

A COMPARISON OF GERMAN AND US STUDENT ATTITUDES TOWARD E-COMMERCE

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ABSTRACT

An online survey was administered to 81 German and 122 US college students to determine their current usage, attitudes toward, and concerns about e-commerce. Differences and similarities between US and German students' beliefs and attitudes are discussed and compared with results of prior research. Results show demographic differences in areas where prior research has disagreed, and may indicate that German students are more sophisticated e-consumers than US students.

Keywords: E-Commerce, international e-commerce, e-commerce usage, attitudes toward e-commerce, concerns about e-commerce

INTRODUCTION

As we begin the 21st century, e-commerce is playing an increasingly important role in business. 87% of CFO's of Fortune 1000 companies believe that e-commerce will have an impact on their organizations within the next five years (24), executives in some industries believe that developing an effective e-commerce strategy is the most critical issue that they face in the near term (25), and B2B e-commerce sales are expected to grow by more than 600% within the next 4 years, while B2C sales quadruple during the same time frame (19). Yet the tripling of B2C on-line Christmas sales experienced from 1997 to 1998 and the 230% increase from 1998 to 1999 (15) were followed by relatively flat sales for the Christmas 2000 buying season (17).

A survey of Internet 500 companies indicated that investing in e-commerce was expected to provide three primary benefits (2). These benefits included reaching new customers and markets, improving consumer service and increasing sales to existing customers. The unexpectedly flat Christmas 2000 sales point out a failure to achieve numbers one and three. The situation also points to the need for studies of consumer attitudes and beliefs toward e-commerce and a number of studies of this sort have been published recently (1, 2,3,4,9, 10,12, 14, 16, 17, 21, 22, 23, 26). These attitudes and beliefs are developed early, change slowly, and a recent study has shown an impact of these attitudes and beliefs on consumers' intention to buy online and online shopping behavior (14).

Since college students are long-term future consumers and are more likely than older adults to be computer literate, they may be an especially appropriate sample to study for attitudes and beliefs that will serve as indicators of the future of B2C e-commerce. In addition, the existing but declining difference in Internet penetration between the US and European countries begs investigation. This study undertakes a portion of that investigation by investigating German and US students' beliefs and attitudes toward a number of aspects of online purchases.

THE STUDY

This study evolved from a joint project between business students from a mid-western US university and a southern German university. Students were assigned a joint project to investigate differences in attitudes between German and US students toward e-commerce. The authors of the study supervised the preparation of a survey instrument that was administered online to business students from both universities.

Survey

The survey was developed with reference to existing literature on cultural, technical and consumer differences between US and German citizens. Areas investigated in the thirty-nine item questionnaire included attitudes and beliefs about online shopping, fulfillment and security, as well as items about purchase decisions. The survey was developed in English, as all students at the German university were required to be fluent in English.

Online administration of the survey was selected for several reasons. The online approach is consistent with the content being investigated, while some consumers view online surveys as more interesting, important, and enjoyable than traditional surveys, potentially leading to more accurate results with higher response rates (6, 8, 23). A snowflake sampling strategy where students recruit other students to take the survey was pursued in order to attempt a rough matching of the samples.

Subjects

Subjects were 122 US and 81 German undergraduate business students. The US and German samples were not significantly different in terms of age, gender, hours per week spent on the Internet and self-assessed expertise with the Internet. Table 1 gives descriptive data for the samples.

Table 1. Descriptive Data for Samples.

	German		US	
	Mean	Std. Dev.	Mean	Std. Dev.
Age	23.04	2.26	23.20	5.59
Hours per week on internet	8.05	5.41	7.75	5.9
Expertise with Internet 2 = intermediate 3 = advanced	2.43	.57	2.30	.56
	Male	Female	Male	Female
Gender	63%	37%	62%	38%

Analysis Strategy

The limited amount of research published on most items means that the researchers had few prior expectations about the results. The study should be regarded, therefore, as exploratory and the

analysis strategy is consistent with an exploratory study. For most items a simple comparison of means in a one-way ANOVA was used to evaluate the similarity between samples.

