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# Successful Design of Electronic Commerce Environment: On the Role of Sense of Presence in User Behavior

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## 1. Research Background and Objective

Despite the various benefits of the Internet/World Wide Web (Web) as a business transaction tool, such as lower search cost and greater selection of goods [Bakos 1998], and the millions of web-site visits, serious conduct of electronic commerce (EC) on the web by individual consumers does not appear to have taken root [Jarvenpaa & Todd 1997]. Notwithstanding security and privacy concerns [Kiely 1997], it appears that the current EC systems do not address varying levels of user needs. They fail to provide the rich commerce environment that users typically experience in a physical world; this deficiency might fail to arouse motivation or interest in carrying out “real transactions”. For instance, in a physical commerce environment, consumers can touch and feel the products and freely communicate with sellers about the products they want to buy. On the contrary, consumers in an EC environment might find it difficult to deal with the inherent nature of virtuality in their interaction, especially in a poorly designed EC environment where users might be uncomfortable with uncertainty and ambiguity caused by lack of interaction with products and sellers.

I assert that EC environments should be rich enough to compensate for this deficiency to be successful. For instance, in a well-designed EC environment that provides dynamic and sufficient interaction with products and sellers, buyers may psychologically perceive the products and sellers to be physically present when interacting with them and exhibit favorable perception, attitude and behavior. Beyond the inherent advantages of EC such as, convenience [Jarvenpaa & Todd 1997] or lower search cost [Bakos 1998], I suggest that an EC environment that facilitates strong sense of presence consumers have in a physical commerce environment will arouse their motivation and interest in carrying out “real transactions”. One can characterize the EC environment in terms of the level of sense of presence EC systems allow the users.

In this study, I will explore the critical components of a virtual environment for business-to-consumer EC and the impact of those components on user attitude and behavior. Specifically, this study focuses on sense of presence that can be perceived by users in an EC environment. Major research questions to be addressed in this study include:

does sense of presence matter in a virtual EC environment?; what effects does sense of presence have on user attitude and behavior in a virtual EC environment?; and what other factors would have important influences on these effects? I posit that product characteristics would be an important factor that can have significant influences on the level of sense of presence of EC environment and that individual’s tolerance for uncertainty and ambiguity would have moderating influences.

## 2. Theory and Proposition Development

### Social Presence Theory and Telepresence Theory

Two theories are relevant to this study: social presence theory [Short et al. 1976] and telepresence theory [Steuer 1992, Schloerb 1995]. According to social presence theory, communication media differ in the amount of social presence they afford or “the degree to which a medium permits users to experience others as being psychologically present” [Fulk et al. 1987]. Social presence is defined as “the extent to which an individual psychologically perceives other people to be physically present when interacting with them” [Carson & Davis 1998]. Face-to-face interaction is at the top in social presence whereas written communication such as a letter is low in social presence.

On the other hand, telepresence is defined as a sense of presence in a remote environment that can be either a distant real environment or a nonexistent virtual environment created by a computer/communication medium [Steuer 1992, Schloerb 1995]. Telepresence theory posits that media can offer a feeling of telepresence through approximating real-world experiences. First-person experiences in the real world are used as a standard for all mediated experiences [Steuer 1992]. Mediated environments are created and then experienced through interaction with media technology. Two major technological dimensions have been discussed as determinants of telepresence: vividness and interactivity. Vividness means the representational richness of information in a mediated environment, whereas interactivity refers to user control over the form and content of information in a mediated environment.

## **Social/Product Presence**

One common theme among different definitions of EC is that it is a communication/computer-mediated virtual environment which represents product information to users across space or time and also provides communicational interaction between buyers and sellers to enable the users to make choice decision. Two types of interaction are involved in this environment: interaction between buyers and products, and interaction between buyers and sellers. Thus, I focus on two types of sense of presence in this EC environment: social presence (SP) and product presence (PP). In this EC environment context, social presence means the extent to which a buyer psychologically perceives a seller to be physically present when interacting with him/her whereas product presence refers to the extent to which a buyer psychologically perceives the products to be physically present when interacting with them.

Users might experience different levels of social and product presence in this virtual environment. First, users' perception of social presence in an EC environment could vary depending on communication richness of EC systems. For example, EC environments where users can feel immediate presence of sellers and thus have immediate interaction with sellers on a real-time basis can make much difference than EC environments where users have no contact or only e-mail contact. Similarly, users may perceive different levels of product presence in computer/communication-mediated EC environment depending on how product information is represented. In a richly represented virtual EC environment (e.g., enabled by multimedia interactive technology), a buyer may psychologically perceive higher level of physical presence of products when interacting with them [Schloerb 1995, Klein 1999]. I expect that these differences in social/product presence could have different influences on users who are given choice tasks in a virtual EC environment. I investigate the effects of these senses of presence on users in terms of user attitude [Liu 1997], satisfaction [DeLone & McLean 1992], site recall and recognition [Liu 1997], and intent to buy [Salisbury et al. 1998].

