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A Cultural Perspective on Technology Acceptance

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ABSTRACT

This preliminary study focused on the cultural dimension of masculinity/femininity. Unlike many cultural studies that have utilized previously published country-level scores for dimensions of culture, this study surveyed individuals from thirty-four different countries to determine their score on the masculinity/femininity continuum. These results were part of a research model containing culture, gender, and intention to use computers. Three 2X2 between-subjects factorial ANOVAs were conducted. We found statistically significant main effects for the masculinity/femininity, and national origin. The results indicate that a user's masculinity/femininity score, and national origin have an impact on his or her intention to adopt a technology.

Keywords

Culture, Gender, Country of Origin, Technology Acceptance, Masculinity/femininity

INTRODUCTION

Technology development has played an important role in the globalization of the economy. The use of the World Wide Web, video-conferencing facilities, threaded e-discussions, etc. has made it possible for members of a team to work together even when they are located in different continents. Computers have helped in increasing productivity through the automation of previously manual tasks. Intelligent information systems such as Decision Support Systems and Expert Systems are increasingly being used. Hence, studies involving user acceptance of information systems (IS) in particular, have received considerable attention in the management information systems (MIS) literature.

Different theoretical models have been used for studying user acceptance of information systems. However, few studies have looked into effects of gender and culture on user acceptance of technology (Srite, 2000). There is a significant amount of literature available supporting the viewpoint that social influence and gender do play a role in shaping behaviors in various domains (Venkatesh and Morris, 2000). In fact, the relationships of gender and culture to the acceptance and use of technology could be critically important. In this paper, we shall investigate how gender and culture affect intention to use technology. The reminder of the paper is organized as follows. First, the literature relevant to our constructs is briefly surveyed. This leads into our research questions and the theoretical background of the paper. Next, we discuss our research design and methods, followed by some preliminary results. The paper concludes with discussion, implications, limitations, and future directions.

LITERATURE SURVEY

User adoption of technology is one of the better researched areas in the MIS literature. Different models for technology acceptance such as the Technology Acceptance Model (TAM) (Davis, 1989), and the Theory of Planned Behavior (TPB) (Ajzen, 1991), have helped researchers predict the intentions of a user to adopt a new IS. Both these models are based on Theory of Reasoned Action (TRA) which posits that "attitude towards an act or behavior" as well as "subjective norms" regarding the act or behavior predicts "behavioral intention" which in turn predicts "behavior" (Fishbein and Ajzen, 1975). There have been many subsequent studies where each model has been modified by adding or changing some antecedents and arriving at a new model such as TAM2 (Venkatesh and Davis, 2000) or where both the models have been combined (Taylor and Todd, 1995). Recently, Venkatesh and others proposed a unified model called the Unified Theory of Acceptance and Use of Technology (UTAUT) by integrating eight different models (Venkatesh, Morris, Davis and Davis, 2003).

As we indicated earlier the effect of culture on technology acceptance has not been studied extensively. Venkatesh and Morris (2000) extended TAM by including "subjective norms". "Subjective norms refers to a person's perception that most people who are important to him or her think he or she should or should not perform the behavior in question" (Fishbein and Ajzen, 1975, p.302). Venkatesh and Morris found that gender has a moderating effect on each of the relationships leading into behavioral intention (perceived usefulness, perceived ease of use, and subjective norms). They mentioned as one of the

limitations of their study that they treated "gender" as "biological sex." They suggested that it might be interesting to conceptualize gender as a psychological construct. Masculinity/femininity could be considered as such a construct (Venkatesh and Morris, 2000). Similarly Srite (2000) studied the influence of national culture on technology acceptance behaviors. He based his research model on TAM and added "subjective norms" to the model. Walsham and Sahay (1999) used actor-network theory for studying technology adoption. They found technology acceptance to be very different in India and based on the above study it is possible to surmise that technology acceptance could also depend on national origin. This was also confirmed in a subsequent study by Walsham (2002).

THEORETICAL BACKGROUND

Venkatesh and others have stated that gender has a moderating effect on all the relationships in their unified research model based (Venkatesh et al., 2003). Based on this we posit the following research question:

- How does gender affect a user's intention to adopt a technology?

