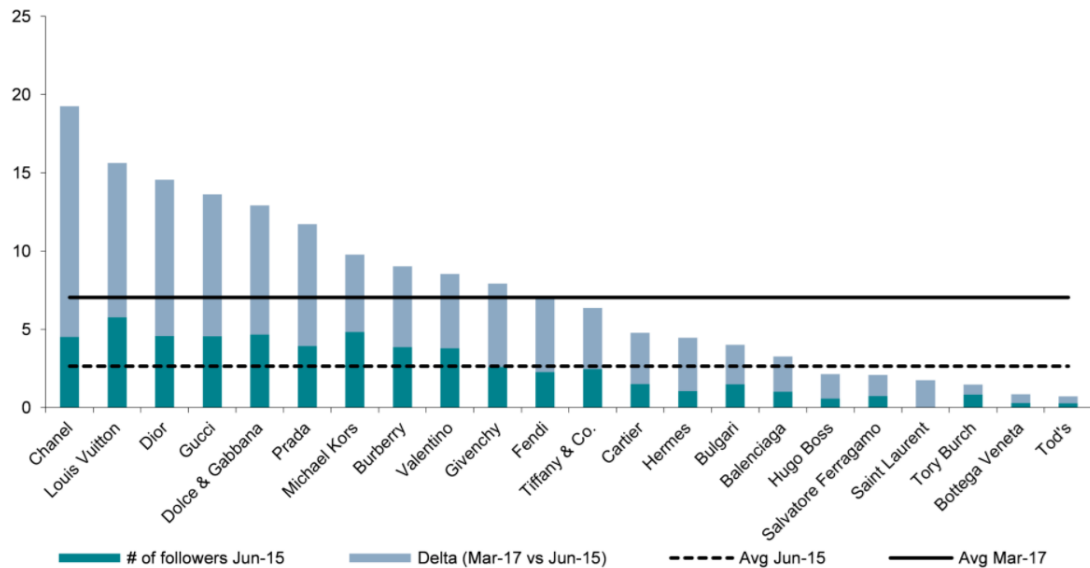


Source: Statista

According to “Luxury goods: the social media boxing ring”, fashion brands use significantly Instagram and its mobile functions because it is the “place to be”, the virtual hub for fashion. It accounts for about 50% of brand posts (up from 30% two years ago) and more than 90% of social actions. Social media traction is growing rapidly and it has become a strategic priority. In June 2015, fashion brands had about 2.5million Instagram followers with an

average 3,000 of posts while in 2017, the amount of posts and followers have almost tripled reaching 5,000 of posts.

Figure 2.16: Number of followers on Instagram in March 2017 (mln)



Source: Exane Bnp Paribas & Trendalytics "Luxury goods: the social media boxing ring"

As seen in the figure 2.16, the number of followers has increased in almost 2 years. There is an average of less than 4 million posts to an average at least of 6 million for the luxury fashion brands analyzed in 2017. Chanel (22,6 mln)¹³, Louis Vuitton (17,6 mln), Dior (15,9 mln), Gucci (15,7 mln), Dolce&Gabbana (13,9 mln), Prada (12,8 mln), Michael Kors (10,2 mln), Burberry (9,5 mln), Valentino (9 mln), Givenchy (8,6 mln) and Fendi (7,5 mln) are the main brands above the average which have a high number of followers on Instagram. Subsequently, the number of posts has increased and doubled from its average of 100 million in 2015. In the top 10, Valentino (5024 posts)¹⁴, Dolce&Gabbana (4724 posts), Michael Kors (3630 posts), Fendi (3519 posts), Gucci (3306 posts), Ferragamo (2614 posts), Tod's (2572 posts), Dior (2529 posts), Prada (2427 posts) and Tory Burch (2415 posts) are the most one. The most liked brands are Chanel with 294,954 likes in a Kristen Stewart adv for Chanel's makeup. Other well-liked brands are Dior and Michael Kors. Obviously, an important role is those of influencers which are tractors of likes and they amplify the brand engagement.

Another relevant social media is Snapchat. This social media app was invented in 2011, in L.A. by students of Stanford University. Its first name was "Taboo" but it was later changed to Snapchat and its main feature is the 24h availability of pictures and videos posted. Through

¹³ Number of followers updated on June 16th, 2017

¹⁴ Number of posts updated on June 16th, 2017

updated versions, the inventors have added other functions such as video chats, live stories, advertisement contents from publishers and magazines, memories to save snaps, "Geostickers", city-specific stickers that can be placed on snaps and messages. Twitter has also played an important role in the world of social media since its advent in 2006. This social network makes its users communicate in a short and concise manner. Interactions are carried out via "tweet" a post of maximum 140 characters. Also in this social media, when there is a person or a celebrity, it is possible to follow and unfollow them. The social network has 319 million of users monthly (Exane Bnp Paribas & Trendalytics, 2017).

Social media gives to the average individual an opportunity to become popular and to influence the fashion world. Companies and fashion brands utilize this mechanism and as a result, fashion influencers become a new category of journalists and trendsetters. Furthermore, famous elites, celebrities play the role of influencers, tractors of likes and amplifiers of the brand engagement. The number of influencers is increasing every day and this is phenomenon is appreciated because it gives a strong individual, personal, point of view on choices available on the market.

However, social media builds a vicious circle through the word of mouth which is the verbal exchange of information that leads to the creation of viral contents on these platforms. This could lead to a vicious cycle because the word of mouth is an influential and quick source of information for customers and it could also be a double-edged sword. Information are fast but this mechanism can spread lies or misrepresented facts.

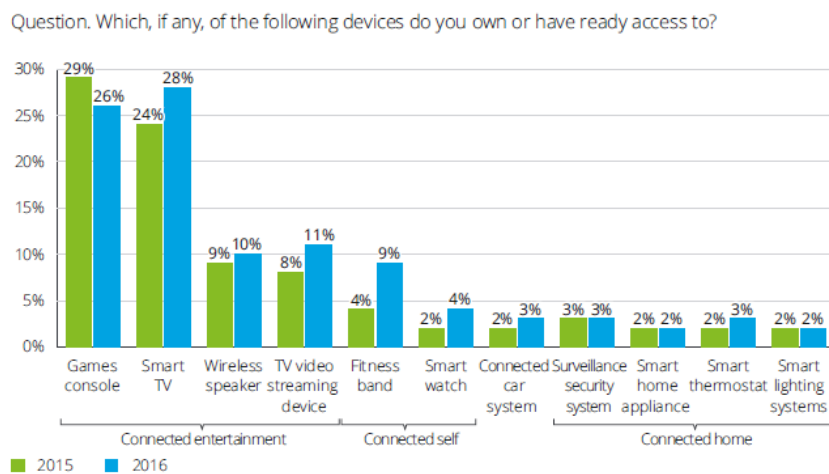
2.3.3 Internet of things

IoT is a new word used in technology and it represents a new opportunity. The term "the Internet of Things" was coined by Kevin Ashton, a member of MIT's Auto-ID Center, in 1999. IoT performs the function of linking Internet with objects and devices connected. It enables devices to be controlled remotely in a network to reduce human intervention and to create an integrated system. The Internet of things (IoT) is "a global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies" (ITU,2015).

IoT performs the function of creating an "electronic identity" of all devices which are in the daily routine. A thing can be virtual or physical but it should be identified and integrated into networks.

This kind of technology becomes an example of a new area which includes innovation such as smart grids, virtual power plants, smart homes, intelligent transportation and smart cities. The expansion of Internet-connected automation will increase the amount of data available and then, aggregation systems will be necessary to optimize products, services, and operations. In next years, the connection between devices and internet will be automatic, which will increase the data traffic and applications to support it. The impact of the Internet of Things on the global economy might yield a profit as high as €6 trillion by 2025(McKinsey,2015). However, there are some doubts concerning perspectives of business opportunities, due to the amount of applications being developed, the potential markets affected and the fact that the trend is still nascent. Three years ago, industry analysts predicted that, by 2020, the market for connected devices would be between 50 billion and 100 billion units. Today, the forecast is far more reasonable but it is still sizable around 20 billion or 30 billion units. This change of expectations is in line with what was seen in past introductions of new technologies. In 2013, 7/10 billion objects were part of IoT while in 2020, the estimation is about 26/30 billion with an annual growth of 15-20%.

Figure 2.17: Adoption of IoT devices, by categories and product, 2015-2016 %



Source: *There's no place like phone: consumer usage patterns in the era of peak smartphone - Global Mobile Consumer Survey 2016: UK Cut*

As shown in figure 2.17, the most used widely devices are games consoles and smart TVs because they are the most hi-tech products which are part of the mass market. Other devices as wireless speaker and TV video streaming are entertainment tools which are becoming relevant in recent years. Fitness bands and smartwatches have followed the same trend and their adoption is doubled in one year. The demand for the first generation of Internet of Things products will increase as component technologies evolve and their costs decline, as it happened for smartphones. WIFI and Bluetooth technology need to develop their abilities to be flexible to every use of these devices.

The main components such as semiconductors and chips are evolving every year and they will reach in few years a complete optimization of all features. The innovators are establishing the rules of the game, creating associations and consortiums to establish interoperability standards and application programming interfaces (APIs) which are the basic commands and data transfer in these devices.

The IoT in its purest definition is limited to objects that are able to communicate via the Internet. Nevertheless, everything that is directly connected to the Internet should be a thing. People cannot communicate via the Internet except through the mediation of a thing. Smartphones are essential to the use of these devices. Smart devices are connected to Internet via smartphones, facilitating their usage. The principal reasons why customers may have been resistant to many IoT devices are the need, the cost and the ease of use. Some types of IoT device may simply not satisfy primary needs and they can also be significantly more expensive and their efficiency can be limited by procedures they require.

Projects about IoT are difficult to execute and this creates financial channels where entrepreneurs behind these projects ask the public to fund by pre-financing their development and production and it is called crowdfunding. Producers can realize their prototype and funders usually buy the finished product or receive promotional material, depending on the level of funding they have provided.

The evolution of the IoT is underpinned by four main trends in high technology development: big data, the cloud, M2M (Machine to Machine) communication and sensors. The combination of all these elements improve machine learning applications and aid in the achievement of a new level of artificial intelligence. Data have become a core asset which constitutes a vital resource for innovation, new industries and applications, and competitive advantage.

IoT applications are several and it involves every aspect of human life. Home is one of the main areas in which technology can be applied. For instance, it could aid energy management, the implementation of security measures and chore automation.

Another main function can be represented by workplaces like offices which can employ the use of devices to monitor employees' activity, and in turn, to increase augmented reality and security controls. Also in factories, IoT can help employers 'efficiency and productivity with real time production dashboards, auto-sensing equipment to control environmental conditions and sensor to monitor machine health and quality of products. High tech applications can ignite changes in the market competition and help to produce new business model that companies can adopt to create a competitive advantage.

Also in transportation vehicles, there can be services which can automatically diagnose malfunctions or give maintenance recommendations, real time traffic conditions and other special functions that can be useful to survive in a traffic jam. The location of technological applications can be heavily concentrated in cities and it is useful for urban life, governance planning, and the management of urban infrastructures and services which will in turn, save money, time and energy. For example, control of electrical distribution, water leak identification, traffic control and transportation schedule management and air and water quality monitor are examples of some possible improvements.

The essentiality of IoT technology increases on a daily basis. It is expected that in the nearest future, people will become more familiar with this branch of technology and it will play an important role in the various spheres of human life.

Nevertheless, there are some challenges faced by these new technologies. First at all, the privacy issues which is one of the most debated issue. IoT employs the use of big data to shape applications but this can threaten customers' privacy and render it prone to invasion and all forms of cyber-attacks. Countries need to establish regulatory and protocols to define legal parameters and specify the applicable standards.

Chapter 3: Wearable technology

“We don't want humans to be aware of what they are wearing. It has to be self-contained piece that can charge itself, store energy and perform useful functions. Otherwise, it's an extra burden that nobody needs in our lives.”

Maksim Skorobogatiy, referring to wearable technology

The world is finally starting to wake up, and it's connecting everybody. Digitalization, Internet domination, e-commerce and social media diffusion are the first steps towards the integration of technology in every day's life. Internet of things is the next level which englobes wearable technology and it is the starting point for the assimilation of technology and products used in daily life. The “Information age revolution” is based on the growth and the adoption of hardware component, innovative software and ecosystems.

A big number of machines and devices that humans have for long taken for granted such as cars, appliances, cooking devices, lights, watches, clothing will be networked to sense and to communicate to each other. There will be a “programmable world” where “things will become intuitive [and] connectivity will extend even further, to the items we hold most dear, to those things that service the everyday needs of the members of the household, and beyond” (SmartThings, 2013). In other words, this emerging world is composed by “enchanted objects,” which are objects that “start as ordinary things,” but then they are “augmented and enhanced using emerging technologies—sensors, actuators, wireless connection, and embedded processing—so that it becomes extraordinary”. “The enchanted objects gain some remarkable power or ability that make them more useful, more delightful, more informative, more sensate, more connected, more engaged, than its ordinary self” (Rose, 2015) This “magic” is invisible for customers and it acts in their background.

3.1 What is wearable technology

In literature, an official definition for wearable technologies is not present. However, there are expressions which have very close meanings, words such as “wearables”, “wearable devices” “smart wearable”. Wearables are defined as “an application enabled computing device which accepts and processes inputs. This device is generally a fashion accessory usually worn or attached to the body. The device could work independently or be tethered to a smartphone allowing some kind of meaningful interaction with the user” (Çiçek, 2015).

Wearables are “mobile electronic devices that are worn on the body, or attached to or embedded in clothes and accessories. These mini computers and sensors can display, process, or gather information, and tend to have wireless communication capabilities” (Morgan Stanley, 2014).

Wearables are seen as an extension of past computing cycles. This refers to desktop computers, notebooks and more recently tablets and smartphones which have become more personal and portable. Simply described as the technological devices worn on a user’s body, wearable technology can represent all devices which can be “integrated, seamless, transparent, comfortable, portable, multi-functional, useful, reliable and practical” (Çiçek, 2015). While Investopedia states that it is “Electronics that can be worn on the body, either as an accessory or as part of material used in clothing”.

Terms such as “wearable technology “, and “wearables” all refer to “electronic technologies or computers that are incorporated into items of clothing and accessories which can comfortably be worn on the body” (Wearable device magazine, 2014). The potential benefits of the wearable devices are numerous. In professional sectors, these devices could serve as training agents, they could act as time savers by enabling real-time feedbacks and productivity through the creation of hands-free guidance tools.

In retail businesses, wearable devices can improve point of sales processes, customer service and speed up purchasing processes. Wearable technology is suitable for the creation and enhancement of the customer experience. It can help to improve checkout and payment processes, to give access to special offers and suggest suitable deals with a focus on customer’s needs and preferences.

In addition, wearable devices can be used to collect data and interpret them in order to intercept information concerning pre-store and instore behaviors which in turn, help fashion producers reach a new level of “interconnected retail”. Another characteristic which makes them a useful tool in every professional sector is its hand free function which permits full accessibility in every field of application. A fundamental tool for the success of wearable is the “human centered design”. This involves the adaption of the capabilities and systems of the firm to customer and user experience. Also, wearable do not only need to deliver the right information rather they need to deliver the right insight and help to transform that insight into action. Nevertheless, wearable technology is at an “early adopter” stage in respect of public acceptance and commercial use. There is a strong speculation about the authenticity of its innovation or the probability that it is just a mere fad.

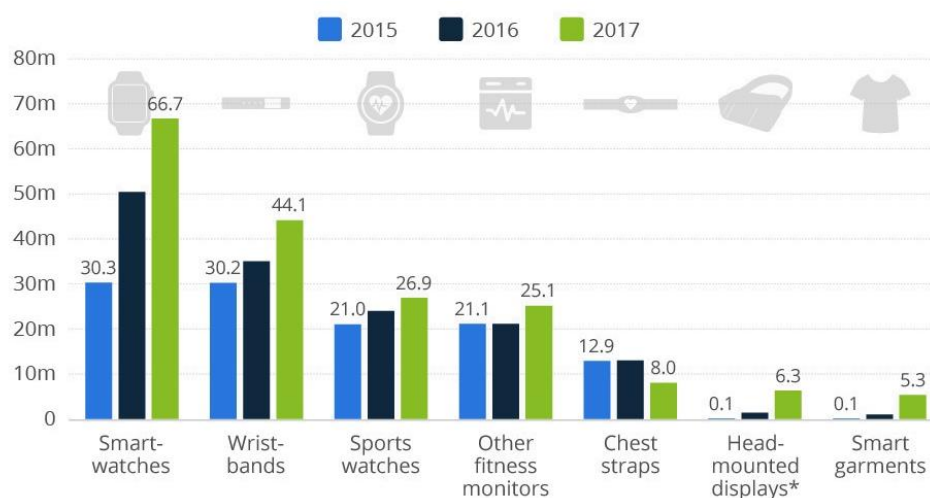
It is certainly not a fad though the growth of this segment is hard to achieve. This is because it is still part of an innovative field and it can discourage some investments for businesses

especially startups which do not have a solid financial basis. Furthermore, there have been significant milestones in the development of wearable technologies such as the advancements in the innovation of mobile technologies which have facilitated the implementation of the key features of wearable technologies. In fact, its major feature, which is the ability to connect to the internet and enable the exchange between a network and device, is possible due to the modernization of connection technologies. The advent of several innovative elements such as cloud services and Bluetooth sensor have upgraded the function of smartphones and of other digital accessories. With the aim to be useful, these technologies need to transmit data that is not just informative, but also prescriptive, giving to customers a clear understanding of action steps they should to take.

3.2 Trends and data

The market is becoming wide and it continues to explode and create new niches. The wearable technology market is worth around € 15 billion, and it will reach € 29,5 billion in 3 years¹⁵. According to Statista, the number of connected wearable devices worldwide was 325 million in 2016 and it is expected to be 453 million in 2017, 593 million in 2018, 722 million in 2019, 835 million in 2020 and 929 million in 2021 as the market enlarges.

Figure 3.1: Forecast of worldwide wearable devices sales (in \$ million units)

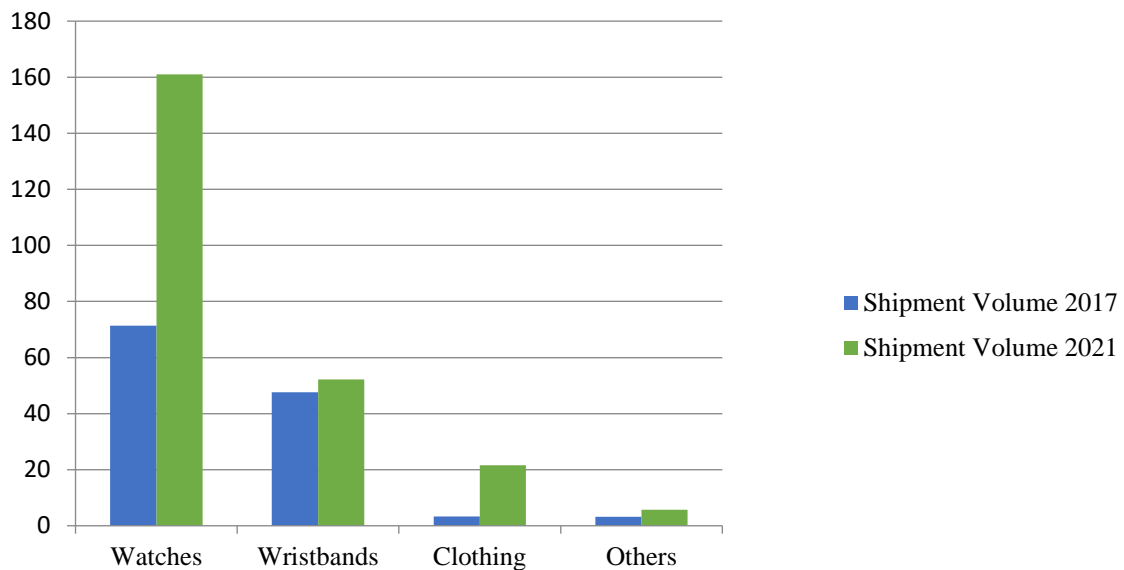


Source: Statista

¹⁵ *Accessori elettronici a 34 mld \$ in tre anni*, 2017, “Pambianco News”
www.pambianconews.com/2017/03/14/wearable-technologies-a-34-mld-in-tre-anni-210751/

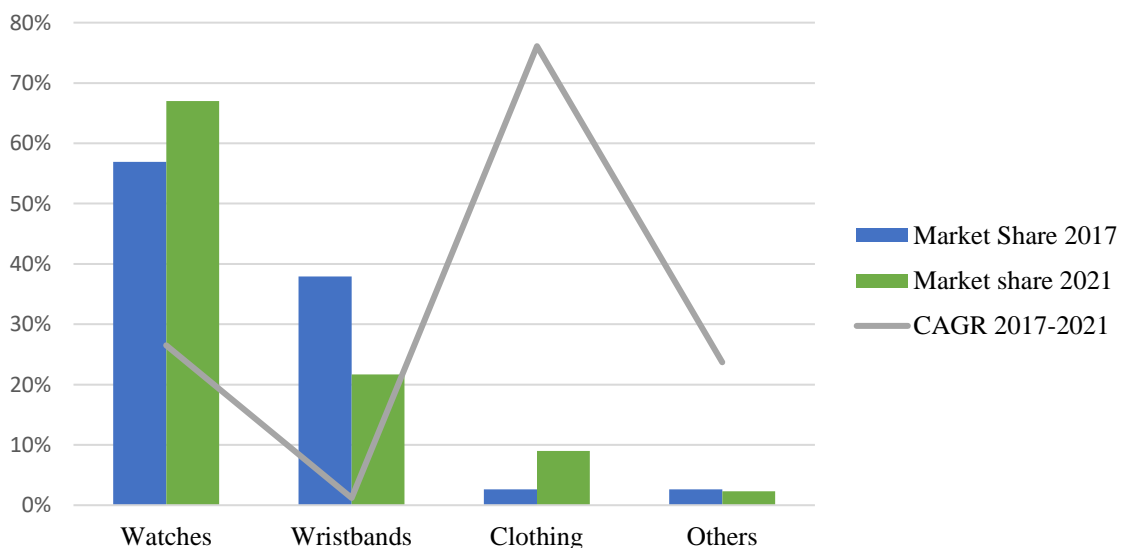
As shown in figure 3.1, the sales are lucrative and profits are seen especially in the sales of smartwatches and wristbands. Smartwatches' sales have doubled in two years from € 25.7 million in 2015 to € 56.7 million in 2017. Another category like virtual reality display is growing quickly from less than € 1 million to € 5 million in 2017 even if it has a small market share. Shipments volume for 2017 have been forecasted to be 125,5 million units while for 2021 they have been projected to reach 240,1 million, with a CAGR of + 18,2%.

