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Internet of Things and Consumer Psychological Well-Being

Abstract
Internet of things provides consumers with real-time access to data about their environment and about themselves. This technological revolution has affected several areas of life: industry, cities, health, automobiles, housing, etc. In this research, the emphasis is on smart wearable technologies, which are the smart devices with the highest penetration rate among consumers. What are consumers looking for through the consumption of these items? Using a conceptual framework based on theories of psychological well-being in hedonic and eudemonic psychology, this research aims to study what benefits connected objects provide to users in terms of psychological well-being. A qualitative study was carried out to collect data about the benefits that consumers derive from connected watches and bracelets. The results reveal a significant presence of benefits that are quite consistent with the theory of psychological well-being, especially in terms of autonomy, relationships, personal growth, and user control over his or her environment.

Keys words: Well-being, IoT, Wearables, Consumer.

INTRODUCTION

Connected objects offer consumers real time access to data relating to their environment and to themselves. This technological revolution has affected several areas of life: industry, cities, health, automobiles, and housing, among others. One category of connected objects that have been highly successful with consumers is wearables. Some of the many attributes of this new technology are smart bracelet and watch applications that provide consumers with real time access to quantified data relating to the quality of their sleep, physical activity performance, body hydration level, and vital signs. Considering their success, this research is aimed at exploring the benefits that the use-generated data provide and that explain consumer appetite for these objects.

Wearables, in particular connected bracelets and watches are associated with the notion of well-being. This relationship is readily found in the discourses of the brands that market them, as well as in the academic and management literature. In the context of this study, emphasis was placed on examining connected object consumption from the perspective of well-being theories developed in the field of psychology. Using a conceptual framework based on psychological theories of well-being in hedonic and eudemonic psychology, this research is aimed at (1) exploring the benefits of using wearables, in particular connected bracelets and watches, as perceived by users, and (2) challenge these benefits from the viewpoint of the fundamental assumptions of the theory of psychological well-being.

THEORETICAL FRAMEWORK AND RESEARCH QUESTIONS

The Internet of things (IoT), as defined by Sundmaeker et al., (2010) "links the objects of the real world with the virtual world, thus enabling anytime, anyplace connectivity for anything and not only for anyone." Connected objects are currently being studied in a number of disciplines in the field of technologies, but also in the humanities and social sciences. In marketing, academic research is just starting to produce and disseminate findings on the relationship between consumption and the Internet of things. By way of an example, the most recent research can be divided into two broad categories according to the issues addressed:

- Research focused on the dissemination of connected objects and consequently, the study of factors leading consumers to adopt or to resist them (Piwek et al., 2016; Gao Y., Li He., and Luo Y., 2015; Chouk I. and Mani Z, 2016; Canhoto A. and Arp S., 2017; Mani Z. and Chouk I., 2017, etc.).

- Value co-creation between consumer and brand through connected object consumption (Authors, 2016; Lapassouse-Madrid C. and Vlad M., 2016; Bothorel G., Vanheems R. and Guérin A., 2016; Balaji M. and Roy S., 2017; Woodside A. and Sood S., 2017; Ehret M. and Wirtz J., 2017, etc.).

The Internet of things is a recent technological revolution whose main objective was to generate metadata from interconnectedness between machines and servers. This technology quickly developed to connect consumer goods to servers. Considering user enthusiasm for this new trendy consumption, it is becoming important to study user behavior in this regard. At this stage,

the initial question that this research seeks to answer is, in users' perception, what key benefits motivate consumers to purchase and use connected objects.

Businesses, researchers, and consultants associate these consumer goods with the market of well-being. However, there are currently no behaviour studies of connected object consumers from the perspective of well-being psychology. Hence, the psychological theory of well-being was chosen in order to explore the factors that drive individuals to purchase and use smart bracelets and watches.

