Computers in Human Behavior 78 (2018) 74–89

Contents lists available at ScienceDirect

Computers in Human Behavior

journal homepage: www.elsevier.com/locate/comphumbeh

Full length article

Effects of social popularity and time scarcity on online consumer behaviour regarding smart healthcare products: An eye-tracking approach

Jian Mou [a], Donghee Shin [b, *]

[a] Information Management and Information Systems Department, The School of Economics and Management, Xidian University, Xi'an, China
[b] School of Media and Communication, Chung-Ang University, #1411, Bldg. 303, Heukseok-ro 84, Dongjak-gu 06974, Seoul, South Korea

ARTICLE INFO

Article history:
Received 7 April 2017
Received in revised form
12 August 2017
Accepted 30 August 2017
Available online 20 September 2017

Keywords:
Social popularity
Time scarcity
Smart healthcare
Eye tracking

ABSTRACT

Smart healthcare has become one of the most important issues for practitioners and researchers. In this study, we investigated the effects of social popularity and time scarcity on online consumer perceptions of smart healthcare products. To achieve this, we employed signaling theory and a laboratory-based eye-tracking design. We then collected both questionnaire and user visual fixation data for analysis. We found that social popularity is important with regard to consumers' trust, perceived product quality, and perceived value. Further, the questionnaire data showed that time scarcity is only important for perceived product quality and perceived value. We also found that time scarcity has a significant influence on online consumers' fixation attention. Moreover, interaction effects were found among the variables.

1. Introduction

Providing quality healthcare for older people has become an increasingly important issue because the population of the world is aging and this aging population is susceptible to chronic diseases such as diabetes (Sneha & Varshney, 2006). The availability of quality healthcare affects other segments of society as well, as the younger members of society struggle with mental health issues, drug and alcohol abuse, high rates of sexually transmitted diseases, nutritional problems, smoking, and poor eating habits (Bansal, Zahedi, & Gefen, 2010; Fergie, Hunt, & Hilton, 2013; McKinley & Ruppel, 2014; Morahan-Martin, 2004; Percheski & Hargittai, 2011). Consequently, smart healthcare has become one of the most important issues for society. According to the Centers for Medicare and Medicaid Services (2015), U.S. healthcare spending increased by 5.3 percent from 2013 to 2014, reaching a total of $3 trillion, or $9523 per person. Healthcare expenditure is predicted to continue rising, at an average rate of 5.8 percent per year from 2014 to 2024. Given this projected growth, governments should pay greater attention to their healthcare investment.

With the development of information and communications technology (ICT), healthcare services can provide the right information to the right person at the right time so that the right decision is made (Gianchandani, 2011). An example of smart healthcare, ICT mostly helps individuals self-manage their health, making smart healthcare research an important part of healthcare management for both practitioners and researchers.

From a practical perspective, it is important to provide high-quality healthcare products to help consumers manage their own health conditions more easily and reliably away from clinics and hospitals. Addressed in a great many studies, this concept of ubiquitous healthcare is defined as "the environment where healthcare is available to everyone, everywhere without any dependence on time and location and where the technologies enabling ubiquitous healthcare will be assimilated flawlessly in our daily lives such that the technologies become invisible" (Sneha & Varshney, 2006, p. 2624).

Previously, two types of smart healthcare-enabling technology have been classified: on-body (wearable) and off-body products. A wearable product should be small and light (e.g., a smart watch). On the other hand, an off-body product (e.g., smart healthcare scales) cannot be worn or carried; instead, it must be connected to a system with a wireless local area network (WLAN) infrastructure (Doukas et al., 2011).

Given that various IT-based healthcare products are sold online,

* Corresponding author.
E-mail address: dshin1030@cau.ac.kr (D. Shin).

https://doi.org/10.1016/j.chb.2017.08.049
0747-5632/

it is important to know consumers' cognitive perceptions of such products (Shin, 2015). Human decision-making behaviors are influenced by situational and environment conditions such as time, money, and information (Shin & Biocca, 2017). In an online marketplace environment, vendors persuade people to buyer products with claims such as the exact amount of time may therefore significantly compel consumer to order a product online; this is because the belief that "time is money" may lead consumers to seize an otherwise unavailable opportunity (Godinho, Prada, & Vaz Garrido, 2016). Further, researchers have also examined potential pressure situations such as time scarcity as an environmental signal in an online marketplace (e.g., Amirpur & Benlian, 2015), and consumers' purchase behavior is also influenced by social and contextual information accumulated online (Yi, Jiang, & Zhou, 2014). Consumers may evaluate online products according to the popularity or consumer reviews of a product, which studies have examined as indicators of a product's social popularity in the context of online shopping (Yi et al., 2014). Indicators of social popularity of a product, such as consumer reviews and ratings, allow prospective consumers to evaluate a product's quality online. For example, a highly ranked product (e.g., a product garnering many "stars") is more likely to be ordered by other consumers. Further, other signals (e.g., trust signs) can influence trust and indirectly influence consumers' behavior (Wang, Beatty, & Foxx, 2004).