Figure 3.2: Shipment Volume of wearables (in million units)



Source: IDC Worldwide Quarterly Wearables Device Tracker, June 21, 2017

Figure 3.3: Wearables market share 2017, projections for 2021 and CAGR 2017-2021

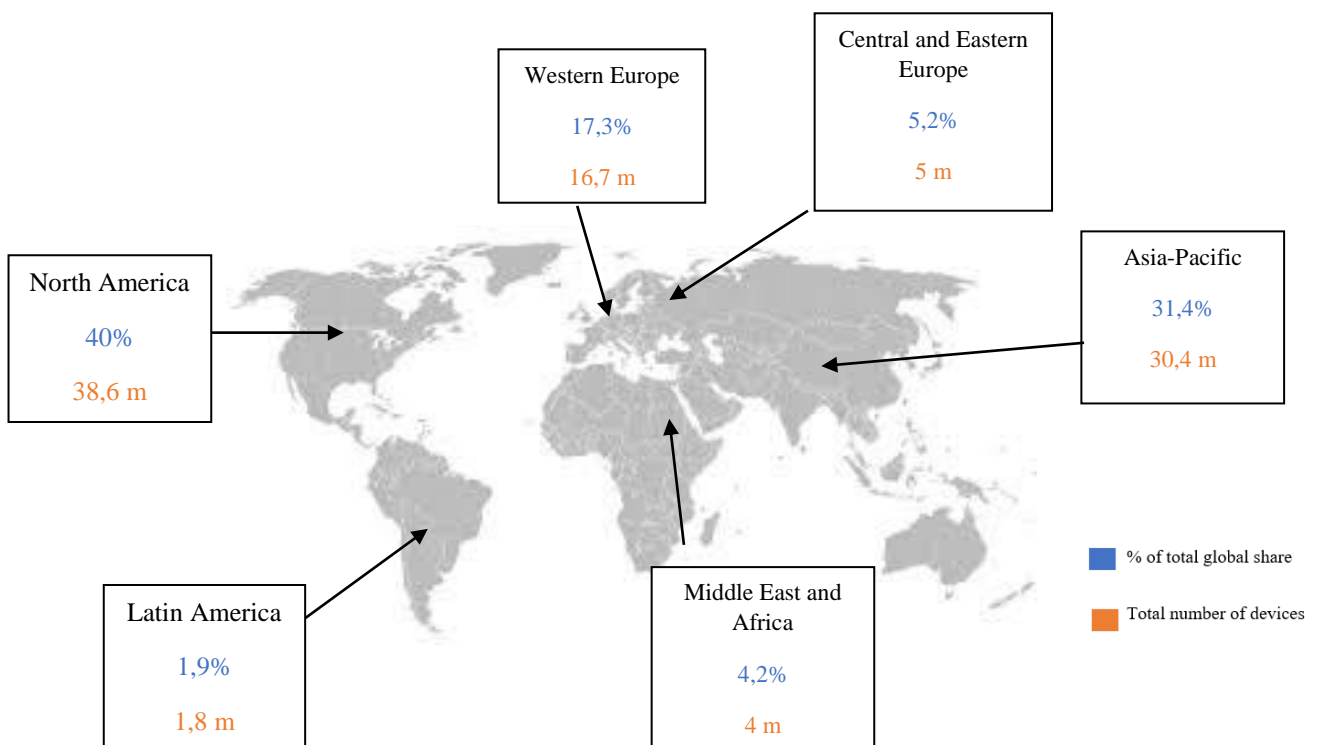


Source: DC Worldwide Quarterly Wearables Device Tracker, June 21, 2017

As figure 3.2 and 3.3 have shown shipments for 2017 will mark a 20.4% increase from the 104.3 million units shipped in 2016. Watches and wristbands are the most profitable categories as mentioned before with 71.4 and 47.6 million of units shipped. In 2021, watches will maintain its premium share while wristbands will lose its market share in order to give room to the clothing category. Clothing's shipment volumes will be more than doubled and its growth will register a + 76% from a market share of 2,6% in 2017 to 9% in 2021.

The analysis by region shows that in 2016, American and Canadian dominated the market with a global share of 40% and 38,6 million of item sold. They are tailed by Asian, who are trend followers and they represent almost more than 30% of the entire market and they buy 30,4 million of devices. Middle East and Africa seem to be still cautious and reluctant about wearables and they represent around 4% of the market. Europe represents about the 23% of global share and 21,7 million of devices are shipped to the Old Continent.

Figure 3.4: Wearables market by region



Source: Smart Wearables, Reflection and Orientation Paper

In Europe, the wearable device market experienced a +45% growth in 2016 with sales of 13 million units. Great Britain is the largest contributor in Europe, followed by Germany, then France and Italy, and in the last position by Spain. Health and fitness trackers represent 53%

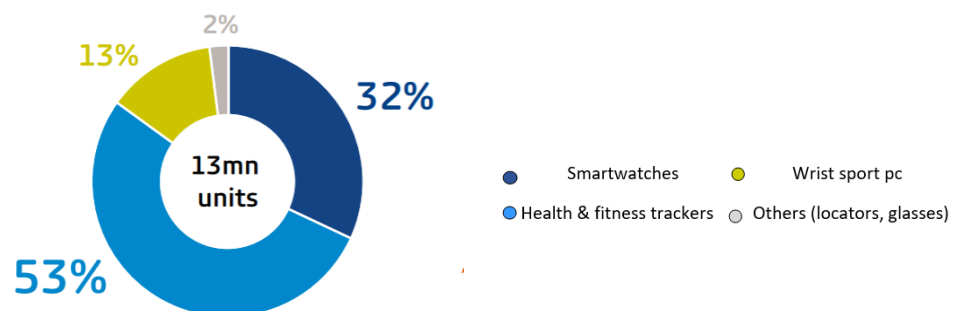
of the market, followed by smartwatches with 32%. While portable computers for wrist cover only 13% and the other devices account only for 2%.

In 2012, Germany acquired the largest share (32%) but advancements in UK have overturned the ranking. In 2015, 3 million of devices were sold in UK while in 2016, British have bought 5 million of smart devices. In the next four years, it is projected to sold 33 million units. Activity tracker category was the most sold one but also virtual reality devices have reported a high growth rate. In 2016, 800 thousand of virtual headsets were projected to be sold¹⁶. The demand for wearable technology is expected to rise in UK in the coming years and thus the region is analyzed to grow at a CAGR of 41.8% over the forecast period.

Scandinavian region includes Denmark, Norway and Sweden and these regions are involved in several projects. The growth of these countries will record a CAGR of 43.1% over the forecast period of 2014 to 2019¹⁶.

The growth is related also to the introduction of innovation systems such as contactless payment and mobile payments though platforms. Kevin Jenkins, UK & Ireland Managing Director at Visa said: “In Europe, we’ve recently seen Apple Pay launched in the UK, France and Switzerland, Samsung Pay has launched in Spain and Android Pay in the UK. We’ve also seen a new era of wearable payments: smartwatches, wristbands and even clothing. It’s clear that this trend will continue to accelerate, enabling consumers to choose the connected device that fits with their lifestyle”¹⁷.

Figure 3.5: Wearables in Europe by category

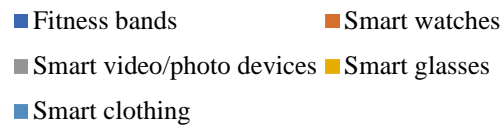


Source: GFK's tech trends 2017

¹⁶UK Wearables Sales to Reach Five Million Units in 2016, “CCS Insight”, 2016, www.ccsinsight.com/press/company-news/2608-uk-wearables-sales-to-reach-five-million-units-in-2016

¹⁷Mobile Payments soar as Europe embraces new ways to pay, 2016, “Visa Europe” www.visaeurope.com/media/pdf/40172.pdf

Figure 3.6: Types of devices owned in England



Source: Pwc report, *The Wearable Life 2.0: Connected living in a wearable world*

Analyzing the European wearable device market from one dimension with the use of England as study case, the situation is not different. Surveys show that fitness bands and smartwatches are the most used devices, followed by the other categories, confirming the global position.

The presence of wearable devices in England’s fashion market is progressing at a moderate pace but companies need to create more awareness and generate customer’s interest. The main aim should idealize the right experience which attracts customers by developing digital assistants, cellular connectivity, and connections to larger systems, at home and in the workplace. Certainly, in the next few years, the market will see a proliferation in the diversity of devices, and a decline in prices that will make them more affordable to a wide range of customers.

3.3 History

Wearable technology arises from the field of ubiquitous computing which commits to the “vision of interweaving technology into everyday life by making technology pervasive and lessening the friction of interaction between human and machine”¹⁸.

The first model of “wearable technology” can traced to the invention of simple mechanic watch. The history of the common wristwatch began in the early 1500s, with the first modern clock which was designed by the German inventor, Peter Henlein. Henlein also known as the

¹⁸ S. Deren, G. M. Gannon, K. Sicchio, *Crafting Wearables*, Apress, 2016, pp.3-10

“father” of modern clocks developed small watches that could be hung from a chain around the neck and worn as a necklace. The popularization of pocket watches began in the late 1600s, men started to carry watches in the pocket of their coat. Wristwatches appeared around the same time, but they were firstly worn by women as ornaments but due to its portable nature, watch makers began to produce wristwatches for members of both sexes. Over time, the watch evolved over time, becoming smaller, more detailed and mechanized.

Furthermore, the early 20th century saw the utilization of wristwatches in the military sector. In 1904, aviator Alberto Santos-Dumont commissioned the famous jeweler Cartier to create a timepiece that could be worn around his wrist, and allow him to keep his hands free while piloting plane. The wrist became recognized as a convenient place to wear a watch, and many soldiers began wearing watches to help synchronize time during war. The wristwatch became widespread as a wearable after the World War I and continues to be redesigned and readapted today.

In the Asian continent, Qing dynasty developed the first smart ring in 1644. It was called “Abacus ring” and it functioned as a basic calculator. The ring was 1.2cm long and 0.7cm wide, the abacus was on the right with seven rods and seven pins. On each rod, sums were calculated with the use of a bead. This bead was moved back and forth using a small tool such as a hairpin. The ring was common among traders and it was used to facilitate calculations while traveling from one port to another.

In the late 19th century, electricity became adapted for the use of ornamentations, design of costumes and theatrical shows and exhibitions. In 1890, the “Electric girl lighting company” was founded. Female dancers wore electronic lights on their foreheads and batteries concealed in their costumes. When they touched a button on their belt, the lights illuminated and created an attractive view. This lighting system was adopted by Theodore Dubois in the debut of his electric ballet *La Farandole*. The female dancers wore diadems with electric lights and with a slight pressure on the battery in the belt, the lights shot up in the middle of their foreheads. The lighting system has been implemented in all forms of entertainment by artists and producers.

During the WWI, a useful device was the pigeon camera. A pigeon was fitted with an aluminum breast harness to which a lightweight time-delayed miniature camera could be attached. They were used to capture aerial photographs behind the enemy lines and also to deliver medications.

The 1960’s brought about a wide range of technological inventions in the market. In 1961, two mathematicians, Edward O. Thorpe and Claude Shannon, built a shoe that was considered as a tool used to cheat at roulette. The idea was to hide a timing device in the shoe, which

would give a fairly accurate prediction of the number which the ball would land on. Radio waves were used to communicate this number to the wearer of the shoe via an earpiece, allowing him to make the right bet. When tested by the inventors, the gadget increased the odds of winning by 44%. However, when Thorpe and Shannon took their gadget to the casino to test it, they experienced several hardware problems and were not able to double their money as planned¹⁸. Years later, the shoe became a computational device. The data was input by the user by tapping a switch under the big toe in the shoe; the signal was then relayed to an output system, which was hidden in the player's shirt.

The year 1972 arrived with the invention of the first electronic digital watch, the Hamilton Pulsar which hit the market. The first "Limited edition" of 100 pieces was made available in 18KT solid gold. However, due to its huge success in the market, a more affordable stainless-steel version was released to the market. In 1976, the company digitalized its design further by using new LCD display technology, and thus, the first calculator watch was invented. The calculator watch was redesigned by Casio in 1980 and became widely popular as an iconic nerd accessory.

The first cell phone was born in 1973. It was invented by Martin Cooper, a R&D director of Motorola. The first cellphone call was made in April 3rd, 1973. The phone needed to be charged 10 hours in order for a user to make a phone call for 30 minutes. The first generation of cell phones could only make and receive calls or send short messages. Only in the 90's, Nokia became a competitor of Motorola and it opened the market for other competitors who could produce cellphones that could perform a wide variety of advanced functions.

The late 70's, music become accessible with a personal portable Sony Walkman. The first of Sony's iconic portable cassette tape player was based on Pressman system, a portable tape recorder. Sony modified the device by integrating stereo playback and earphones. The invention of Walkman changed the recording industry and fundamentally how people experienced music.

Steven Mann is known for his digital and computerized wearables. In 1981, he projected a computer with text, graphics, and multimedia and video capability to his backpack. He utilized the mass production of microchips, started his prototype called "Eye tap". Mann is known as the father of wearable computing and the first person to call himself a cyborg. Mann has invented countless wearable computational perception devices throughout his career. The most notable are the eyewear system which he built and rearranged and the computerized wireless webcam which aims at enabling users record what they see through their right eye and at the same time watch what they have recorded.

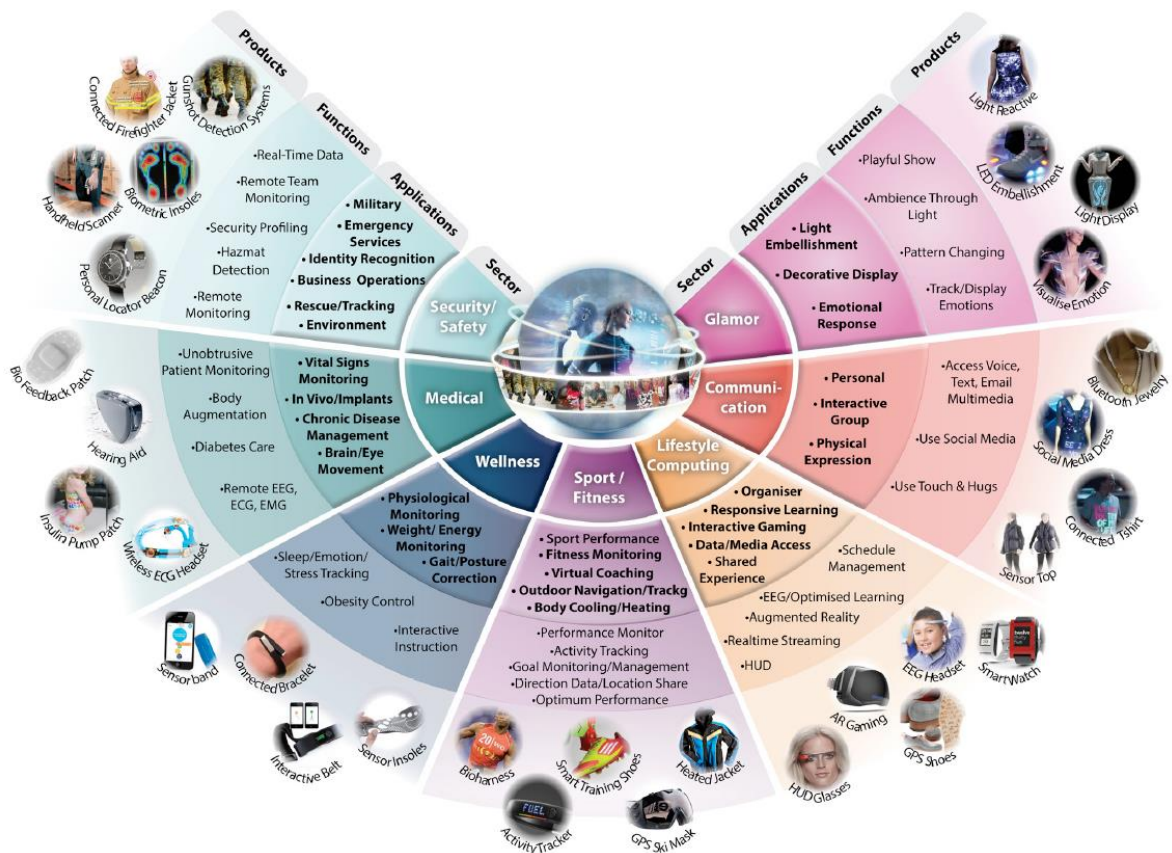
The advent of personal computers in the year 1980 and 1990 led to the production of portable and transferable computer. In these decades, Apple started its path, projecting advanced and commercial types of personal computer from the mechanical Apple I and II of the 70's to the Macintosh, its biggest success which defined the history of the company.

The first cellphone with a complete keyboard was the Blackberry, released in 1999. This model of cell phones came with the ability to send messages and e-mails. This was a big step forward to the current phones. It also has helped producers to develop more mobile technology for various reasons asides from the act of communication.

Wearables have evolved over time, adapting to new technological advances and cultural needs and all these inventions are the basis for the devices which are now available on the market.

3.4 Fields of usage of WT

Figure 3.7: Wearable technology applications



Source: Wearable technology: enabling the connected lifestyle toward function with style, Beecham research

Wearable technology does not exist only in science fiction anymore rather it has become part of the real world. The functions of wearable technology are different and they play dynamic roles in the various spheres of life such as security, health and wellness, fitness, lifestyle, and so on. Communication and fashion sector are the main ones. The applications and functions are unlimited and constantly evolving.

Figure 3.8: Body Map



Source: Google Images

As shows figure 3.8, wearable technology can be installed in every part of the body. From the head to toes, a device can be worn as accessories. Eyewear can be substituted by smart glasses. All clothes can become smart with several functions incorporated and this is possible also for shoes. Accessories can be inserted in an outfit; jewelry, tattoos, wristbands, make-up can become part of a sensor system. Some of these functions and modifications are still prototypes and labs projects where high-tech engineers use to challenge their knowledge, scientific orientation and understanding in order to build and to fine-tune these futuristic devices. Many of these devices however are in the market, gaining market shares and sales.

3.4.1 For health

One of the main application of wearable technology is towards the improvement of healthcare. The utilization of technologies has brought benefits for both patients and healthcare companies. The advancements in this field of technology are contributing and offering innovative solutions, to some of the most healthcare's significant challenges. "As wearable technology becomes cheaper and more sophisticated, and data quality improves, these devices and their associated apps will become a part of consumers' lives and the health ecosystem."¹⁹

These devices produce data which can be employed by different type of users. The use of wearable technology is part of what is called "mHealth". "MHealth" refers to the practice of medicine and public health supported by mobile devices, PDAs (personal digital assistance), and other wireless devices. In 2013, it produced revenues worth € 2 billion but it is predicted to turn out revenues worth € 18 billion in 2018 with a growth of + 54%. In Europe, this will be worth € 6 billion with a +61,6% increase.²⁰ MHealth is based on the TEC "the use of technology to enhance quality and cost-effectiveness of care and support and improve outcomes for individuals through the application of technology as an integral part of the care and support process"²⁰.

Individuals can manage their health parameters and platforms which permit to patients to share medical data and to take necessary actions more efficiently. They can record information on heart rate, brain activity, sleep patterns, glucose levels, blood pressure, stress levels and many more. Other signs which are easily lost in diverse cases are collected to a personal activity logs. Thus, the availability and accessibility of patients' records in real time can increase trust and engagement. Also, they can enhance the level of people's self-control and health security. The possibility of being able to track vital signs can consequently help to avoid and prevent examinations and even so, additionally recognize and understand long-term alterations. The more that healthcare data becomes digitally accessible and monitorable, the more patients will positively value the availability of these devices and avoid expensive healthcare treatments.

Healthcare organizations such as hospitals can utilize Mhealth to improve care and diagnosis, treatment and management of various illnesses. Also, they can effectively increase the quality of the services and subsequently reduce costs. Furthermore, some hands-free devices can help

¹⁹ Pwc, *The Wearable Future: Consumer Intelligence Series*

²⁰ Deloitte, *Connecting health: how digital technology is transforming health and social care*

professionals to maintain sterile environments. For example, medical staff can use smart glasses or other devices to receive information without harming sterilization. In addition, they can serve as a medium by which they deliberate and collaborate with colleagues to solve a surgery's complication or guide training exercises. Doctors can read on glasses and get quick access to patient's correct medical information in order to make the right prescription and save time spent on searching paper records or a computer screen.

There are more electronic devices which have been developed for various health functions. Electronic fabrics, for instance, help to design and produce special clothes used for phototherapy treatments and other diagnostic purposes for the treatment of epilepsy and other illnesses. Some hospitals have tried to use platforms which can include information and records of a patient. These platforms are personal and only relatives of the patient can have access to register and check parameters. In the future, this service can be performed by a smartwatch or glasses.

In countries like U.S. where health insurance has been private, these devices can be useful. Insurers can reduce costs and improve members' health plans. Some agencies offer incentives for individuals who use these devices and demonstrate their improved health and living conditions or reward them in cash.

Pharmaceutical and life sciences companies can run more specific clinical trials, monitor medical effects and reactions and gain regulatory approvals.

The market for healthcare devices is constantly growing; in 2014, it was worth of € 1 billion while in 2018 it has been projected to value € 2.5 billion and Europe counts for 25% of global share.²¹ Worldwide shipments for healthcare wearables will increase from 2.5 million in 2016 to 97.6 million units annually by 2021.²²

The benefits in this field are subdued by some downsides. Sometimes, these devices for health reasons are not so fashionable. As a result, customers are not being on buying them to their lack of aesthetic designs. In addition, the incorporation of sensors and mechanisms into devices designed to be worn on the body can present some physical challenges. Waterproofing is one of the main issue since sweat or washing can introduce damaging moisture into the wearable.

The devices' compact size can become a problem. Constrained power reserves or frustratingly small screens and displays, especially for old people not at ease with advanced technology, could make it more challenging to use.

²¹ MaRS, *Wearable Tech: Leveraging Canadian Innovation to Improve Health*,2014

²² Tractica, *Healthcare Wearable Device Shipments to Reach 98 Million Units Annually by 2021*,2016

Another downside is the issue of delayed production due to challenges such as market and legal complexity. In July 2014, Google signed a deal with Novartis, a global pharmaceutical company to develop a smart contact lens with the capacity to monitor the wearer's blood sugar levels. The launch was programmed for 2019 but the project has been delayed due to its extreme complexity. Both companies have been compelled to regroup and deepen their studies. The lens is expected to help people who suffer from diabetics by recording information about blood sugar levels and upload these records into smartphones. This process would help monitor the health conditions of the patients and notify them when they need to take preventive medications.

3.4.2 For fitness

Fitness is a state of physical and mental health and well-being and, more specifically, the ability to perform aspects of sports, work and daily activities harmoniously. Thus, it can enhance the creation an equilibrium between all spheres and body functions. This can be achieved with moderate training, healthy nutrition and attention to all round selfcare. Developments in smart healthcare technology are currently closely related to developments in fitness devices.

Fitness trackers and fitness bands are devices which can help to maintain or improve personal state of fitness. They enhance positive attitudes towards health habits by automatically and manually collecting data. The information that is collected by wearables can be of various types. The basic function of a fitness tracker or band however, is to record the number of footsteps a person takes in a given period of time and transmits that “data either to a mobile phone application exclusively, or to a fitness company’s servers by way of an application installed on a mobile phone”²³. This mechanism can help users to understand their body and can support them in reaching specific fitness levels. Therefore, it spurs the user towards the attainment of new and challenging targets. The sensors in the wearable can gather other information, for example: altitudinal changes (hiking on higher or lower ground levels), heartbeat and geolocational information, length and quality of sleep, intensity of activity (light, moderate, vigorous) and type of activity (walking, swimming, sports). Brands use GPS sensor to collect other information relevant for the profile. Others also encourage customers to manually input information that can be useful to have a complete portrait of the person. For

²³ Open Effect, *Every Step You Fake: A Comparative Analysis of Fitness Tracker Privacy and Security*, 2016

instance, specifying all food consumed and their nutritional values, and the time of lunch and dinner, personal moods and activities carried out, can help to design specific fitness goals. Some brands have communities where customers can interact with others about their habits and challenge themselves.

In this way, individuals can find meaningful correlations between diet, training, sleep, and mental, physical, and cognitive well-being.

