International Journal for Information Management
Vol. 1, No. 1, April 2021, pp. 28-32

ISSN -
28

Enhancing Experience Values by Reducing Online Psychological Distance Via Augmented Reality

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(Received April 24, 2021 Accepted April 24, 2021, Available online April 25, 2021)

Abstract

An online try-on environment is a favorable solution for consumers to perceive try-on benefits efficiently and effectively. However, psychological distance may appear if consumers cannot view items worn on their own body. Drawing on construal level theory, this study investigated the relationship among usability, the decreasing level of psychological distance, economic value, and efficiency in an online augmented-reality (AR) and a traditional webpage browsing (non-AR) try-on environments. A total of 263 valid questionnaires were collected through a task-based laboratory study, and a partial least squares path modeling was used to test hypotheses. Results showed that the usability of an online store, including graphic style, information content, and navigational structure, contributes to the decreasing level of the psychological distance of consumers and provides economic value and efficiency. The relationship among these constructs was much stronger in an AR try-on environment than that in a traditional webpage browsing try-on environment. Results of this study provide a valuable reference in designing policies and guidelines for e-shopping scenarios.

Keywords: E-shopping; Psychological distance; Economic value; Efficiency; Augmented-reality;

1. Introduction

According to a previous eMarketer market survey [5], online sales of apparel and accessories increased the fastest, from US$37.6 billion in 2011 to US$74.03 billion in 2016. The increase in online sales of apparel and accessories contributed to the growth of retail e-commerce sales in the United States, from $56.88 billion in 2015 to $96.41 billion in 2021 [21]. Apparel and accessories are evidently the primary commodities in online shopping. Consumers prefer to try on apparel and accessories that are available online immediately and virtually to visualize how the apparel and accessories fit their own body and face shapes [4]. Contemporary e-commerce theorizing [8] stated that online consumers generally need to know whether their personal styles and concepts can be reflected by fitting clothes to their own body and face shapes. An online try-on environment is a favorable solution for consumers to perceive try-on benefits efficiently and effectively. However, asymmetric information may occur if consumers cannot view the results of fitting clothes commodities to their body and face shapes online [7], [19], [24]. In particular, asymmetric information occurs because of psychological distance, including social and spatial distances, from the perception of consumers toward online commodities [23]. Social distance occurs in the minds of consumers when no suitable models who share a similar body and face shape to the consumers are featured, which would enable them to try on the commodities. Spatial distance occurs in the minds of consumers because they cannot have tactile experiences [1], [24] from trying on online commodities. Based on a review of relevant studies, researchers have indicated that consumers make purchasing decisions based on feelings and tactile experiences (e.g. Figure 1) [8], [20]. Thus, determining how to create a wonderful experience in online try-on environments for decreasing the psychological distance of consumers is critical. If the decreasing level of psychological distance can be improved by implementing virtual try-on environments, consumer purchase intention would be encouraged because they can easily identify suitable apparel and accessories for their own needs [8], [11]. This paper discusses several factors for improving the decreasing level of psychological distance as well as the resulting effectiveness and efficiency in various virtual try-on environments.

Fig. 1. AR-based Try-on Environment

Construal level theory (CLT) asserts that providing concrete and definite information cues is the most effective approach to decrease uncertainty and psychological distance [30]. Concerning information cues from multiple disciplinary studies, such as those on marketing, human-computer interaction, and information technology (IT) acceptance, the usability of online stores is critical for the concreteness of information on online commodities [11], [12]. However, the relationship between the usability of online stores and psychological distance must be clarified, particularly for the current substantial increase in retail e-commerce sales. Thus, we discuss how the usability of online stores is helpful for the decreasing level of psychological distance.

Concerning virtual try-on environments, numerous online stores adopt high-level image interactivity technology (IIT) to enhance the shopping experiences of consumers. For instance, consumers can use visual information delivered from augmented-reality interactive technology (ARIT) to relate to products and view them worn on themselves, as shown in Figure 1. In addition to presenting more attributes of virtual products compared with traditional online shopping [14], the three-dimensional augmented-reality (AR) experience mitigates consumer uncertainty toward online clothes shopping by using virtual reality [10], [8]. By contrast, traditional online stores provide a traditional webpage browsing try-on environment (non-AR) by implementing low-level IIT to enlarged frontal views of single products and information on a simulated model [6], [24].

The AR try-on environment is superior to the traditional webpage browsing try-on environment in several aspects. First, consumers can view items worn on themselves dynamically in an AR try-on environment that produces a concrete, immediate, and seemingly accurate try-on experience [22]. In addition, consumers can easily try on clothes online by touching the interface directly, without using a mouse [18]. In other words, the AR try-on environment involves a first-person perspective for presenting vivid interaction between consumers and commodities [2], [9], whereas a traditional webpage browsing try-on environment involves a third-person perspective and presents an unfamiliar model trying on clothes [15], [24]. Because of concrete try-on experiences provided using ARIT, a survey on online retailers revealed a 57% increase in the conversion rate between consumers who use ARIT and those who use traditional style and size guides consisting of static images and a measurement grid of shirt size [3]. These findings may imply that ARIT facilitates the decrease of psychological distance; however, research has seldom focused on the relationship between AR try-on environments and the psychological distance of consumers based on the perspective of CLT. Therefore, we sought to clarify how AR and traditional webpage browsing try-on environments affect the decreasing level of psychological distance as well as its antecedence and consequences.