RESULTS

The survey asked two questions dealing with perceived access to the Internet. Though German students believed their access to the Internet was *average* (2.44/4), US students rated their access as being significantly better (*good*, 3.03/4, $F=22.50$, $p<.001$). This is consistent with findings that slow speed of the Internet is a major problem outside the US, but not within the US (5). US students were also more likely to agree that the speed of their connection affects their use of the Internet (5=Strongly Agree, 4=Agree, 3=Neutral; US=4.33/5, German=3.70/5, $F=22.76$, $p<.001$). Perhaps US students are accustomed to better connections and therefore more likely to be unhappy when the connection is slower than they would wish.

In a prior, large-sample study, Bellman et al. (1) had found that demographics did not seem to influence buying habits, so these results were checked in this study. The number of times the subject had made a purchase on the Internet was subjected to a 2X2 ANOVA with gender and country of origin (US & German) as fixed factors. Both main effects and the interaction term were highly significant. A close examination of the distribution of the dependent variable revealed a number of observations more than 3 S.D. from the mean. A reanalysis was conducted, dropping all observations where the dependent variable was 3 S.D. or more from its mean value. The pattern and magnitude of results were identical to the original ANOVA and are reported in Table 2.

Table 2. 2X2 ANOVA of Gender and Country on Number of Purchases.

Gender	Country	Mean	Std. Dev.	N	Source	F-Value
Female	German	2.34	3.35	29	Gender	21.38***
	US	2.7	4.25	44		
	Total	2.56	3.89	73		
Male	German	12.34	13.76	47	Country	11.85***
	US	3.76	5.23	74		
	Total	7.09	10.34	121		
					Interaction	14.01***

*** $p<.001$

The primary source of differences in number of purchases made online is German men, who have a much higher number of purchases than any of the other three cells. This is an apparently stable result, even with outliers removed. This result is somewhat inconsistent with results presented and discussed later in the paper regarding concerns about purchasing online. It is also inconsistent with Johnson et al.'s results. Although the big difference caused by German men is surprising, Johnson et al.'s findings are not unchallenged. There are a number of studies that found buying habits significantly dependent on age, gender, education etc. in European countries (7, 11.)

Several items dealt with subjects' beliefs and opinions about online shopping. German and US responses were not significantly different on any of these items. Both groups felt that online

shopping was slightly worse than shopping in person (1=worse, 2=comparable; US=1.61/3, German=1.76/3; $F=2.47$, ns). 47% of German subjects would have a lower limit on the amount of money they spent over the Internet compared to face-to-face, while 54% of US subjects responded similarly. Finally, both groups slightly agreed that online orders would be reliably filled on time (3=neutral, 4=agree; US=3.50/5, German=3.43/5; $F=.39$, ns).

Subjects were also asked if they had ever been dissatisfied with a purchase they had made over the Internet. 71% of German and 68% of US subjects answered that they had not been dissatisfied. Of those responding that they had been dissatisfied, both groups felt that the resolution was slightly worse than with face-to-face purchases (1=worse, 2=comparable; US=1.46/3, German=1.73/3; $F=1.18$, ns). Still, 83% of US and 85% of Germans responded that they planned to purchase on the Internet in the future. This compares with national surveys of US adults where only 35% planned to purchase online (17) and Germans age 14 to 64 of whom 63% planned to purchase online (13). The significant deviation can be partially attributed to decreasing E-Commerce diffusion rates as we progress from higher to lower levels of education and from younger to older segments of the population. The latter fact is known as the 'Digital Divide' (11).

Security was a major concern for survey respondents. 48% of German and 43% of US survey participants responded that concern for security was a reason that they did not buy online. Yet respondents were relatively unfamiliar with a number of security technologies, with most means falling between 1 (not at all familiar) and 2 (familiar) with the technology. Table 3 lists results for five items dealing with security technology.

Table 3. Familiarity with Security Technology.

