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UNDERSTANDING GENDER-BASED DIFFERENCES IN CONSUMER E-COMMERCE ADOPTION

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Abstract

Despite the spread of e-commerce, few studies have investigated gender-based differences in the adoption of consumer-oriented electronic commerce. Theory and evidence from other domains indicates that such differences may exist. Using innovation diffusion theory as a framework, we empirically investigate whether the impact of beliefs regarding the characteristics of e-commerce and the trustworthiness of Web merchants on intentions to use e-commerce differ according to gender. Results indicate that such differences do exist. Perceived compatibility and visibility have greater impacts for women. In contrast, males' use intentions are more driven by perceived relative advantage and result demonstrability. No differences were found for perceived ease of use and Web merchant trustworthiness.

Keywords: Electronic commerce, innovation adoption, gender

Introduction

Consumer-oriented electronic commerce continues to grow, despite the dot-com bomb. Notwithstanding the considerable interest in e-commerce in both the academic and business press, there have been few studies that investigate gender differences in this important context. In fact, there is a general lack of studies that investigate gender in the context of information technology. There are, however, several recent studies indicating that there may be interesting differences in how men and women perceive and use information technology (IT) (e.g. Gefen & Straub, 1997; Venkatesh & Morris, 2000; Van Slyke, et al., 2002). In this study, we explore gender-based differences in the way in which beliefs impact intentions to use consumer-oriented e-commerce. Specifically, we investigate the following research question:

> *Do the impacts of beliefs regarding the characteristics of e-commerce and the trustworthiness of Web merchants on intentions to use e-commerce differ according to gender?*

Using data from a survey, we empirically examine the above question. We draw from diffusion of innovation theory and the e-commerce trust literature to form our research framework. Prior research on gender differences in information technology adoption is used as the basis for specific hypotheses.

Research Framework

Factors Influencing E-commerce Use

Diffusion of innovation theory provides the foundation for our research framework. We enhance the framework using the literature on trust in e-commerce. Diffusion theory is primarily concerned with the study of how the awareness and use of an innovation spreads throughout a social system (Rogers, 2003). Our main interest here is in the impact of potential adopters' beliefs regarding the characteristics of the focal innovation. These beliefs, which are commonly called "perceived innovation characteristics", are major determinants of the outcome of the adoption decision.

The literature has identified a variety of innovation characteristics that influence the adoption decision. Three, perceived relative advantage (RA), perceived compatibility (CT) and perceived complexity, have received the most consistent empirical support (Tornatzky & Klein, 1982). Perceived relative advantage is the potential adopter's belief regarding the degree to which the innovation is seen as being superior to its predecessor (Rogers, 2003). Although RA is a complex, multi-dimensional concept, the IT literature primarily focuses on the usefulness aspect of RA. Research has generally shown a positive relationship between RA and use intentions (UI) (Plouffe, et al., 2001; Van Slyke, et al., 2004).

Perceived compatibility is the potential adopter's beliefs of the degree to which the focal innovation fits with the adopters' existing needs, values and experiences (Rogers, 2003). Perceived compatibility, which has a positive relationship with use intentions, has received considerable support in the empirical literature (Plouffe, et al., 2001; Van Slyke, et al., 2004). Perceived complexity is the degree to which the potential adopter views the innovation as being relatively difficult to use and understand (Rogers, 2003), and is thought to have a negative impact on use intentions. Much of the literature on IT adoption and acceptance uses perceived ease of use (EOU), rather than complexity. Ease of use is considered to be the conceptual opposite of complexity. In this study, we follow the norm in the IT literature and use ease of use rather than complexity. Rogers (2003) also points to perceived observability as having an influence on adoption decisions. Moore & Benbasat (1991) decomposed observability into two components. Perceived visibility (VI) concerns the degree to which the use of the innovation is apparent. In contrast, perceived (RD) pertains to the apparentness of the outcomes of the use of the innovation. Both perceived visibility and RD have positive impacts on use intentions.

An additional belief may be particularly applicable to the study of e-commerce. There is a growing body of evidence concerning the impact of trust and trustworthiness (TW) perceptions on the use of e-commerce (Gefen, et al., 2003; Van Slyke et al., 2004). The literature often fails to distinguish between trust and trustworthiness. We view trustworthiness as being an antecedent to trusting behaviors. In the context of consumer-oriented e-commerce, trust may be viewed a consumer's willingness to be vulnerable to a Web merchant (Mayer et al., 1995). In contrast, trustworthiness may be defined as "*beliefs about whether Web merchants possess qualities that make them deserving of trust*" (Bélanger, et al. 2002, p. 253). The literature has shown considerable support for the positive influence of trust and trustworthiness on intentions to use e-commerce (Gefen, et al., 2003; Van Slyke et al., 2004).

