

ASSESSING CONSUMERS' PROPENSITY TO EMBRACE SELF-SERVICE TECHNOLOGIES: ARE THERE GENDER DIFFERENCES?

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The proliferation of self-service technologies associated with retail transactions suggests an urgent need to assess the extent to which characteristics, such as gender, influence the likelihood of using technology-based self-services. Findings of this study show that males have a stronger desire to experiment with new technologies, while females exhibit less confidence in making new technology work and a greater need for assurance that new technology will operate reliably and accurately.

INTRODUCTION

The importance of self-service technology in the retail environment has increased significantly over the last decade (Dabholkar and Bagozzi 2002). Many retailers today are using products and services that are characterized by technology-facilitated transactions. Highly sophisticated self-service technology allows companies to interact with consumers while providing fast and effective customer service. Technology-based interactions are expected to become an increasingly important ingredient for long-term success in the delivery of services for retailers (Bitner, Brown and Meuter 2000).

Many consumers have come to expect interaction with self-service technologies. However, not all consumers desire or choose to use new self-service technology to facilitate retail transactions. The desire to use self-service technologies is often influenced by such factors as consumer attitudes toward specific technologies (Curran, Meuter and Surprenant 2003) and the level of technology anxiety exhibited by consumers (Meuter, Ostrom, Bitner and Roundtree 2003).

The purpose of this study is to assess gender differences in propensity to use self-service

technologies in the retail environment. This study utilizes the Technology Readiness Index (Parasuraman 2000) which evaluates an individual's propensity to embrace new technologies for accomplishing goals in home life (such as shopping) and at work. The Technology Readiness Index (TRI), therefore, can be used by retailers to measure the readiness of their customers to use self-service technology to complete a retail transaction.

BACKGROUND LITERATURE

The increased use of technology-based self-service within the retail environment has created a need to assess consumers' readiness and willingness to use self-service technologies required to complete many retail transactions today. One area of interest requiring additional investigation is the key determinants of consumer technology readiness. The increased use and sophistication of self-service technology associated with retail transactions suggests a need to assess the extent to which consumer characteristics, such as gender, influence the likelihood of using this technology.

Self-Service Technologies

The competitive nature of most retail environments today, coupled with the need to minimize overhead costs related to personnel and capital expenditures, has resulted in many companies introducing technology that allows consumers to purchase products and services on their own.

Self-service technology is dramatically changing how retailers offer products and services.

Common self-service technologies being used today by retailers include: 1) telephone-based technologies and interactive voice response systems, 2) direct online connections and Internet-based interfaces, 3) interactive freestanding kiosks, and 4) video or CD technologies (Bitner, Ostrom and Meuter 2002). Specific examples of self-services would include automated hotel checkout, banking via ATMs or by telephone, self-scanning checkouts at grocery or discount stores, and Internet shopping.

Some consumers have been very responsive to new technology-based self-service, while other consumers have been much less receptive. For example, some retailers who are using in-store Internet kiosks are finding out that not all consumers are interested in using the new technology (Mearian 2001). Why some consumers embrace new technology to process retail transactions and others actively resist it is a critical question that needs further investigation. Bobbitt and Dabholkar (2001) report that consumer attitudes will have a strong, direct, and positive effect on intentions to use technology-based self-service.

Mick and Fournier (1998) argue that consumers can simultaneously exhibit positive feelings (such as intelligence or efficacy) and negative feelings (such as ignorance or ineptitude) towards new technology. Similarly, Venkatesh (2000) found that "computer playfulness" and "computer anxiety" serve as anchors that users employ in forming perceptions of ease of use about new technology. Therefore, consumers can seemingly be arrayed along a hypothetical technology-belief continuum with their position on the continuum correlating with their propensity to embrace technology, or their "technology readiness" (Parasuraman 2000).

Studies have also shown that perceived performance satisfaction, usefulness, self-efficacy, inherent novelty seeking, need for interaction with a service employee, self-consciousness

and social influence may impact a consumer's attitude toward using technology (Davis, Bagozzi and Warshaw 1989, 1992; Ellen, Bearden and Sharma 1991; Venkatesh and Davis 2000; Dabholkar et al. 2002;). In addition, some consumers have shown a preference to self-service technology because of ease of use or because it helps them avoid interaction with retail employees (Dabholkar 1996; Meuter, Ostrom, Roundtree and Bitner 2000). Not surprisingly, Szymanski and Hise (2000) also found convenience to be a key factor influencing "e-satisfaction" with technology use in retailing.

