Why Consumers (Don’t) Adopt Smart Wearable Electronics

Gretchen Anderson and Gwanhoo Lee

Many innovative, smart, wearable-electronics products have recently appeared, creating a new market for technology-savvy consumers. One such product is the HugShirt, which remotely sends a hug to another person’s shirt. One person sends data to her mobile phone by touching Bluetooth sensors and actuators incorporated in her shirt. Her mobile phone then sends the data to the other person’s phone and subsequently to his shirt, simulating the sensation of being hugged (www.cutecircuit.com). Other smart wearable electronics products include bags with solar-to-electricity conversion modules to charge portable electronics; shirts with glowing bars graphically displaying Wi-Fi detection; and shirts with electroluminescent designs that can “hear” music, pulsating with the beat.

One of the most commercialized smart wearable-electronics products to date is the iPod jacket, which houses an iPod in an internal pocket and has built-in headphone buds that typically emerge near the collar. The wearer controls the volume and other iPod functions through a washable electronic fabric strip, typically sewn on the sleeve for easy access. Various companies such as O’Neill, JanSport, Burton, and Quiksilver make iPod-enabled jackets.

However, would consumers really buy a shirt that “beams” hugs or detects Wi-Fi hotspots, much less a jacket for their iPod? In our research, most consumers who were surveyed showed little interest in purchasing an iPod jacket in the near future.

Thus, although expectations about the potential for smart wearable-electronics products have seemed high, there has been little understanding of important factors influencing consumer adoption. An important question to address, then, is “What factors are important to consumers in facilitating their adoption of smart wearable-electronics products?”

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ADOPTION FACTORS

According to an interview conducted 27 Feb. 2007 with Tom Krutilek, marketing director for clothing manufacturer Kenpo, the major factors affecting the consumer adoption of iPod jackets include style, price, convenience, and widespread assimilation. The interview left us with the following insights about these adoption factors:

- **Style:** “Fashion comes first.” Smart-wearable-electronics consumers typically fall into two categories: early-adopter young people, and those with substantial disposable income. Neither consumer group will likely purchase an iPod jacket if the jacket is the wrong color or fits poorly.
- **Price:** Consumers will buy the iPod jacket, like any product, only if it fits within their acceptable price range. Because consumers generally demand lower prices, we need mass production to lower the cost and, in turn, the retail price.
- **Convenience:** The success of technical functionality integrated into clothing directly relates to the degree to which the integration is seamless. Creating an essentially unnoticeable integration that facilitates ease of use and convenience for the user is paramount.
- **Widespread assimilation:** iPod jackets and other smart wearable-electronics products might experience initially slow adoption rates similar to that of Bluetooth headsets. Initially viewed by many as peculiar, the headsets were slow to be adopted. Now, they’re commonplace.

Combining these four factors and the five innovation attributes proposed by Everett Rogers (Diffusion of
 Innovations, 4th ed., The Free Press, 1995), we chose to examine the following six adoption factors in this research: trialability, convenience, perceived social prestige, compatibility, complexity, and observability. Trialability refers to the degree to which a consumer can try out an innovation before adopting it. Both convenience and perceived social prestige relate closely to relative advantage, which Rogers defined as the degree to which an innovation is considered better than its predecessor. Compatibility refers to the degree to which the innovation meets the consumer’s needs, whereas complexity relates to how difficult the innovation is to understand and use. Finally, observability refers to the degree to which the innovation is visible and observable to peers and others.

**RESEARCH METHODOLOGY**

We designed an online survey instrument measuring the adoption factors of a specific iPod jacket. We administered it to students in a private US university who are likely early adopters of innovative products and represent an important target market for iPod jackets. In addition to relying on their prior knowledge of iPods, the students viewed an online video demonstrating the functionality of the particular iPod jacket and read a description of the jacket before taking the survey. This supplemental information proved important, as over 80 percent of respondents reported they were not previously aware of the jacket.

**RESULTS**

The survey results are based on 33 respondents out of a sample of 108 students, indicating a 31 percent response rate. While most consumers thought the iPod jacket was better than any other typical jacket they would wear, they considered the jacket’s potential impact on their lifestyle to be minimal. Most respondents found that the jacket generally failed to meet their needs and weren’t interested in purchasing one.