Gender and Information Technology

As information technology continues to become a more integral part of life, it becomes increasingly important to understand differences across groups of users. Because of this, it is worthwhile to investigate gender-based differences with respect to information technology adoption and use. Although there seems to be growing interest in this topic, more attention is warranted (Adam, et al., 2004). There is evidence that women and men view information technology differently. For example, it has been shown that women and men differ in their views of Web-based shopping (Van Slyke, et al., 2002). In general, women view IT less favorably than men (Li, et al., 2001; Schumacher & Morahan-Martin, 2001). A number of possible explanations for this have been put forward, including less experience with IT, higher levels of computer anxiety, and lower self efficacy (Igbaria & Chakrabarti, 1990; Durndell & Haag, 2002). Our interest here is not on differences in beliefs and attitudes related to IT. Rather, we are interested in better understanding differences in how beliefs impact use intentions. Relatively little research has been done in this area. Notable exceptions include Venkatesh & Morris (2000) and Gefen & Straub (1997).

There is some evidence that men are more driven by achievement than are women (O'Neill, 1982). In addition, men tend to be more instrumental in their behaviors, and are more motivated by goal achievement (O'Neill, 1982; Boneva et al., 2001). It has been empirically demonstrated that perceived usefulness is a stronger determinant of use intentions for men (Venkatesh & Morris, 2000). From this body of literature, we believe that RA will be a stronger influence on use intentions for men than for women. Thus we state the following hypothesis.

     H1:   *Perceived relative advantage will have a greater impact on use intentions for men than it will for women.*

The impact of gender on the relationship between CT and use intentions has received little attention in the literature. Gender differences in the CT of e-commerce have been found (Van Slyke et al, 2002), but there is a lack of empirical evidence regarding gender-based differences in the impact of perceived CT on use intentions. To understand gender differences, it may be useful to consider *lack* of CT as being a barrier to use. In other words, CT is not a reason to adopt an innovation, but a lack of CT may be a reason to *not* adopt. Because women perceive e-commerce to be less compatible, we believe that CT may have a greater influence on use intentions for women. This leads to the following hypothesis.

> *H2:   Perceived compatibility will have a greater impact on use intentions for women than it will for men.*

In general, research shows that women have higher levels of computer anxiety (Igbaria & Chakrabarti, Durndell & Haag, 2001) and lower levels of self-efficacy than men (Venkatesh & Morris, 2000). Also, men generally have greater exposure to and experience with computers. (This situation is changing rapidly, but given that the subjects for this study are adults, we believe that overall the women in the study will have had less exposure to computers.) Less experienced and less confident users are likely to be more heavily influenced by the ease of use on an innovation. Because of this, we propose the following hypothesis.

> *H3:   Perceived ease of use will have a greater impact on use intentions for women than it will for men.*

As stated earlier, some researchers think that men are more motivated by the utility of an innovation than are women. Men are also more task and efficiency oriented than women (Minton & Schneider, 1980). In the context of IT innovations, perceived usefulness has a greater influence on use intentions for men than for women (Venkatesh & Morris, 2000). Following this thinking, it may be that men's use of e-commerce is more heavily influenced by perceptions of RD. Recall that RD pertains to the outcomes of using an innovation. Being task and efficiency oriented, innovations with readily apparent outcomes (high RD) are likely to be attractive to men. This leads to our next hypothesis.

> *H4:   Perceived result demonstrability will have a greater impact on use intentions for men than it will for women.*

Women tend to be more social (Wood & Rhodes, 1992) and network-oriented (Tannen, 1990) in their communication. In addition, women typically have large social networks. For women, the subjective norm of using an innovation has a significant influence on their use intentions. The same cannot be said for men (Venkatesh and Morris, 2000). Together, these findings may indicate that women are more aware of the use of e-commerce by those in their social networks. It may be that the degree to which others are using e-commerce has more of an impact for women. High visibility not only increases awareness of e-commerce, but may also act as a signal of subjective norm. Therefore, we propose the following.

> *H5:   Perceived visibility will have a greater impact on use intentions for women than it will for men.*

There is some evidence that trust is more important in the early stages of a relationship. Also, trust is more important in risky situations. Women generally have less experience with the Internet and online shopping, although the gap is narrowing. Despite the growing use of e-commerce by women, it is still likely that men have more past experience in the online environment, which leads us to believe that the trustworthiness of Web merchants will be more important for women. There is some evidence that women are more influenced by trust. In a study of factors influencing satisfaction with e-commerce, Rogers and Harris (2003) found low trust to be a predictor of low satisfaction among women. For the reasons delineated above, we state the following hypothesis.