Several studies have also looked at user profiles to explain receptiveness to self-service technologies. For example, Barczak, Ellen and Pilling (1997) looked at consumers' use of ATMs, automatic deposits/withdrawals, and telephone banking and identified the consumer profiles of security conscious, maximizers, instant gratifiers, and hassle avoiders. Other studies have looked at age profiles of consumers to predict the adoption rate of consumer-related technologies (Gilly and Zeithaml 1985; Zeithaml and Gilly 1987).

Gender Differences

A limited amount of research has looked at gender in the context of technology adoption and usage rate. Venkatesh, Morris and Ackerman (2000) and Venkatesh, Morris, Sykes and Ackerman (2004) used the theory of planned behavior (TPB) to conclude that the extent of technology usage among men was strongly influenced by their "attitude" toward using new technology, while women were more strongly influenced by "subjective norm and perceived behavioral control." Fram and Grady (1997), however, found no differences in Internet purchasing pattern between male and female shoppers. Overall, the marketing literature has generally overlooked gender as a factor influencing the propensity to use new self-service technology.

METHODOLOGY

Questionnaire

A consumer's "propensity to embrace self-service technology" was assessed through the use of the 36-item Technology Readiness Index (TRI) scale developed by Parasuraman (2000). A question was also included which asked respondents to indicate their gender. The TRI is a Likert type scale with responses ranging from "Strongly Agree" (5) to "Strongly Disagree" (1). The TRI measures an individual's propensity to adopt and use innovative technology by assessing how "techno-ready" individuals are. In addition, the TRI helps explain how and why different individuals adopt technology. The TRI does this by looking at both forces that attract consumers to innovative products and forces that may inhibit them from adopting new products.

The TRI identifies four dimensions of technology belief that impact an individual's level of techno-readiness. Two of the dimensions are contributors and two are inhibitors of technology adoption. The contributors are: 1) Optimism – the degree to which individuals believe that technology can benefit their lives and give them more control over their life, and 2) Innovativeness – a natural desire to experiment with new technologies, as well as to be a thought leader. The inhibitors are: 1) Discomfort – a feeling of lacking both control over technology and the confidence in making the technology work, and 2) Insecurity – a need for assurance that a technology-based product, service or process will operate reliably and accurately. The four dimensions are relatively independent of each other, therefore, an individual could harbor both contributor and inhibitor feelings towards technology.

The TRI also classifies individuals into one of five technology segments. The five categories follow a continuum, ranging from the group of individuals with the most positive and proactive outlook towards technology to the group which is very insecure about new technology. The

five technology segments are as follows: 1) *Explorers* – young, upscale males who are extremely innovative and uninhibited when it comes to technology, 2) *Pioneers* – mostly young, middle class who are optimistic, somewhat innovative, impulsive, and success oriented, 3) *Skeptics* – average age, upper-middle class that are pessimistic and not very innovative with technology, 4) *Paranoids* – typically middle aged, with lower incomes and insecure with new technology, and 5) *Laggards* – older, with lower incomes that do not believe in the value of technology, lack curiosity about it, and are even fearful of technology.

The TRI scale has demonstrated high internal reliability. Coefficient alpha scores range from .74 to .81 across the four dimensions of the scale. The TRI scale has also demonstrated high construct validity by being able to discriminate across different levels of consumer ownership of products/services for which one might a priori expect different levels of technology readiness to be very relevant.

Data Collection

Data was collected using a convenience sample of 236 juniors and seniors enrolled in Principles of Marketing at an upper mid-west university. Students were surveyed via an on-line questionnaire using the school's instructional management software (IMS) platform. All majors within the College of Business (Accounting, Finance, International Business, Management, and Marketing) were represented in the sample as Principles of Marketing is a required course for all majors. The sample was representative of students majoring in business, with 131 males (55.5 percent) and 105 (44.5 percent) females participating in the study. The only students in attendance that didn't respond to the questionnaire were those who either forgot to bring their laptop computer to class, or whose laptop computer was being repaired or re-imaged at that time.

