THE IMPLICATION OF CONSUMER KNOWLEDGE OF TECHNOLOGY, DEMOGRAPHICS AND OTHER TECHNOLOGICAL FACTORS AFFECTING CONSUMER BEHAVIOR: EMPIRICAL EVIDENCE FROM U.S. AND INDIAN CONSUMERS

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ABSTRACT

A variety of studies have examined consumer adoption of technology, as well as consumer knowledge of technology. One of the goals of this study is to identify the demographic characteristics of U.S. and Indian consumers which have an effect on their technological knowledge and behavior. The youngest consumers, as revealed from this study, have more knowledge of technology. American male consumers demonstrate more knowledge of technology than Indian male consumers. However, the study discovers that the younger and less educated Indian consumers have a higher knowledge of technology. Our results show that the underlying technology and benefits of a product are directly correlated to consumer technological knowledge in both countries. Our findings suggest that consumers tend to lean more towards the benefits of technology rather than a physical appearance of the product.

INTRODUCTION

Humans have had a fascination and complex relationship with technology since the dawn of their existence. Fleck and Howells (2010) stated that technology requires both human/social elements and an artefactual element for its effective operation. In a narrower sense, and the focal definition in this research, technology is (1) the branch of knowledge that deals with applied science, engineering, etc., and (2) the practical application of knowledge [Merriam-Webster's Dictionary 2011]. The term ''technology'' can encompass both material and nonmaterial things. In this research, technology refers to artificial things, and more particularly modern machines: artificial things that (a) require engineering knowledge for their design and production, and (b) perform large amounts of operations by themselves [Mick and Fournier, 1998]. This study is located within the area of consumer behavior and these concepts are investigated through qualitative methods deriving from sociology and psychology.

Consumers and technology

From the consumer point of view, technology allows access to information to make a more educated decision, provides openness and exposure to new ideas, facilitates interaction with significant others [Edwards 2010], improves awareness of products and services, and allows them to become more selective, sophisticated value seekers [Murphy 2010]. At the same time, the transformation of consumer life into a fully overwhelmed technoculture of tools, machinery, and networks is quickening [Joerges 1988; Postman 1992]. As a result, new technology and service functions are

continuously introducing new capabilities and improving performance on some dimensions [Balasubramanian et al. 2002; Dekleva 2004]. Additionally, tablets and/or mobile phones are typically always with their American users now. The electronic devices are rarely separated from their owners, and are in use, or ready for use, at all times. A new term has even become more popular by consumers – "multiscreen users." More and more, consumers develop deep relationships with their favorite devices [Lyytinen and Yoo 2002] and deal with technology by engaging in extended decision making [Mick and Fournier 1998].

In term of consumer culture in India, countries in developing Asia currently face a unique set of macro-level critical issues, such as coping with globalization effectively (Bruton, 2004). In the Indian market, this challenge is especially acute, and consumerism is on the rise (Bijapurkar, 2004; Guna, 2007). With rising consumerism in India, one of the most important tensions is between the increasing desire to consume technology products newly available in the marketplace and the economic ability to do so (Alden et al. 2006). As Applbaum (1998) has noted, consumers manage this tension in the Indian market differently than they do in the American market because of a heightened contrast between the desire to consumer and the inability to consume because of local social norms and incompatibility with local culture.

We are interested in understanding Indian consumer behavior in terms of technological products where the market is in transition from a more traditional and agrarian economy to a more modern and technology-focused market. The new phase with a more modern and technology-focused market brought contemporary consumption culture in India which began after the liberalization in 1991. Varman and Belk (2008) found that more choices, in particular via television, significantly affected rising material aspirations in India. In India, white goods, such as refrigerators, are perceived to provide convenience, a better life, and also status in the community. This is especially true among the middle class of aspirational consumers (Chaudhuri and Majumdar, 2006) where computers are very closely tied to the revolutionary consumer behavior in modern India. Technological acceptance and adoption are clearly linked with modernization in the Indian market (Venkatesh, 1995). In response to this, our research focuses on the acceptance of technological products and knowledge of technology.

Consumers' knowledge of technology and demographic characteristics

In term of consumers' knowledge of technology, important considerations are how and when technology will be integrated, accepted, and adopted by consumers. Un and Price [2007] identified the gap between technology and consumer demands for technology and indicated that gap is currently vast. In their view, this gap is due to the different phase of innovation in which technology and market research traditionally play a leading role.

In the present study, we asked the question, "What are the demographic characteristics of consumers that have an impact on their technology knowledge?" A primary reason for the correlation between consumer demographics and their technology knowledge can be traced to the Technology Acceptance Model (TAM). While several models have been designed to explain adoption and knowledge of technology, the Technology Acceptance Model tends to be among the most widely noted and accepted throughout various research [Parasuraman 2000; Kulviwat et al. 2007].The Technology Acceptance Model (TAM) suggests that perceived usefulness and perceived ease of use are beliefs about a new technology that influence an individual's attitude toward and use of that technology [Davis 1989]. These various aspects of consumer behavior tend to have a direct correlation with demographic characteristics, especially consumer age.