In this category, the activity trackers and smartwatches play the major roles even though there are doubts towards considering watches in the analysis. Both devices have been merged because they process similar features. This merger has enabled an interconnection between the two devices. However, a smartwatch can act also as heart beat measurer while fitness tracker can carry out a range of features that go as far as acting as a portal for payment. Another main driver for this category is smartphone penetration. Smartphones have become fundamental in life, wearables are more desirable. Smartphones are important for activity trackers because they can be synchronized to give a complex analysis of vital data.

The global revenues in this category (which include also apps) have amounted to € 3.8 billion in 2016. The majority of revenues is generated by wearables fitness devices which cover about a 60% share of the market then € 2.2 billion. Globally, United States is the country which has the highest spending rate, around € 1 billion in 2016, followed by China which had similar results. Amongst the European countries, Germany is one of the leading country with revenues of €140 million in 2016, followed closely by UK with revenues of € 130 million in 2016²⁴. Fitness' revenues in Europe were about € 830 million in 2016. In specific, wearables registered revenues for € 503 million in 2016 and it has a projection for 2021 to achieve € 1 billion revenues with a +16,2 annual growth.²⁴

Nevertheless, some regulations have become obstacles during the adaptation of these wearable devices. Medical authorities are considering the implementation of software for health as medical devices and this will consequently have some costs effects on companies who should meet all the requirements and in turn, this will lead to a higher price for customers.

A field survey was carried out in order to understand this “quantified self” movement which represents the sentiment towards these devices, with the question “Do you currently monitor or track your health or fitness using an online or mobile application or through a fitness band, clip or smartwatch?”²⁵, these were the main responses. 33% answered “Yes, I currently

²⁴ K. Schreiber, *eServices: Fitness*, 2016, “Statista”

²⁵ Statista, www.statista.com/statistics/668201/usage-of-health-and-fitness-monitoring-devices/

monitor or track”, 45% “No, I have never monitored or tracked my health or fitness”, 18% “Not currently, but I have monitored or tracked in the past” and only 4% “Not sure”. It is clear that there are some individuals who never come in contact with this technology while the majority is using or has used a device.

3.4.3 For beauty

Beauty technology is a “a wearable computing paradigm that uses the body’s surface as a creative, interactive platform by integrating technology into beauty products applied directly to one’s skin, fingernails, and hair”²⁶. This category is still in its early stages of development and it has not achieved recognition in the market. Some examples of beauty technology are sensors that are applied in a small piece of skin, or hair or in an eyelash which enhance human experience. Furthermore, chemically metalized plastic eyelashes can act as switches, detecting voluntary blinks, but maintaining a natural color, only studying the eyes’ blink. These devices can send an electrical signal to a microcontroller via conductive materials attached to the skin as eyeliner²⁶.

Figure 3.8: E-eyelashes and fingertips and UV Patch



Source: Wired UK, Daily Mail UK and L’Oréal

Scientists have developed an e-makeup application through the use of FX materials. This kind of materials are employed in prosthetic makeup which comprehends the use of prosthetic sculpting, molding and casting techniques to create advanced cosmetic effects especially used in movies. This type of make-up with the help of a latex facial mask can activate different light patterns through smiles, raised eyebrows, lip movements. The mask, when applied to a human face, is capable of sensing muscle movements as the skin folds on the musculature of the face, acting in effect as a second skin²⁶.

²⁶ K. Vega, H. Fuk, *Beauty Technology: Body Surface Computing*, 2014, IEEE

Also, nails can become a fashionable, inexpensive wireless tool which can be adaptable to different applications. Through the installation of Radio frequency identification (RFID) and near field communication (NFC) microchip, technologies create interfaces to identify the wearer. Consequently, they can substitute for instance, conventional ID card with RFID tag and keys used for access control and customer payment cards. The wearer just passes her finger over a scanner, which then reads her unique ID, allowing contactless interaction with the interface.²⁶

Through NFC microchips, which transfer small amount of power in short distances, it is possible to install in fingertips LED stickers that light up when phone is ringing as shows the image on the right side.

For what concern hair, there are various smart applications. Communication between devices is possible through a wig. For example, it can be used as a fitness tracker and also it can possess a wireless link. Even further, there are hair accessories which can be used as security gadgets to communicate with mobile app and call for help in case of danger. Also, a microphone can be attached and used to collect audio proofs, useful especially in violent situation.

Body's surface can be used for example, as a medium for monitoring body vitals. This can be achieved with the aid of sensor tattoos in which electrodes are printed directly on skin by dispersing carbon fiber segments within the tattoo ink. These tattoos can monitor heart, muscle, body temperature and motion, hydration levels and read brain waves.

Beauty and skincare giant L'Oréal has launched its "UV Patch" in 2016, under premium brand La Roche-Posay. It is an ultra-thin, stretchable, transparent, adhesive skin patch incorporating with a sensor, designed to monitor ultraviolet light exposure. This patch contains photosensitive dyes that factor in the baseline skin tone and change colors when exposed to UV rays to indicate varying levels of sun exposure.²⁷ It measures approximately one square inch in area and 50 micrometers. It is a reader of skin exposure and it helps customers to educate themselves about sun protection. Consumers will be able to take a photo of the patch and upload it to the La Roche-Posay My UV Patch mobile app, which analyzes the varying photosensitive dye squares to determine the amount of UV exposure the wearer has received²⁷. Beauty technology is transforming the body into an interactive platform with exciting new digital functionalities by hiding microchips and sensors in beauty products to create interfaces that don't give the wearer a cyborg look.

²⁷ L'Oréal Press Release, *L'Oréal debuts first-ever stretchable electronic UV monitor at the 2016 Consumer Electronics Show*, 2016, www.loreal.com/media/press-releases/2016/jan/loreal-debuts-first-ever-stretchable-electronic-uv-monitor

3.4.4 For educational purposes

Wearable technology continues to develop and gain access to different sectors of lives particularly during learning activities. Wearables can increase a student's ability to interact with the environment and people in a more enlightened and natural manner, they also help them to be innovative, creative, and could provide an easier access to information. Internet is the driver of this new teaching method and with the use of sounds, pictures, videos, texts can be presented in a multimedia context that would stimulate the interest students. These wearable devices are also useful for disable students. Autistic student can be controlled with smart bands and rings. These devices would help them by monitoring their mood levels and an alarm can alert parents or teachers whenever there's a problem. Furthermore, smart glasses can be used to capture the attention of a hyperactive or distracted child who will be rewarded with a game.

This technology changes and improves the learning process in different ways. Firstly, they can help with the presentation of learning materials and lessons by usually explaining models. They provide a multisensorial experience through recorded video and presentations and improve the students' understanding of abstract concepts. Wearable devices such as headbands, smartwatches and applications also play an important role in the wearable device sector for learning. Special headbands can measure brain activities and transfer data to an app through wireless connection. This process helps to determine what can gain the student's attention and what keep them focused. Smart watches could serve as timers for student during tests and they can become a security alert in case of danger. They can also be used to control the movement of student by enabling them to sign into the class with their digital signature and this information can be transferred to a cloud infrastructure accessible to professors and parents so they can control them.

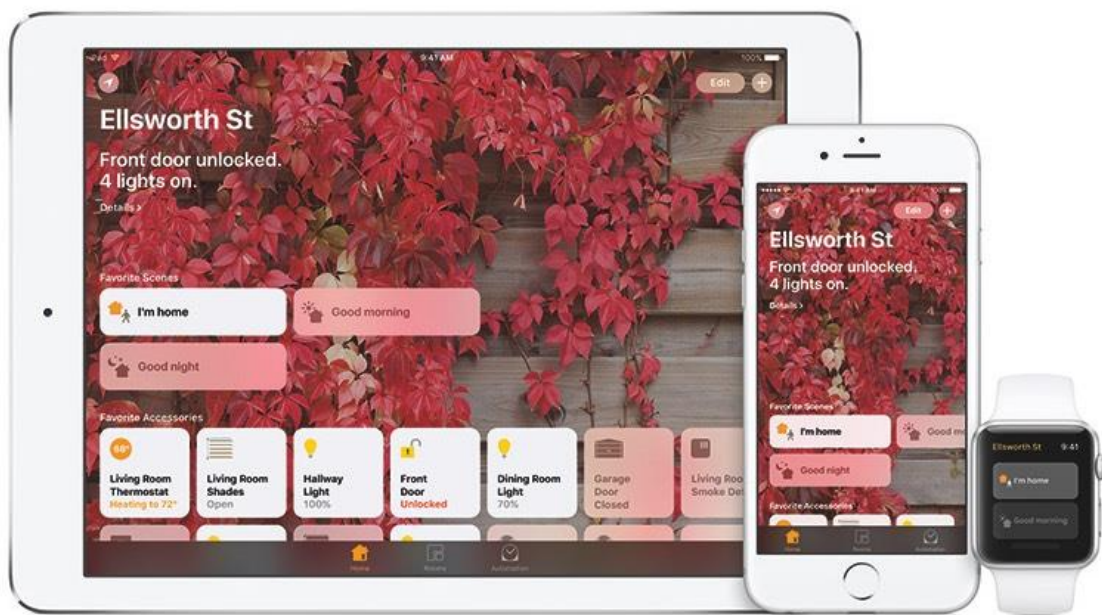
Concrete motivation for the adoption of this technology can encourage teachers to use devices and show the benefits to parents who are skeptical about them or unwilling to make use of the devices. This field faces challenges due to contrasting opinions between parents and teachers, who are excited to adopt this kind of technology or reluctant to use them.

3.4.5 For the smart home

Smart home is a new interpretation of the term home utilities which have been adapted to new technologies. It refers to all smart appliances, for example washers, dryers, refrigerators, safety and security systems like internet-connected sensors, monitors, cameras, and alarm

systems and energy equipment, such as smart thermostats and smart lighting. The living room was the first part of the home to become connected, because smart TVs are already available on the market and their sales are always positive. Customers who have already understood the benefits of these technologies will see the advantages that a home with a connected kitchen can represent, for example. According to Deloitte's survey²⁸, around 28% of UK's respondents have a smart TV while 26% have a smart console, 11% a streaming device and 10% a wireless speaker. All these entertainment devices are widespread while surveillance security systems, smart thermostats, home appliances and smart lighting are used only by 3%. Two-thirds of consumers think that having a connected device will facilitate life in several ways. For example, help to control the security of a house from a smartphone or remotely managing heating and lighting systems can save money and time.

Figure 3.9: Apple's HomeKit



Source: Apple Developer site

Apple has started its project of smart home in 2014 and in 2016, the company launched the “Homekit”. The name is a combination of “home” for home automation and “kit” for software developer kit and it is a platform framework which can connect every device of a house. It is possible to manage it with voice commands through Siri, Apple’s voice recognition service, and the app “Home”. The application permits the connection of all devices in a single interface in a tablet, phone or smartwatch. The application manages the lights, switches,

²⁸ The Deloitte Consumer Review, *Switch on to the connected home*, 2016

windows, fans, air conditioners, sensors, locks and doorbells. Apple's main competitor, Samsung launched its own version named "Smart Thing". A hub which connects devices that are managed through an application. Samsung is working with other brands to get access to a wide range of products because not every device is compatible with the "Smart Thing". Google released "Google Home" between 2016 and 2017, a smart speaker which permits interactions with services through "Google Assistant" to control home and entertainment appliances. Google Home devices can be placed in different rooms in a home for the synchronization of music. Also, it can be used by different people at the same time, thus making it suitable for family use. Google has announced the arrival of some updates such as hands-free calls, Bluetooth music streaming, integration of calendar. Customers are hesitant about these technologies, because they do not really know their potential or due to the price for half of customers. 26% of individuals predicts that these technologies will evolve year by year so they are more likely to wait future updates and 21% will make purchases only when the hype of current device have reduced along with the prices. However, the market still has time to grow. North America is the biggest market with around € 8 million in 2016 and it accounts for 64% of the market share. Its projected market penetration for 2020 is 17% while for Europe, it is only 3%. Europe covers 18% of the market with € 2 million of revenues²⁹. Smart homes are opportunities to change the way people live and work. They can be a solution to the reduction of energy consumption and security safeguards but they are still necessary steps to take in order to integrate these technologies in the world.

3.4.6 As tool for emotional communication

Emotions are fundament elements for social interaction between human beings in the society. Expression of emotions are essential in the maintenance of social relationships and to the life of human interactions. The body is the main medium for the expression of emotions. People intentionally or unintentionally communicate their emotions with various facial expressions, gestures, vocal tones, and body movements. Also clothes and accessories can convey feelings and moods in socially acceptable manner.

Choice of clothing is a mode of communication, a statement about oneself. The message to be conveyed, however, is different for every individual according to their preferences. Despite all changing fashion trends, the main purpose of clothes is to express and give a message to

²⁹ Technical Report M2m/Iot Enablement in Smart Homes, Telecommunication Engineering Centre Department Of Telecommunications Ministry Of Communications Government Of India, March 2017

others about themselves. In the current society where everything is fast, direct and connected, the transmission of this message should adapt to it. In this era, an individual's identity is complex and multidimensional and so the mere clothing is not fully capable to express the intricacy of the self. Designers want to create clothing which “react, collect information, and enrich our interactions with spaces and people”³⁰.

New technological mechanisms can be the optimal tools to maximize the self-expression, feelings and movements can be communicated through these devices which combined with smart materials can realize new forms of expression and interpretation. Electroluminescent fiber embedded textiles, LED textiles, sensors, microcontrollers, textile based controls, embedded ultra-thin displays or speakers are all elements which can be used to produce clothes. These technologies permit to convey personality but they are also part of the expression. Communication has changed its mode of expression; facial and vocal signs have been replaced by multimedia, emoticons and animated videos.

“As we have evolved to recognize the emotions from visual cues, such as gestures and body movements, we are developing an ability to decode the emotions by evaluating the visual cues that are artificially created and represented to us with the evaluation of communication”³⁰.

This technology embedded in clothes enhances any input and output which can be visual, tactile or of other types. Sensors on the body can precisely detect physiological changes during the expression of feelings. The interactive reply of clothes to the change of inputs can improve the communication by acting as a second way to express feelings. This technology aims at developing garments which can express emotions directly by a user's order and thus, enhance relationships. Clothes can change colors when a person feels a particular emotion or help to communicate the reactions of the individual to a certain stimulus. The clothes can be as an “assistance” during social interactions.

More examples of wearable devices for emotions are body suits which use biometric sensing technology to signal changes on the skin and creates an LED visual output. Jewelry as rings, necklaces and bracelets can be used as stress indicators, trainer for meditation exercises, or change its color according to the heartbeat of the user.

Overall, wearables can improve the relationships with people, enhance connections and emotions' exchange. It also gives the body an opportunity to interact, monitor, and have a deeper knowledge of its triggers and reactions.

³⁰ M. Gökhan, *Wearable Technologies for Emotion Communication*, 2008

Chapter 4: Technology & Fashion

“Technology is the fashion of the 90’s. It affects everyone, and everyone is interested in it, either from fear of being left behind or because they have a real need to use technology”

Jay Chiat, advertising copywriter

In the 21st century, wearable technology is redefining the roles that clothes play and it is innovating new functions that exceed those that humans are familiar with. As the production of wearables gains popularity, the need for the technological and fashion industries to collaborate gets stronger because both industries aim at augmenting their market share. It is essential to know and understand the characteristics of the customers they cater to. This information and knowledge is useful during the fine-tuning of their products and the presentation of services to customers. Data mining is a crucial tool in this process. It is used by companies to analyze information about their target and remain key competitors in the market. Researchers predict that fashion designers and technology developers will have to combine efforts towards the development of wearables which can attract customers with their designs and technological actions. This cooperation will help them to change the dynamics of the market and understand their customers’ needs and preferences. “This is especially true for fashion and technology companies that operate in industries where a majority of the goods and services provide relatively the same functions and utility, thus making it increasingly harder for brands to differentiate based solely on the basis of product design”³¹.

As stated before, the Millennials are the target customers for this industry. Therefore, fashion producers need to create outfits based on their preferences and needs. They should take advantage of the Millennials’ high level of fashion consciousness and positive attitudes towards new technology. Fashion companies are advised to create a sense of urgency and need for these products in the minds of their customers. The products should become a natural extension of a customer’s daily needs and a part of his or her daily routine. A wearable should be made as a fundamental part of a social individuals’ life, just like a smartphone; this is the prescribed key to success in the fashion market.

Wearables have become the media of self-expression through the combination of clothes and technology. Companies should aim at delivering a unique experience which is possible only through the analysis of data shared by customers.

³¹ R. D. Nyeplu, *A Marriage of Convenience: Why Luxury Fashion Brands and Technology Companies Need Each Other to Survive the Data Revolution*, 2014

4.1 Key factors considered by fashion and high-tech brands

Fashion and technological brands need each other to survive in the market. As consumers evolve their preferences, fashion brands need to identify technology companies whose vision for wearables matches their own. It is not enough to have a logo in a product which they can produce by themselves, but apparel and accessories brands should seek tech companies to work together.

Technology companies should carry out their technological duties and extend their knowledge before technical issues while fashion companies need to commit to the task of finding resources, recruiting technological specialists and effectuating mutually profitable mergers. This will help both partners to grow and launch the wearable industry with products that are fashionably designed and technologically advanced.

As stated earlier, wearable items can be used to express feelings and technological devices are becoming part of the process in aiding customers in their self-expression. The ability of digital clothing to self-monitor means that companies can understand how certain styles and textures can make an individual feel. Instead of bombarding users with cookies which do not give an exact expression of what customers prefer, sensors can communicate answers in a clearer and more defined manner. This way, companies can understand customer' needs more accurately. Also, the information obtained is useful for both industries who need data to improve their performances.

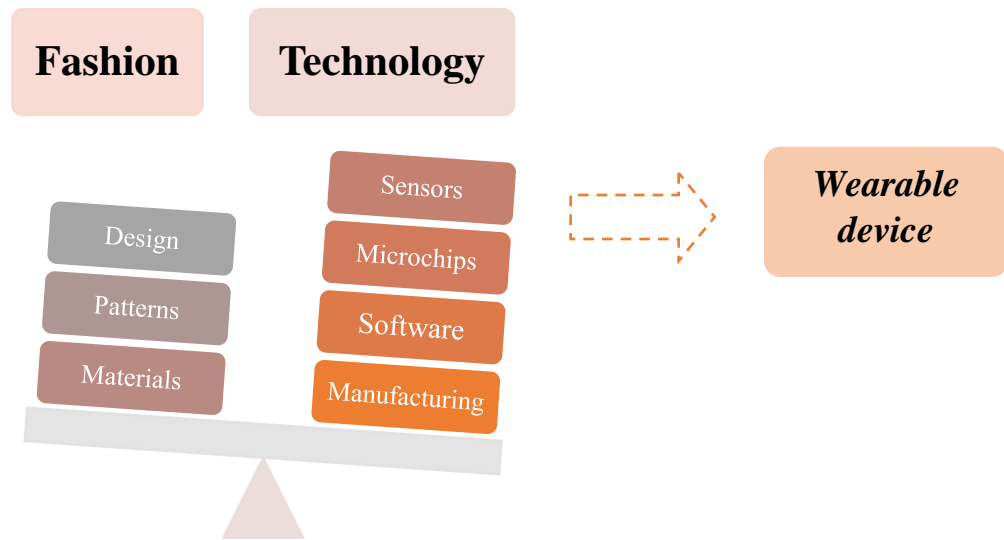
BOF states that the collaboration of both industries will be a huge benefit to them and to the market. A collaboration saves time, resources and encourages diversity of products. "It's not viable for fashion companies to design products for market segments when tech companies can design products for specific individuals. It's not viable for fashion companies to spend weeks or months bringing products to market if tech-companies can do the same in seconds."³² Fashion companies should begin their transition into the technology field. As they continue, they can gather know-how and become competitive.

Technological company such as Apple, can bring sensors and microchips to monitor parameters and install software to manage information. Hermès is an iconic brand and its sophisticated style is developed through the design of straps. High quality leather straps and classy patterns contribute to develop what is known as Apple Watch Hermès.

The two brands have complementary skills which are developed in order to create a unique product which has revolutionized the market.

³² C. M. Close, *Technology Is Eating Fashion*, Business of Fashion, 2017
<https://www.businessoffashion.com/articles/opinion/op-ed-technology-is-eating-fashion>

Figure 4.1: Wearable process from the design to manufacturing



“Technology companies need fashion companies more than fashion companies need technology companies to survive”.³¹ Design is essential to attract customers and it is important to prevent early dissatisfaction of the products after few months. Fashion and technology companies play important roles in the production of wearables. However, they should note that fashionable and attractive designs are essential during the production of wearables. This is the case of Louis Vuitton’s Tambour Horizon watch. Its design represents Louis Vuitton style but it is idealized in an innovative and technological look with the help of Qualcomm, a Silicon Valley firm.

This would help prevent the early loss of customer’ interest after some months from the presentation on the market.

Data is a key element in the interpretation of customer’ preferences, but companies need to go beyond the collection of information to be successful. Firms have to develop new methods by which they can integrate technology in devices in order to gather information such as cloud platforms. Forms of artificial intelligence are entering in the fashion market, letting people find their dream dress by only describing it, for example. The information gathered will consequently enhance interactions and product’ development. As a result of the data gathering, products can be personalized according to specialties and preferred features. This is possible only through the circulation of this information within the circle of fashion, technology industries and customers in a connected data warehouse. Customers are responsible for data they share; this data is analyzed with the aim of obtaining more integrated

and specific information. Millennials are demanding more personalized items. This trend is propagated due to the unlimited access to the Internet and social networks. Consumers' expectations for products are becoming more sophisticated even though these trends could lead to an infringement on personal space and privacy. Every wearable device is programmed to collect an amount of data which is a portion of the customer's identity. Then, a total of these parts can give a profile of the customer and detach all customer's choices. However, customers' preferences evolve continuously. As a result, technological companies are developing new functionalities which will attract more input of data and constantly monitor its movement. This is one of the major motives for the partnership between fashion brands and high-tech companies. Both parties are highly interested in the management and manipulation of data.

Design is an important aspect in the production and sale of wearables. Many products fail because they do not attract customers for their design or they are considered as too weird because their interfaces. Google Glass did not realize expectations; it was the first virtual headset but its design which was considered too technological and it did not attract customers. A joint research by both industries will solve this problem. In fact, Google started a partnership with Luxottica, and the two companies have established team of experts to work and develop the design, tooling and engineering of Glass products prototype in the eyewear market.

To customers need to be offered products which put them at ease and make them feel trendy. They cannot change their behaviors in order to wear them, rather the devices should "become like a second skin, a habit already established"³¹. Only fashion producers and designers have the capacity to give this added value and perceive its importance. Fashion and technology companies have to create a need for these devices and encourage human dependency. Dependency on these products can be created in line with their functions and consumer preferences.

All factors depend on the level of technological advancement achieved by both industries and how many resources both parties are able to invest the higher the amount of investment, the higher the results both companies are likely to achieve.

It is important that fashion and technology companies create partnerships that aim at providing products which connect them with customers. In fact, as competitors of Apple and its watches in collaboration with Hermès and Nike, Intel has launched in the market, a series of smartwatches in partnership with different brands. Intel has worked with Tag Heuer and they have launched "Tag Heuer Connected Modular" which is available in different models to challenge Apple Watch Hermès. While to satisfy active customers, they have developed the

“New Balance RunIQ” which can challenge Apple Watch Nike + with its functionalities. This is because in both cases, they have complementary skills which can help them become winners in both industries.