Hofstede (2001) treats culture "as the collective programming of the mind that distinguishes the members of one group or category of people from another" (page 9). He defined the following five dimensions of culture:

- Individualism/Collectivism
- Power Distance
- Uncertainty Avoidance and
- Masculinity/Femininity
- Long-term versus short-term orientation

In this study we shall focus on the dimension masculinity/femininity. As we discussed earlier, in a recent study Venkatesh and Morris suggested conceptualizing gender as a psychological construct instead of as a biological construct (Venkatesh and Morris, 2000). Here, we propose to use masculinity/femininity as such a construct. According to Maccoby (1988) "One can be more or less feminine. One cannot be more or less female" (p. 762). Masculine cultures tend to emphasize work goals such as earnings, advancement, and assertiveness while feminine cultures tend to emphasize personal goals such as friendly atmosphere, getting along with one another, having a comfortable work environment, etc. Although, there is a correlation between gender and masculinity/femininity these two constructs have been shown to be distinct. In this paper, we shall specifically focus on the effects of a subject's masculinity/femininity score, as well as his/her country of origin, on a subject's intention to use technology. This leads to the following research question:

- How does a user's masculinity/femininity index affect his or her intention to adopt a technology?

Walsham and Sahay (1999) and Walsham (2002) showed how technology acceptance could depend on national culture. Hence, we posit the following research question:

- How does a user's country of origin (USA versus Foreign) affect his or her intention to adopt a technology?

RESEARCH DESIGN AND RESEARCH METHOD

A field study was conducted in a large university in the southeastern United States. The data were collected from international students from over thirty different countries as well as from randomly selected US students. Validated scales were used to measure behavioral intention to use, and masculinity/femininity. The demographic information about the students such as gender, national origin, number of months lived in the US were also collected (Srite, 2000). Although students, as opposed to individuals with extensive work experience, were used in this survey the constructs measured were overall behaviors and not dependent on professional or IT knowledge. Hence in this study we have fewer concerns about the problems normally associated with the use of a student sample.

In this study we are not testing a detailed research model, so a between-subjects factorial ANOVA is an appropriate analysis technique for an initial look at the data. We have three different variables (gender, masculinity/femininity, and national origin) and hence we could have used a 2X2X2 between-subjects factorial ANOVA. However, for investigating the effect of national origin in our data set we had subjects from numerous countries and we could not use the whole data set because we decided to focus on only three countries (USA, India and China). Hence instead of a 2X2X2 between-subjects factorial ANOVA we ran three separate 2X2 between-subjects factorial ANOVAs. The detailed description of the research design is given below.

We first focused on the independent variables of gender and masculinity/femininity. By gender the subjects were automatically divided into two classes. For the masculinity/femininity construct there were five items and each item was

measured with a seven point Likert scale (1-7). So by adding all the items a comprehensive masculinity/femininity score could be obtained and that score could range from 5 to 35. Based on that we divided the subjects into two groups one with a masculinity score ranging from 5 to less than 20.0 and the other with score from 20.0 to 35.0. They were assigned masculinity/femininity indices of 0 (more feminine) and 1 (more masculine) respectively.

Next, we focused on the independent variables of gender and national origin. While testing for national origin we focused on only three countries. We decided to test between subjects from USA and subjects from India and China. We assumed that subjects from China and India were exposed to somewhat similar cultures and hence in terms of technology acceptance they can form a homogenous group. We also observed that in the sample there are a few students who are natives of a foreign country but have lived in the US for a significant amount of time (greater than one month) and as a result have been exposed to and possibly assimilated into the US culture. We decided not to consider those subjects in our study. So anyone who was born abroad and had lived in the US more than one month was not included in the preliminary study.

Finally, behavioral intention to use computers was measured using two items both using seven point Likert scales. For our study we added the two scores and obtained a final score.

PRELIMINARY RESULTS

The ANOVA method is based on two assumptions normality and homogeneity of variance. Skewness and Kurtosis were calculated for the data. Although the range of kurtosis values indicated a possible violation of this assumption, it has been suggested that ANOVA is robust to the violation of normality assumption (Maxwell and Delaney, 2004). Hence, we decided that the violation of the normality assumption could be ignored. Cronbach's alpha was calculated for both the masculinity/femininity and behavioral intention constructs and in both cases it was 0.78.

