



Modeling innovative points of sales through virtual and immersive technologies

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ABSTRACT

This study examines the benefits of virtual and augmented reality for retailing in order to propose a theoretical framework for the development of innovative and efficient stores. The purpose is to investigate the relevance of advanced technologies in the points of sale from user's standpoint for deeply understanding their influence on consumer's perception. The study gathers data from 150 respondents for investigating the influence on consumers in terms of ease of use, enjoyment and store perception. To achieve this goal, the research focuses on Structural Equation Model (SEM) approach to map the correlations among variables.

The results illustrate consumer's response towards the introduction of virtual and immersive technologies in traditional points of sales. Specifically, they are prompted to use these stores, which became more attractive and appealing.

Managerial and marketing implications are also theoretically discussed, showing how an immersive store might represent the starting point for further advances in retailing.

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1. Introduction

The current advances in the field of Virtual Reality offer efficient and novel tools to create innovative online stores. These tools are capable of giving consumers a more realistic representation of the point of sale and enhancing their feeling of presence (Borgers et al., 2010). Furthermore, the introduction of virtual stores produces important effects for retail sector, by providing innovative consumers interaction systems (Chen, 2010).

The online stores have attracted the attention of researchers who studied the applications of virtual technologies to enhance user's shopping experience, by influencing product quality judgments, consumer satisfaction, permanence in the store, frequency of visits and visualized products, and to finalize the subsequent purchasing process (Catterall and Maclaran, 2001). The success of these technologies mainly depends on the choice of the channel used for purchasing, as well as on the increasing purchases through online systems (Liu and Forsythe, 2011). The current studies on online stores are largely based on the analysis of brand loyalty, trust, perceived risk (Luo et al., 2010; Doong et al., 2011; Shen and Chiou, 2010; Udo et al., 2010; Li and Yeh, 2010; Chiu

et al., 2010; San Martín Gutiérrez et al., 2010; Pantano and Timmermans, 2011), and consumer's acceptance of virtual stores in terms of attitude and behavioral intention, as well as on their characteristics such as system interfaces and quality (Chen and Tan, 2004; Ganesh et al., 2010); whereas other studies pointed out the importance of employed interactive tools, which deliver high personalized products, and e-windows which represent innovative elements capable of catching consumer's attention and motivating people to visit the online store (Ganesh et al., 2010). In particular, the advantages of virtual stores can be described in terms of time saving, by reducing the operational costs and offering more products than a traditional one 24/7, due to the possibility for consumers to access to the store directly from their place, by supporting in this way also clients with disabilities in reaching the store (Lee, 2007).

As a consequence, the increasing competition in the retail sector forces marketers to design and develop more appealing stores, by capitalizing the recent advances in information and communication technologies, in order to extend the use of these ones as innovative and more efficient marketing channel (Parsons and Conroy, 2006; Vrechopoulos et al., 2004).

In this scenario, just few studies focus on the link between online services quality and consumer's satisfaction or behavioral intentions (Pantano et al., 2010), without finding any important correlations (Udo et al., 2010; Hausman and Siekpe, 2009); as well as on the relationship between environmental stimuli and user'

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attention level, in order to improve the online interaction quality (Breugelmans et al., 2007; Kim et al., 2007).

Despite the large deal of research in both online retail patronage behavior and virtual stores (Ganesh et al., 2010), the potentiality of advanced technologies such as augmented reality, ubiquitous computing, and pervasive environments is not fully exploited yet.

The aim of this study is to investigate consumer's response towards the introduction of immersive environments based on the 3D virtual reality in traditional points of sale, in order to understand to what extent these technologies make store more attractive and how they are capable of influencing consumer's shopping mode choice, as well as their effective integration within traditional retail tools.

The first part of the paper is devoted to the current literature on virtual stores characteristics, as well as on their influences on consumer behavior; whereas the subsequent section concerns the employed quantitative methodology and results. The last section highlights the main implications of the research and the related contribution to the literature.

2. Theoretical background

3D computer graphics technologies provide powerful tools to design virtual stores, by adding innovative elements (e.g., realistic interactions, customized virtual products, etc.), which are more efficient in catching consumer's attention (Lee and Chung, 2008). In fact, the stores based on 3D virtual environments display on computer scenarios and objects which users can explore and experience directly through Internet in a more entertaining way (Lee and Chung, 2008; Liu, 2010). Thus, users can perform various activities such as interacting with the products, visualizing details, requesting and findings customized information capable of influencing their purchasing decision (Liu, 2010).