4.2 Opportunities and downsides for fashion and technology companies

When two brands come together to work on a project, different values, missions, histories need to find common grounds and gear their efforts towards the achievement of shared goals and interests. Also, their different KPIs, experiences and targets should not stop them from finding the shared vision for a specific product.

Whenever companies from different industries such as fashion and technology come together, there is often a clash due to their professional knowledge which has been derived from diverse fields. There should be an exchange of principles and values that need for a mutual benefit to be achieved. For example, the Swarovski Shine is created by the partnership of Swarovski and Misfit. The two companies have different targets and roles in the market. Swarovski’s mission states: “Swarovski adds sparkle to everyday life with high-quality products and services that exceed our customers’ desires”. Swarovski represents crystals in every declination. Since centuries, what differentiates the Austrian brand is its style and its jewelry, traditionally made. Misfit is a new born company which is focused on future, fashion and wellness. It has developed several activity trackers which have become popular for its technology. Swarovski and Misfit represent a win-win instance of how different cultural values can match and elaborate a successful product. Two companies from different markets and backgrounds can share their knowledge to become winners. Fashion needs to assimilate the speed, the transparency and the customer-centric nature of technology while technology needs to obtain the high-class brand image and the exclusivity that only some fashion brands possess. “Fashion affords people the ability to take different brands, designers, garments, time periods, and social classes to shape our identities, and technology must respect that intimate and empowering relationship that already exists between the individual and what they wear”³³.

The strongest brand in the two industries cannot guarantee the success, even if the level of credibility is high and the product is projected by well-established designers. Customers, who have already developed an emotional attachment with a certain brand, can be more attracted to buy from the same producers as a brand extension, such as Apple. Customers, who have

³³ J. B. A. Hayden, *Brave New Clothes: The Prospect of Augmented Reality for the Fashion Industry*, 2017, “The Savannah College of Art and Design”, pp.30-31

already bought products from Apple, are more willing to trust and purchase again. The brand has a strong image and this is a positive starting point to launch a successful product but it is not always enough. Big brands do not always launch successful products because what is important is not how remarkable the brands are but the creativity and the innovation they transfer to their products. Fashion jargon is different from that of technology. Therefore, it is necessary to find a mediator. Fashion producers are considered to be in the possession of a unique and specific knowledge which can help to shape products. “One of the fundamental challenges of making wearable technology is reconciling the way traditional, one-size-fits-all electronics devices are developed with the dizzying speed and variation of the fashion market, where consumers demand a constant stream of new products that fit their specific lifestyles and give them a wide enough range of aesthetic choices to simultaneously assert their individuality and signal their belonging”³⁴.

Open research is needed between experts from both worlds which can be an opportunity to start collaborations which can find a position for designers in the digital sector. Their inclusion in technological processes can help the development of new value propositions within the digital economy.

Customers should be at the center for brands and follow their needs. They should be engaged in innovative ways, delivering experiences which improve a brand’s prestige. Data are essential, but without creative talent, it is worthless. On the other hand, brand reputation and image are not enough. This is the reason why both need to work and put together their strengths to launch successful products.

Companies can gain reputation and brand recognition and additionally, increase brand loyalty and extend their targets. They can have to access distribution channels which allow them to consider other markets. On the contrary, there can be issues to solve such as exclusivity to protect products and value or the prevalence of one brand over the other.

Whether fashion companies are looking to maximize their opportunities or simply keep up with their competitors, they just need to focus on innovation and design to be competitive and gain market shares.

4.3 When design meets technological innovation

The design for wearables is different from the design used for fashion or technology products. It combines the features of both sectors which can be challenging to combine. Technicians are

³⁴ V. A. Kansara, *Ringly Weds Fashion and Hardware*, 2015, “Business of Fashion”, www.businessoffashion.com/community/voices/discussions/is-fashion-missing-the-technology-revolution/ringly-weds-fashion-hardware

faced with the task of studying the user's need and functionality of wearables in everyday life. Fashion designers care about trends and style while technology experts study how devices can be functional. The balance between technical and style while technological experts focus on the tasks which a device can perform. As result of these diverse objectives, bringing the gap between technology and aesthetics is an essential but arduous task.

Fashion companies are just getting in touch with innovation such as cloud management to share and gather data easily but more efforts are still needed. Advancements and studies on nanotechnologies and artificial intelligence are at the basis to develop wearable device. To insert a small sensor, all these fields need to be studied in order to find the right and the less invasive solution to project.

3D printing is one the tool available and it facilitates the creation of prototypes. It reproduces clothes exactly the way designers wish with no wasting of materials and with less labor hors. One of the first examples, which was publicly seen, dated to 2013 when Lady Gaga wore a 3D printed dress at the launch of her album. In 2014, Dita Von Teese worn a black 3D dress created from 3,000 moving parts made using “selective laser sintering, in which a metal is built up in layers from plastic powder fused together with a laser”³⁵ at a weight of 5kg.

Figure 4.1: Dita Von Teese's and Lady Gaga's 3D dresses



Source: Google images

A major problem encountered by designers comes from the supply of the right materials. Usually, materials used for this type of printing are not flexible neither breathable to let skin

³⁵ M. Ferrier, *Francis Bitonti, the dress designer applying architecture to 3D printed couture*, 2014, “The Guardian”, www.theguardian.com/technology/2014/sep/22/fashion-dress-made-3d-printer

aerate. Furthermore, innovative materials such as smart and programmable textiles are tricky for designers to manipulate. Innovative materials are challenges for designers such as smart and programmable textiles, and in addition, there are digital printing software, Beacon technology, body scanning, pattern digitizing which are new helpful techniques and tools. Therefore, digital tools such as interfaces, communication, data management, energy management and circuits should be integrated in a system which combines both features.

As status quo, there is a skills gap in the two industries. It can be closed by providing fashion professionals with a digital background. Design students are encouraged to learn how to work with smart fabrics and fibers and software like CAD (Computer Aided Design). Fashion designers are less likely to work with software compared to architects or graphic designers. Therefore, workshops and collaborations between fashion and technology universities are needed to integrate students with skills that would help them to navigate into the digital world. The fashion designer of today's world should be at ease with codes and data, not only with needle and yarn.

The fashion and technology industries need to integrate the best of both worlds in order to produce stunning and indispensable products.

4.4 Acceptance from customers

Every wearable can be considered as a fashion or a technological product and in some cases, a combination of both. As mentioned before, wearables can be useful tools to improve communication between individuals. It can help to enhance a faster and more efficient exchange of information and perceptions through sensors. In addition, it can represent the inner personality of individuals, encouraging the self-expression in the society.

Before assessing this potentiality, it is necessary to understand if customers are willing to accept this technological revolution and what is the approach that customers will use to become familiar with these devices. In order to understand the triggers which push customers to buy and use technological products, the scholars Fishbein and Ajzen have developed the TAM, the Technology Acceptance Model. According to the model, the behavioral intention defines the adoption, which is determined by attitudes and perceived usefulness and ease of use. Motivational factors stimulate the adoption to achieve a particular task.

Two other motivations need to be considered during the adoption of the model for the fashion industry. The first is the customers' perceived product innovativeness and the customers'

perceived fashionability of adoption of highly technological fashion products (HTFP).³⁶ Perceived innovativeness refers to the belief that a product is unique in the market and the most innovative amongst other products. While perceived fashionability is defined as the perception of some attributes such as style, brand image which can directly imply popularity. The study was carried out using Millennials students as subject. It was confirmed that the intention to adopt a technological fashion product depends on four elements: innovativeness, fashionability, ease of use and usefulness. However, in the case of Millennials customers, there is no correlation between perceived ease of use and perceived usefulness because they are already at ease with technology, as being a part of their lives. Another model³⁷ suggests that there are other relevant factors that affect the acceptance of technological and fashion products in addition to perceived usefulness and perceived ease of use. The study, which was led by analyzing customers' considerations about smartwatches, contemplates other elements. The perceived compatibility is considered as how the product can be adapted in daily routines and lifestyle and the personal innovativeness in information technology. Other factors included are vanity and need of uniqueness. Vanity acts as the expression of success through appearance while the need of uniqueness is defined as the aim of an individual to be different in comparison to others by possessing a particular product which improves self and social image. These two traits give rise to a perceived enjoyment of the product and the self-expression is achieved through it. The results of the study show that compatibility with other devices is a significant variable that increases customers' willingness to buy. In addition, the need of uniqueness can be considered as a means in order to reflect self-image through the use of devices. Although, vanity is not strongly correlated with self-expression, it points out the gap that needs to be bridged by fashion companies.

The gap which characterizes the acceptance of technology by customers is getting closed but more efforts to integrate both areas of fashion and technology are needed to fasten the acceptance of these devices.

³⁶ K. Watchravesringkan, N. Nelson Hodges, Y. H. Kim, *Exploring consumers' adoption of highly technological fashion products: The role of extrinsic and intrinsic motivational actors*, 2010 "Journal of Fashion Marketing and Management: An International Journal", Vol. 14 Issue: 2, pp.263-281

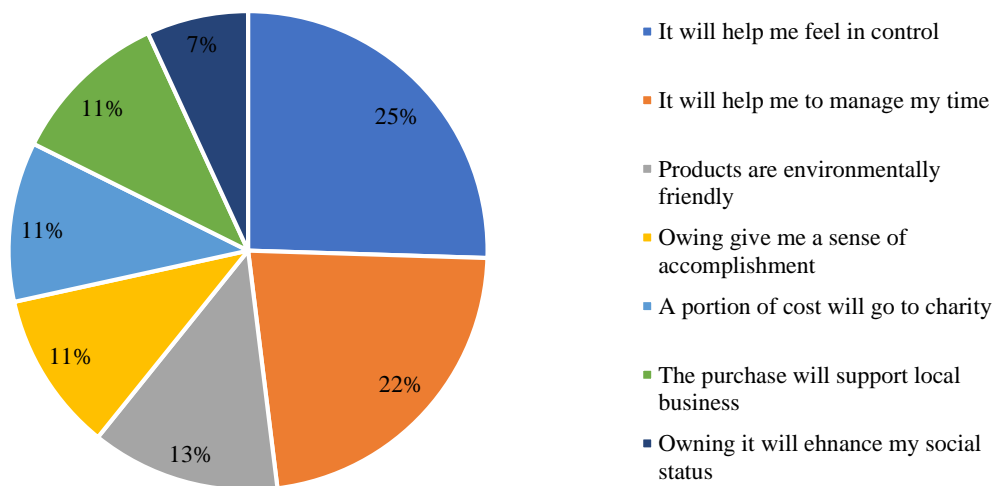
³⁷ J. Choi, S. Kim, *Is the smartwatch an IT product or a fashion product? A study on factors affecting the intention to use smartwatches*, 2016, "Computers in Human Behavior 63" pp.777-786

4.5 Customers' perceptions and challenges and opportunity of the industry

The potentials of wearables lie in their abilities to create actionable insights for companies and deepen consumers' journey. Fashion and technological companies aim at making these devices' functions as part of an average individual's daily routine. This is confirmed by results of a series of surveys³⁸; 57% of respondents agreed that they excited to be helped in the future by these devices. An increasing trend in comparison to the 41% of 2014. The use of wearable technology is considered to promote, not discourage, human interaction. A positive shift in consumer sentiment towards this technology is attested to by 33% in 2016 much higher than the 10% achieved in 2014. Customers find support and relief through these devices because they help them to exercise, to control child, to relieve stress, to be more efficient at home and at work; 74% for general population while 82% for Millennials.

As figure 4.2 illustrates, there are reasons that encourage customers to buy wearables. The major motives are: to monitor better fitness and health habits, have a more convenient internet access, listen to music, check weather and mails, access apps, receive delivery and products updates. Several researches³⁹ have shown that wearables are bought to take on daily dares.

Figure 4.2: Why should I wear a wearable?



Source: Colloquy report, *Weighing in on Wearables: Are Consumers Wavering or Won Over?*, July 2016

For example, people choose these devices because they can provide information which is helpful at work or to help to cut efforts and costs. In addition, these devices are used to manage time more efficiently and they help to be more productive and organized. They are a

³⁸ Pwc, *The Wearable Life 2.0: Connected living in a wearable world*, 2016

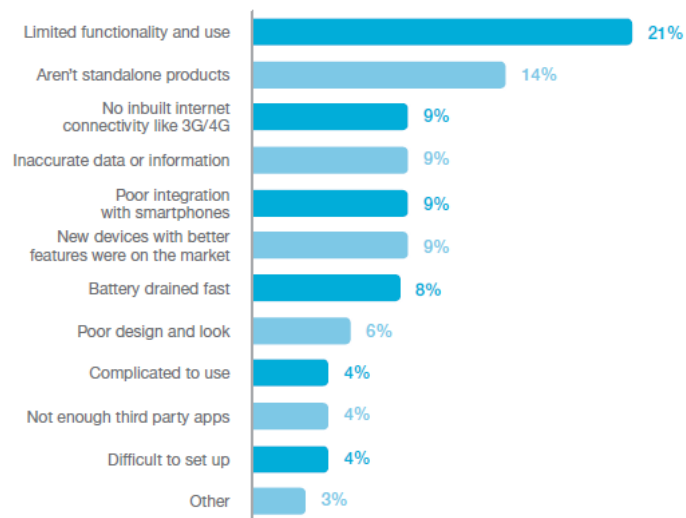
³⁹ Pwc, *The Wearable Life 2.0: Connected living in a wearable world*, 2016 and Pwc, *The Wearable future*, 2016

representation of values which are close to a customer's heart, and these advantages have increased their importance.

However, there is a sizable portion of customers who does not have enough knowledge about them. This shows that there is a need for more education or a clearer definition about what exactly is meant by "wearables". People see some benefits, but more awareness needs to be carried out. Many customers do not know all its possibilities and functions, but if they can be informed through a demonstration or a video, they will feel more inclined to use them. This will also increase the engagement rate of the target customers. In fact, main hesitations about a potential purchase of the wearable technology are linked to the lack of knowledge about their functions. In fact, consumer excitement does not always correspond to trust. Excitement about the possibility that doctors, hospitals, health insurances, cellphone providers, pharmacies, teachers, banks, car companies would use these devices is about 50-60% but when trust is involved, the story is different. Customers that would trust a product from a doctor are only 41%, from a hospital 38%, from teachers 12%, from banks 33% and from car companies 9%³⁸.

The production of wearable devices involves a large amount of services and planning. As a result, these devices could be expensive and its high price range is a major source of discouragement. Many customers are unwilling to spend large amount of money in devices that are not very valuable. Nevertheless, producers are able to design a wide range of products that cater to various customers at various levels. There are a wide variety of products such as smart watches, glasses, clothing and fitness bands. Other source of customer discouragement from the purchase of wearable are doubts including the functions of devices, lack of relevance, utility and privacy. As figure 4.3 shows, the main reasons for giving up for wearables is functionality and use, which are essential for the purchasing intention and for the consumption of the product. Lack of connectivity and integration with smartphones, need for support from other devices, new technologies in the market are causes which lead to put a wearable in the drawer. In opposition, the possibility of future purchases is significantly high. 57% of respondents will buy smart watches, 53% fitness bands, 50% smart video or photo device and 41% smart glasses and 38% smart clothing. According to Millennials' preferences, 51% of customers will buy fitness bands, 40% smart watch, 24% smart clothing and 23% smart glasses. The use of England as a case study will likely produce similar results; 54% of people will purchase in the next 12 months a smartwatch, 58% a fitness band, 46% a smart video device, 39% smart glasses and 38% smart clothing. English customers, once bought a device, want especially information about exercise (58%), health (56%), diet (48%), e-mail and communication history (35%) and athlete analytics.

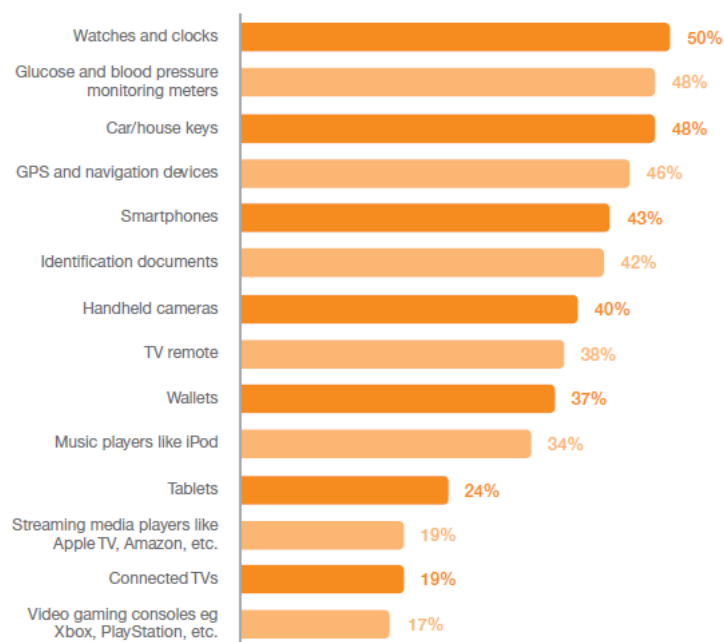
Figure 4.3: Reasons for abandoning wearables



Source: Ericsson Lab, *Wearable Technology and the Internet of Things: Consumer views on wearables beyond health and wellness, June 2016*

Figure 4.4 indicates the products that in the future will probably be replaced by wearable devices. Obviously, the purchase of watches has declined by the arrival of smartwatches, health gadgets, GPS and keys, ID cards and wallets. There are expectations that wearables will decrease obesity problems and enhance life expectancy.

Figure 4.4: Items that wearables are likely to replace in future



Source: Ericsson Lab, *Wearable Technology and the Internet of Things: Consumer views on wearables beyond health and wellness, June 2016*

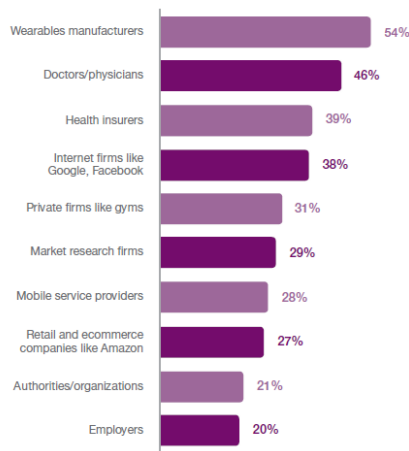
As stated earlier, individuals understand that these devices could serve to monitor health parameters. They can improve efficiency and time management, avoiding waste of time when information is immediately available. Wearables can create a more direct connection with the environment. They are devices less invasive and more discreet than a screen and they perform the same functionalities of a smartphone. Another bonus is the fashionability of these items. The design is a necessary feature for customers and thus, designers need to work fervently to make them look sleeker and more stylish.

The wearable technology has several disadvantages in its usage. One of the major challenges is the high-power consumption of smart wearable devices. GPS and wireless connections consume power thus, the durability is low and this aspect discourages usability. Even if the possibilities in terms of dynamicity and applications are potentially endless for these devices, costs and price are great barriers to the purchase. In fact, the mass adoption rate is low but efficiencies and technological advances are reducing expenses for producers. Other concerns are linked to the consequences of usage such as the ability to relate with other people (72%), the addiction to technology (68%), the waste of money and devices (65%), the decrease of autonomy at work (54%).

Furthermore, there are technical and legal issues that create some restrictions that need regulations by governments. The major concern is about privacy and security of data shared, in fact, 82% of respondents fears that wearables would infringe on their privacy. These devices, even if of small dimension, collect every type of data and sensitive information. This information could be weapons if possessed by cybercriminals. GPS, NFC give information which can be intercepted; NFC in credit cards can let “digital pickpockets” act easily. Figure 4.5 illustrates the more trusted entities are illustrated with which customers would share their information. The more people outfit themselves with data-gathering devices, the more exposed they are. Half of customers trust in manufacturers while 46% of customers thinks doctors cannot widespread data and following, health insurers and Internet companies like Google. Amazingly, government authorities and employers are the less trustworthy organizations maybe because of fear of potential backlashes.

In certain instances, it is difficult to understand the liable part in some privacy feuds. Product standard regulations are still in a developing phase, thus there is not a clear picture about that. Another reason for legal instability is the involvement of various entities. Manufacturers, users, software developers are involved and thus articulated legislations are needed.

Figure 4.5: Organizations and entities which customers are willing to share wearables data with



Source: Ericsson Lab, *Wearable Technology and the Internet of Things: Consumer views on wearables beyond health and wellness*, June 2016

The evolution is rapid so it is becoming harder for consumer advocates, regulators, and legislators to act. Another problem is the risk of vulnerability and security breaches. 86% of respondents have this fear and despite the rapid evolution, authorities are advised to put limitations on the flow of data without menacing the service of these devices. The EU Commission is working towards the delivery of a project. This project is focused on the regulation of the use of these devices called “EU general data protection regulation” which will come into force in May 2018. Any organization that offers goods or services to EU residents or monitors the behavior of data subjects in the EU will follow the regulation and if companies need to transfer these data outside EU, they will respect precise privacy rules established by authorities. Obviously, all companies should ensure a high level of privacy protection with clear statements about the data management. Every customer needs to give a clear and affirmative statement to allow the share of personal data and companies will be forced to communicate every data management change. Privacy policies need to be clear and effective to ensure the maximum protection levels. In U.S., The Federal Food and Drug Administration has defined that products for general wellness products will not be regulated by Health Insurance Portability and Accountability Act of 1996 (“HIPAA”). These products are defined as all devices which encourage or maintain a general state of health and they are not subject customers to any safety risk. So, if products not treat specific diseases, they will not be regulated. Thus, also in U.S., there is still a lack of clear regulation and management of data.

Its major functions are to limit data location and to mediate issues about data ownership. This will help to gain customer's trust especially when they feel clearness and transparency of regulations regarding data issues have being achieved.

In its ideal form, wearable technology provides better information that leads to better decisions and consequently people can spend less time deliberating and more time in action. This can help at work; with hands free and heads up, information can be delivered in a relevant, quick manner. Even better, employees will use their office hours more productively. By 2020, more than 75 million wearables will permeate the workplace, and by 2018, 2 million employees will be required to wear health and fitness tracking devices as a condition of employment³⁹. 2 in 3 respondents expect their workplace to permit the use of wearable technology and half of them thinks that their company will fund the purchase of these technology to be more efficient.

Notably, consumer willingness to adopt wearable technology is much higher when their employer pays for it (62%), versus paying out of pocket (36%).

Wearable technology could increase workplace loyalties and morale. Increased efficiency will make employees feel more confident and appreciated. When wearables are provided by employers, employees feel more valued and consumer's willingness to adopt wearable technology is higher. Collaboration and communication can grow, bettering working environments. This type of device, sponsored by companies, can be successful if careful guidelines are put in place around privacy. Employers should ensure privacy rules, and establish no punitive implications for whose do not want to use them.

The potential gains in terms of productivity and stimulations surpass the disadvantages of wearable tech application.

Chapter 5: Big players in the WT market

After analyzing what are the functionalities, the categories, the applications of the wearable technology industry, it is time to analyze what are the main players and to propose some of the most popular products.

Smartwatches and activity trackers are the most famous categories which were the first to enter in the market. “Apple Watch”, “Samsung Gear”, “Fossil Q”, “Xiaomi Mi Band”, “Fitbit Alta”, “Garmin Vivo” series, “Misfit” are the main products which are present in the market.