According to Laguardia J. and Ryan R. (2000), the two prevailing theories in the psychology of well-being are (1) psychological hedonism, which focuses on pleasure and happiness, and (2) eudemonia, which is the convergence between psychological functioning and the nature of the individual. From the perspective of hedonism, psychological well-being is described as a state of pleasure and happiness, the attainment of which is the guiding principle that drives human activity (Ryff and Singer, 1998). According to the eudemonic view, psychological well-being is a matter of individuals' accord with their true nature (Waterman, 1993). In the context of a conceptual meta-analysis of well-being and taking into consideration the various theoretical approaches, Voyer Ph. and Boyer R. (2001) identified six dimensions of psychological well-being. Individuals responding positively to all six are in a state of psychological well-being and vice versa:

1. Self-acceptance: a positive attitude towards oneself, recognition and acceptance of the self's multiple facets, including good and bad qualities.
2. Relationships: having warm, fulfilling, and trusting relationships with others. In addition, the individual must have a concern for the well-being of other people and be capable of feeling empathy, affection, and intimacy.
3. Autonomy: self-determination and independence.
4. Control over one's environment: the feeling of having the competency and control to effectively manage one's environment and activities.
5. Goal in life: seeing meaning in one's present and past, and having objectives.
6. Personal growth: a sense of thriving, growth, and development.

Using the theory of psychological well-being as described in the literature, the second question addressed in this study is whether the perceived benefits that drive consumers to purchase and use connected bracelets and watches are in line with the quest for psychological well-being.

METHOD

Exploratory qualitative research was carried out for the purpose of this study. The main objective is to explore the perceived benefits as revealed spontaneously by current and future connected bracelet and watch users. As part of the analysis of collected data, the consistency between these benefits and the foundations of the theory of psychological well-being was examined. Given the nature of the research object, online non-participatory observation was conducted. The idea was to perform a netnographical study of discussion forums where connected bracelet and watch users interact. The approach followed was that recommended by Kozinets (2010) in relation to the choice of both forums and topics.

Entrée: focus was directed towards two websites, www.frandroid.com (F1) and www.phonandroid.com (F2). These two forums were chosen according to criteria of relevance to the topics addressed as regards the study subject and the interaction frequency on the forums.

Data collection: the analyzed subjects were selected so as to draw information regarding the perceived benefits by future consumers of connected bracelets and watches, as well as feedback from current users of these objects. The topics brought up in the selected discussion threads concerned a number of connected watch and bracelet brands, mainly LG, Samsung, Asus, Motorola, Sony, Huawei, Alcatel, Pebble, Jawbone, Fitbit, and Withings.

Observation duration: given the fact that this is a recent consumer trend; data collection was limited to the 2014-2016-time period.

Data analysis: data was analyzed through an inductive approach with some a priori defined categories and some a posteriori discovered categories. Data was therefore analyzed using an iterative process where blocks of data were first analyzed separately and subsequently reinterpreted in view of the overall meaning developed (Thompson, Pollio and Locander, 1994). Content was analyzed in accordance with the main stages of the qualitative data analysis approach recommended by Spiggle (1994). A second reading of data and content recodification were carried out in order to ensure coding reliability.

FINDINGS AND DISCUSSION

Initial analysis of forum content showed the presence of a number of benefits identified by consumers following their use of connected watches and bracelets. Five different dimensions were identified:

Safety: consumers particularly appreciate the safety provided by wearing a connected watch or bracelet. This sense of safety manifests in various ways depending on the product used. For example, the safety related to receiving notifications on the connected object rather than on a smart phone when driving (F1: "Tremendously useful, both for GPS and for sending a quick hands-free text message to say that you'll be arriving in 10 minutes"). A sense of safety is also generated for users through the ability to follow vital signs during physical activity in order to avoid health problems. Finally, it can also be related to the possibility to transfer data from a cell phone to the connected device when the phone's battery runs down. (F1: "we turn on our smart phone screens much less frequently. Since it is the primary energy expenditure item, I feel that I have more autonomy than before."

Efficiency: efficiency was expressed in relation to two major benefits, speed of access to data and accuracy of data, such as heart rate, pedometer data, calorie counter data, and GPS data. (F1: "through the LG Pulse application, installed by default, it can run continuously, it has to be stopped manually, and one can use markers to keep track of when it was used (walking, jogging, biking…"). Consumers say that they need a product that is able to measure, read, and store data relating to their activities and their health status indicators (F2: "I can't wait to read more comments, in particular in regards to the accuracy of the heart rate monitor, under what conditions can data be less accurate, and to what extent?")

