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ABSTRACT

We examine the effect of Hofstede's (2001) cultural dimension of uncertainty avoidance (UA) on consumer perceptions of e-loyalty. Viewing information quality, trust, and system quality as uncertainty reduction mechanisms, UA is hypothesized to moderate relationships involving these constructs in a recognized model of IS success. Using data drawn from over 3,500 actual consumers from 38 different countries, and controlling for the impact of other cultural dimensions, results suggest that UA moderates the effects of information quality on perceived usefulness, and of trust on e-loyalty, but not system quality relationships. The moderating effect of UA on the information quality-satisfaction relationship was non-significant, indicating uncertainty reduction effects may operate via a cognitive rather than an affective route. We close with implications.

Keywords

e-loyalty; cultural differences; Hofstede model; uncertainty avoidance; website satisfaction

INTRODUCTION

Online purchasing entails a decision making process where consumers visit websites to gather information, compare alternatives, and make a decision as to what to purchase, what features to include, at what price, and from which vendor. Each of these actions aims to reduce uncertainty about product features, alternatives, prices, quality, delivery, service, and vendor trustworthiness. Online consumers must rely on the website to reach their decision rather than on actual, physical interactions with the product and vendor. Thus, uncertainty may exist as to product characteristics and their fit to one's needs, and whether a vendor is trustworthy and will deliver the product as promised. Poorly structured websites that are difficult to navigate will also increase uncertainty regarding how to locate relevant information and complete the transaction.

Given the centrality of uncertainty (product, vendor, website) in the online purchasing process, uncertainty avoidance (UA) is likely to be an important cultural dimension influencing how consumers from different countries make purchasing decisions. UA reflects a culture's tolerance for ambiguity. One would expect that in high UA cultures, factors related to uncertainty reduction (such as information quality for assessing product features, trust in the e-vendor, and a logically organized website) would be more important determinants of e-loyalty than in low UA cultures. Thus, given that countries differ on their levels of UA (Hofstede, 2001), e-vendors may need to take this into account when designing websites for global use.

Rigorous theory-based research on UA and other cultural dimensions is still in its infancy. Most B2C research on culture has focused on a single (often Western) country, or a very small set of countries. It thus becomes difficult to untangle and isolate distinct effects of each cultural dimension. We contribute to the literature by examining the impact of *one* dimension of culture (UA) on relationships in a well-established model of IS success (see Rai, Lang, and Welker, 2002), that is adapted to an e-commerce setting. We posit that UA moderates those model relationships that are relevant to uncertainty reduction. Specifically, we suggest that (a) information quality, reflecting the breadth and depth of information available on the website, serves to reduce product uncertainty; (b) trust serves to reduce vendor uncertainty, and (c) system quality, reflecting the ease of navigation and logical organization of the website, along with experience with the website, serve to reduce uncertainty associated with the site itself. As such, relationships involving these three constructs will be more important for individuals from high UA countries. Our analysis utilizes a random sample of 577 drawn from over 3,500 actual consumers from 38 different countries who visited the websites of a large multinational hotel chain on their own accord. The large number of

countries in our dataset allows us to isolate effects of UA while controlling for effects of the other cultural dimensions.

We begin our paper with a review of the e-commerce literature on UA. We then present our research model, and summarize our methods, analysis, and findings. We close with a discussion of our results and practical implications.

THEORETICAL BACKGROUND

Uncertainty avoidance is defined as "the extent to which the members of a culture feel threatened by uncertain or unknown situations." The high UA culture "seeks clarity, structure and purity," whereas the low UA culture "is comfortable with ambiguity, chaos, novelty, and convenience" (Hofstede 2001, p.161). Uncertainty avoidance is frequently but incorrectly conflated with risk avoidance. Uncertainty is a general feeling *not* associated with a particular object or event, nor assigned a likelihood of occurring, whereas risk *is* associated with a specific event and its probability. While people in high UA cultures will take *known or familiar* risks, those in low UA cultures are more willing to take *unknown* risks (Hofstede, 2001).