The purpose of this study, which focused on the decreasing level of psychological distance in online stores based on CLT, was threefold: (a) to examine the effect of the usability of online stores on the decreasing level of psychological distance, (b) to investigate the effectiveness and efficiency of online shopping caused by the decreasing level of psychological distance, and (c) to determine contextual effects of online AR and traditional webpage browsing try-on environments. The results of this study can contribute to enriching the application of CLT to online shopping and

provide practical suggestions and guidelines toward the future development and application of ARIT, particularly for virtual fitting and trial applications.

2. Method

A task-based laboratory study was conducted because users usually require an individual space to try on clothes alone. In this study, two online try-on environments, AR and traditional webpage browsing, were applied in an online clothes fitting context. Concerning the online ARIT context (Figure 1), the participants were invited to freely use the ARIT individually in the laboratory. For example, each participant was allowed to use all of the functions and clothing on the ARIT freely, without interference. Each participant merely had to touch the virtual button on the screen without using the mouse to directly view the results of fitting clothes to his or her own body and face. Regarding the traditional webpage browsing try-on environment, users tried on clothes in a traditional online store. By using the mouse, each user could adjust the size and direction of the virtual model on the screen to view the result of fitting clothes to an unfamiliar model.

Regarding the sampling method, we adopted a snowball e-mail method to invite participants. After providing written consent to participate in the study, the participants were informed of the research procedure, which included stating that the primary purpose of using ARIT or no-ARIT (traditional webpage browsing try on) was for clothes fitting. The two group participants were allowed to leave the laboratory after completing the fitting task, after which, they completed a questionnaire. The questionnaire was designed by referencing previous studies [13], [16], [17], [22] and amended based on our research contexts. The responses to each question were scored on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). After answering all of the questions of the questionnaire, each participant was provided with a small gift.

3. Result

A total of 263 valid questionnaires were collected (144 for online AR and 119 for traditional webpage browsing try-on environments); 10% on average spent less than 5 hr for each clothing browsing session; 20% on average spent 6–9 hr for each clothing browsing session; 70% on average spent 10 hr for each clothing browsing session; 30% on average spent less than US$20 for each session; 44% on average spent US$21 to US$40 for each session; 26% on average spent more than US$41 for each session; 20% were aged younger than 20 years; 70% were aged 20 to 24 years; 10% were aged 25 years or older; 90% acquired a bachelor's degree; and 10% acquired a high school degree or lower.

The effect of usability on the decreasing level of psychological distance was positive and significant for both the AR and traditional webpage browsing try-on environments (online AR try-on environment: $\gamma = .79$, $t = 20.12$, significant at $p < .01$; traditional webpage browsing try-on environment: $\gamma = .68$, $t = 12.25$, significant at $p < .01$). As expected, the decreasing level of psychological distance significantly affected economic value (AR: $\beta = .65$, $t = 12.22$, significant at $p < .01$; traditional webpage browsing: $\beta = .29$, $t = 3.51$, significant at $p < .01$) and efficiency (AR:$\beta = 0.67$, $t = 12.00$, significant at $p < .01$; traditional webpage browsing:$\beta = .46$, $t = 5.71$, significant at $p < .01$) for both the AR and traditional webpage browsing try-on environments. These results indicated that the decreasing level of psychological distance positively influenced economic value and efficiency.

We conducted the Chow test (F test) to compare the R2 values of the online AR try-on environment model with that of the traditional webpage browsing try-on environment model. The result indicated that the R2 improvement of the decreasing level of psychological distance (.62), economic value (.42), and efficiency (.44) in the online AR try-on environment model was significantly higher at $p < .01$ than those of the traditional webpage browsing try-on environment model (psychological distance = .47 F = 2.26, economic value = .09 F = 2.90, efficiency = .21 F = 2.55). Obviously, these results indicated that both the explanatory and predictive power of the online AR try-on environment were more effective and higher than those of the traditional webpage browsing try-on environment. On the other hand, the results for the invariance of the hypothesized model among the groups revealed statistically significant differences in the path parameter estimates between the online AR and traditional webpage browsing try-on environments. Such results indicated that the level of the online AR try-on environment moderated the effect

of the decreasing level of psychological distance on economic value and efficiency and moderated the effect of usability on the decreasing level of psychological distance.

4. Implications

First, our findings indicate that online consumers perceive high usability of online stores when they experience the beautification and detailed configuration effect of the graphic style, timeliness and accuracy of the delivery of information, and intuitive and cooperative navigational structure. We suggest that Web-site managers create vivid experiences for consumers when designing their Web sites, by focusing particularly on the usability of the Web site. In addition, the graphic style, information content, and navigational structure are three critical aspects to consider.

According to our findings, eliminating social and spatial distances is critical for decreasing the psychological distance of consumers in online try-on environments. Managers must be cautious when investing in IIT to eliminate social and spatial distances and to create economic value and efficiency for consumers. To decrease spatial distance, Web-site managers can help consumers to directly participate in events, touch objects, and experience vivid interactions in online try-on environments. To decrease social distance, Web-site managers can create a more familiar environment; for example, by providing an ideal fitting experience by using the users' own body virtually by exploiting ARIT. In brief, eliminating social and spatial distances of their Web sites can be a worthwhile goal.

Furthermore, our findings also explain why ARIT is superior to other online computer technologies. The reasons can help ARIT salespersons who seek to promote their Web sites. For example, salespersons using ARIT Websites can convince consumers that they can perceive favorable usability in ARIT because ARIT can produce a high-quality graphic style, information content, and navigational structure. Second, salespersons using ARIT Websites can convince consumers that they will have a wonderful try-on experience and feel close and familiar with the fitting process. These experiences are reflective of the decrease in social and spatial distances in ARIT. Moreover, salespersons using ARIT Websites can proudly promote the satisfactory service of ARIT Web sites because it can create economic value and efficiency when consumers make purchasing decisions.

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