Figure 5.1 shows the fundamental brands which are at the top five for their number of device sold. Fitbit is considered the leader for its number of shipment units. Its range of products gives to the brand the ultimate position, heading the list. In 2016, it has sold 22.5 million units, an increase of 0.5 million compared to the year before. In 2015, in the first quarter, 3.9 million units were shipped, 4.4 million in the second part, 4.7 million in third quarter and 8.1 million in last one.

Xiaomi is in the second position with 15.7 million units sold in 2016, 3.7 million units more than the year before. In first quarter of 2015, the company recorded 2.8 million of units shipped, in second one 3.1 million, in third one 3.7 million and in the fourth one 2.7 million. Apple is on the average with 10.7 million of units shipped, but it is possible to see a loss between the year before when 11.6 million of units were shipped. Also, market share has decreased of – 3,7% and this is in line with the -7,9% of year-over-year growth. In 2015, the units shipped were less than 1 million, while in the last quarter were about 4 million.

Garmin has registered positive results in 2016 with 6.1 million of units shipped with a + 0,3 % from 2015. In 2015, the company recorded less than 1 million of units shipped. Samsung is placed at the last position with 4.4 million of shipments, increasing of + 1,2 % from the year before.

Figure 5.1: Top five device vendors, units shipped, market share of 2015 and 2016 and YoY growth (units in million)

Vendor	2016 Unit Shipments	2016 Market Share	2015 Unit Shipments	2015 Market Share	Year-Over-Year Growth
1. Fitbit	22.5	22.0%	22.0	26.8%	2.4%
2. Xiaomi	15.7	15.4%	12.0	14.7%	31.0%
3. Apple	10.7	10.5%	11.6	14.2%	-7.9%
4. Garmin	6.1	5.9%	5.8	7.0%	5.4%
5. Samsung	4.4	4.3%	3.2	3.9%	38.6%
Others	43.0	42.0%	27.4	33.4%	57.1%

Source: IDC Worldwide Quarterly Wearable devices tracker, March 2017

According to IDC, in the first quarter of 2017, these companies have registered positive results; Xiaomi has shipped 3.5 million of units, Apple 3.4 million, Fitbit 3.4 million, Garmin 1.4 million, Fossil is entered in the Top five with 1 million, after the acquisition of Misfit. According to another consultant company, Strategy Analytics, Xiaomi, in the second quarter of 2017, has kept its place in the pole position with 3.7 units shipped, followed by Apple which has decreased its number of units to 2,8 million and Fitbit has reached 3,4 million units.

The recovery of Xiaomi in last year is linked to its growth of smartphones' sales, which has helped also those of wearable. Its Mi Band is a best seller and its value for money is relevant. Apple's growth is driven by sales of Series 1 and 2 and by iPhone domination. The Cupertino's company has a strong brand image which increases its popularity.

In fact, the excitement of customer to experience a wearable technology product from Apple is about 59%, while a product from Google will be interesting for 53% of respondents, and for 51% of Microsoft.³⁹

To understand deeply what are the reasons of these results, it is important to examine some examples.

5.1 Smartwatches and activity trackers

Wristwatches and bands equipped with computing technologies were prototyped in the early 2000s but their limitations have impeded their customers' acceptance. Fossil "Wrist PDA" in 2003, "Microsoft Spot", "Samsung S9110 Watch Phone" in 2009 were some examples of the first wristbands which were released without success. The first product which defeated the market was "Pebble" in 2012. The company launched its project in 2012 in a crowdfunding platform, "Kickstarter". Within 6 days, it raised more than € 4 million and it is defined as the most funded project in the history of "Kickstarter". The "Pebble" watch was the first example of smartwatch in the market, which forerun "Pebble Steel", "Pebble Time" and "Pebble 2". Unfortunately, in December 2016, the company was sold to Fitbit for around € 20 million due to insolvency problems.

Fitbit can be considered as one of the pioneers of the activity tracker segment. In 2009, the company released the "Fitbit Tracker", its first product. A small device which can be clipped on clothing and it measures steps taken, and combines them with other user's data to calculate distance walked, calories burned, floors climbed and activity duration and intensity, and finally sleep activity. "Jawbone" was another company which was one of the first to enter in

this market. In 2011, “UP” was launched as a non-audio activity tracker which was water resistant with rechargeable battery. It was the first to link to the tracker also a health application. In following years, other models went to public but in July 2017, it started its liquidation.

These products pushed other companies to engage in this kind of categories, giving origin to the second generation of smartwatches and trackers.

5.1.1 Apple Watch, Fossil Smartwatch, Samsung Gear, LV Tambour Horizon

- Apple Watch

The first version of Apple Watch was presented on September 9th, 2014 at the Flint Center in San Francisco together with the iPhone6. Initially, only three collections were released the “Apple Watch”, “Apple Watch Sport” and “Apple Watch Edition”. Then “Apple Watch Hermès” in collaboration with the fashion brand Hermès was launched one year later. In September 2016, the “Sport” has been replaced by “Apple Watch Nike +”, with the help of Nike. Every model has interchangeable straps of different materials and colors and two dimensions of cases are available 38mm and 42mm. The watch has different functions; it can track activity and health and measure workouts, signal notifications of calls and messages using Siri. One of the main advancements that Apple made in 2014, was the introduction of “Apple Pay”, a payment platform where credit cards are registered and the customer can pay by using NFC sensors inside the iPhone to pay in several retails and online. Credit cards numbers and codes are not registered on the device neither on Apple’s servers but they can be unlocked through touch recognition. It is possible to create a personal “wallet” to register and to dispose different credit cards. This process is already installed in U.S. and UK and recently, American Express, Unicredit, Mediolanum are the first banks in Italy which deliver this service in Italy and in U.S., it is possible send and receive money. At the press release of the launch of Apple Watch, Jony Ive, the Senior Vice president of design stated: “With Apple Watch, we’ve developed multiple technologies and an entirely new user interface specifically for a device that’s designed to be worn. It blurs the boundary between physical object and user interface. We’ve created an entire range of products that enable unparalleled personalization.”⁴⁰

⁴⁰ Apple’s Newsroom, *Apple Unveils Apple Watch — Apple’s Most Personal Device Ever*, 2014, <https://www.apple.com/sg/newsroom/2014/09/09Apple-Unveils-Apple-Watch-Apples-Most-Personal-Device-Ever/>

On September 2nd, 2016 “Apple Watch Series 2” was presented while on September 12th, 2017 the “Series 3” was released. In this updated version, Series 2 is eliminated to maintain Series 1 and Series 3 of Nike+, Hermès and Edition collections. Also, the operating systems are evolving, from WatchOS to WatchOS4 to increase customer’s experience and connectivity.

The Apple Watch Series 3 will be available from September 22th, 2017 as “the ultimate device for a healthy life”. During the conference, Jeff Williamson, the chief Operating Officer explained how Apple Watch was created to help people to stay active, motivated and look better every day. In 2016, the Apple Watch was the second watch in the world for sales, after Rolex and before Fossil but in 2017, it has gained the pole position as top selling company. Since the launch of Series 2, in the last quarter, the company has registered a +50% of growth. The main feature is the increase of heart information through “Apple Heart App”. It can check resting heart rate, recovery heart rate, heart rhythm and it has new functionalities for swimmers. The main innovation is the introduction of a cellular in order to create a watch as “the automotive expression of what I wear”⁴¹. It can receive and make calls with the same number of the usual smartphone. Its display has an antenna integrated and an electronic sim card. Apps can be downloaded and “Apple Music” can stream songs “40 million songs on your wrist”⁴¹. There is a new dual processor that makes it 70% faster than previous one.

Financially, the Apple Watch is considered by the brand together with other products like Apple TV, Beats headphones and Ipods. The financial results are not published by the company, so information about revenues and sales are limited. The category has produced € 2.3 billion revenues and from Tim Cook’s statement, Watch sales has been doubled year over year. According to some estimations⁴², in the last quarter of 2016, 6 million of watches have been sold while during all 2016.

The partnership with Hermès gives the possibility to Apple to be considered as fashionable luxury technology company. The functionality of Apple and the class of the French brand capture two elements, essential for customers. Hermès designers produce the leather straps while Apple has repropose the watches’ model of the fashion house Cape Code, Clipper and Espace in an innovative version. Straps are available in four colors: Bordeaux, Fauve, Etope,

⁴¹ Quotation of Williamson during the Conference, www.apple.com/it/apple-events/september-2017/

⁴² D. Phelan, *Apple Financial Results Reveal Good News for Apple Watch*, 2017, “Forbes”, www.forbes.com/sites/davidphelan/2017/08/02/apple-financial-results-reveal-good-news-for-apple-watch/#6341725f32df and S. Kozub, *Apple sold 6 million Apple Watches last quarter, analysts say*, 2017, “The Verge”, www.theverge.com/2017/2/7/14537584/apple-6-million-apple-watch-sales-estimates

Feu with double or single tour and there is also an orange sport strap. The co-branding meets sophistication, elegance of Hermès with technological innovation in one timepiece. Hermès was interested to refresh its image of brand founded on heritage.

Figure 5.2: Apple Watch Series 3, Apple Watch Nike +, Apple Watch Series 3 Hermès, Apple Watch Series 2 Hermès



Source: Apple Website

Apple can move closer to attract a different target and becoming a luxury brand and this was possible also because of the entrance in the Apple’s team of Angela Ahrendts, former CEO of Burberry. “Ours is a partnership born of parallel thinking and mutual regard — we share similar preoccupations, ever evolving and refining our design,”⁴³ said Jonathan Ive, Apple’s chief design officer. “We are united by the same vision, the uncompromising pursuit of excellence and authenticity, and the creation of objects that remain as relevant and functional as they are beautiful. This is a new step of our attelage,”⁴³ said Pierre-Alexis Dumas, Hermès’ executive vice president, in charge of artistic direction.

Apple Watch Nike+ is the ultimate device for people who love sports. Through “Nike+ Run Club app” coaching plans, training schedules and progress can be registered and tips from coaches and athletes are available. It has different features: GPS to track pace, 50 meters water resistant for swimmers, daily updates about weather and it connects the customer to the community of Nike people. The series 3 can connected to specific training tools due to the collaboration of some fitness brands such as “Technogym”. Nike always wants to expand its boundaries to the digital world, especially to wearable technology. Trevor Edwards, president of the Nike Brand explained the reason of the partnership “The market is full of complex, hard-to-read devices that focus on

⁴³ Apple press release, *Apple Watch Hermès introduces new styles & colors*, 2016, www.apple.com/newsroom/2016/09/apple-watch-hermes-introduces-new-styles-colors/

your data. This focuses on your life. It's a powerful device with a simple solution — your perfect running partner.”⁴⁴

“Apple Watch is the ultimate device for a healthy life and we wanted to push it further to create the best smartwatch in the world for runners and athletes,”⁴⁴ said Jeff Williams, Apple's chief operating officer. "Apple Watch Nike+ takes performance tracking to a whole new level and we can't wait to bring it to the world's largest community of runners."⁴⁴

This co-branding is a win-win collaboration which can help people who are interested in technology and sport.

The Apple Watch is a device which satisfies different targets, from the young and athletic people to classy women and men. It expresses the customer's desire to be different with a unique design and personality according to the type of customer.

- Fossil

“Fossil Group” was founded in 1984 by two brothers Tom and Kosta Kartsotis and its headquarter is in Texas (USA). In 2001, the group acquired “Zodiac Watches”, a Swiss watch company to acquire a significant presence in the European market and learn the know-how of Swiss artisans. In 2012, the group purchased “Skagen”, an American brand of watches and accessories characterized by a Danish design. The major competitive advantage of Fossil is its portfolio of brands. The company has acquired the license of “Burberry”, “DKNY”, “Armani”, “Diesel”, “Tory Burch”, “Zodiac”, “Relic”, “WSI”, “Kate Spade”, “Michael Kors”, “Karl Lagerfeld”, “Mark Jacobs”, “Adidas”, “Chaps” and “Michele” for the production and sale of watches and accessories.

The company launched its first smartwatch in 2015 but “Fossil Q Smartwatches Gen 2” and “Gen 3” are the latest collections of the brands which are compatible with iOS and Android as operating systems. There are also hybrid watches which “look like a watch but act like as smartwatch” as the Fossil site reports, with the classic style of watch but with functions of a smart one. The integrated features are fitness trackers, notifications of social media, SMS, e-mail, apps, calendar. In addition, there is the possibility to take pictures, to personalize the dial, to activate Google Maps, Google voice and the Led flashlight.

⁴⁴ Apple press release, *Apple & Nike launch the perfect running partner, Apple Watch Nike+*, 2016, www.apple.com/newsroom/2016/09/apple-nike-launch-apple-watch-nike/

In 2016, the group has launched more than 140 smartwatches lines⁴⁵ and its sales from the EU market for watch category is about € 622 million in 2016. Fossil is trying to expand its range of products and to double its wearables production to include 300 new products and add new brands in 2017 as explained in a press release.⁴⁶

“Fossil Group is uniquely positioned to succeed. We bring the rich history in fashion, portfolio of brands, design prowess and sophisticated software development that’s required to drive strong sales in this competitive market.”⁴⁵ “Customers crave connectivity that doesn’t compromise style. We’re creating more options to seamlessly integrate desired tech features into our customers’ style and lifestyle. Fossil Group’s design, scale, speed to market and unrivaled portfolio of fashion brands, coupled with our cloud and app platform, and tech and hardware innovation, have pulled us ahead of the wearables pack. In particular, the success of our hybrid smartwatches has proven that our consumers want a balance of function and fashion. We’ve effectively filled that gap in the market. Hybrids pack the power needed to efficiently accomplish daily tasks in a beautifully-crafted timepiece.”⁴⁶ said Greg McKelvey, chief strategy and digital officer, Fossil Group.

Fossil cares on equal terms about technology and fashion, and this was the key for its success. Fossil is working with several fitness applications such as “Google Fit” and “Health”, “UP” by Jawbone” and “UA Record” by Under Armour in order to maximize its functions.

Figure 5.3: (from the left) two models of Michael Kors Access smartwatches (Grayson&Sofie), and three Fossil Q Smartwatches, Venture, Explorist



Source: Fossil and Michael Kors websites

⁴⁵ Fossil Press Release, *Fossil Group Reimagines the Watch*, 2017, www.fossilgroup.com/wp-content/uploads/2017/03/Fossil-Group-Basel-2017-FINAL.pdf

⁴⁶ Fossil Press Release, *Fossil Group Doubling Wearables in 2017 to More than 300 Products, Adding New Brands, New Designs and Smaller Hybrid Smartwatches*, 2017, www.fossilgroup.com/wp-content/uploads/2017/01/Fossil-Group-CES-2017-Press-Release-FINAL.pdf

The success of Fossil is based on their successful partnerships with companies that are involved in developing wearable technology. They are able to compete with three different type of products: smartwatches, hybrid watches and activity trackers with the acquisition of “Misfit”. On December 22, 2015, it acquired Misfit, in order to obtain “a scalable technology platform that can be integrated across the company's multi-brand portfolio, a native wearable technology brand and a pipeline of innovative products”⁴⁷.

Michael Kors has renewed the licensing agreement for watches and jewelry with Fossil until 2024. John D. Idol, Chairman and Chief Executive Officer of Michael Kors, said: "We are very pleased to continue our partnership with the Fossil Group. Accessories are central to the Michael Kors brand DNA, and we will continue to build on that positioning as we grow globally. Fossil's position as a leader in the global watch market has made them an ideal partner in the design and development of innovative watches and jewelry that capture the sophistication, energy and style of the Michael Kors lifestyle. We have enormous confidence in the future growth of our relationship and the many opportunities that lie ahead."⁴⁸ “It’s clear to me that the future of fashion will combine great design, personal style and innovative technology, and the amazing response to Michael Kors Access has confirmed that that future is now.”⁴⁹ reported the founder, Michael Kors. The two-new model “Sofie” for woman and “Grayson” for man are the latest which connect style and innovation. Grayson represents an expansion for men’s strategy in accessories which started with the hybrid “Gage” model. The brand wants to develop the project of “My Social”, a feature that allows the user to link an Instagram account and share personal posts and set them as a watch face. The app allows to personalize the watch with personal images taken from Instagram, select a favorite image, and even apply filters.

Considering the relevance of Fossil in the wearable market, in past weeks, an interview with Fossil has been requested in order to analyze one of the main players of the industry. After several weeks, a reply followed by an anticipation of potential questions has been submitted thanks to the intervention of Professor Dal Santo. The interview will take place by

⁴⁷ Fossil Group Financial, *Fossil’s Annual report 2016*, www.fossilgroup.com/wp-content/uploads/2017/03/FOSL-2016.12.31-10K-Final-w-exhibits.pdf

⁴⁸ MK Press Release, *News Releases Details, Michael Kors And Fossil Group Renew Global Licensing Agreement for Watches and Jewelry*, 2014, www.investors.michaelkors.com/news-releases/news-releases-details/2014/Michael-Kors-and-Fossil-Group-Renew-Global-Licensing-Agreement-for-Watches-and-Jewelry/default.aspx

⁴⁹ MK Press Release, *Michael Kors Access Expands with New Smartwatches, New Apps, New Faces and New Markets*, 2017, www.investors.michaelkors.com/news-releases/news-releases-details/2017/MICHAEL-KORS-ACCESS-Expands-with-New-Smartwatches-New-Apps-New-Faces-and-New-Markets/default.aspx

telephone with the participation of Francesca Fabris, PR Manager at Fossil Italy and Antonio Nigro, Vice President of Fossil Group EMEA. The interview has been fixed after the deadline for the thesis ‘submission thus, it will be presented in the final presentation. In the appendix, it is possible to check the questions’ list sent to Fossil.

- Samsung Gear S

Samsung is another innovative player in different technological categories. The South Korean company is established since 1938, during all decades, it has always been competitive with its products. Between its range of products, smartwatches “Gear S3” and “Gear S2” are most updated ones. The Korean firm should have sold 7.1 million sales of its Gear smartwatches and trackers from 2014 to the end of 2016's second quarter.⁵⁰ Samsung Gear S2 was launched in 2015 and it is available in two different styles, Samsung S2 and S2 Classic. S2 is more simple and sporty, the other classy and sophisticated but both with the same functionalities. Mail notifications, Google Maps, synchronization with “SHealth”, the application of Samsung that monitor health parameters are installed in every Samsung devices. Samsung has collaborated with “Atelier Mendini”, headed by Alessandro Mendini, an Italian designer and architect to create a collection of straps and dials. “Our partnership with Alessandro Mendini on these exquisite watch faces and bands for the Gear S2 is part of our continued commitment to deliver more custom options that help users express their personal styles while they stay connected”⁵¹, these were the words of the Samsung Executive Vice President of Global Marketing. “I believe the watch is one of the most precise and valuable devices that mankind has ever made, and Samsung has successfully reinvented this device in a way that fits within in our technology-driven world. It was a fun and highly collaborative experience working with the global leading mobile company to craft something that merges the style of a traditional watch with the digital world for a completely unique design experience – it will truly become the future of mobility”⁵¹, commented the designer.

⁵⁰ J. Leslie, *Wearable tech sales explored: Just how many devices have been sold?*, 2016, “Wareable”, www.wareable.com/wearable-tech/how-many-apple-watches-sold-2016

⁵¹ Samsung Press Release, *Samsung and Alessandro Mendini Partner to offer Stylish Customization Options for Samsung Gear S2*, 2015, www.samsung.com/uk/news/local/samsung-and-alessandro-mendini-partner-to-offer-stylish-customisation-options-for-samsung-gear-s2/

Samsung Gear S3 is the recent collection, released in November 2016 with two models “Gear S3 Classic” and “Gear S3 Frontier”, both equipped of Bluetooth and LTE connections. In addition to the general features, other functions are installed.

The company has developed “Samsung Pay”, to compete to “Apple Pay”. A payment system which permits through mobile or watch to make transactions. Sensible data are securitized and the system is easy to use. In July 2017, the company signed an agreement with “PayPal” in order to enter in PayPal security system as one payment method accepted to pay online and offline.

At the beginning of 2017, a partnership with “Under Armour” has been revealed. The sport apparel brand is collaborating with Samsung to deliver a unique fitness experience. Applications “UA Record”, “MyFitnessPal”, “MapMyRun” and “Endomondo” are developed by the fitness brands exclusively for Samsung. UA Records helps to create dashboards for every activity, monitor sleep and workout.

Figure 5.4: Samsung Gear S3 Frontier and Classic, Samsung Gear Sport, Samsung Gear S2 and Samsung Gear S2 Classic



Source: Samsung website

While MyFitnessPal controls nutrition, calories and exercise by recording food injections. MapMyRun tracks every ride, stroll and steps taken and Endomondo customizes training plans and paths.

At the end of August 2017, the company has introduced new devices: “Samsung Gear Sport”, a smartwatch and “Samsung Gear Fit 2 Pro”, a fitness band. The company wants to find the perfect products for all people who like sports and train themselves at different levels of workouts. It can monitor heart rate and detect the activities which an individual is doing. It is water resistant and swim tracking; in fact, Samsung has developed a partnership with “Speedo”, the famous swimwear brand, to connect and share information through its app to improve swimming sessions.

- Louis Vuitton Tambour Horizon

“Louis Vuitton” does not need a presentation; it is an iconic brand founded in 1854 in Paris and it became one of the most famous, loved brand in the world. In 1977, the company created a joint venture with “Moët Hennessy” and the group “Louis Vuitton Moët Hennessy (LVMH)” was founded. The group controls several brands of wine, spirits, fashion, fragrances, watches and jewelry. Some examples are Dior, Tag Heuer, Bulgari, Fendi, Celine, Kenzo, Guerlain, Sephora, Acqua di Parma and others.

In July 2017, the brand launched its smartwatch “LV Tambour Horizon” with the collaboration of “Android” and “Qualcomm”, a U.S. telecommunication company.

Figure 5.5: Tambour Horizon Black 42, Graphite 42, Monogram 42



Source: Louis Vuitton website

In 2002, Louis Vuitton entered in the watch market with the “Tambour” model, which become a must-have. From its success, 15 years later, the brand has reintroduced it in a new version. The aim of watch is to connected people who travel around the world.

The watch was designed in Paris while the case was projected in the famous “Vuitton Atelier” and the assembly was made with all skills in the Silicon Valley company. The brand has created three models: Horizon Black, Horizon Graphite and Monogram at which are added 60 straps interchangeable, 30 for women and 30 for men.

The watch is not yet equipped with heart rate sensor, or NFC payment support because the main purpose is to be an accessory for traveling. Besides the common functions of smartwatches, notification of calls, emails, alarms, what it is unique in this watch are some features which embody the values of Louis Vuitton. With “My Flight”, customers are always updated on flight information and follow the traveler since it is boarding time, and it has a countdown features which defines how many hours are left before the departure. While “LV City Guide” is an exclusive guide for seven major cities, London, Beijing, Shanghai, Paris, Los Angeles, New York and Tokyo. It can recommend hotels, restaurants, sightseeing which embody the prestige of the brand. It is compatible with iOS even if its software is Android Wear 2. 0. The brand has recruited a list of celebrities to create an advertisement campaign which represents at best what does Tabour Horizon watch and the value of a connected world. Catherine Deneuve, Adèle Exarchopoulos, Jaden Smith, Jennifer Connelly, Laura Harrier, Miranda Kerr, Victor Cruz, Yaya, Lu Han, Doona Bae, Gong Yoo, Ebizo Ichikawa participated at the project.

The sense of time and travelling are elements which have always characterized the spirit of the brand though bags and luggage collections and now the path is continuing through a new interpretation of the watch.

5.1.2 Examples of activity trackers: Fitbit Alta and Swarovski Shine

Activity trackers are the most common devices which represent the first example of wearable technology in the mass market. Versions and models at every level of price are present and with an excess supply, companies need to diversify their devices through design and functionalities in order to create a competitive advantage.