> *H6:   The trustworthiness of Web merchants will have a greater impact on use intentions for women than it will for men.*

An empirical study was conducted to investigate the hypotheses stated in this section. In the next section, we describe the methodology used in that study. Results of the analysis are also provided.

Methodology and Results

A survey was used to collect data from 507 consumers (212 males and 295 females) who were currently enrolled in courses at one of three large universities in the USA. Subjects ranged in age from 17 to 48 years. The median age was 20 years old. Scale items representing the constructs of interest were primarily drawn from previously-validated scales. Scales for RA, CT, EOU, VI and RD were derived from Moore & Benbasat (1991). A new scale was developed for Web merchant trustworthiness.

Scale validities were assessed using the full set of data. Data analysis was performed using PLS-Graph. Convergent and discriminant validities were assessed based on the analysis of a measurement model comprised of all relevant scales. Results

of this analysis are shown in Table 1. Average variance explained is shown on the diagonal. Overall, the results indicate acceptable validity for the scales. One exception comes from the low reliability of the VI scale. This is likely due to the fact that we used short-forms of the scales (as recommended by Moore & Benbasat (1991)). The short form of the VI scale has only two items, one of which is reverse-worded. This likely had a negative impact on the scale's reliability. Because this scale has been widely used in other contexts, we decided to keep it in subsequent analysis. However, results related to VI should be viewed with caution.

Table 1 – Measurement Model Statistics

	Reliability	RA	CT	EOU	RD	VI	TW	UI
RA	0.864	**0.824**						
CT	0.940	0.748	**0.915**					
EOU	0.859	0.591	0.545	**0.778**				
RD	0.781	0.525	0.451	0.651	**0.748**			
VI	0.631	0.419	0.416	0.476	0.387	**0.723**		
TW	0.917	0.423	0.552	0.492	0.350	0.346	**0.887**	
UI	0.969	0.681	0.723	0.656	0.623	0.512	0.564	**0.954**

Data from the survey were analyzed using partial least squares. Separate structural models were analyzed for females and males. Table 2 provides statistics for each structural model. Standardized beta coefficients are shown in the table.

Table 2 – Structural Model Statistics

	Women		Men	
Path	**Beta**	**t-statistic**	**Beta**	**t-statistic**
RA	0.0467	0.6257	0.1957	3.5426
CT	0.4281	6.9528	0.2268	4.3757
EOU	0.1584	2.3326	0.1490	2.2693
RD	0.1796	2.7811	0.2511	3.9959
VI	0.1261	2.1124	0.1046	2.7445
TW	0.1350	2.2973	0.1396	2.9931

For women, CT, EOU, RD, VI and the trustworthiness of Web merchants impact their intentions to use e-commerce. For men, RA, CT, EOU, RD, VI and the trustworthiness of Web merchants are significant. The general expectation that beliefs impact intentions to use e-commerce is supported by our analysis. However, it is apparent from Table 2 that the strength of some belief's impact on use intentions varies according to gender. Because of this, we tested for differences in standardized path coefficients (betas) across the two groups using the method prescribed by Cohen & Cohen (1983). Results of this analysis are shown in Table 3. Four of the six hypotheses are supported. As expected, RA (H1) and RD (H4) have stronger influences for men, while CT (H2) and VI (H5) are stronger for women. There are no significant differences in the strengths of the paths for EOU (H3) and trustworthiness (H6).

Table 3 – Hypothesis Tests

Hypothesis	Direction	Beta-diff. t-statistic
H1 – Relative advantage	W < M	-18.525
H2 – Compatibility	W > M	29.020
H3 – Ease of use	W > M	1.277
H4 – Result demonstrability	W < M	-9.056
H5 – Visibility	W > M	3.641
H6 – Trustworthiness	W > M	-0.734

Discussion

This research investigates gender-based differences in the manner in which beliefs impact intentions to use e-commerce. From the results, it is clear that such differences exist. E-commerce practitioners may be able to use these findings to better target women and/or men to their e-commerce sites. To attract men, Web merchants should emphasize the advantages of shopping online. In addition, steps that draw attention to the outcomes of using e-commerce would likely attract men to online shopping. In contrast, increasing the visibility of e-commerce may be more effective in attracting women to e-

commerce. For example, "bricks-and-clicks" retailers could emphasize the availability of online shopping in their offline advertisements, which would increase the visibility of e-commerce.

Web merchants who wish to attract female consumers should pay special attention to compatibility, as this is the strongest predictor of use intentions for women. Women tend to be more social than men; this is at odds with the relatively isolated nature of e-commerce. Web merchants should investigate ways to build a sense of community among shoppers. This may reduce the isolation of the experience, which may increase compatibility. We are somewhat surprised with the results related to ease of use and Web merchant trustworthiness. We expected both of these to have a larger impact for women, but no significant differences exist. Future research should further investigate these findings.

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