Uncertainty Avoidance and Online B2C Purchasing Behavior

Most prior e-commerce studies on UA fall into one of four categories. First, adoption studies have viewed online shopping as involving inherent risks, with high UA impacting risk perceptions. Second, web design studies have investigated how cultural dimensions such as UA affect the need for adaptation and localization. A third group of studies has explored the impact of UA on website perceptions, but often without placing this work within a larger theoretical framework. Finally, trust studies have investigated the relationship between UA and trust formation. Many of these prior studies have examined only a small number of countries (often three or less). Given the confounding effects of other cultural dimensions, it can be difficult to attribute differences to a particular measure of culture. Most studies have also utilized surveys and experiments with student subjects. This leaves a gap in our understanding of the impact of UA in actual purchasing situations with real online consumers engaged in real decision making, and prevents a cumulative research tradition from emerging.

Our study extends extant research in several ways. First, we use a well-known model of IS success, tailored to the online context, as our foundation. We view online purchasing as a decision making process fraught with uncertainty about the *product*, *vendor*, and *website* to hypothesize effects of UA on relationships in this model. Second, using a large sample of respondents from 38 different countries, we employ multi-level modeling to isolate the impact of UA from that of other cultural dimensions. Third, our respondents are online consumers engaged *real time in an actual purchasing decision*, thus providing valuable insights as to UA's effect on salient perceptions and behaviors of actual online consumers. Our ultimate objective is to understand the *cross-level* effects of national culture on individual behavior.

RESEARCH MODEL

We begin with an established model of IS success (see Rai et al., 2002). This model posits information quality (IQ) and system quality (SQ) as important determinants of perceived usefulness (PU) and user satisfaction. PU in turn influences satisfaction, and both influence system dependence. We use e-loyalty, defined as "the online consumer's preference towards using and loyalty to the site," as our measure of system dependence (Luna, Peracchio, and deJuan, 2002). We extend the Rai et al. model by adding the construct of "trust." A website is not just a technology, but an interface with an e-vendor. Consumer trust in the e-vendor has been consistently shown to predict e-loyalty as well as a website's PU. A site that does not respect the consumer's privacy (one aspect of trust) will be considered less useful, since "detrimental consequences" may result. A consumer who lacks trust in the e-vendor may also consider its site to be a less convenient and effective way of accomplishing tasks, e.g., searching for information or placing an order (Gefen, Karahanna, and Straub, 2003).

We also add the construct of experience with the site. While technology acceptance studies have included experience as a control or moderator, the marketing literature indicates that experience plays an important role in consumers' decision-making processes. Thus, experience with a particular website may predict loyalty to that site. Website experience leads to a level of familiarity, knowledge, and expertise with its features that results in individuals wanting to continue using it in the future so as to avoid the cognitive costs of switching to something else (Murray and Häubl, 2007). Given these relationships have all been justified in prior research, we focus our hypothesizing solely on the moderating effects of UA on the relationships in the model (Figure 1). We further posit *only* those moderating effects which we believe can be theoretically justified. Finally, we explicitly control for the effects of Hofstede's other cultural dimensions.

Information Quality and Uncertainty Avoidance

Perceptions of IQ are critical in e-commerce since consumers cannot physically examine items before purchase. Given the uncertainty that exists regarding a product's quality and features, site content becomes the primary source for consumers to

judge both product and vendor attributes (Pavlou and Fygenson, 2006). When consumers perceive IQ to be high, PU as well as satisfaction with the site will increase. UA has been shown to influence the types of, and relative importance attributed to, information used in making online purchasing decisions (Reimann, Lunemann, and Chase, 2008). Individuals from high UA cultures desire more, and richer, information, and can be expected to collect more information and do more site exploration (Kralisch, Eisend, and Berendt, 2005). Since individuals in high UA cultures seek clarity and predictability and eschew ambiguity, they will place higher importance on site IQ to help them assess the product and compare options. Thus we posit:

H1: UA will moderate the IQ-PU relationship such that it will be stronger for individuals from countries high in UA.
H2: UA will moderate the IQ-Satisfaction relationship such that it will be stronger for individuals from countries high in UA.

System Quality and Uncertainty Avoidance

A website's design elements aid consumers in their decision-making process. Features of SQ such as ease of use and navigability allow for smoother, problem-free website interaction that in turn leads to higher levels of PU and satisfaction (Flavian, Guinaliu, and Gurrea, 2006; Gefen and Straub, 2000). While SQ is generally considered important to *all* consumers, individuals from high UA cultures especially prefer simplicity, responsiveness, clear and controlled navigation structures, and redundant cues in the sites they visit (Tsikritsis, 2002). These features make the site clearly interpretable and predictable (reducing uncertainty related to finding / accessing information, and executing transactions).