Data Analysis

A three-step data analysis procedure was used for this study. First, sum scores for each respondent were calculated for each of the four dimensions (Optimism, Innovativeness, Insecurity and Discomfort) of the TRI scale. In addition, an overall "Technology Readiness Score" for each respondent was computed. Next, in order to assess gender differences with respect to mean sum scores of Optimism, Innovativeness, Insecurity, Discomfort, and overall Technology Readiness, *t test* analyses were conducted comparing mean scores of male versus female respondents. Finally, a series of *t tests* was conducted to assess gender differences for individual items comprising the three dimensions (Innovativeness, Insecurity and Discomfort) that were found to have significant differences in overall mean scores for male versus female respondents.

RESULTS

The results in Table 1 summarize the differences in mean sum scores for male versus female respondents with regard to the four dimensions of the TRI scale and the overall TRI score. As shown in Table 1, there were significant differences in male versus female scores in three dimensions (Innovativeness, Insecurity and Discomfort) of the TRI scale and in the overall TRI score. Males had a significantly higher "Innovativeness" and "Technology Readiness Index" scores, while females had significantly higher "Insecurity" and "Discomfort" scores. No significant difference

was found in Optimism for male versus female scores.

Since "Insecurity" and "Discomfort" reflect a negative attitude towards technology readiness, these two dimensions are reversed scored when calculating the overall Technology Readiness Index score. Specifically, the TRI score = Optimism + Innovativeness + (6 – Insecurity) + (6 – Discomfort).

Given the results in Table 1, further analysis was conducted on the three dimensions of the TRI scale (Innovativeness, Insecurity and Discomfort) found to have significant differences in mean sum scores for male versus female respondents. Table 2 examines mean scores of individual items comprising the "Innovativeness" dimension of the TRI scale. Four of the seven mean scores were found to be significantly higher for males versus females within this dimension. Males reported stronger agreements to the following statements: 1) "Other people come to me for advice on new technologies," 2) "I can usually figure out new high-tech products and services without help from others," 3) "I keep up with the latest technological developments in my areas of interest," and 4) "I enjoy the challenge of figuring out high-tech gadgets." All of these statements reflect the natural desire to experiment with new technologies.

The results in Table 2 are consistent with past research investigating gender differences in estimating ability. For example, Bennett (1996, 1997) found that IQ self-estimates of men are

TABLE 1
Gender Differences in Mean Scores Across
Dimensions of TRI Males (n = 131) Females (n = 105)

	Optimism	Innovativeness	Insecurity	Discomfort	TRI
Male	4.19 ^a	3.66 ^a	3.30 ^a	3.11 ^a	13.45 ^a
Female	4.10 ^a	3.28 ^b	3.50 ^b	3.28 ^b	12.59 ^b

Notes: 1) Mean scores with different superscripts are significantly different at $p < .05$

2) Scores range from "Strongly Agree" (5) to "Strongly Disagree" (1)

TABLE 2
Gender Differences In Mean Scores Across
Individual Items Comprising "Innovativeness"

#	Item	Male n=131	Female n=105	p<.05
3	Other people come to me for advice on new technologies.	3.52	3.20	Yes
15	It seems my friends are learning more about the newest technologies than I am.	2.30	2.25	
19	In general, I am among the first in my circle of friends to acquire new technology when it appears.	3.15	2.88	
23	I can usually figure out new high-tech products and services without help from others.	3.95	3.26	Yes
27	I keep up with the latest technological developments in my areas of interest.	3.79	3.21	Yes
31	I enjoy the challenge of figuring out high-tech gadgets.	3.77	3.12	Yes
35	I find I have fewer problems than other people in making technology work for me.	3.72	3.52	

Note: Scale ranges from "Strongly Agree" (5) to "Strongly Disagree" (1)

significantly higher than that of women. Similarly, in this study men exhibit higher levels of self-confidence in using new technology.

Table 3 summarizes mean scores of individual items comprising the "Insecurity" dimension of the TRI scale. Three of the nine mean scores were found to be significantly higher for females versus males within this dimension. Females reported stronger agreements to the following statements: 1) "I do not consider it safe giving out a credit card number over a computer," 2) "I do not consider it safe to do any kind of financial business online," and 3) "I do not feel confident doing business with a place that can only be reached online." All of these statements reflect a need for assurance that a new self-service technology will operate reliably and accurately.