Age holds a high degree of relevance in terms of technology adoption and technology knowledge in general. Age tends to be a primary influential demographic because older consumers have highly

different motives than do consumers in younger generations. A primary reason to use technology is to access information quickly; the largest example of this would be the internet. Older individuals do not find this to be of much personal use because they tend to be focused on emotional goals in relationships [Carstensen 1995]. Because a large benefit of technology is to access information rather than achieve an emotional outcome, it is therefore recognized as less useful to older people. This fact exists in both consumer markets, Indian and American.

A great deal of research has examined the relationship between gender and technological knowledge. The predominate reason for considering this study is due to the fact that technology has evolved quickly. Additionally, women's roles in society have changed significantly over the past century. Michie and Nelson [2006] found that, compared to men, women are less likely to adopt and use new technology. One of the goals of current education is to provide technological knowledge to consumers which relates to an individual's ability to use new technologyThose who do not experience an ease of use will tend to feel anxious towards technology and therefore choose not to engage with it, inhibiting their ability to acquire greater knowledge.

RESEARCH MODELS AND HYPOTHESES

Based on previous research, our first research model was developed to provide a framework to examine of consumers technology knowledge and their demographic characteristics such as age, gender, and years of education

Another goal of this study is to identify the correlation between consumer technological knowledge and their behavioral relationship to technological novelty and benefits of a product in American and Indian markets. Based on previous research, our second research model was developed which provides a framework to examine five hypotheses. A number of construct measures that have been used previously and reported in major marketing journals were selected. These measures were all multiple-item scales and spanned a wide variety of constructs and marketing studies. The first three hypotheses are based on the assumption that consumers who have a higher knowledge of technology will recognize novelty and become the first consumers of a new technological product. Consequently, the technological experience and knowledge should be a strong motivation to spend additional time waiting for a new technological version of a product. Consumers develop their own ways with a new technological product which can impact their acceptance of technology. For example, if consumers are asked to evaluate technological novelty, most of them will not have a clear picture what they should evaluate because they are unable to tell what the potential benefits and risks of the product novelty are [Van De Hende et al. 2007]. Consumers simply cannot imagine what the innovation is all about and potentially great technological novelties are not recognized by consumers [Hoeffler 2003]. Based on the discussion above, Hypotheses 1 through 5 were developed.

> Hypothesis 1: Consumers with higher knowledge of technology are more likely to recognize novelty as an important purchase factor.
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> Hypothesis 2: Consumers with higher knowledge of technology are more likely to be among the first consumers of a new technological product.
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> Hypothesis 3: Consumers with higher knowledge of technology are ready to spend extra time waiting for a new technological version of a product.

The dynamics of changing technology requires consumers to change their behavior [Baker and Hart 2007]. Consumers may not identify technological needs. Ortt and Schoormans [1993] found the reason for that is that consumers are not able to link physical product characteristics with the benefits of technology. Therefore, two more hypotheses were developed.

Hypothesis 4: Consumers with higher knowledge of technology are more concerned about underlying technology when they purchase a technological product.
Hypothesis 5: Consumers with higher knowledge of technology recognize the benefits of technology more than the physical appearance of the product.

METHODOLOGY

This quantitative study consisted of a survey that was conducted among consumers in the U.S. and India. To test the research models, two samples were developed. The American data were collected from 156 respondents that included both American business students at a large western university, as well as other respondents of various demographic characteristics. The Indian data were collected from 100 Indian consumers in southwestern India. All independent variables were categorized. The first category of variables was demographic characteristics, such as age, gender, and the number of years of college attendance. The other two categories of variables are technological novelty and technological benefits of a product. Regarding the last two categories, three items were included to measure perception of technological novelty and two items were used to measure the preferences of consumers regarding the technological benefits of a product.

Table 1. The sample sizes of American and Indian consumers' survey

	American consumers	Indian consumers	Total
Number respondents	154	100	254
Gender:			
Male	84	89	173
Female	70	11	81
Average age	28.2	36.1	31.3
Average years of education	3.6	4.7	4.0
Technology knowledge	3.69	3.62	3.67

Respondents have answered question where they self-assessed their knowledge of technology on a scale from 5-very high to 1-very low. Table 1 shows some characteristics of the sample.

RESULTS

The following relationships were tested using Pearson correlation analysis to measure the linear relationships between variables and consumer technology knowledge [Cohen et al. 2003]. Table 2 presents the final results of correlation analysis of various factors' effects on consumer technology knowledge in both samples. A measurement model was constructed to determine the correlation between variables in the model. For each of the three variables, the correlation coefficient was calculated.

Correlation coefficients less than 0.1 indicate a small relationship, between 0.1 and 0.4 indicate a medium relationship and 0.4 and higher suggest a stronger relationship [Cohen et al. 2003]. The results suggest that only one demographic characteristic of the American consumers, such as consumer age, have a significant correlation.