Esthetics: the esthetics, evaluated mainly in relation to the ostentatiousness of having a connected object, the appearance, and the general design of the object (F1: "classy," "elegant," "eye-catching"), as well as the materials that it is made of, the dial, the shape of the screen, the size of the object, and, finally, how comfortable it is.

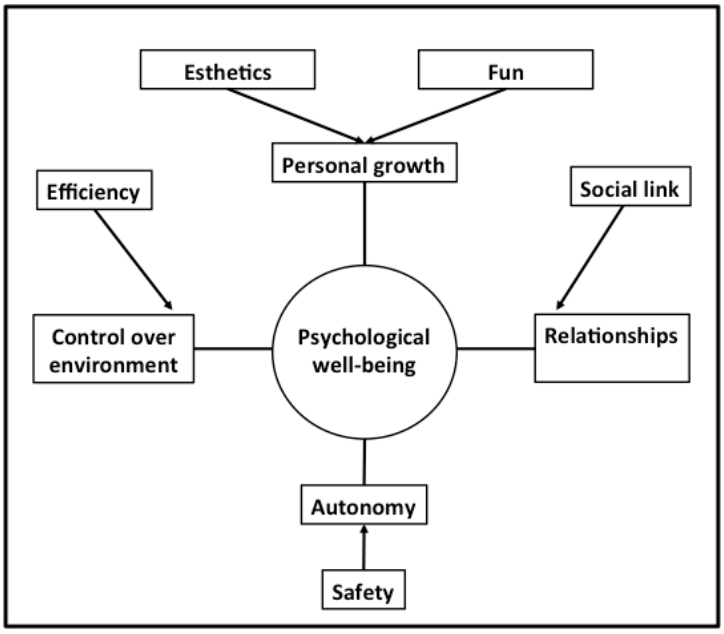
Fun: the fun aspect is related to the object itself, in other words, the pleasure of manipulating and interacting with a Star Trek-style object (F1: "I'm not that old, but I enjoy wearing a watch that was the stuff of science fiction 15 years ago with childlike pleasure"). There is also fun in the possibility to personalize objects. Finally, the curiosity that consumers have about novelty and the excitement they feel when they purchase something new and curious is also a part of the fun aspect of connected objects (F1: "offers a totally new experience. It is really fun to be able to check notifications without having to take out one's smart phone. You can Google search and find more applications that allow you to do even more, it's really great!").

Social connection: two types of social connections were identified. An "intra" community connection associated with connected objects, regardless of brand. This connection is related to the mutual assistance between consumers who visit the same specialized forums that were included in this study (F1: "Great, thanks! I think I will soon have it on my wrist. Yours is the first test I've been able to find in French, you enjoy exclusivity.") The second type is an "inter"-brand social connection. For example, analysis clearly shows that there is a tightly knit Android community that is in opposition to the Apple community.

A reinterpretation of data according to the six-dimension grid of psychological well-being enabled to explore the underlying basis of the match between perceived benefits that consumers have expressed on forums and the aspects reported in the literature. This exploratory in scope research opens up a discussion allowing to see the connected objects covered in this study as a source of psychological well-being with regards to personal growth, autonomy, social relationships, and control over one's environment. This initial analysis does not indicate that these consumer items are a source of well-being as regards self-acceptance and life objective.

The objective of this exploratory research was to study whether the benefits of connected object use, as perceived and expressed by consumers, are in line with the theoretical dimensions of psychological well-being. At this point in our research, the data collected has made it possible to put forward an a priori conceptual framework. The second stage of this research project would be to carry out confirmatory research in order to (1) verify the validity of the model and (2) put forward a marketing strategy applied to connected objects using the concept of psychological well-being. Examining the validity of this typology in different cultural contexts would also be pertinent. Exploring forums visited by English-speaking consumers would inform as to the relevance of the cultural context in relation to this topic and contribute to the research and findings.

Defining the implications for management as regards brand positioning strategies in relation to the fact that connected objects are sources of psychological well-being can become pertinent only after confirmation research has been conducted.


Esthetics
Fun
Personal growth
Efficiency
Social link
Control over environment
Psychological well-being
Relationships
Autonomy
Safety

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