- Fitbit Alta and Flex 2

Fitbit was founded in 2001 in San Francisco (USA) and it has become the leader for activity tracker category. Its mission states: “To empower and inspire you to live a healthier, more active life. We design products and experiences that fit seamlessly into your life so you can achieve your health and fitness goals, whatever they may be”⁵². Most relevant products are “Fitbit Alta” and “Fitbit Flex 2”, two wristbands which represent the main products for the company. Fitbit focuses its activities on health and fitness features. Devices tracks activities, exercise, food, weight, sleep and real-time information, by always be in sync with smartphone and PC. Applications encourage trainings by notifying progresses and celebrating achievements. The annual report of 2016, registered revenues for € 1.8 billion and EMEA revenues grew of 86%, covering 18% of total revenues. In the second quarter of 2017, EMEA countries revenues were about € 91 million. New products “Fitbit Charge 2”, “Fitbit Alta”, “Fitbit Blaze”, and “Fitbit Flex 2” represent 70% of revenues with more than 60 million devices sold in 2016. In 2016, it has acquired some assets of “Pebble”, such as specific key personnel and intellectual property related to software and firmware development in order to improve speed and efficiencies. The acquisition will also accelerate the development of customized solutions, in fact, Fitbit has a strong community which is connected through apps and it counts 23.2 million of active users over 50 million of registered device users.

In August 2017, the company has launched the “Fitbit Ionic”, the latest smartwatch to compete with the giant like Apple and Fossil. The watch is equipped with a personal trainer which can give personalized recommendations and tips and though “Fitbit Pay” system, Ionic can make payments, thanks to the agreement with “MasterCard”, “American Express” and “Visa”. The watch can be in sync with over 200 devices to enhance customers’ experience and it is available in three styles and colors. Innovative apps and systems are introduced as “PurePulse” to monitor sleeping and create a sleeping schedule. Fitbit has signed a collaboration with “Adidas” as response to Apple Nike + which will release in 2018.

Particularly relevant are Fitbit’s collaboration with “Public School”, “Vera Wang” and “Tory Burch”. The partnership with New York design house Public School is consolidated from 2016. “Fitbit + Public School” is a collection designed to be accessible, functional and versatile for every day and for every customer to express a unique style. The two designers take inspiration from New York street style to propose an irreverent collection “Axis” and “Type III” suitable for Fitbit Alta and soon for Flex 2.

⁵² Fitbit’s site, www.fitbit.com/about

Vera Wang sophisticated style is visible in the new model of Fitbit Alta and Flex 2, signed by the most famous bridal designer from late 2016. Classic but at the same time modern, the model “Simply Vera for Fitbit” are suitable for everyday occasions are available at Kohl’s department stores or online.

Tory Burch+ Fitbit is the most successful partnership for Fitbit. They started to collaborate since 2014, when the designer handled a series of pendants and bracelets and the win-win situation was visible for both.

Figure 5.6: (from left) two models of Simply Vera for Fitbit, (at the center) Fitbit+ Public School, and Tory Burch+ Fitbit models



Source: Fitbit website

Tory Burch, CEO & Designer of Tory Burch, stated “Wearable technology is an exciting new category and we’re thrilled to be partnering with Fitbit to offer a unique collection of accessories that transform the fitness tracker into a stylish piece of jewelry that is versatile enough to go from day to evening.”⁵³ The new models embody both brands’ values, fashion and fitness together and they are available for Fitbit Flex 2 with different colors but in the next future also for Fitbit Alta.

- Swarovski Shine

Misfit was founded in 14 October 2011 and its name wants to tribute Steve Jobs’ famous speech of “think different” Apple adv:” Here’s to the crazy ones. The misfits. The rebels. The

⁵³ Fitbit’s Blog, *Tory Burch for Fitbit Accessories Collection Now Available*, 2014, www.blog.fitbit.com/tory-burch-for-fitbit-accessories-collection-now-available-for-pre-sale/

troublemakers. The round pegs in the square holes.”. In fact, Jobs died nine days before the foundation. The brand mission states: “It is who we are, who we aspire to be, and the company we keep. This is not just a job or a brand, it’s a way of seeing the world. And because of that, we quite often do not fit. But as people who are «mis-fits», we see the like-minded among us – our passionate users, fans and collaborators. In addition, we co-opt misfits throughout history as the pioneers of this. So, we embrace the skepticism, the insecurity and even the self-doubt. We understand that they are our strength, our advantage and our doorway to the future. In this, we stand together, as Misfits. Misfit is always pressing towards the horizon. The true power of this brand is to innovate, and in doing so, capture hearts and minds. Innovation, imagination, possibility, the next frontier and even the unknown belong to this brand.”⁵⁴ The brand embodies fashion, wellness and intelligence. Fashion is what makes its devices accessible for everyday life and suitable for every occasion. Wellness is the main inspiration for Misfit which was created for this purpose, guided by the intelligence. Misfit invests in people and technology to improve innovation.

In November 2015, it was acquired by Fossil for approximately € 215 million as mentioned and this increases Fossil’s position as pillar in the fashion wearable technology industry. “With the acquisition of Misfit, Fossil Group will be uniquely positioned to lead the convergence of style and technology and to become the fashion gateway to the high-growth wearable technology and connected device markets.”⁵⁵ states the CEO of Fossil, Kosta Kartsois. While Sonny Vu, founder of Misfit announced: “We are thrilled to join forces with Fossil Group to usher in the next era of wearables where elegance, beauty and long-lasting wearability are paramount. Together, we will introduce products that blends Misfit’s seamless, intuitive technology and user experience with design, style and branding that is the hallmark of Fossil Group”⁵⁵. Misfit has range of products, smartwatches “Phase”, “Shine” and “Vapor” which will be launched in October 2017 and activity trackers “Ray”, “Shine 2”, “Flare” and “Speedo Shine”. Speedo Shine was designed in collaboration with Speedo, and it is specifically suitable for swimmers because it tracks laps and swim distance.

In 2014, the company collaborated with “Victoria’s Secret” and it created a special Misfit Shine pink model because of the launch of Victoria’s Secret’s athleisure collection. A limited number of devices were available in selected countries as gift linked to a shopping bag in Victoria’s Secret online.

⁵⁴ Misfit’s website, www.misfit.com/uk_en/overview/

⁵⁵ Fossil Press Release, *Fossil Group, Inc. To Acquire Wearable Technology Innovator Misfit*, 2015, www.fossilgroup.com/wp-content/uploads/2016/06/fossil-group-inc-to-acquire-wearable-technology-innovator-misfit.pdf

The most important partnership that Misfit has developed is with “Swarovski”, the famous Austrian crystal company in 2015. A new interpretation of Misfit Shine gave birth to “Swarovski Shine Collection”. The device is not a usual activity tracker; it has a form of a crystal button which can be applied as a wristband or in a necklace.

Figure 5.7: Swarovski Shine Collection



Source: Google images

It tracks and records all your daily activities including walking, running, swimming, sleeping, calories burned and more, all linked to an application. It is water resistant and it can control music, or to get notified of an incoming call or text message. It functions as smart button and it permits to control connected household devices. At its launch, two models were proposed a clear Swarovski Shine with a brilliant crystal face with chargeable batteries and a violet Swarovski Shine which uses a patented “energy crystal” technology to allow an efficient solar charging. The crystal is available in different colors and in two sets: “Slake” with a sport band and a bracelet where the crystal can be installed and the other, “Vio Pendant” is equipped with a pendant and the sport wristband. The idea is that with two different types of supports, the crystal can be used in every occasion, and in combination with different styles. The Victoria’s Secret Angel, Miranda Kerr has represented the brand image for the advertisement and the product was firstly launched in U.S., China and Hong Kong and then worldwide.

5.2 Augmented Reality devices

Augmented reality is a specification of virtual reality and it is defined as “an enhanced version of reality created using technology to overlay digital information on an image of something being viewed through a device”⁵⁶.

Specifically, virtual reality is a type of reality where there isn't the possibility to sense the environment. AR is a dimension where virtual objects are 3D elements represented in front of users. In addition, there is another type of reality, the mixed one where virtual objects are in 3D and they can interact with physical ones.

Devices used in this category are smart glasses and headsets which englobe physical information and recreate them on a display in a different format through location, object and image recognition technologies. The main purpose is to enhance the visual experience and perception of the world. When reality will be not more distinguishable from the virtual one, the era of AR will be at its most momentum.

Figure 5.8: (from left) Example of recognition of AR and holograming



Source: Google Images

There are different types of AR; the most common is projection. Images are used to enlarge the reality while the record of images is called holograming, which is another technique. Through a smart projector, colors, images and videos can be represented onto the object and adaptable to size and structure. Recognition through a device like smartphone can a possible tool to create interactive contents. Outline technique is the interaction with virtual objects which are viewable through a display, and this is the example of interactive fitting rooms.

⁵⁶ Merriam Webster Dictionary definition, 2017, www.merriam-webster.com/dictionary/augmented%20reality

In fact, applications of this technology are limitless for work, leisure and for different industries. The technologies can help brands to improve customers' experience, generating touchpoints and involving campaigns with a high level of emotional connection.

Retail is exploring this technology to create virtual mirrors through which a customer can see its image with a dress on.

Smart glasses represent the most popular example of this technology and "Google Glass" is the product that has introduced the category to the mass market. "Google Glass" is considered the pioneer but its success didn't last due to several problems and conditions. There are still some models in the market, such as "Samsung Gear", "Solos" which is suitable for cyclists, "Epson Movero" and "Sony SmartEyeGlass" and other type of interactive glasses like "Safilo X" and "Vue", which will be launched soon. Hi-tech companies are working on prototypes and others has already developed other AR devices but limitations on high price and use do not attract customers. Apple is engaged in "AR Kit" through applications and the same is doing Google, developing AR by a platform. On the other hand, social networks are developing this technology on smartphones and accessories which should be considered as an important part of category. Facebook is interested to make its steps in this category and as the social network with largest number of users, it will be easier to succeed.

Obviously, AR is still in an early adopter phase and the path for this category is long to achieve; efforts and patience to understand and develop innovative products are needed and more precise sensors and systems.

5.2.1 Google Glass

Google Glass started to be as a project of "Google X", a division of the entire company. In 2013, Google launched its glass prototypes for a limited period in U.S. and they became available on May 2014. The headset permits to take a picture or record a video with hand-free, and it can become a navigator with the support of Google Maps and a search engine. It can notify events and updates, write a text or e-mail via dictation. Functionalities attract early adopters who were interested but price and style act as deterrent. In fact, in June 2014, Google announced a partnership with the designer Diane von Furstenberg to launch a limited edition of Google glass designed by the stylist. Five new frame designs and eight new shades were introduced in the collection. The edition "DVF made for Glass" was available only in U.S., sold in "Net-à-Porter" online retail. Prescription lenses were sold at €1,500 while sunglasses € 1.350.

Figure 5.9: (from left) the first Google Glass, four models of Diane von Furstenberg for Google Glass, new Google Glass Enterprise Edition



Source: Google Images

This wasn't the first time for Von Furstenberg to collaborate with Google Glass; during spring/summer fashion show of 2013, models wore the glass and recorded the runway. "I have always been fascinated by technology and as a brand, DVF embraces technology," says von Furstenberg, commenting on the collaboration. "It is a very natural fit for us and we are delighted to be on the forefront with Glass"⁵⁷.

Google did not release to the public sales units but in January 2015, Google announced to stop the production of Glass. Glasses represent a step forward to innovation but customers maybe were not ready to this change, especially for cost and unaesthetic features, which created the "Glasshole effect". This effect represents the negative perceptions arisen from wearing a pair of smart glass in the current society. In fact, Google created a list of behavior to avoid for early adopters.

The rebirth of Google Glass is recent, in fact, in July 2017, the company has announced the "Google Glass Enterprise Edition". The division X in collaboration of several hi-tech firms has projected this new collection to enhance employees' performance and efficiencies. The design is the same but functionalities are improved and more than 50 companies have already tried to use glasses' prototypes in the working places. It is helpful to be connected with co-workers and to have access to training videos, instructions, quality checklists.

⁵⁷ Diane Von Furstenberg Press Release, *DVF Unveils Limited Edition Google Glass Collection*, 2014, www.newsroom.vspglobal.com/vsp-global/news-releases/dvf-unveils-limited-edition-google-glass-collection

Google Glass has again the opportunity to succeed, focusing on firm's dimension where it can improve their functionalities in order to repropose the use of glasses for mass market in the future.

5.2.2 Spectacles by Snapchat

As mentioned before, Snapchat is an instant messaging and an image sharing application. At the beginning, it was only used to share personal photos but new features have given the possibility to send and share images and videos. What is unique in Snapchat are filters and short-lived stories. Filters are updated every week and through an efficient facial recognition, they create animated selfies. "Stories" are photos or videos which are online only for 24hours, and each user can create its storytelling and also save it in "Memories". In September 2016, the company announced its first hardware gadget, "Spectacles", a pair of smart glasses which can record videos from 10 to 30 seconds. In February 2017, sales became also online and in June 2017, Spectacles arrived also in Europe.

The know-how for developing the glasses was inspired by "Epiphany Eyewear" produced by "Vergence Lab" which was acquired by Snap in 2014. Snap exploited the rudimental prototype which was then developed. Snapchat team is formed by members from different sectors and brands such as Microsoft, Qualcomm, Michael Kors. This mixed team can be the key for the success to compete in every direction.

The company does not sell Spectacles in retails; customers can buy them only or through "Snapbot". "Snapbots" are yellow vending machine from which glasses are sold as snack does. The first "Snapbot" appeared in Venice (California) near the headquarters of Snapchat on November 2016. Temporary "Snapbots" in Europe where in major cities such as Venice, Paris, Berlin, London and Barcelona, in particular locations. While there some fixed one which are spread in some U.S. and European cities, such as London, Paris, New York, Chicago, Las Vegas.

Spectacles have two cameras integrated in the frame and it is synchronized with Snapchat's account via WIFI. Around cameras, LED lights appear when it is recording or when the battery is low. The case of the glass is also a charger which can be used when customers are out. Glasses are available in three colors but there is only one size.

Figure 5.10: Snap's Spectacles



Source: Google Images

In U.S., in the first seven months, 600.000 units were sold. Spectacles sales are accounted to be around € 6.7 million in the first quarter of 2017 while in the first quarter of 2016 were more than € 3 million. In the second quarter of 2017, sales have slowed down to € 4.5 million⁵⁸.

The key of success of Spectacles is the possibility to capture customers' imagination being fashionable and functional. It is simple to use and ready to wear; two elements that are fundamental to attract customers especially, Millennials. According to Snap's CEO, 5 million of Snaps were sent via Spectacles since their launch⁵⁸.

Rumors affirmed that the company is working on a new pair of glasses and expectations are promising and the possibility to introduce its lenses to Spectacles' videos is becoming reality.

5.3 Smart textile

Smart textile is still expecting its Golden Age and the category hasn't reached its full development. Projects and prototypes are still closed in laboratories where divisions are working. One of the main expert in smart textile is Dr. Sabine Seymour, an entrepreneur and researcher interested in analyzing wearables as function of clothing. She studied textile innovations, following projects from the software application to the development of prototypes. She was the director of the "Fashionable Technology Lab" at the Parsons School of Design and she wrote "Fashionable Technology, The Intersection of Design, Fashion,

⁵⁸ E. Niu, *Snap's Spectacles Sales Fell in Second Quarter*, 2017, "The Motley Fool", www.fool.com/investing/2017/08/11/snaps-spectacles-sales-fell-in-second-quarter.aspx

Science, and Technology” and “Functional Aesthetics” and co-edited “Computational Fashion”. She is the inventor of “Supa”, a powered sport bra which through biometric sensors can track parameters. The introduction of sensors and mechanisms gives new life to wovens which are reinterpreted in an innovative mode. Embedding sensors in clothing is an opportunity to track and protect health and security in every moment without wear any accessories. In the future, this will enhance wellness and it will essential and natural to keep under control health but also but also to control applications and notifications.

5.3.1 Levi’s + Google

Google with its division “Advanced Technology and Projects” (ATAP) is a technology incubator which works on projects with a maximum of two years realization. They are looking after different projects, one of them is the Soli one, known as “Project Jacquard”, launched in 2015. Its aim is to include sensors in fabrics and receive feedbacks from them, without changing the nature and the characteristics of textile. They are working to create woven with conductive fibers and small components which can give feedback, supporting by an application. The name comes from Jacquard loom, the machine invented in 1801 which facilitated the weaving of particular patterns. A “chain of cards” were integrated to wave together all fibers continuously.

At the same time, the partnership with “Levi Strauss &Co” was announced. Levi’s Strauss is a company that passed through history. It was founded in 1853 by a German immigrant in San Francisco who decided to produce clothes for workers with a particular textile, the denim jean. Through decades, the denim jean became iconic, and people started to wear not only for work but as casual clothes and the company became one of the most popular brands.

The two company have decided to work on a piece of Levi’s collection, the “Commuter Tracker” jacket. The collection is specifically suitable for bikers, people who use bike for moving in cities. The collection is made with textiles which have particular features to resist at every climatic situation. Equipped with “Coolmax” technology which is adaptable to every weather change. It absorbs humidity and protect from cold and it ensures to keep dry and cool the skin according to the occasion. The “Cordura” textile, a mix of cotton and nylon, is resistant and stretch, suitable for every situation. The project with Google enhances performance of this textile in a new direction. A tag in the jacket’s cuff is connected wireless to the special fibers through an app and with a gesture, it is possible to provide inputs to the mobile phone. Notification on calls, events, music, maps are possible to be controlled without

looking at phone but only with a simple movement of hands. The jacket is compatible with Google Apps such as Google Maps and Google Messaging, as well as “Spotify” and athletic activity tracking app “Strava”. The Jacquard woven is washable when tag is removed like a casual jacket.

Google has defined Jacquard textile as a blank canvas for the fashion industry. It has worked to transform the textile to interactive surface through connected fibers. Usual yarns such as silk, cotton, polyester are combined with metallic supports and sensor grids in order to be resistant to industrial loom. Connections are miniaturized in small electronics to be discreet and not visible. They can capture touch interactions and gestures which are transmitted through app to the smartphone. Designers can use the woven as they need without having technological skills, and fibers can be manufactured as a normal textile and layers, decors can be added. Levi’s is a brand which transformed a workmen’s garment to a casual wear. Through its limitless potentiality, the brand englobes fashion and efficiency. From producing jeans for miners to the urban warrior cyclists, time passes but functionality is always needed. The two companies always want to improve the products and the VP of global product innovation at Levi Strauss & Co states: “We don’t want the functionality to be a short fix and the technology then expires. We want people to keep the jacket for a long time as they do with other Levi’s products.”⁵⁹

Figure 5.11: Levi’s Commuter+ Jacquard by Google



Source: Google’s Images

⁵⁹ R. Arthur, *Trying on The Levi’s And Google Smart Jacket At SXSW Feels Like The Future*, 2017, “Forbes”, www.forbes.com/sites/rachelarthur/2017/03/13/levis-and-google-smart-jacket/

The company has announced that the jacket will be available from fall 2017 but there is not yet a precise date. Originally, it should be launched in past spring but problems with the application have delayed the launch.

The jacket can be useful not only because of its technological features but it can be a tool to prevent bike accidents and improve the road safety. The success of this jacket is its perfect combination between two worlds, fashion and technology applied in a single item which offers new possibility to be connected.

5.3.2 Polo Tech by Ralph Lauren

“Ralph Lauren” founded its brand in 1967 and one year after launched its first full line of menswear “Polo” and in 1972, he introduced its famous cotton shirt which gave him its path to success. In 2015, the company decided to enter in the wearable technology, by projecting the “Polo Tech” shirt. The technology used is simple. Silver fabrics register body information and the data collected by the shirt are stored by a “black box,” which includes an accelerometer and gyroscope, and capture movements and directions. The” black box” transfers through Bluetooth data on the application which elaborates biometrics information. It can track calories burned, heartbeats, and steps taken. The application suggests a series of adaptive workouts videos of cardio, agility and strength according to personal parameters in ten thousand combinations of personalized exercises.

The shirt is black with yellow Polo player logo which underlines the brand participation.

Ralph Lauren is the brand which mainly represents sporting spirit with its brand “Polo Sport” and “RLX” especially polo and tennis. The company has sponsored 2017 U.S. Open and in fact, the shirt was launched during U.S. Open in 2014 as sign of consolidated partnership.

David Lauren, Executive Vice President of Global Advertising, Marketing and Corporate Communications states about the launch: “Ralph Lauren continues to be at the cutting edge of fashion and culture. Our goal is to create and reflect the ultimate lifestyle, and we believe that a healthy and active life is an essential part of that. Ralph Lauren is excited to help lead the industry in wearable technology in this ever-evolving, modern world. Our vision is that this will transcend sports to help us at every age and in every aspect of life. Reaching far beyond just the needs of elite athletes, Polo Tech will offer innovative technology for all ages and lifestyles to promote general wellness and quality of life.”⁶⁰

⁶⁰ Ralph Lauren Press Release, *Ralph Lauren Introduces the Next Evolution of Wearable Technology*, 2014, www.investor.ralphlauren.com/phoenix.zhtml?c=65933&p=irol-newsArticle&ID=1960738

Figure 5.12: Polo Tech by Ralph Lauren



Source: Google Images

The Ralph Lauren Polo Tech shirt was developed with “OmSignal”, a Canadian company which is expert in technology. The hi-tech company owns the patent for this kind of technology and they study wearables in health and medicine. “It was clear from our very first meeting that Ralph Lauren had clarity of mind about the future of fashion tech. Its legendary Polo brand and unparalleled design and merchandising capabilities make Ralph Lauren a natural partner to bring smart clothing technology into everyday lives.”⁶⁰ explained Stéphane Marceau, CEO of OmSignal.

The shirt is now off the market and it is no more present in Ralph Lauren site, thus it did not have a great success. Reasons are not revealed, maybe the shirt has a too sporty style which did not meet classy sport customers. Looking at Ralph Lauren presentation, the company in the last year decided to focus on main brands, “Polo”, “Ralph Lauren” and “Lauren”. They express the intention to reinventing icons and eliminating marginal products.

5.4 Smart jewelry

Jewelry has always played a functional role since Egyptians, it represents the connection of personality to the public appearance. Jewelry industry has always been dynamic and growing. Its functionality is relevant also nowadays and through smart devices, a new interpretation is adapting to 21st century innovation. Accessories are suitable in every occasion, from a ring to

a bracelet. At the begging, smart jewelry category was linked to smartwatches and activity trackers but recently, smart accessories have been developed and several smart devices are entered in the market.

Earrings can become speakers connected via WIFI, necklaces can help voice recognition technologies, rings can signal notifications or incoming calls, for instance. Even if these devices lack of a display, they can be useful tools which can compete with smartwatches. Already some designers such as Michael Kors and Kate Spade have developed fashion bracelets whose functions are equal to those of an activity tracker.

Accessories are essential for women, who consider as fundamental the design and the aesthetic side. On the other hand, the emotional impact of a device should not be ignored. The key of success for smart jewelry companies should be creating engagement between customers and improvement of the sense of community, in particular for women, who cover several roles and tasks in the same moment. Through these devices, women need to enhance their wellness and physical and mental equilibrium. In fact, the shift of some wearables is to not only control vital parameters but also to track sleeping time. The insert of meditation exercises is a potential successful strategy. If innovation and advancements will be implemented, this type of devices would overtake the use of activity trackers and smartwatches for female customers for their efficient functionalities.