Consumer's choice to buy in an online virtual store, as well as in a traditional offline point of sale, is affected by several attributes which can be expressed in numerous dimensions such as time dimension, place dimension, and acquisition dimension (Yoon and Kim, 2007). The time dimension refers to a lack of time or to time pressure in terms of time of shopping trip, purchasing delivery, and waiting (Lee, 2007). This dimension represents an important component of the consumer's convenience in the shopping mode choice, and it plays a key role for their judgments, with consequences on the subsequent satisfaction level; whereas the place dimension consists of making the place more convenient for consumers, according to their preferences; and acquisition dimension concerns the possibility to purchase products in an easier way (Yoon and Kim, 2007). Therefore, these factors might improve the perception of the utilitarian benefits in terms of saving time and effort (Kim et al., 2007; Yoo et al., 2010). The introduction of advanced technologies in the point of sale might positively influence all these dimensions in several ways.

Since the realistic Human–Computer Interaction (HCI) studies, virtual environments, and products displays have increased the visual appeal of web sites and affected consumer's behavior in terms of frequency of visit and purchase intention (Chen David and Cheng John, 2009; Kim et al., 2007; Suh and Sunhye, 2006). In fact, the digital storefront of the virtual store represents the online version of the physical shop window (Chen and Tan, 2004), thus the quality of both navigation and provided contents/services plays a key role for determining the level of attractiveness of the store (Ha and Stoel, 2009). Since the ease of use of the system can be represented in terms of the degree to which a consumer believes that using these interactive stores does not require a cognitive effort (Davis, 1989), hard navigation,

as well as difficulties in searching and finding products and information might negatively affect the shopping experience (Yoon and Kim, 2007; Kowatsch and Maass, 2010; Udo et al., 2010). Hence, these factors are capable of influencing the consumer's perception of the digital point of sale.

Therefore, the aforementioned considerations lead to the following research hypothesis:

H1. *Perceived ease of use has a positive influence on store perception.*

Furthermore, an entertaining and emotional shopping context positively affects consumer's satisfaction (Diep and Sweeney, 2008; Söderlund and Julander, 2009; Newsom et al., 2009; Pantano and Naccarato, 2010; Penz and Hogg, 2011), with benefits for the purchasing decision process (Kim and Kim, 2008). Enjoyment can be defined as the degree to which carrying out a task is perceived as providing pleasure, aside from activity consequences (Venkatesh, 2000). Indeed, if consumer's intentions are driven by intrinsic motivation like interest and enjoyment, they are more willing to persist in online shopping (Eighmey and McCord, 1998; Lee and Chang (2011)). In fact, several studies showed the stronger value of perceived enjoyment in virtual stores if compared to the traditional ones (Lee and Chung, 2008), due to the possibility to play with the available items with ease and interactive tools. Hence, the level of interactivity of the virtual environment interface influences the fun provided by the virtual store (Kim et al., 2007).

Therefore, we hypothesize:

H2. *Perceived ease of use has a positive influence on perceived enjoyment.*

Due to the characteristics of virtual stores in terms of utilitarian benefits, these points of sale might be perceived by consumers as a more convenient shopping mode (Hsiao, 2009; Lee and Chung, 2008; Yoon and Kim, 2007). In addition, several researches carried out the convenience as the major advantage of Internet shopping (Yoon and Kim, 2007), by considering convenience an influencing factor during the consumer's satisfaction (Thirumalai and Sinha, 2011). Satisfaction is a feeling, or the overall pleasure, emerging from the past experience with a product, service, and system (Tseng and Lo, 2011; Kang and Lee, 2010; Taylor and Strutton, 2011).

Since perceived ease of use represents a key factor for the consumer's satisfaction capable of measuring the system quality and subsequent adoption (Yoon, 2010), the usability of the visual system interface and the ease of navigation, as well as the possibility to reach any place in the store directly from any other place of the point of sale, affect consumer's perception of provided fun and of the store overall quality (Vrechopoulos et al., 2004; Vieira, 2010).

Therefore, we hypothesize:

H3. *Perceived ease of use has a direct effect on consumer satisfaction.*

H4. *Perceived enjoyment affects store perception.*

H5. *Perceived enjoyment influences consumer satisfaction.*

H6. *Consumer satisfaction is positively influenced by store perception.*

Furthermore, the effect of product rotation in online stores might improve the products knowledge transfer process, by supporting consumers to realize a consistent perception of the virtual environment (Park et al., 2008).

Katterattanakul and Siau (2003) summarize the characteristics of the virtual store compared with the physical one according to

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