Table 4 identifies mean scores of individual items comprising the "Discomfort" dimension of the TRI scale. Four of the ten mean scores were found to be significantly higher for females versus males within this dimension. Females reported stronger agreements to the following statements: 1) "Technical support lines

are not helpful because they don't explain things in terms I understand," 2) "If I buy a high-tech product or service, I prefer to have the basic model over one with a lot of extra features," 3) "There should be caution in replacing important people-tasks with technology because new technology can break down or get disconnected," and 4) "Technology always seems to fail at the worst possible time." All of these statements capture the feeling of lacking both control over technology and the confidence in making the technology work.

DISCUSSION

This study attempted to assess differences in male versus female consumers with regard to their propensity to embrace self-service technology used in a retail transaction. Since this study used a relatively homogeneous sample of respondents in terms of age (college students), an argument seemingly could be made that the differences found in this study would be even greater for an older and less homogeneous sample base. However, for this sample three key areas of differences emerge: 1) Innovativeness – males exhibited a stronger natural desire to

TABLE 3
Gender Differences in Mean Scores Across
Individual Items Comprising "Insecurity"

#	Item	Male n=131	Female n=105	p<.05
2	The human touch is very important when doing business with a company.	4.45	4.30	
7	When I call a business, I prefer to talk to a person rather than a machine.	4.72	4.66	
11	If I provide information to a machine or over the Internet, I can never be sure it really gets to the right place	2.95	3.22	
14	I do not consider it safe giving out a credit card number over a computer.	2.72	3.18	Yes
18	I do not consider it safe to do any kind of financial business online.	1.98	2.29	Yes
24	I worry that information I send over the Internet will be seen by other people.	3.06	3.22	
28	I do not feel confident doing business with a place that can only be reached online.	2.84	3.30	Yes
30	Any business transaction I do electronically should be confirmed later with something in writing.	3.67	3.87	
34	Whenever something gets automated, I need to check carefully that the machine or computer is not making mistakes.	3.28	3.50	

Note: Scale ranges from "Strongly Agree" (5) to "Strongly Disagree" (1)

TABLE 4
Gender Differences in Mean Scores Across Individual Items Comprising "Discomfort"

#	Item	Male n=131	Female n=105	p<.05
4	Technical support lines are not helpful because they don't explain things in terms I understand.	3.08	3.34	Yes
5	Sometimes, I think that technology systems are not designed for use by ordinary people.	3.02	3.00	
9	There is no such thing as a manual for a high-tech product or service that's written in plain language.	3.24	3.20	
12	When I get technical support from a provider of a high-tech product or service, I sometimes feel as if I am taken advantage of by someone who knows more than I do.	2.71	2.98	
16	If I buy a high-tech product or service, I prefer to have the basic model over one with a lot of extra features	2.16	2.51	Yes
20	It is embarrassing when I have trouble with a high-tech gadget while people are watching.	3.03	3.29	
22	There should be caution in replacing important people-tasks with technology because new technology can break down or get disconnected.	3.85	4.26	Yes
26	Many new technologies have health or safety risks that are not discovered until after people have used them.	2.85	2.85	
32	New technology makes it too easy for governments and companies to spy on people.	3.62	3.44	
36	Technology always seems to fail at the worst possible time.	3.54	3.95	Yes

Note: Scale ranges from "Strongly Agree" (5) to "Strongly Disagree" (1)

experiment with new technologies, 2) Discomfort – female respondents demonstrated less confidence in making new technology work, and 3) Insecurity – female respondents exhibited a stronger need for assurance that new technology will operate reliably and accurately.

Implications/Recommendations

The infusion of self-service technology into the retail environment is significantly changing how retailers interact with their customers. Moreover, self-service technology is likely to become increasingly more important as retailers continue to strive to minimize costs and maximize service in order to remain competitive in the marketplace. As a result, an important challenge facing retailers utilizing the latest technology that allows customers to perform services for themselves is to assess the level of technology readiness their customer base exhibits with regard to utilizing the new technology. This is critical since research has been shown that technology readiness is directly related to perceptions of electronic service quality (Zeithaml, Parasuraman and Malhotra 2002).