Table 2. Results of correlation analysis of technology knowledge and demographic characteristics of American and Indian consumers

Demographic characteristics	*Consumer knowledge of technology, correlation coefficient, Rxy*	
	American consumers	Indian consumers

Age	- .374**	.012
Gender	-.074	-.029
Years of education	.014	-.022

** Correlation is significant at the 0.01 level

It is obvious that younger American consumers have more knowledge of technology and this is more visible in its correlation value (-.374). It is interesting that younger Indian consumers show higher knowledge of technology than older Indian consumers, but the difference is not statistically significant. The reason for this result may be the sample size for the Indian consumers. Since the average age of the Indian consumers is older than the average age of American consumers (36.1 and 28.2, respectively), our results indicate that younger American consumers have higher technology knowledge than the same age Indian consumers.

Regarding the gender, American male consumers demonstrate more knowledge of technology than Indian male consumers (-.074 and -.029, respectively).

Our results also contradict the hypothesis that more highly educated consumers have more knowledge of technology. For example, our results suggest that more educated consumers were not strongly correlated with their technology erudition (.014). However, Indian consumers who have a high knowledge of technology have less years of education than do American consumers (-.022 and .014, respectively). It again supports the finding that younger but less educated Indian consumers have more knowledge of technology.

To examine the hypotheses for the second goal of this study, Pearson linear correlation analysis between two variables was used as well. Table 3 presents the results of correlation analysis of the relationship between consumer technology knowledge and consumer perceptions of technological novelty and technological benefits of a product in both countries. A measurement model was constructed to determine the correlation between variables in the model.

Table 3. Results of Hypotheses Testing

Hypotheses	*Consumer knowledge of technology, correlation coefficient, Rxy*	
	American consumers	**Indian consumers**
Technological Novelty of a product		
Consumer with high knowledge of technology:		
H 1: Recognize novelty as an important purchase factor	.178*	.203*
H 2: Become the first consumers of a new technological product	.275**	.069
H 3: Ready to spend an extra time and wait for a new technological version of a product	.124	.129
Technological Benefits of a product		
Consumer with high knowledge of technology:		
H 4: Concern with underlying technology when they purchase a technological product	.203*	.233*
H 5: Recognize the benefits of a technology more than a physical appearance of the product	.070	.100

* Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

In both country samples, the results show a direct relationship between higher technological knowledge and how important technological novelty is to consumers (.178 and .203, respectively). Indian consumers with high technological knowledge are more likely to recognize novelty as an

important factor than American consumers. However, the same consumers in India are not likely to become the first consumers of a new technology (.069). Also, they will not stay a long line to purchase a new version of a product. As a result, this research shows a small correlation in both cases which indicates a minor willingness of consumers with higher technological knowledge to wait for a new version of a product.

Although not typical, one study found that a consumer might have a mixed attitude about adopting a piece of technology [Bruner and Kumar 2005]. An interesting finding has appeared in this current research. The test results about the relationship between consumer knowledge of technology and the technological benefits of a product show more positive effects. It was hypothesized that consumers with more knowledge of technology are more concerned about underlying technology when they purchase a technological product. For this category of consumer in India and the U.S., the underlying technology is one of the important factors for the consumer purchase decision.

The last hypothesis proposed that consumers with more knowledge of technology recognize the benefits of a technology more than the physical appearance of the product. The hypothesis was confirmed. Hoeffler [2003] also found that consumers had high levels of uncertainty when estimating the benefits of a new product.

CONCLUSION AND FUTURE IMPLICATIONS

Our research supports previous research that young American consumers have more knowledge of technology than do Indian consumers. However, young Indian consumers have higher knowledge of technology than older Indian consumers. These results support Gupta (2012) findings that young Indian consumers (16-25) demonstrate significantly higher consumer preferences to global consumer culture with respect to Indian cultural aspects. It is only because technological knowledge is a part of the global consumer culture.

When consumers were asked to what degree technological novelty of a product was important to them, the Indian and American consumer response was high. This result could be a result of several factors. In our case, Indian consumers with high technological knowledge recognize novelty as an important purchase factor and it means they value the novelty as a part of social status. In our American case, technological novelty is an important purchase factor as well, but American consumers place less value on novelty as a part of social status. The reason for second factor might be that when asked if it is preferred to be the first to acquire a new piece of technology, the highest rate of Indian respondents disagreed with that statement. This result indicates that consumers with good knowledge of technology are less likely to become the first consumers of a new version of a technological product.

Results of this study also indicate that consumers tend to lean more towards the benefits of technology rather than physical characteristics of a product. The results supported previous research that underlying technology and the benefits of a product are more important for consumers than physical appearance and characteristics of a product.

This research is the first step in exploring the implication of consumer knowledge of technology, demographic characteristics, and consumer behavior related to technological novelty and benefits of a product. In this study, consumers were asked the self-assessed question to measure the level of their technological knowledge. Also, our empirical analysis was largely based on data collected from 156 U.S respondents and 100 Indian consumers and we believe the data, as well as the implications, can be extended in future research.

References are available on request.