Empirical support for the moderating effect of UA on the SQ-satisfaction relationship is mixed. In the B2B context, Reimann et al. (2008) found that UA moderates the relationship between website quality assessments and satisfaction. Cyr (2008) investigated the impact of information design (ID) and navigation design (ND), two constructs similar to SQ, on satisfaction. While not hypothesized, her pattern of results indicated a stronger ND-satisfaction relationship for users from higher UA countries. Despite the lack of clear empirical evidence, theoretical arguments suggest that a site that is easy to navigate and logically structured will make interaction with that site clear and predictable rather than unstructured and ambiguous. Since predictability and structure reduce site uncertainty, it follows that SQ should be a more important determinant of PU and site satisfaction for consumers from high UA cultures than for consumers from low UA cultures. Thus we posit:

H3: UA will moderate the SQ-PU relationship such that it will be stronger for individuals from countries high in UA.
H4: UA will moderate the SQ-Satisfaction relationship such that it will be stronger for individuals from countries high in UA.
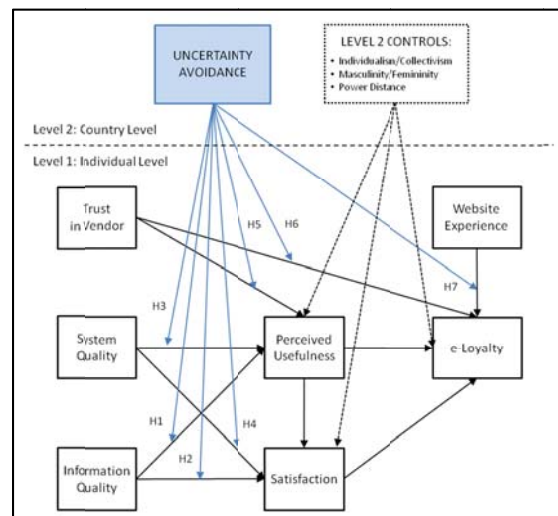

Figure 1. Research Model

Trust and Uncertainty Avoidance

Trust can be conceptualized as a set of beliefs regarding the e-vendor's integrity, benevolence, ability, and predictability (Gefen et al., 2003). It is a significant predictor of both website PU and intentions to return to the site and make purchases in the future (e.g., Flavian et al., 2006; Kim, 2008). Trust reduces uncertainty, in that the consumer needn't worry whether information exchanged with the e-vendor will be kept secure and private, the product will be as described, and the vendor will deliver it as promised without acting opportunistically or exploiting the transaction (Gefen et al., 2003).

UA has been shown to positively moderate the relationship between overall perceptions of risk and the situational use of a

particular vendor offering (Broderick, 2007), and to influence the process of trust formation when assessing known risks (Lundgren and Walczuch, 2003). Since high UA individuals are more averse to unfamiliar risks, we would expect them to view uncertainty reduction through trust in the e-vendor to be more important in determining PU and e-loyalty. Yet the empirical evidence is mixed. While Yoon (2009) found that higher UA at the *individual* level negatively moderates the trust-usage intentions link, Cyr's (2008) results at the *country* level were less clear. Based on our theoretical argument, we posit:

H5: UA will moderate the Trust-PU relationship such that it will be stronger for individuals from countries high in UA.
H6: UA will moderate the Trust-e-Loyalty relationship such that it will be stronger for individuals from countries high in UA.

Website Experience and Uncertainty Avoidance

Familiarity with a product that comes from lengthy experience using it has been shown to lead to greater loyalty for individuals from high UA cultures (Palumbo and Herbig, 2000). Uncertainty reduction can also occur based on the consumer's experience with an e-vendor and its website. Prior satisfactory experience will act as an uncertainty reduction mechanism in the purchasing decision process, as it enhances familiarity with the vendor, products, and website, thereby reducing unknown risk. Since this is more important for individuals from high UA countries, we posit:

H7: UA will moderate the Experience-e-Loyalty relationship such that it will be stronger for individuals from countries high in UA.

METHODOLOGY

Our data were collected via a web-based survey administered to a random sample of visitors to the websites of the InterContinental Hotels Group (IHG), as part of a study conducted by IHG. All respondents visited the same company websites, that is, IHG (in line with many global B2C vendors today) does not have sites designed specifically for each country or region. The IHG survey was administered in English and in an identical manner to all respondents. This helps to ensure equivalence in survey administration, as well as to reduce item and method biases that can confound the analysis of cross-cultural differences (e.g., van de Vijver and Leung, 1997).

