

## Chapter 57

# Market Forecasts and Personal Adoption of Smart Textiles in Fitness Sector

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### ABSTRACT

*The basic concept of smart textiles consists of textile structures that can sense and react to different stimuli from their environment. While forecasts indicate how this sector has the potential to grow in the future, a gap remains for smart textiles to become commercially viable. Growth in consumerism and consumption of services and experiences has led to innovative products that satisfy higher order needs including ideas, sensory and emotional fulfilment, cultural experiences and entertainment. The aim of the paper is to understand smart textiles in this context and to identify factors that influence personal ownership in fitness sector. These will help manufacturers and technologists gain insight into consumer experience and contribute to better design, innovation, marketing and services. The research findings identify important features consumers value in their decision making to purchase a smart top in fitness sector. The results contribute to the field of user adoption in smart textiles and conclude with proposals for the direction of future design and technical development.*

### INTRODUCTION

Intelligent (or “smart”) clothing uses technology with the ability to sense stimuli from the environment and register it as digital information. It then uses this information to react or adapt to circumstances (Ariyatun, Holland, Harrison & Kazi, 2005). Forms of smart clothing are currently used as interfaces that help wearers: navigate the world, communicate, gain a greater understanding of their body, or for entertainment purposes (Perkes, 2014). For smart clothing to achieve commercial success, evidence suggests the technology must become deeply embedded into the clothing, starting at the level of the fibers and fabrics.

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Smart clothing can be organized under four classifications: 1) health care/medical, 2) fashion/entertainment, 3) military/public sector and 4) sports/fitness (Stoppa & Chiolerio, 2014; McCann, 2009).

The application of smart textiles in healthcare generally ensures patient safety and optimises outcomes by helping healthcare professionals (HCP) work: smarter, faster, and more cost-effectively (Thakur, Hsu & Fontenot, 2012).

Fashion is synonymous with: style, dress, adornment, decoration and clothing. Fashion wearables incorporate technological elements that transform garments into interactive interfaces to achieve these aims (Seymour, 2008). The company Cutecircuit is a prominent example who make illuminative, interactive clothing for fashion and theatrical uses.

In 1998, the U.S. Army Soldier and Biological Chemical Command produced a report on the use of interactive textiles by the military. A report by the US Army Research Laboratory discussed the potential of graphene-based nanoelectronics for applications in wearable electronics (Cork et.al., 2013). It is likely that innovation and application of smart textiles will continue to be led by the military sector.

Wearable technology is perhaps most prominently used in the sport and fitness market. Devices include: wristband devices, sensor embedded equipment and smart clothing using woven and knitted technology; as well as embroidered and printed electronic materials (Anzaldo, 2015; FBIC, 2014). From a business perspective, the sports and fitness industry is a valuable part of global economy. Wearable sports and fitness devices are forecast to generate \$9.4 billion in worldwide revenue by 2020 (Kearney, 2014; Anzaldo, 2015). Juniper Research has found that the fitness wearable technology sector will generate over \$10bn in hardware revenues by 2020, up from an estimated \$3.3bn in 2015. One driver behind this anticipated growth is the consumer profile. 18-54-year-olds account for 77% of wearable fitness device ownership. For this group, sports wearable technology has become an integral part of their daily routine. Notably, wearable technology can promote physiolytics more efficiency; thus, providing developers with data analysis. This, in turn, offers opportunities for further development of core functionality (Maisto, 2013).

Smart clothing used in the sports and fitness sector also provides detailed feedback about movement for professional athletes. Presently, smart clothing is expensive. However, continued advances in smart fabrics will steadily reduce the cost. Furthermore, collaborations with the fashion sector driven by social (rather than fitness applications) has been posited as a key route to the mass market for smart clothing (Hunn, 2015). Despite this, evidence remains that consumers are unsure about the value propositions of wearable technology and smart clothing (MarketandMarkets, 2013). Therefore, an integrated framework that explains core factors surrounding customer adoption of smart clothing in the fitness sector is needed.

Thus, the focus of this paper is to identify: 1) the design attributes and 2) marketing factors that are most important to “fitness” consumers in their uptake of smart clothing.

## **RESEARCH AIM AND OBJECTIVES**

The aim of the research is to identify the factors that influence personal ownership of smart clothing. This paper will focus, in particular, on consumers within the “fitness” category. Findings will help manufacturers and technologists gain new insight into the consumer experience. This in turn, will contribute to better: design, innovation, marketing and services within the smart clothing sector.

The specific objectives of this research are:

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