5.4.1 Ringly

“Ringly” was founded in 2015 by Christina Mercado, a young entrepreneur who was inspired by daily struggles of every woman. In an interview, she declared: “I was just always missing calls and texts because my phone was in my purse, and my family was getting frustrated with me [to the point that] it became a running joke. And I was looking at my hands, and I thought, «You know, I wear some big rings. I wonder if I can make a technology that would fit into the things I wear every day that would help solve this problem and be useful? »”⁶¹. This is the idea underlying this project which is getting positive feedbacks from customers and experts.

The mission of the company states: “Be healthy, live happy”⁶². This statement explains what is the main purpose for the company. Their customers should take care of themselves to be

⁶¹ V. D. Hoff, *This (Surprisingly) Stylish Ring Will Tell You When Your Phone Is Ringing*, 2014, “Elle Magazine”, www.elle.com/culture/tech/tips/a14756/ringly-wearable-tech-fashion/

⁶² Ringly’s website, www.ringly.com/pages/our-mission

healthy, and then this can enhance their wellness and they should feel better and more self-confident.

Ringly as its brand name declares, initially launched a ring and then a line of bracelets joined the collection. For now, three models are available: “Ringly Go smart bracelet” available in two colors, “Ringly Luxe smart bracelet” in six colors’ combinations and “Ringly Luxe smart ring” in five colors.

Figure 5.13: (from left) Ringly Go smart bracelet, Ringly Luxe smart bracelet, Ringly Luxe smart ring



Source: Ringly.com

Ringly has different features; it can help to track steps, calories, distance and notify goals and reminders. It has five color led lights and four vibration’s types which can be set up to notify certain calls or events. It can support more than 200 applications and it works with iOS and Android software. For now, shipments are available only for U.S., Canada and Mexico but products can be bought in some retail shops such Nordstrom, Target, Bloomingdale’s, Shopbop, Neiman Marcus.

Through the application, it is possible to set fitness goals and guided meditation programs and breathing exercises are available. “Women deserve technology that helps them live healthy, balanced lives without sacrificing style or comfort. The days of clunky fitness trackers are behind us”⁶¹ declared the founder. According to the brand’s values, technology should not be a distraction but it should be a help to enhance efficiency of individuals who get out of daily responsibilities.

Ringly’s team started its project with an unusual approach; first by looking and creating the design and then developing the technology to insert. What is unique in smart jewelry is the lack of screen which was defined choice for the company; in fact, the founder said: "One of the things we don't want to add is a screen. For us it's more about - how can I get the most relevant information without it being distracting or disrupting what I'm doing. That's the opposite of a screen. Let's use technology to make us stop looking at screens. It's distracting. There's a place for it but for people who want to be a little more stylish and discreet, there

needs to be an alternative."⁶³ New functionalities are in phase of development in fact, they are trying to introduce the possibility to pay through a partnership with Mastercard. "Through our partnership with MasterCard, Ringly will not only be able to keep people connected, but will provide another layer to how our customers can use their jewelry while on the go. Our mission is to make women's lives more manageable through beautiful jewelry and discreet technology"⁶⁴ Mercado said. Unfortunately, this innovation has not been introduced.

What makes Ringly unique is its fashionable design related to a small price with all functionality of a common activity tracker. It is a woman's dimension accessory which has good margins to grow.

5.4.2 Bellaleaf by Bellabeat

"Bellabeat" is a U.S. company founded in 2014 which has created a leaf-shaped accessory, "Bellaleaf". The product can "help women easily track their overall health and wellness, and get connected to their body and mind throughout different stages in life"⁶⁵. Following Ringly's technology perception, also Bellabeat acknowledges the complex role of technology which should be used to promote harmony and a healthy lifestyle. Products' design is inspired by nature, in fact, it has a leaf shape with wood background or stone-shaped one. The mission states: "The future of health care lies in prevention, not correction. With the help of data, we can predict and improve lives and prevent irrevocable consequences. Our future focus is to shape new mindsets and behaviors with the help of our products. Together, we can change the world's perception about health and inspire people to live better quality lives"⁶⁵. The major aim for the company is to improve health of its customers and to inspire potential ones to care about their health conditions, by tracking vital signs.

Bellaleaf can track steps taken, calories burnt, distance moved, activity time but also sleep, controlling duration, quality, wake up time. Special features are about meditation and tracking periods and stress level. It can monitor stress sensibility and meditation, cycle, activity, sleep, pregnancy impact and it offers guided meditation sessions. It can check fertile periods, ovulation and pregnancy ones and it can notify a pill reminder.

⁶³ S. Charara, *Ringly CEO: Keep smart jewelry simple with no screens or steps*, 2015, "Wareable", www.wareable.com/meet-the-boss/ringly-ceo-christina-mercando-smart-jewellery-2016

⁶⁴J. Stables, *MasterCard gets Ringly on board for new wearable NFC payment tech*, 2015, "Wareable", www.wareable.com/wearable-tech/mastercard-gets-ringly-on-board-for-new-wearable-nfc-payment-tech-1872

⁶⁵ Bellabeat's website, www.webshop.bellabeat.com/pages/about-us

Figure 5.14: (from left) Bellaleaf Urban and Bellaleaf Nature and how to wear



Source: Bellabeat's site

All these characteristics can help women to feel more confident and equilibrated with their body as reported in the website “We believe that knowledge is power. Learning more about our bodies, what they’re capable of and learning how our lifestyle habits and choices affect our stress levels gives us knowledge and motivation necessary to improve our well-being”⁶⁵. Two models are available one “Urban” with in three colors launched in 2016, the “Nature” one and a special edition “Urban Impulse” in four versions and “Urban Bundle” in two colors. It can be used as a necklace, as a bracelet or as brooch, giving free choices to customers according their preferences. Also, Bellaleaf accessories are present such as necklaces and bracelet bands. In the site, it is possible to find a blog where the Bellabeat community is continuously supporting Bellaleaf’s lifestyle as the co-founder said at the launch of Urban Leaf: “Our loyal fan base continually helps us create, develop and improve a useful and seamless ecosystem of wellness products that work organically within a woman’s lifestyle.”⁶⁶ Bellabeat offers through the application a personal coach “Airi”. According to personal parameters, she can give advices and tips about exercise sessions with videos, recipes to eat healthy and it helps to achieve goals.

In June 2016, the company has launched a smart bottle “Spring” which can monitor hydration levels and acts as drink reminder. It is made of glass and it can be washed as a normal dish and it doesn’t need to be charged. The first edition was sold out and the second is coming soon. In addition, Bellabeat is focusing also on needs of pregnant women. In fact, “Bellabeat Shell” is a device which can monitor the baby. Heart beats listening, kick counter, real time

⁶⁶ Bellabeat’s Press Release, *Bellabeat launches Leaf Urban: the new edition in health-oriented smart jewelry*, 2016, www.bellabeat.com/assets/img/press/Bellabeat_launches_Leaf_Urban.pdf

recording are some functions of the tool useful for every mum-to-be. iPhone can be inserted in the shell that acts like a screening tool without harming baby's safety.

5.5 Smart shoes

There are several devices which are still prototypes and they need more time to release. Others are presented in conferences and their potentialities are still in a developing phase. "Lenovo's smart shoes" were presented at Tech World Conference in San Francisco in 2016. This pair of shoes acts like an activity tracker. Shoes track step taken and calories burned through a microchip inserted inside the shoes. The project was developed in collaboration with "Vibram", an Italian company expert in safety and sport shoes and in soles and "Beijing Design Week". The cooperation was born in "The Smart Moving Platform" in 2014 to develop common projects in China. An "Intel Curie" microchip collects the data and transmits them to the application which will propose specific training exercises. Through the GPS, it is possible to receive directions which will be indicated by LED lights and vibrations. They can be used also to play videogames if associated with a computer or a console. They will be available in red or while colors.

Figure 5.15: (from left) Lenovo smart shoes, Xiaomi 90' Minutes Ultra, Nike Hyper Adapt

1.0



Source: Google Images

Competing with Lenovo's shoe is "Xiaomi 90' Minutes Ultra" smart shoes. As Lenovo, Xiaomi has integrated an Intel microchip to gather information about steps taken, calories burned and distance covered, slope of the run through the application. They are available in two colors combination, black-blue and black-pink and there is a special edition with glow

details for night runners. Xiaomi is the winner of the wearables for its value for money and in fact, these shoes are sold for approximately €50.

In 2011, Adidas with “Micoach” introduced a “Speed Cell”, a sensor which collects information about performance of running as step taken and speed. Just putting in the shoes, it was connected wireless to an application and it was applicable to specific models for running and football.

With a more intuitive mechanism, “Nike Hyper Adapt 1.0” shoes are the shoes which customers do not need to tie. Pressing two buttons, it is possible to tighten and loosen the laces. The company launched the shoes in November 2016 and the distribution has started in September 2017 firstly in the U.S., Japan and China then in Europe.

With a different perspective, “Volvorii Timeless” shoes and “Shiftwear” are developing shoes which can change colors or inserting a screen, photos can be selected and displayed. The projects are still raising funds from crowdfunding, maybe next years it will be possible to wear them.

Chapter 6: Conclusion

Life is a movement and this is reflected by the constant change of fashion and technology. The correlation between fashion and technology is becoming every day more relevant and the two worlds are becoming acquainted with each other to succeed. Wearable technology is the manifestation of the collaboration between these two industries.

Fashion is facing structural and external challenges and it is fighting to maintain its profitability, even if Brexit, terrorism forces are menacing its stability. The industry is carrying out initiatives to persuade customers and to satisfy trends such as the athleisure movement and fast fashion.

Customers are evolving and the target for companies has enlarged with a result of mixed and multifaceted characteristics and needs. More aware of environment and of health, tech-savvy, fashion addicted are the customers who are the potential buyers of wearables. The most important element which is marking not only economy but life is becoming more digitalized. The advent of the Internet and smartphones has indicated a new era where social media are dictating the market trends.

Technology is advancing and creating innovations which are changing every aspect of life. The Internet of Things is one of these. A myriad of devices is projected which will have millions of functions suitable for different industries. These devices are useful to track parameters in health studies but they can become a tool for educating at schools or for controlling home appliances. Technology can build a system of sensors and chips which can enable individuals to express feelings and emotions.

Clothing is an expression of oneself and that is the reason why the two industries need to follow the same directions as stated by Ildeniz, a manager at Intel: “Anything we wear is very personal. I like to think that whatever I wear as a woman is a true reflection of myself, rather than the basic functionality of it. There's a clear distinction between having technology and carrying it with you versus putting it on yourself. I think this is almost unavoidable that the two have a clear interplay and if people are to carry technology it will have to be fashionable”.

Fashion and technology should walk shoulder to shoulder in order to be successful. “Fashion and information makes people connect to the movement of the world, and keep up with the rhythm of social life and changes. On the one hand, fashion allows people to adapt to rapid social and life changes by constantly updating self-representation. On the other hand, information informs people with the most up-to-date knowledge and news through digital technology and communication devices.” (Pan&Blevis, 2014).

Fashion needs technological know-how to develop features which can amaze customers. On the other hand, technology cannot make it alone. It lacks the design, the style, the sophistication that only fashion brands have.

Partnerships between brands are required to launch products which satisfy every dimension on the market. Customers are likely to adopt these devices and feel at ease with them, because of functionality and fashionability.

Co-branding, licensing partnerships can be effective tools to launch new products which embody fashion style and technology. Relevant brands need to cooperate and respect each other's strategy and intellectual property. In this decade, the majority of hi-tech companies is established in the U.S., giving the possibility firstly to Americans to get in touch with new technologies. However, what can become the competitive advantage for these products is the design and style that only European brands have. The European iconic fashion houses can express what is concealed under sensors and microchips, elaborating interpretations and revisiting models with modern and innovative features.

Obviously, there are still some doubts about the privacy issue, which is one of the main problems linked to the use of these devices. In the future, these devices will probably replace objects like watches, keys, credit cards, some medical tools and they will be essential in the workplace.

In my opinion, eyewear is the category which has several possibilities still unexplored to become a mass market product. In the next future, probably it will be possible to watch a movie or control traffic jam by using smart glasses. I think this product will be helpful in our daily routines to manage life's challenges. Wristbands and smartwatches are becoming oversaturated products but with still positive projections. Also, smart textile has the possibility to incredibly alter the fashion industry in every dimension. Imagining the possibility to be in sync with our body and feelings and monitor every health parameter constantly; it will be a milestone for human progress.

In fact, according to CSS Insight, projections show that in 2020, 411 million of devices will be sold; 110 million of smartwatches, 4 million of smart jewelry, 164 million of wristbands, 97 million of eyewear and 9 million of hearables are the evaluations on the future wearables' categories. Wearables will value about € 30 billion, and specifically virtual head devices will represent €12 billion of the total sum while smartwatches will be around €10 billion.

A limitation on the research was the availability of data, especially for the European market. Information is not revealed by companies or by consultants because of their exclusivity of the industry which is still in a developing phase.

In the market, wearable technology devices are spreading rapidly and according to types, functionalities and price, thus, several models are available. A selection of the most popular devices in the market has been made to understand who are the winners in this new market. The research is the first step to analyze advancements and dynamics in the future of the wearable technology industry. An investigation into the main reasons why fashion and technology companies should heed and study this industry has been conducted.

The potential of this industry is developing because its functionalities can be limitless and they can be helpful to enhance life's quality. What we could have imagined only watching a movie, now is turning to reality and it is becoming part of our lives.

N.B.: After several attempts, Fossil has positively replied to my request to meet a member of Fossil Group, thanks to the intervention of Professor Dal Santo. After having submitted some potential questions, it was possible to arrange an interview by telephone with two relevant figures inside the company: Francesca Fabris, PR Manager at Fossil Italia and Antonio Nigro, Vice President of Fossil Group EMEA, based in Basel, Switzerland. Unfortunately, the interview will take place after the deadline for the thesis' submission, thus the results will be introduced in the final oral presentation.

6.1 Bibliography and webgraphy

6.1.1 Books, Research papers

Achille A., (2017), *Digital Luxury Experience 2017*, McKinsey&Company

Aiello G. and Donvito R., (2006), *L'evoluzione del concetto di lusso e la gestione strategica della marca. Un'analisi qualitativa delle percezioni sul concetto, sulla marca e su un prodotto di lusso*, International Congress "Le Tendenze Del Marketing", Ca' Foscari University

Beechman Research, *Wearable Technology. Enabling the Connected Lifestyle. Toward function with Style.*, Preface,
<http://www.beechamresearch.com/files/BRL%20Wearable%20Tech%20Report%20Outline.pdf>

Berry J., (2016), *Weighing in on Wearables: Are Consumers Wavering or Won Over?*, Colloquy,
<https://www.colloquy.com/resources/pdf/Weighing-in-on-Wearables.pdf>

Black S., Edwards M. and Miller G., (2015), *What's Digital About Fashion Design? Enabling the designer fashion community to understand and adopt technologies that lead to new economic models in the Digital Economy*,
<http://ualresearchonline.arts.ac.uk/9790/1/WHAT%27S%20DIGITAL%20ABOUT%20FASHION%20DESIGN.pdf>

Bohnhoff T., (2016), *E-Commerce: Fashion*, Statista digital Market Outlook,
<http://bura.brunel.ac.uk/bitstream/2438/1347/3/Thesis-chapter01.pdf>

Business of Fashion and McKinsey, (2016), *The State of Fashion 2017*,
https://images.businessoffashion.com/site/uploads/2016/11/The_State_of_Fashion_2017.pdf

Cappellari R., (2016), *Marketing della Moda e dei Prodotti Lifestyle*, Carocci Editore, Chapter 1, pp. 13-35

Charlesworth J., (2007), *Wearables as "relationship tools"*, *AI&Society*, Volume 22, Issue 1, pp. 63-84, Springer, DOI 10.1007/s00146-006-0077-y

Choi J., Kim S., (2016), *Is the smartwatch an IT product or a fashion product? A study on factors affecting the intention to use smartwatches*, *Computers in Human Behavior* 63 pp. 777-786, Elsevier,
<http://dx.doi.org/10.1016/j.chb.2016.06.007>

Çiçek M., (2015), *Wearable Technologies and Its Future Applications*, *International Journal of Electrical, Electronics and Data Communication*, Volume-3, Issue-4, pp. 45-50, Research Gate

Contactlab and Sap Hybris, (2015), *European Digital Behavior Study 2015.Ecommerce & Fashion*

ContactLab, (2016), *European Digital Behavior Study*, https://contactlab.com/wp-content/uploads/2016/10/EDBS_2016_Contactlab_Report_Excerpt.pdf

Criteo, (2015), *Fashion Flash Report. Fickle yet fashionable: How apparel consumers are leading the multidevice revolution.*, pp. 4, <http://www.criteo.com/media/2861/criteo-fashion-flash-report-2015.pdf>

D'Arpizio C., Levato F., Zito D., Kamel M. and De Montgolfier J., (2016), *Luxury Goods Worldwide Market Study, Fall–Winter 2016. As Luxury Resets to a New Normal, Strategy Becomes Paramount*, Bain&Company,
http://www.bain.com/Images/REPORT_Luxury_Goods_Worldwide_Market_Study_2016.pdf

Dastan I., (2016), *Time-Related Changes in the Purchasing Attitudes and Behaviors of Individuals: A Study on Wearable Technologies*, *Journal of Business Studies Quarterly* 2016, Volume 7, Number 3 pp. 62-74

Deloitte, (2016), *Connecting health: how digital technology is transforming health and social care*, Deloitte Center for Health Solutions, <https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/life-sciences-health-care/deloitte-uk-connected-health.pdf>

Deloitte, (2016), *Global Powers of Luxury Goods 2016*, <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Consumer-Business/gx-cip-gplg-2016.pdf>

Deloitte (2017), *Global Powers of Luxury Goods 2017*, <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/consumer-industrial-products/gx-cip-global-powers-luxury-2017.pdf>

Deloitte, (2016), *Switch on to the connected home*, The Deloitte Consumer Review, <https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/consumer-business/deloitte-uk-consumer-review-16.pdf>

Deloitte, (2016), *There's no place like phone. Consumer usage patterns in the era of peak smartphone*, Global Mobile Consumer Survey 2016: UK Cut, <https://www.deloitte.co.uk/mobileuk/assets/pdf/Deloitte-Mobile-Consumer-2016-There-is-no-place-like-phone.pdf>

Deren Guler S., Gannon M., Sicchio K., (2016), *Crafting Wearables. Blending Technology with Fashion*, pp. 3-10, Apress, DOI 10.1007/978-1-4842-1808-2

Dey R., (2016), *Wearable Technology*, SG Analytics White Paper Information and Communications Technology,

Dorancy Nyeplu R., (2014), *A Marriage of Convenience: Why Luxury Fashion Brands and Technology Companies Need Each Other to Survive the Data Revolution*, Savannah College of Art and Design

Ericsson Consumer Lab, (2016), *Wearable Technology and the Internet of Things. Consumer views on wearables beyond health and wellness.*, Ericsson Consumer Insight Summary Report, <https://www.ericsson.com/assets/local/networked-society/consumerlab/reports/wearable-technology-and-the-internet-of-things-ericsson-consumerlab-2016-presentation.pdf>

European Commission Directorate-General for Communications Networks, Content and Technology, (2016), *Smart Wearables: Reflection and Orientation Paper*, <file:///C:/Users/federica/Downloads/SmartWearablesReflectionandOrientationPaper.pdf>

GfK, (2017), *Tech Trends 2017*, https://cdn2.hubspot.net/hubfs/2405078/Landing_Pages_PDF/Tech%20Trends/Global_201703_Tech_Trends_2017_Report.pdf

Giovannini S., Xu Y. and Thomas J., (2015), *Luxury fashion consumption and Generation Y consumers Self, brand consciousness, and consumption motivations*, Journal of Fashion Marketing and Management Vol. 19 No. 1, 2015 pp. 22-40, Emerald Group Publishing Limited, DOI 10.1108/JFMM-08-2013-0096

Hayden J. B. A., (2017), *Brave New Clothes: The Prospect of Augmented Reality for the Fashion Industry*, "The Savannah College of Art and Design", pp. 30-31

Hilts A., Parsons C., and Knockel J., (2016), *Every Step You Fake: A Comparative Analysis of Fitness Tracker Privacy and Security*. Open Effect Report, pp. 1-6, https://openeffect.ca/reports/Every_Step_You_Fake.pdf.