Our sample included 3575 respondents from 38 countries. Due to the large number of respondents from the United States, United Kingdom, and Canada, we randomly selected 70 respondents each from these three countries to include in the analysis. Robustness analysis using 100 random samples achieved consistent results. The remaining countries had anywhere from 1 to 67 respondents each, producing a final sample size of 577 respondents from 38 countries with an average of 15 respondents per country. The Hofstede UA scores for the 38 countries ranged from a low of 8 to a high of 112. The full listing of countries, sample sizes, and Hofstede scores for each cultural dimension, is available upon request.

Since the respondents were real visitors to IHG's website, the company deemed it critical to use a short questionnaire that would not alienate its customers. As such, overall satisfaction was measured using only one item (see Wanous, Reichers, and Hudy, 1997 for support). IQ was assessed via items tapping the relevance, breadth, and depth of information on the site, while SQ was measured via items tapping ease of navigation, speed of the site, and site layout (Rai et al. 2002). PU was measured via items tapping comparative convenience and effectiveness, since other PU items found in technology acceptance research (e.g., performance improvement and increased productivity), are not relevant to our context. Trust was assessed through perceptions of trust and privacy, while e-loyalty was assessed via items indicating preference and loyalty to the site. Experience with the site was assessed by asking respondents the frequency of their past visits to the site. Uncertainty avoidance was measured using Hofstede's (1980) scores. We also included Hofstede's scores for individualism/collectivism, power distance, and masculinity/femininity, in order to assess and isolate their effects from the effects of UA.

DATA ANALYSIS AND RESULTS

We used SmartPLS to assess the psychometric properties of the scales. All reliability coefficients were above the recommended level of 0.70. All item loadings were significant at 0.01 or better, and AVEs were greater than the recommended 0.50, demonstrating convergent validity. Discriminant validity was demonstrated by examining the cross-loadings of measurement items on the latent variables, and by comparing the AVE for each construct with the squared correlation of that construct with all other constructs. Tests for multicollinearity and method bias indicated no concerns. We used Hierarchical Linear Modeling (HLM) to evaluate the multi-level structural model and to test our hypotheses. Our sample involves individuals who are nested within countries. As such, multi-level modeling is an appropriate technique to model the variation of individual-level effects nested within countries. We represent the country level effects through Hofstede's four cultural dimensions. Thus, we are testing individual level effects, controlling for the direct effects of the four cultural dimensions, and positing cross level interactions by UA. Before estimating the models, the data were grand-mean centered and adjusted for skewness using the Box-Cox power transformation. We estimated the single-level and multi-level

models using ordinary least squares and maximum likelihood after testing for normality of residuals and equal variances.

Results (summarized here due to space limitations) indicate that all *individual-level* relationships but one (the effect of PU on satisfaction) were significant as expected. In terms of the hypothesized *cross-level* effects, UA moderates the effect of trust on e-loyalty and the effect of IQ on PU, providing support for H1 and H6. UA also moderates the effect of experience on e-loyalty, but in the opposite direction as hypothesized in H7 (Figure 2). The hypothesized moderating effects of UA on the relationships of IQ and SQ on satisfaction, SQ on PU, and trust on PU were not significant, indicating no support for H2, H3, H4, and H5. For our country-level control variables, only masculinity/femininity had a significant direct effect on e-loyalty.
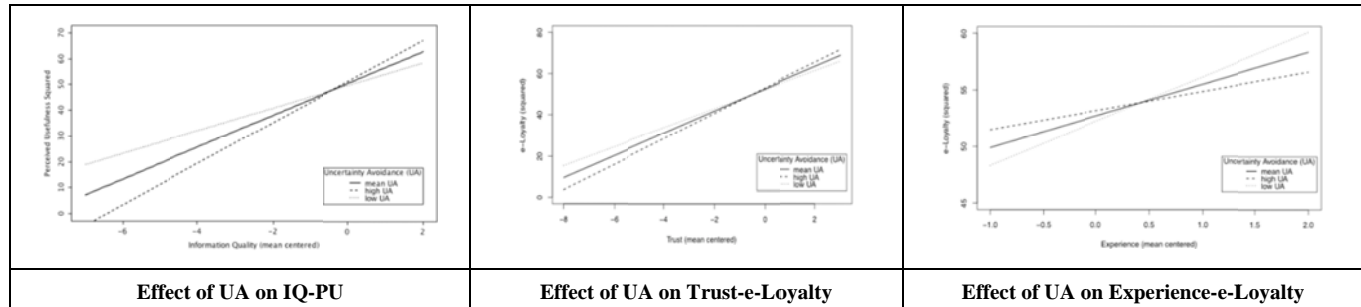

| Effect of UA on IQ-PU | Effect of UA on Trust-e-Loyalty | Effect of UA on Experience-e-Loyalty |