Technology	German		US		F-Value
	Mean	S. D.	Mean	S. D.	
Encryption Technology (e.g. 128 bit SSL)	1.58	.59	1.60	.59	.04
Secure Electronic Transaction (SET)	1.53	.62	1.65	.56	1.99
Personal Identification Number (PIN)	2.26	.57	2.28	.51	.11
Transaction Number (TAN)	2.05	.75	1.85	.62	3.97*
Trust Center Identification (digital certificates)	1.51	.62	1.43	.56	.91

* $p<.05$; 1=not at all familiar, 2=familiar, 3=expert

Respondents were also skeptical that the technologies listed above were effective in helping to prevent misuse and fraud. Though significantly different, both groups' responses fell between 1 and 2 (1=not at all effective, 2 better than nothing; US=1.23/4, German=1.42/4; $F=4.68$, $p=.032$). They were also ambivalent about trusting sites' promises not to misuse personal information (2=distrust somewhat, 3=trust somewhat; US=2.63/4, German=2.31/4; $F=10.64$, $p<.001$). Both groups, however, expressed a desire for international laws to regulate security for e-commerce, with 90% of Germans and 88% of US students responding in the affirmative.

DISCUSSION

Overall results of the study are summarized in Table 4. Prior research has been contradictory regarding the importance of privacy to online consumers. Compare Caudill & Murphy (3) and

Phelps, Nowak & Ferrel (16), who are among many to suggest that privacy is a major issue, with Bellman, Lohse, & Johnson (1), whose large scale study suggests that privacy is not a major issue in buying versus non-buying for examples. The current study suggests that these respondents feel that privacy is an important issue, with most somewhat concerned about dissemination of their private information. On a related topic, 45% responded that security concerns had kept them from buying online. According to Scribbins (20) the respondent's skepticism seems to be justified. This study was supported by the European Commission and states that US and EU websites fall woefully short of international standards on privacy. Security and encryption, trust and risk, user authentication and lack of public key infrastructure presently rank one, two, and three among the top ten global business-to-consumer barriers (5).

Table 4. Summary of Results.

Item	Result	Significant Difference Between Samples
Access to internet	German=avg, US=good	Yes, US better access
Speed of connection limits use	Both agree	US agrees more than Germans
Age and Gender affect the number of purchases	Significant interaction effect and both main effects sig.	German males made the most purchases
Online shopping compared to face-to-face	Online slightly worse	No
Lower spending limit online	About half have a lower limit	No
Online orders filled on time	Both agree	No
Ever dissatisfied with online purchase	Most (68-71%) never dissatisfied	No
If yes to above, how did resolution compare	Slightly worse	No
Will you purchase in future	Yes, 83-85%	No
Concern for security a reason I do not buy online	43-48% cite concern for security	No
Familiarity with encryption technology	No	No
Familiarity with SET	No	No
Familiarity with PIN	Yes	No
Familiarity with TAN	German=yes, US=no	Yes, Germans more familiar
Familiarity with digital cert.	No	No
Technology effective in preventing misuse and fraud	Generally ineffective	Yes, US more skeptical
Sites will misuse personal information	Germans=distrust somewhat US=trust somewhat	Yes, Germans less trusting
Desire for International laws to regulate e-commerce security	Yes, 88-90%	No

Other studies had also been equivocal regarding the extent to which foreign consumers embrace e-commerce, with some indicating greater adoption (10) and others lesser adoption than US consumers (1). Bellman et al. (1) also found that demographics were not useful in predicting

buying behavior. The current study found an interaction between gender and native country to be useful in explaining a large difference in number of online purchases between US and German respondents.

This study also found that shopping online was viewed as slightly less favorably than shopping face-to-face, about half of respondents had lower spending limits for online shopping. Consistent with other studies, a large proportion of subjects desired international laws to regulate e-commerce and protect privacy. Responses also indicated a general unfamiliarity with available security technologies and a lack of confidence that these technologies could effectively reduce fraud and misuse.

Taken together, the findings also suggest a higher level of sophistication on the part of German e-consumers. German students were the only ones familiar with more than one of the security technologies, believed (arguably more accurately than US students) that the technologies were more likely to be effective in preventing fraud, and were less trusting of sites' promises not to misuse private information.

The differences found between the results of this study and others cited also point to the need for additional research in international differences in consumer attitudes and buying habits online, with particular attention paid to generational differences in users. Firms selling over the Internet need careful attention to market segmentation, given the aforementioned digital divide that separates different age groups and levels of educational attainment. As our global economy increasingly includes an international component for B2C e-commerce, firms will need information that allows them to compete in this new channel for sales from less-familiar, foreign consumers.

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