Gender	Masculinity/Femininity Level		Marginal Means	F Value	MSE	P-value
	High	Low				
Male	11.74	12.90	12.32	2.25	2.65	0.1352
Female	13.10	13.00	13.05			
Marginal Means	12.37	13.00				
F Value	5.90					
MSE	2.65					
P-value	0.0162					
Table 1: Preliminary result of 2X2 ANOVA between gender and masculinity/femininity Level						

An initial analysis of the data revealed a number of interesting results. The first two-way (gender and masculinity/femininity level) ANOVA indicated no statistically significant interaction between gender (male or female) and masculinity/femininity. However, a statistically significant main effect was observed for masculinity/femininity and the detailed results have been shown in Table 1. No statistically significant main effect for gender was observed.

Gender	National origin		Marginal Means	F Value	MSE	P-value
	Foreign	US				
Male	12.33	12.85	12.59	0.12	2.55	.7284
Female	11.57	13.21	12.39			
Marginal Means	11.95	13.03				
F Value	9.29					
MSE	2.60					
P-value	.0030					
Table 2: Preliminary result of 2X2 ANOVA between gender and national origin						

The second two-way (gender and national origin) statistical ANOVA indicated no statistically significant interaction between gender (male or female) and national origin. However, a statistically significant main effect was observed for national origin

(US versus India & China) and the detailed results have been shown in Table 2. No statistically significant main effect for gender was observed.

The third two-way (masculinity/femininity and national origin) ANOVA indicated no statistically significant interaction between masculinity/femininity and national origin. A statistically significant main effect was observed for national origin. The detailed results have been shown in Table 3. Surprisingly, no statistically significant main effect for masculinity/femininity was observed.

National origin	Masculinity/femininity level		Marginal Means	F Value	MSE	P-value
	High	Low				
Foreign	12.00	12.04	12.02	6.78	2.47	.0107
US	11.71	13.23	12.47			
Marginal Means	11.85	12.63				
F Value	2.80					
MSE	2.47					
P-value	0.0977					
Table 3: Preliminary result of 2X2 ANOVA between national origin and masculinity/femininity Level						

In all the above calculations we used the Type II sum of squares. As our design is non-orthogonal (we have different cell sizes and since the differences in cell sizes do not mirror the differences in population) a Type I Sum of Squares is inappropriate. When the interaction in the population is non significant, a Type II Sum of Squares is the most appropriate measure to use (Maxwell and Delaney, 2004).

DISCUSSION

First, we can conclude from the above study that subjects who perceived themselves to be more feminine (masculinity/femininity index = 0) have a statistically significant higher score on behavioral intention to use computers as compared to subjects who perceived themselves to be more masculine (masculinity/femininity index = 1).

Second, we can conclude that subjects who are from India and China have a statistically lower score on behavioral intention to use computers as compared to subjects who are from the US.

We set out to find answers to the following three research questions:

1. How does gender affect a user's intention to adopt technology?
2. How does a user's masculinity/femininity index affect a user's intention to adopt technology?
3. How does a user's country of origin (USA versus India and China) affects a user's intention to adopt technology?

We found a statistically significant main effect for two of the above three variables (e.g. masculinity/femininity and national origin) and we did not find any main effect for gender. This supports our earlier assertion that it could be better to conceptualize gender as a psychological construct rather than as biological sex. We also did not find any interaction among the variables. There could be several reasons for this finding. In our sample, the cell sizes were very different. As an example, we had only 33 subjects in our masculine group compared to 143 subjects in our feminine group. This pattern was repeated for other designs too.

IMPLICATIONS FOR PRACTITIONERS

Globalization is breaking the barriers among different countries and cultures and cross-cultural teams are becoming more common place. Also the workplace is getting more diverse in terms of gender. This research looks into effects of culture and gender on technology adoption. Managers will be able to use the results for assigning particular responsibilities to team members.

LIMITATIONS

As in every study there are some limitations. First, we decided to differentiate subjects into only two groups on the basis of their masculinity/femininity indices. That means that we are assuming that this scale is linear. A study done taking into account the continuous nature of a subject's masculinity/femininity index could give further insights into how culture affects a user's intention to adopt technology. Second, we have considered only one dimension of culture (masculinity/femininity) out of the five dimensions.

FUTURE DIRECTIONS

The study will be expanded to include greater details relating to its theoretical justification as well as utilizing more sophisticated analysis techniques (regression and/or structural equation modeling) to better take advantage of the richness of the data set. The format limitations also preclude us from providing a full and detailed explanation of the implications of this study.

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