Figure 2. Interaction Plots for Significant UA Moderating Effects

LIMITATIONS

Survey length restrictions required us to use fewer items than desired for some constructs. Nonetheless, we believe that these items captured the essence of the constructs and that the sample realism was a worthwhile tradeoff. As a cross-sectional study, causal inferences are based on the underlying theory. The survey was administered to actual website visitors and was voluntary, so we could not test for non-response bias. The role of trust may have been reduced for such a well-known vendor.

DISCUSSION

Our findings suggest that UA plays a significant moderating role in the IQ-PU relationship (H1), with the effect being stronger for individuals from high UA countries. This is perhaps not surprising since information plays a key role in uncertainty reduction, and purchasing decisions require information to assess product or service attributes and "fit." The lack of a moderating effect of UA on the IQ-satisfaction relationship (H2) is a bit more surprising. Given that satisfaction is an affective post-consumption response (Oliver, 1980), uncertainty reduction through better information *may* work primarily through cognitive mechanisms. As such, one would expect UA to moderate the effect of antecedent uncertainty reduction mechanisms on cognitive evaluations of site efficacy rather than on affective reactions. The moderating influence of UA on the IQ-PU relationship supports this interpretation. Thus, a promising avenue for future research is to explore the influence of UA in the relationships of other uncertainty reduction mechanisms on cognitive factors involved in website evaluations.

Contrary to expectations, the SQ-PU (H3) and SQ-satisfaction (H4) relationships were not influenced by UA. One possible explanation is that the IHG sites were all well-designed, well-structured and easy to navigate. This eliminated the primary sources of ambiguity such that uncertainty and lack of structure may not have been salient, rendering UA less relevant.

The effects of UA on the relationships involving trust were mixed. While the effect of trust on e-loyalty was significantly stronger for individuals from high UA countries (H6), its effect on PU did not vary as a function of UA (H5). Risk perceptions may help explain the relationship with e-loyalty, since high UA individuals are willing to pursue known risks. Trust in the e-vendor helps to shift the inherently risky activity of online purchasing into the category of a known risk. H1 and H5 results imply that the uncertainty reduction mechanism for assessing a website's *usefulness* is the depth and breadth of information available on the site, whereas the uncertainty reduction mechanism for determining whether or not to be *loyal* to the site is the level of trust in the e-vendor. This has interesting implications for future research. Given that online shopping involves an interaction with *both* the website and the e-vendor, different uncertainty reduction mechanisms may be necessary: some focused on product uncertainty (IQ) and others focused on vendor uncertainty (trust).

The finding regarding UA's impact on the experience-e-loyalty relationship (H7) was most unexpected, as the relationship was actually stronger for *low UA* individuals. A possible explanation could be the difference between experience in terms of *site visit* frequency and frequency of *actual transactions* (i.e. room bookings). The former represents experience with the website itself, while the latter represents experience with the vendor and product. Prior findings (e.g., Reimann et al., 2008) have related the influence of UA to *vendor* loyalty, derived from satisfactory repeat product/service use. Thus, the influence

of UA on this relationship may still be important but experience may need a more nuanced conceptualization. Future research should seek to clarify different types of experience (website, vendor and product use) and how UA influences each.

PRACTICAL IMPLICATIONS

The quality of information presented through a website is shown to be critical to perceptions of usefulness, satisfaction, and ultimately consumer loyalty to the site. Results indicate that IQ becomes even more important for high UA cultures. As such, e-vendors expanding their operations worldwide must ensure high quality information on their sites, and determine the *type* of information needed to reduce consumer uncertainty to a level that encourages online purchasing. In our context, this may imply defining terms, providing maps and directions, information about proximity to sites of interest, and current pictures of the hotel and various types of accommodations. The absence of a moderating influence of UA on SQ suggests that effective layout and logical navigation may render cultural differences at least with respect to UA irrelevant. This suggests that efforts to tailor websites to culture should focus less on navigation structures and logical organization, and more on content.

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