Of equal importance to retailers is assessing individual differences in consumers' propensity to embrace the new self-service technology. The findings of this study suggest there are gender differences with respect to readiness and willingness to use the latest self-service technology to process retail transactions. These differences need to be acknowledged and managed by retailers to reduce customer anxiety, and ultimately to increase overall customer satisfaction.

Knowing that male consumers may be more "technology ready" than female consumers to use many of the self-service technologies today can help guide promotional strategies for these technology driven self-services. For example, women could be targeted to provide additional information regarding specific self-services (e.g., on-line banking, self-scanning checkouts) to help ease their anxiety toward using these

services. A more informed female consumer could create lower levels of discomfort and insecurity resulting in increased usage of the self-service technology, and ultimately a more satisfied consumer.

Similarly, higher anxiety levels in women with regard to the adoption of new technology may be a result of either the uncertainty associated with technology or the negative consequences associated with a self-service failure. Strategies geared toward female consumers should involve either reducing uncertainty or minimizing the negative consequences of a self-service failure.

Additionally, there may be a tendency to link certain types of products/services to the degree of perceived effectiveness of self-service technologies (i.e., this type of product/service should work well in a self-service environment). This assumption may be flawed if the purchase of the product/service is gender related. A product/service may seem to fit well in a self-service environment, when in reality it fits because males are predominantly purchasing the product/service. It would seem prudent to employ gender as a covariate in any investigation that looked at products/services and their fit in a technology-based self-service environment.

The findings of this study also suggest that female consumers may prefer interacting with organizations more on an interpersonal basis than do male consumers. Male consumers are more confident in using self-service technologies, while female consumers seemingly may feel more secure in dealing directly with a retail employee. This supports the argument that retailers still allow consumers to choose the method they prefer to conduct retail transactions in the marketplace. Forcing all consumers (regardless of gender, age, attitudes, etc.) to use technology-based self-services is not a good strategy for maximizing overall customer service and satisfaction.

Limitations

Certain limitations of this study must be acknowledged. First, the sample was a convenience sample of junior and senior college students majoring in business. A student sample may somewhat restrict generalizability of results to the general consuming public. However, one could make the argument that students are also consumers who interact with self-service technologies in the retail environment on a regular basis. To the extent that business students have similar buying patterns and characteristics to that of the general consuming population, the findings of this study can be extended to the general public.

Second, non-response bias could exist if students in attendance during days the data was collected were significantly different in some way from those students who were absent on those days. In addition, if those students whose computers were unavailable on days the data was collected were in some way different from students whose computers were available and functioning, non-response bias could also be present. However, given the relatively high attendance and "up and running" rates, no formal attempt was made to assess the non-response bias issue.

Direction of Future Research

Future research should examine gender differences in the propensity to embrace technology-based self-service products across time. Longitudinal studies could also assess shifts in Optimism, Innovativeness, Discomfort, and Insecurity in both male and female consumers over time and investigate the reasons for the changes.

There is also a need for comparative studies of gender differences with respect to willingness to embrace self-service technologies across subcultures. Are there different subcultures in the United States (e.g., racial minorities, over sixty-five) where males tend to be more or less willing to use technology-based self-service

technologies? The differences found in the readiness and willingness to use self-service technologies for male versus female consumers across specific subcultures would have important marketing implications for retailers.

Finally, future insight is needed as to why there are apparent differences between males and females with regard to embracing new technology. What are the inherent causes behind these differences? What are the implications for retailers who are heavily reliant upon self-service technology? Answers to all of these questions will benefit many retailers today who are striving to remain competitive in a technology-based environment.

CONCLUSION

This study examined gender differences with respect to propensity to embrace self-service technologies within the retail environment. The findings suggest that male and female consumers do exhibit different perceptions and attitudes towards the usage of self-service technologies. Male consumers expressed a stronger desire to experiment with new technologies, while female consumers exhibited less confidence in making new technology work and a greater need for assurance that new technology will operate reliably and accurately. These differences should be considered as new self-service technologies are designed to interact with consumers. The implications are clear. In order to remain competitive in a highly innovative, technology-based marketplace, retailers must be able to assess and respond to gender differences with respect to willingness to embrace self-service technologies used in retail transactions.

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