When we asked the respondents how likely it was that they’d buy an iPod jacket in the near future, 42 percent said they were “not inclined to buy one,” and 39 percent said they would “definitely not buy one.” Only 7 percent said that they “might buy one,” while 12 percent said they were “not sure.” No respondents “definitely wanted to buy one.”

So, we decided that understanding the factors influencing the respondents’ low interest was important. We asked the survey respondents to rank the six adoption factors already mentioned. To test statistical differences of factor rankings, we performed paired sample t-tests on the six factors. Table 1 shows the ranking of all six factors and each factor’s mean score. When the difference in factors’ mean scores was statistically significant, those factors fell into different ranks; when that difference wasn’t statistically significant, we ranked those factors the same. Thus, the six factors fell into three ranks. The results indicate that consumers find convenience and compatibility of the product most important, followed by complexity and trialability. On the other hand, to our surprise, observability and perceived social prestige were the least important factors when respondents considered adopting the iPod jacket.

As mentioned earlier, two adoption factors—convenience and perceived social prestige—were associated with the relative-advantage innovation attribute as defined by Rogers. We examined this attribute in more detail by asking respondents to select one or more of the following that would contribute to their purchasing the iPod jacket. The first four items are associated with convenience, the last with perceived social prestige:

- less time searching for the iPod in bags and pockets;
- less hassle untangling headphone wires;
- no loose headphone wires catching on objects;
- no software or assembly required, making it immediately beneficial; and
- increase in social status.

Figure 1a shows the results. Although 30 percent of respondents chose “none of the above,” the other 70 percent selected at least one of the items listed, indicating that the iPod jacket provides some relative advantage to most consumers. By far the greatest perceived advantage was “less hassle untangling headphone wires” with 87 percent of respondents choosing this benefit, followed by “no loose headphone wires catching on objects.” None of the respondents chose “increase in social status.”

Still, to a large extent, the iPod jacket doesn’t seem to benefit consumers’ lifestyles. Although 21 percent felt their lifestyle would be “somewhat more” improved with an iPod jacket, almost four times as many (79 percent) felt the impact would be “insignificant.” Furthermore, we measured consumers’ perceptions of the iPod jacket’s compatibility with their needs. As Figure 1b shows,

<table>
<thead>
<tr>
<th>Rank</th>
<th>Adoption factor</th>
<th>Mean score*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Convenience (relative advantage)</td>
<td>2.15</td>
</tr>
<tr>
<td>2</td>
<td>Complexity</td>
<td>3.21</td>
</tr>
<tr>
<td>3</td>
<td>Observability</td>
<td>4.70</td>
</tr>
<tr>
<td></td>
<td>Perceived social prestige (relative advantage)</td>
<td>4.76</td>
</tr>
</tbody>
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*1 = most important; 6 = least important

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**TABLE 1**

Ranking of factors affecting consumer adoption of iPod jackets.
consumers’ perceptions of compatibility were widely distributed on a 6-point Likert scale, from (1) “exceeds my needs” to (6) “fails to meet my needs,” but slightly skewed to the latter. This result suggests that the iPod jacket generally fails to meet most consumers’ current needs for their iPod use.

According to our research using the iPod jacket as our test item, the most important adoption factors are convenience and compatibility, and the least important are perceived social prestige and observability. This finding might not be intuitive, considering that potential consumers of wearable electronics, especially technology-savvy young adults, are thought to be greatly influenced by external forces such as peer pressure, trends, and perceived social prestige. Our research suggests to the contrary, that consumer adoption of an iPod jacket is likely to be driven primarily by convenience, compatibility, complexity, and usefulness.

We suspect that the struggle for mass consumer adoption of smart wearable electronics is partly due to companies’ misguided overemphasis on products’ social prestige and visibility instead of product convenience and compatibility. For example, if a smart shirt can beat to the music but only with the help of a battery pack, how convenient is it for consumers to first load their shirt with batteries?

The key to companies’ fostering the adoption of smart wearable electronics lies in their sincere efforts to deeply understand consumer adoption factors instead of making assumptions on the basis of intuition or anecdotal experiences. Then, companies must act upon this understanding and deliberately improve critical aspects of the product to facilitate the adoption process.

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