However, there is a lack of research that considers perceived social popularity and time scarcity as signals that influence consumers' cognitive perceptions of product quality, trust, and perceived values. Also scarce is research that considers how signals influence consumers' visual attention. In this study, we expected that high social popularity, compared to low social popularity, serves as a signal that generates a more positive impact on perceived product quality, trust, and perceived value. Aggarwal, Jun, and Huh (2011) stated that scarcity enhances the perceived value of a product and leads to higher product desirability and an increased willingness to purchase. Moreover, Suri, Kohli, and Monroe (2007) argued that the presence of scarcity in messages enhances consumers' cognitive perceptions and play an important role in consumers' decision-making, such as the choice of a product or service (Mittone & Savadori, 2009). With the hypothesis that social popularity and time scarcity act as signals that influence consumers' cognitive perceptions and visual attention, we identified these research questions for this study:

RQ1: Do social popularity and time scarcity influence consumers' cognitive perceptions in an online marketplace?
RQ2: Do social popularity and time scarcity influence consumers' visual attention in an online marketplace?

This study addressed the research questions by employing an eye-tracking method, combined with an online questionnaire designed to investigate consumers' perceptions. The rest of this paper is organized as follows. The next section introduces the theoretical foundations and outlines the research methodology. Thereafter, the research results are discussed. Finally, the paper offers conclusions and describes the contributions of the research and its limitations.

2. Related literature and theoretical foundations

2.1. Smart healthcare

The past few years have seen a surge in the development of smart products such as smartwatches and smartphones. Smart technologies are those that learn by themselves and produce unanticipated, visible results (Shin & Lee, 2017). They act as a powerful data collection device used for personal health monitoring in clinical and fitness trials (Duclos et al., 2016). Since their introduction to the commercial, research, and clinical markets, smart devices have generated a significant amount of health-related data (Hashem et al., 2016); such data not only benefits smart device users but can facilitate healthcare research and practice and better inform insurance agencies. This is because the analysis of health-related data allows for epidemics prediction, cures, treatment, improvement of quality of life, as well as tracking users with one or more cognitive disabilities (Hashem et al., 2016; Wu, Li, & Fu, 2011). To build a smart healthcare environment requires technological development on two fronts. The first is the development of technologies such as radio frequency identification, GPS, cellular networks, and wireless LANs, all of which support the success of smart healthcare. Secondly, a smart healthcare environment necessarily requires smart healthcare products, which include both on-body and off-body products (Doukas et al., 2011). On-body healthcare products include Fitbit, neuron, Soltrackr, and Zenytime, and major off-body healthcare products include smart scales, smart chairs, and S+ sleep tracker.

These products allow users to more easily track and visually represent their daily health-related data, which empowers consumers to understand their real-time health conditions for prevention of a multitude of health risks. For example, smartwatches monitor physiological data such as bold pressure, heart rate, weight, and sleep condition in a 24-h circadian cycle (Shih, Hsu, & Chao, 2011). It supports health in a user's daily life by enabling self-monitoring of personal activity, obtaining health feedback, and identifying patterns of health-related measures (Reeder & David, 2016). These benefits that smartwatches have resulted in their widespread popularity: a 2014 report forecast that more than 25 billion wearable devices such as smartwatches and smart wristbands will be in worldwide use by 2018, with sales growing from 22 million in 2014 to 135 million in 2018 (CCS insight, 2014). Indeed, a 2017 study found that individuals perceived a smartwatch to be more a set of sensors than simply a watch or a smartphone (Shin & Lee, 2017). In addition, the GASON A2 smart scale has sold 2150 times on AliExpress, an online marketplace, which is strong evidence that the smart scale is a popular household smart healthcare product. Given above reasons, we selected both smartwatch and smart scale for our study.

Previous studies have focused more on smart healthcare product adoption (e.g., Choi & Kim, 2016; Chuah et al., 2016; Hong, Lin, & Hsieh, 2017; Wu, Wu, & Chang, 2016). These studies have helped achieve better understanding of what factors influence the acceptance of smart healthcare products, and it is only when individuals widely adopt these healthcare devices will they have a significant impact on our society's healthcare management. In the existing literature, researchers have employed these frameworks as their theoretical foundation: technology acceptance model, innovation diffusion theory, unified theory of acceptance and use of technology, theory of planned behavior, and status quo bias theory (Choi & Kim, 2016; Chuah et al., 2016; Hsieh, 2016; Wu, Wang, & Lin, 2007, 2011, 2016). We will now turn to discuss the theories relevant to our study.

2.2. Signaling theory

Signaling plays an important role in guiding individuals' cognitive perceptions, decision-making, and behavioral intentions (Wells, Valacich, & Hess, 2011). When consumers do not have enough knowledge for a product or are uncertain of its quality, they typically draw inferences from available signals to form cognitive perceptions (Braddy, Meade, & Kroustalis., 2008). For example,