## **Product Characteristics**

I argue that product characteristics would be an important factor that can have significant influences on the level of social/product presence of EC environments. Here, product characteristics can be viewed in terms of social presence requirement and product presence requirement. Social presence requirement indicates the extent, to which a product choice decision requires the social presence of a seller, whereas product presence requirement refers to the extent to which a product choice requires sense of presence of a target product. Products such as financial products may require higher level of

social presence while others like a camcorder may need greater level of product presence. A complex software package might require higher levels of both social and product presence, and a book may not need high levels of either presence.

## **EC environment/Product Fit**

A key theme that has been studied extensively in media use research is the notion of a relation between task and medium [Daft et al. 1987]. The prevalent view is that individuals use the medium that best meets task requirements. Social presence theory posits that individuals evaluate the degree of social presence required by the task and match it to the social presence of the medium [Short et al. 1976, Straub & Karahanna 1998]. This theory suggests that when a task is interpersonally involving (e.g., negotiation), media with high social presence such as face-to-face interaction are considered the most appropriate choice, but that, for low social presence task such as a straightforward information exchange, the medium's social presence is not as important as efficiency [Straub 1994].

Consumers confront a choice type of decision task. Their task can be characterized in terms of social presence requirement and product presence requirement of a target product. In a product choice that requires high social/product presence, buyers may feel more uncertainty and ambiguity due to lack of product information or experience, and thus have a greater need for an EC environment with higher level of social/product presence. In this EC environment, users need richer channels of communication with sellers and interactive, multi-sensory product interaction that can help to reduce uncertainty and ambiguity associated with their product choice [Palmer & Griffith 1998]. Thus, I propose that there must be *congruence* or *fit* between EC environment and product characteristics to have favorable user outcomes. This line of discussion also has support in the cognitive fit theory proposed in the context of information acquisition and information evaluation for (what the researchers labeled as) simple decision tasks [Vessey 1991, Vessey & Galletta 1991].

*PROPOSITION 1. The congruence between EC environment characteristics (EC SP/PP) and product characteristics (SP/PP requirement) will lead to favorable user outcomes.*

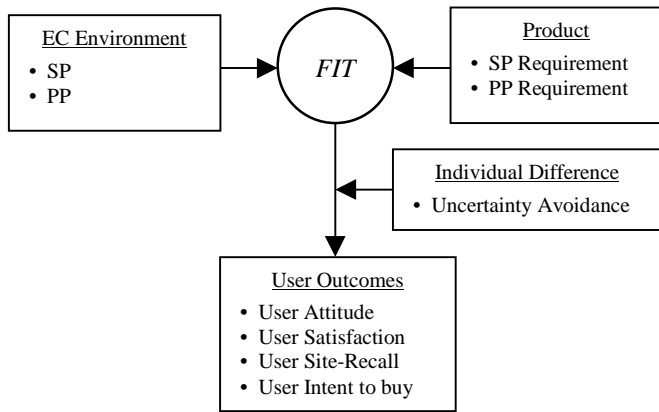
## **Individual Differences**

Individual differences might influence the effect of sense of presence on user behavior. Since sense of presence is perception of individuals, the same EC environment can be perceived differently depending on their inherent characteristics. Some people prefer more

socially-present/product-present EC environment than others in the same choice task context. We focus on the individual difference in terms of tolerance for uncertainty and ambiguity, called uncertainty avoidance, which might have a direct bearing on preference for and use of communications media [Straub 1994]. Uncertainty avoidance is defined as “the degree to which an individual feels uncomfortable with uncertainty and ambiguity” [Hofstede 1984, Straub 1994]. Users who are more uncomfortable with uncertainty and ambiguity (i.e. high on uncertainty avoidance) will choose more socially-present/product-present media to deal with product-choice tasks.

*PROPOSITION 2. Individual differences will moderate the effects of FIT (between EC SP/PP and Product SP/PP requirements) on user outcomes.*

These two propositions are summarized in the research model of this study, as shown in Figure 1.



**FIGURE 1** Research Model

### 3. Research Methodology

In this thesis, I will design and administer a series of controlled laboratory experiments that manipulate social presence and product presence independently in an EC environment, in order to test propositions described earlier. This study employs four product categories requiring different levels of social presence and product presence. This study is 2 (levels of social presence) X 2 (levels of product presence) X 4 (types of product) factorial design. Social presence and product presence will be assessed with a multi-item scale to validate the perception of participants in the experiments. I will control individual difference variables in these experiments to investigate pure effects of fit between EC SP/PP and product SP/PP requirements on user outcomes as well as to test whether individual differences have moderating influence on the effects of the fit on user outcomes.

### 4. Conclusion

The expected contribution of this study is in providing researchers with a theoretical understanding of the effects of sense of presence on user behavior, and in offering practitioners an opportunity to evaluate and (re)design their EC systems to realize enhanced effectiveness (e.g., increase sales).

**References are available upon request from author.**