- Hunn N., (2015), *The Market for Smart Wearable Technology. A Consumer Centric Approach*, WiFore Consulting, pp. 1-18, <http://www.nickhunn.com/wp-content/uploads/downloads/2014/08/The-Market-for-Smart-Wearables.pdf>
- Inside Retail, (2016), *The UK Fashion Market Opportunity*, pp. 7, http://www.purelondon.com/files/pure_market_report_2016.pdf
- Jiang L., Cova V., (2012), *Love for Luxury, Preference for Counterfeits –A Qualitative Study in Counterfeit Luxury Consumption in China*, International Journal of Marketing Studies; Vol. 4, No. 6; 2012 pp. 1-3, Canadian Center of Science and Education, DOI:10.5539/ijms.v4n6p1
- Ko D., Kwon J. and Seo Y., (2016), *Effective Luxury-Brand Advertising: The ES-IF Matching (Entity-Symbolic Versus Incremental-Functional) Model*, Journal of Advertising, 45(4), pp. 459-471, Routledge, DOI: 10.1080/00913367.2016.1226995
- MacIntosh, E., Rajakulendran N., Salah H., (2014), *Wearable Tech: Leveraging Canadian Innovation to Improve Health*, MaRS Market Insight
- Martin B., (2017), *La Piramide dei Bisogni del Mobile. Come il mobile è diventato strumento per gli onnivori digitali*, ComScore, <http://www.upa.it/static/upload/mob/mobile-hierarchy-ita.pdf>
- Maulik S., (2015), *Wearables and Internet of Things 2015*, People Power
- Mediobanca, (2017), *Focus sulla Moda (2011-2016). Analisi sulle Maggiori società della Moda*, Associazione Stampa Estera, https://www.mbres.it/sites/default/files/resources/Presentazione_Moda_2016.pdf
- Morabito V. (2016) *Wearable Technologies, The Future of Digital Business Innovation*. Springer, Cham, pp. 23-42, https://doi.org/10.1007/978-3-319-26874-3_2
- Morgan Stanley Research, (2014), *Wearable Devices The “Internet of Things” Becomes Personal*, Morgan Stanley Blue Paper, http://byinnovation.eu/wp-content/uploads/2014/11/MORGAN-STANLEY-BLUE-PAPER_Internet-of-Things.pdf
- Mura, Gökhan. (2008). *Wearable technologies for emotion communication*, Middle East Technical University Journal of the Faculty of Architecture, pp. 153-161, http://jfa.arch.metu.edu.tr/archive/0258-5316/2008/cilt25/sayi_1/153-161.pdf
- Pan Y., Blevis E., (2014), *Fashion thinking: lessons from fashion and sustainable interaction design, concepts and issues*, DIS 2014, June 21-25, pp.1008, Vancouver, BC, Canada, https://www.researchgate.net/publication/266658185_Fashion_thinking_lessons_from_fashion_and_sustainable_interaction_design_concepts_and_issues
- Parker K., (2016), *The Future of Marketing Luxury Fashion Using Augmented and Virtual Reality*, Savannah College of Art and Design
- Parsons A. G., So J.T., Yap S., (2013), *Corporate branding, emotional attachment and brand loyalty: the case of luxury fashion branding*, Journal of Fashion Marketing and Management: An International Journal, Vol. 17 Iss 4 pp. 403 – 423, Emerald Group Publishing Limited 1361-2026, DOI 10.1108/JFMM-03-2013-0032
- Positive Luxury, (2016), *Prediction for the luxury industry. Sustainability and innovation*, London
- Pwc, (2014), *The Wearable Future*. Pwc Consumer Intelligence Series, <https://www.pwc.com/us/en/retail-consumer/publications/assets/pwc-cis-wearable-future.pdf>
- Pwc, (2016), *The Wearable Life 2.0. Connected living in a wearable world*, Pwc Consumer Intelligence Series, <https://www.pwc.com/us/en/industry/entertainment-media/assets/pwc-cis-wearables.pdf>
- Remy N., Werner C., Schmidt J., Lu M., (2014), *Unleashing Fashion. Growth City by City*, McKinsey’s Fashion Scope

- Rose D., (2014), *Enchanted Objects. Innovation, design and future of technology*, Scribner, Chapter 4, pp. 47-48
- Sandall K. B., (2016), *Wearable Technology and Schools: Where are We and Where Do We Go from Here?*, *Journal of Curriculum, Teaching, Learning and Leadership in Education*: Vol. 1: Iss. 1, Article 9, pp. 74-83.
- Schreiber K., (2016), *E-Services: Fitness*, Statista digital Market Outlook
- Solca L., Grippo M., Lucarelli G., Marsella G., (2016), *All you ever wanted to know about... (3) The future of luxury goods*, Exane Bnp Paribas
- Solca L., Grippo M., Lucarelli G., (2016), *Digital and Physical Integration: Luxury Retail's Holy Grail*, https://contactlab.com/wp-content/uploads/2016/03/LUXURY_GOODS_-_Digital_and_Physical_Integration___for_ContactLab.pdf
- Solca L., Grippo M., Lucarelli G., (2017), *The Digital Frontier for Luxury Goods*, Exane Bnp Paribas, https://altagamma.it/media/source/Digital%20Frontier%20for%20Luxury%20Goods_FINAL.pdf
- Solca L., Grippo M., Lucarelli G., (2017), *The Social Media Boxing Ring – Two Years After*, Exane Bnp Paribas, <https://cube.exane.com/linkmvc/publications/getPDFInline/bIbRam8cU9RsyF1JmHDA>
- Telecommunication Engineering Centre Department of Telecommunications Ministry of Communications Government of India, (2017), *M2m/IoT Enablement in Smart Homes* pp. 5-11, <http://tec.gov.in/pdf/M2M/Smart%20home%20Technical%20Report.pdf>
- Trendalytics, (2016), *The Athleisure Movement: From Fad to Forever*, http://docs.trendalytics.co/whitepapers/Trendalytics_Athleisure_Report.pdf
- Vega K. and Fuks H., (2014), *Beauty Technology: Body Surface Computing*, IEEE Computer Society, <http://www.cs.rug.nl/~roe/courses/isc/BodySurfaceComputing.pdf>
- Vega K. and Fuks H., (2016), *Beauty Technology: Designing Seamless Interfaces for Wearable Computing*, Human–Computer Interaction Series, Springer, DOI 10.1007/978-3-319-15762-7
- Watchravesringkan K., Nelson Hodges N., Kim Y., (2010), *Exploring consumers' adoption of highly technological fashion products: The role of extrinsic and intrinsic motivational factors*, *Journal of Fashion Marketing and Management: An International Journal*, Vol. 14 Issue: 2, pp.263-281, Emerald Group Publishing Limited, DOI 10.1108/13612021011046101

6.1.2 Webgraphy

- Apple Website, (last visited 10/09/2017) <https://www.apple.com/>
- Apple Press Release, (2016), *Apple & Nike launch the perfect running partner, Apple Watch Nike+*, (last visited 15/09/2017), <https://www.apple.com/newsroom/2016/09/apple-nike-launch-apple-watch-nike/>
- Apple Press Release, (2014), *Apple Unveils Apple Watch — Apple's Most Personal Device Ever*, (last visited 15/09/2017), <https://www.apple.com/sg/newsroom/2014/09/09Apple-Unveils-Apple-Watch-Apples-Most-Personal-Device-Ever/>
- Apple Press Release, (2016), *Apple Watch Hermès introduces new styles & colors*, (last visited 15/09/2017), <https://www.apple.com/newsroom/2016/09/apple-watch-hermes-introduces-new-styles-colors/>

Arthur R., (2016), *8 Tech Trends That Will Shape the Future of Fashion and Luxury Retail In 2017*, Forbes, (last visited 13/07/2017), <https://www.forbes.com/sites/rachelarthur/2016/12/19/8-tech-trends-that-will-shape-the-future-of-fashion-and-luxury-retail-in-2017/#b5fb90d76157>

Arthur R., (2017), *Trying on The Levi's And Google Smart Jacket at SXSW Feels Like the Future*, Forbes, (last visited 22/09/2017), <https://www.forbes.com/sites/rachelarthur/2017/03/13/levis-and-google-smart-jacket/#5ce5b7d53975>

ATAP's Google Project Jacquard, (last visited 15/09/2017), <https://atap.google.com/jacquard/>

Bellabeat Website, (last visited 14/09/2017), <https://webshop.bellabeat.com/>

Bellabeat, (2016), *Bellabeat Launches Leaf Urban: The New Edition in Health-Oriented Smart Jewelry* (last visited 20/09/2017), https://www.bellabeat.com/assets/img/press/Bellabeat_launches_Leaf_Urban.pdf

Barton C., Egan C., Fromm J., Koslow L., (2012), *Millennials Passions. Food, Fashion and friends*, BCG Perspectives by Boston Consulting Group, (last visited 18/05/2017), https://www.bcgperspectives.com/content/articles/consumer_insight_consumer_products_millennial_passions/

BBC News, (2014), *Many young people addicted to net, survey suggests*, (last visited 13/08/2017), <http://www.bbc.com/news/technology-29627896>

Boelli G., (2017), *Cotton USA: Millennials italiani poco sensibili agli abiti vegani, ma attenti a fibre, etica e provenienza più dei brand*, Fashion Network, (last visited 08/08/2017), <http://it.fashionnetwork.com/news/Cotton-USA-Millennials-italiani-poco-sensibili-agli-abiti-vegani-ma-attenti-a-fibre-etica-e-provenienza-piu-dei-brand,835928.html#.WcgpKHZJY2x>

Ccs Insight, (2016), *UK Wearables Sales to Reach Five Million Units in 2016*, (last visited 02/09/2017), <http://www.ccsinsight.com/press/company-news/2608-uk-wearables-sales-to-reach-five-million-units-in-2016>

Charara S., (2015), *Ringly CEO: Keep smart jewelry simple with no screens or steps*, Wearable, <https://www.wearable.com/meet-the-boss/ringly-ceo-christina-mercando-smart-jewellery-2016>

Clark L., (2014), *Superhero remote control eyelashes: the wearable tech we can get onboard with*, Wired, (last visited 01/09/2017), <http://www.wired.co.uk/article/motion-control-makeup>

Close C. M., (2017), *Technology Is Eating Fashion*, Business of Fashion, (last visited 19/09/2017), <https://www.businessoffashion.com/articles/opinion/op-ed-technology-is-eating-fashion>

Della Dora L., (2017), *Digital In 2017: In Italia E Nel Mondo, We Are Social*, (last visited 15/06/2017), <https://wearesocial.com/it/blog/2017/01/digital-in-2017-in-italia-e-nel-mondo>

Demidenko A., (2017), *Wearables market overview*, Teslasuit, (last visited 18/08/2017), <https://teslasuit.io/blog/wearables/wearables-market-overview>

Desjardins J., (2015), *The History of Wearable Technology*, Visual Capitalist, (last visited 27/08/2017), <http://www.visualcapitalist.com/the-history-of-wearable-technology/>

Eliot, (2013), *What We Believe In*, SmartThings, (last visited 29/08/2017) <https://blog.smartthings.com/manifesto/what-we-believe-in/>

Ferrier M., (2014), *Francis Bitonti, the dress designer applying architecture to 3D printed couture*, The Guardian, www.theguardian.com/technology/2014/sep/22/fashion-dress-made-3d-printer

Fitbit Website, (last visited 13/09/2017), <https://www.fitbit.com/it/home>

Fitbit Press Release, (2014), Tory Burch for Fitbit® Accessories Collection Now Available, (last visited 13/09/2017), <https://investor.fitbit.com/press/press-releases/press-release-details/2014/Tory-Burch-for-Fitbit-Accessories-Collection-Now-Available-/default.aspx>

Fossil Website, (last visited 16/09/2017), <https://www.fossilgroup.com/>

Fossil Press Release, (2017), *Fossil Group Doubling Wearables in 2017 to More than 300 Products, Adding New Brands, New Designs and Smaller Hybrid Smartwatches*, (last visited 13/09/2017) <https://www.fossilgroup.com/wp-content/uploads/2017/01/Fossil-Group-CES-2017-Press-Release-FINAL.pdf>

Fossil Press Release, (2017), *Fossil Group Reimagines the Watch. Traditional Watches Get Smarter, Smartwatches Get Sleeker*, (last visited 13/09/2017), <https://www.fossilgroup.com/wp-content/uploads/2017/03/Fossil-Group-Basel-2017-FINAL.pdf>

Fossil Press release, (2015), *Fossil Group, Inc. To Acquire Wearable Technology Innovator Misfit*, (last visited 25/08/2017), <https://www.fossilgroup.com/wp-content/uploads/2016/06/fossil-group-inc-to-acquire-wearable-technology-innovator-misfit.pdf>

Gailewitz J., (2014), *Marketing to Millennials: The consumers to change the market landscape*, The Next Web, (last visited 03/06/2017), https://thenextweb.com/entrepreneur/2014/03/29/meet-millennials-consumers-change-marketing-landscape/#.tnw_NHihQVZN

Henseler C., (2014), *Millennials and Boomers: Don't Forget Generation X*, Huffington Post, (last visited 06/06/2017), http://www.huffingtonpost.com/christine-henseler/millennials-and-boomers-generation-x_b_5253931.html

Hoang L., (2016), *Fashion Needs a More Robust Approach to Technology Education*, Business of Fashion, (last visited 23/08/2017), <https://www.businessoffashion.com/articles/education/fashion-technology-digital-education>

Hoang L., (2017), *Triggering Article 50: What Brexit Means for Fashion*, Business of Fashion, (last visited 13/07/2017) <https://www.businessoffashion.com/articles/intelligence/triggering-article-50-what-does-brexit-mean-for-fashion>

Hoff D. V., (2014), *This (Surprisingly) Stylish Ring Will Tell You When Your Phone Is Ringing*, Elle Magazine, (last visited 12/09/2017), <http://www.elle.com/culture/tech/tips/a14756/ringly-wearable-tech-fashion/>

IDC, (2017), *Worldwide Wearables Market to Nearly Double by 2021, According to IDC*, (last visited 29/08/2017), <https://www.idc.com/getdoc.jsp?containerId=prUS42818517>

IDC, (2017), *Wristwear Dominates the Wearables Market While Clothing and Earwear Have Market-Beating Growth by 2021, According to IDC*, (last visited 29/08/2017) <https://www.idc.com/getdoc.jsp?containerId=prUS42371617>

Investopedia, *Wearable technology definition*, (last visited 20/08/2017), <http://www.investopedia.com/terms/w/wearable-technology.asp>

ITU, (2015), *Internet of Things Global Standards Initiative*, (last visited 03/08/2017), <http://www.itu.int/en/ITU-T/gsi/iot/Pages/default.aspx>

Kansara V. A., (2015), *Ringly Weds Fashion and Hardware*, Business of Fashion, (last visited 10/09/2017), <https://www.businessoffashion.com/community/voices/discussions/is-fashion-missing-the-technology-revolution/ringly-weds-fashion-hardware>

Kozub S., (2017), *Apple sold 6 million Apple Watches last quarter, analysts say*, The Verge, (last visited 09/09/2017), <https://www.theverge.com/2017/2/7/14537584/apple-6-million-apple-watch-sales-estimates>

Lamkin P., (2016), *Wearable Tech Market to Be Worth \$34 Billion By 2020*, Forbes, (last visited 15/09/2017), <https://www.forbes.com/sites/paullamkin/2016/02/17/wearable-tech-market-to-be-worth-34-billion-by-2020/#6cb861923cb5>

Leitch L., (2017), *Jiggery-Bespokery. In its tireless struggle to innovate, fashion is turning to mass customization. Luke Leitch examines a trend which is both very new and very old*, The Economist 1843, (last visited 13/05/2017), <https://www.1843magazine.com/style/jiggerybespokery>

Leschinsky L., (2017), *How Brexit Will Impact the Fashion Industry In 2017*, LinkedIn, (last visited 01/09/2017), <https://www.linkedin.com/pulse/how-brexit-impact-fashion-industry-2017-leon-leschinsky/>

Leslie J., (2016), *Wearable tech sales explored: Just how many devices have been sold?*, Wareable, (last visited 21/09/2017), <https://www.wareable.com/wearable-tech/how-many-apple-watches-sold-2016>

Levi's Website, (last visited 12/09/2017), http://www.levi.com/IT/it_IT

L'Oréal Press Release, (2016), *L'Oréal Debuts First-Ever Stretchable Electronic UV Monitor at the 2016 Consumer Electronics Show*, (last visited 05/09/2017), <http://www.loreal.com/media/press-releases/2016/jan/loreal-debuts-first-ever-stretchable-electronic-uv-monitor>

Louis Vuitton Website, (last visited 16/09/2017), <http://it.louisvuitton.com/ita-it/momenti-lv/tambour-horizon#the-collection>

Maddox T., (2014), *Wearables and fashion: Blending the two will be a key to success*, Tech Republic, (last visited 20/09/2017), <http://www.techrepublic.com/article/wearables-and-fashion-blending-the-two-will-be-a-key-to-success/>

Merriam Webster, (2017), *Augmented Reality*, (last visited 10/09/2017), <https://www.merriam-webster.com/dictionary/augmented%20reality>

Merriam Webster, (2017), *Social Media*, (last visited 08/08/2017), <https://www.merriam-webster.com/dictionary/social%20media>

Michael Kors Press Release, (2017), *Michael Kors Access Expands with New Smartwatches, New Apps, New Faces and New Markets*, (last visited 10/09/2017), <http://investors.michaelkors.com/news-releases/news-releases-details/2017/MICHAEL-KORS-ACCESS-Expands-with-New-Smartwatches-New-Apps-New-Faces-and-New-Markets/default.aspx>

Michael Kors Press Release, (2014), *Michael Kors And Fossil Group Renew Global Licensing Agreement for Watches and Jewelry*, (last visited 10/09/2017), <http://investors.michaelkors.com/news-releases/news-releases-details/2014/Michael-Kors-and-Fossil-Group-Renew-Global-Licensing-Agreement-for-Watches-and-Jewelry/default.aspx>

Misfit Website, (last visited 20/09/2017), https://misfit.com/uk_en/overview/

Niu E., (2017), *Snap's Spectacles Sales Fell in Second Quarter*, The Montley Fool, (last visited 16/09/2017), <https://www.fool.com/investing/2017/08/11/snaps-spectacles-sales-fell-in-second-quarter.aspx>

O'Callaghan J., (2014), *Wearable technology NAILED: Smart fingernails light up when you take a call*, Daily Mail, (last visited 02/09/2017), <http://www.dailymail.co.uk/sciencetech/article-2676522/Wearable-technology-NAILED-Smart-fingernails-light-call.html#ixzz4td6TMWzK>

Owano N., (2015), *Project Jacquard to weave interactivity into textiles*, Tech Explore (last visited 19/09/2017) <https://techxplore.com/news/2015-05-jacquard-interactivity-textiles.html>

Pieraccini S., (2016), *L'Europa traina l'export del tessile-moda, frenano gli Stati Uniti (-6,2%)*, Il Sole 24 Ore, (last visited 20/06/2017), <http://www.ilsole24ore.com/art/moda/2016-11-17/1-europa-traina-l-export-tessile-moda-frenano-stati-uniti-62percento-182143.shtml?uuid=ADHU02wB>

Pambianco news, (2017), *Accessori elettronici a 34 mld \$ in tre anni*, (last visited 20/08/2017) www.pambianconews.com/2017/03/14/wearable-technologies-a-34-mld-in-tre-anni-210751/

Phelan D., (2017), *Apple Financial Results Reveal Good News for Apple Watch*, Forbes, (last visited 09/09/2017), <https://www.forbes.com/sites/davidphelan/2017/08/02/apple-financial-results-reveal-good-news-for-apple-watch/#630141e832df>

Ralph Lauren Website, (last visited 12/09/2017), http://www.ralphlauren.fr/home/index.jsp?ab=Geo_iUS_rUS_dFR&locale=it_FR

Ralph Lauren Press Release, (2014), *Ralph Lauren Introduces the Next Evolution of Wearable Technology*, (last visited 13/09/2017), <http://investor.ralphlauren.com/phoenix.zhtml?c=65933&p=irol-newsArticle&ID=1960738>

Ralph Lauren Press Release, (2015), *Ralph Lauren Launches Polotech Smartshirt With Groundbreaking Adaptive Workout App*, (last visited 13/09/2017), <http://investor.ralphlauren.com/phoenix.zhtml?c=65933&p=irol-newsArticle&ID=2080852>

Ringly Website, (last visited 20/09/2017), <https://ringly.com/pages/our-mission>

Samsung Website, (last visited 10/09/2017), <https://news.samsung.com/global/search?query=samsung+pay&type=&st=d&ct=all&rd=420160914:20170914&pa=3>

Samsung Press Release, (2015), *Samsung and Alessandro Mendini Partner to offer Stylish Customization Options for Samsung Gear S2*, (last visited 10/09/2017), <https://news.samsung.com/global/samsung-and-alessandro-mendini-partner-to-offer-stylish-customization-options-for-samsung-gear-s2>

Spectacles by Snap Website, (last visited 19/09/2017), <https://www.spectacles.com/it/>

Sport Wearable, (2017), *Xiaomi launches '90 Minutes Ultra Smart Sportswear Shoes' powered by Intel Technology!*, (last visited 12/09/2017) <http://www.sportswearable.net/xiaomi-launches-90-minutes-ultra-smart-sportswear-shoes-powered-intel-technology/>

Stable J., (2015), *MasterCard gets Ringly on board for new wearable NFC payment tech*, Wareable, (last visited 12/09/2017), <https://www.wareable.com/wearable-tech/mastercard-gets-ringly-on-board-for-new-wearable-nfc-payment-tech-1872>

Statista, (2017), *Most famous social network sites worldwide as of August 2017, ranked by number of active users (in millions)*, (last visited 09/07/2017), <https://www.statista.com/statistics/272014/global-social-networks-ranked-by-number-of-users/>

Steele V., Major S. J., *Fashion Industry*, Encyclopedia Britannica, (last visited 20/05/2017), <https://www.britannica.com/topic/fashion-industry>

Tehrani K., and Andrew M., (2014), *Wearable Technology and Wearable Devices: Everything You Need to Know*, Wearable Devices Magazine, (last visited 10/09/2017) <http://www.wearabledevices.com/what-is-a-wearable-device/>

Tractica, (2016), *Healthcare Wearable Device Shipments to Reach 98 Million Units Annually by 2021*, (last visited 29/09/2017), <https://www.tractica.com/newsroom/press-releases/healthcare-wearable-device-shipments-to-reach-98-million-units-annually-by-2021/>

Under Armour.Inc site, (last visited 10/09/2017), <https://www.uabiz.com/company/mission.cfm>

Visa Europe, (2016), *Mobile Payments soar as Europe embraces new ways to pay*, (last visited 01/09/2017) <https://www.visaeurope.com/media/pdf/40172.pdf>

Vincent J., (2016), *Nike's self-lacing sneakers finally go on sale November 28th*, The Verge, (last visited 17/09/2017), <https://www.theverge.com/2016/9/21/12998474/buy-nike-self-lacing-shoes-hyperadapt-1>

Vision Service Plan, (2014), *DVF Unveils Limited Edition Google Glass Collection*, (last visited 15/09/2017), <http://newsroom.vspglobal.com/vsp-global/news-releases/dvf-unveils-limited-edition-google-glass-collection>

Waltzer S., (2017), *Strategy Analytics: Xiaomi Becomes World's No.1 Wearables Vendor in Q2 2017*, Strategy Analytics Press Releases, (last visited 01/09/2017), <https://www.strategyanalytics.com/strategy-analytics/news/strategy-analytics-press-releases/strategy-analytics-press-release/2017/08/03/strategy-analytics-xiaomi-becomes-world's-no.1-wearables-vendor-in-q2-2017#.WcgYaHZJY2x>

Winchester H., (2015), *A brief history of wearable tech*, Wareable, (last visited 03/09/2017), <https://www.wareable.com/wearable-tech/a-brief-history-of-wearables>

Wired, (2017), *Tambour Horizon, il connected watch che cambia il viaggio*, (last visited 15/09/2017), <https://www.wired.it/gadget/accessori/2017/07/24/tambour-horizon-connected-watch/>

Zanolla I., (2016), *Lenovo Smart Shoes, nuova versione con Intel Curie mostrata al CES Asia 2016*, Tutto Android, (last visited 12/09/2017), <https://www.tuttoandroid.net/accessori/lenovo-smart-shoes-intel-curie-mostrata-ces-asia-2016-379440/>

6.2 Appendix

Questions to submit to Fossil

- Fossil is one of the pioneers in the watch industry since decades. What are the main reasons that led the company to be interested in the wearable technology?
- What does wearable technology represent for the company?
- According to IDC statistics, Fossil is in the top five of wearable technology's vendor in the first quarter of 2017. How did company achieve this result?
- What are the main expectations and future project from this innovative industry?
- When a product is projected, what's the target of the customers?

- Which are the obtained goals of the wearable technologies in the European market?
What are the main characteristics?
- Which are the main downturns of this industry?
- How you can define your collection of smartwatches Q and what the main features.
- Why did you decide to develop a series of smartwatches and in addition to a collection of hybrid watches? What the main features of hybrid watches?
- In a press release, the company announced the aim to launch in the future 300 smartwatches under 14 brands. What are the main reasons that induced such statement?
- How are you planning to develop this project with your licensing brands?
- Fossil has several licensing brands for the production and the distribution of watches. Which are the main ones?
- Dealing with several brands which have different values and strategies is hard to achieve. What kind of approach do you choose in dealing with partners?
- Michael Kors is one of your licensing brand. What are the main strengths about this partnership?
- How do you expect this relationship will evolve?
- Armani is part of your brands 'portfolio'. How are you dealing with such sophisticated brand? What are the main touchpoints of this partnership?
- In 2015, Fossil acquired Misfit. What the main reasons behind this acquisition?
- How the acquisition has increased Fossil's know how?
- How you decide to place Misfit in your portfolio?
- Fossil has developing agreements with several companies in order to integrate in the watches a wide range of applications. What are the main ones?
- What makes different Fossil from other smartwatches' producers? What is your competitive advantage?
- Who are your competitors?
- Some of your licensing brands count on activity tracker collections. What your approaches towards this segment? How are you developing it?
- One of problems for wearable technology is to find the perfect combination between innovation and design. What is your strategy to fill the gap?
- Which are your main partners which are involved in the technological development?
- The main issue about wearable technology is the privacy. How are dealing with this problem?

- Fossil is developing projects especially with fashion brands. Are you interested in the future to explore partnership with fitness brands?
- How do you expect this industry will evolve in the next future?