Cultural and Language Affects on Technology Acceptance and Attitude: Chinese Perspectives

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ABSTRACT

A theoretical model based on the theory of reasoned action (TRA) and technology acceptance model (TAM) is used to investigate culturally-specific user interface preferences that affect technology acceptance and attitude toward technology. The research also examines the effects of acculturation on the interpretation of questions in a technology instrument. Subjects were recruited from academic institutions in the Peoples' Republic of China. Structural equation modeling using PLS Graph found a strong and positive relationship between cultural-preference interface features and the TAM constructs of perceived usefulness and usage intentions. Results also found a strong and positive relationship from perceived usefulness to use intentions, perceived usefulness to attitude toward using computers, use intentions to attitude, and actual usage to attitude. These findings demonstrate that culturally-specific interface features can be identified, measured, and used to predict the likelihood of acceptance and use of information systems.

Keywords: TAM, TRA, technology acceptance model, theory of reasoned action, user interface, culture

I. INTRODUCTION

Software developers are increasingly marketing their products internationally [1, 2]. This trend is necessitating changes in how software is constructed since customers in non-English speaking countries hesitate to accept English-language only interfaces [3]. This also means that user interfaces must be correctly translated and culturally savvy – termed "culturalization" [4]. In order to culturalize one must understand the target locale, including gaining a grounded knowledge of the meanings of color, sounds, symbols, icons and other artifacts that may comprise an interface design [5, 6, 7, 8, 9]. In essence, creating software for a global market means not only translating user interfaces into other languages, but also that software developers must understand differences in culture to enhance product usability and acceptance [10, 9, 11].

The foundation of many studies involving technology acceptance incorporates the widely used and extensively validated Technology Acceptance Model (TAM) [12, 13]. This model has been used to explore technical, task, and contextual aspects of information system (IS) acceptance and usage. Building on TAM, other studies have explored the impact of cultural differences on the acceptance of technology [14, 15, 16, 3, 17, 18, 19].

The current paper builds on previous research, as well as three specific studies [20, 21, 22], to identify and test culturally-based user interface characteristics that affect technology acceptance. Our approach develops and validates a new measure of cultural preference that focuses on specific user interface characteristics. With this measure we determine how culture-driven interface preferences influence user attitudes toward technology.

Understanding the target culture where software will be sold and customizing the software, particularly the user interface and supporting documents to that culture, are expected to increase acceptance and thus improve the marketability of the software [23, 24, 22, 25, 26]. Further, it is believed that when interviewing or discussing software features and preferences with users in countries where English is not the native language, interviewers and researchers must translate materials (e.g., brochures, materials, videos, questionnaires) into the native language [9] and honor culturally-dependent expectations [5, 27]. This study tests these premises through the administration, dual (cross-culture) translation, and data analysis of a questionnaire that investigates cultural preferences in user interface design for multiple subject populations whose native language is Chinese. The remaining sections of this paper are structured as follows: we review prior research and develop a theoretical model that incorporates culturally-specific user interface preferences as predictors of technological acceptance and user attitude toward technology. Within this discussion we also discuss language and translation issues, primarily from an experimental procedure perspective, that must be considered within technology-driven studies. Next, we discuss the model and provide an overview of the data sample and measures used in the study. The model is then tested and results reported. A discussion of results, limitations of the study, implications for research and practice are provided. A summary concludes the paper.

II. THEORY DEVELOPMENT

A. Technology Acceptance and Use

The theoretical basis of this research is the theory of reasoned action (TRA) [28, 13], technology acceptance model (TAM) [29, 30], and extension to TAM (e.g., TAM2) [12, 13]. The technology acceptance model was extended to consider the impact of culture on user behavior and attitude [31, 20, 21, 22]. Figure 1 presents the original TAM from [29] while Figure 2 shows the precursor model to the current work [20]. As shown, Evers and Day [20] added culturally specific design preferences and the construct of actual system usage to TAM.

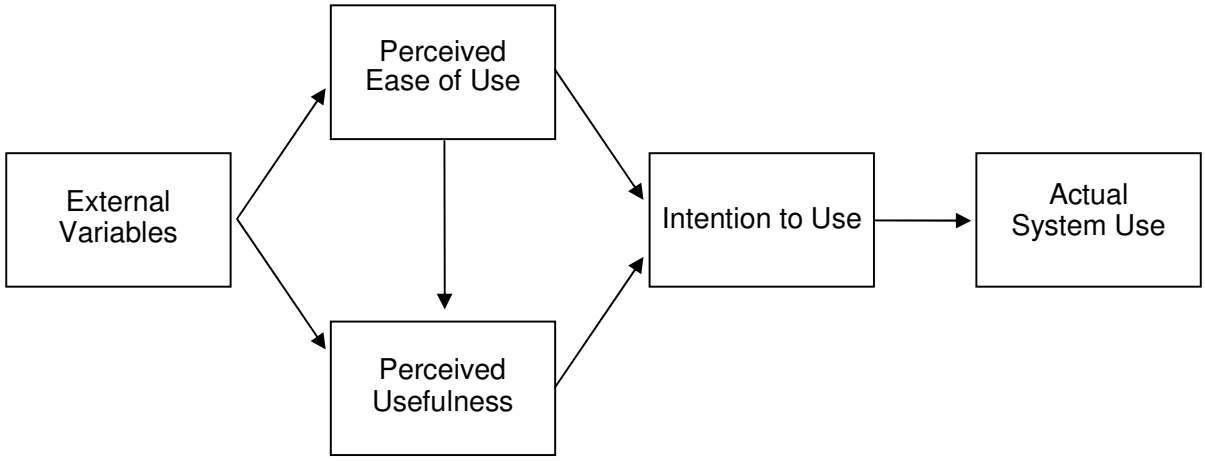

Figure 1. Original Technology Acceptance Model (adapted from Davis (1986))

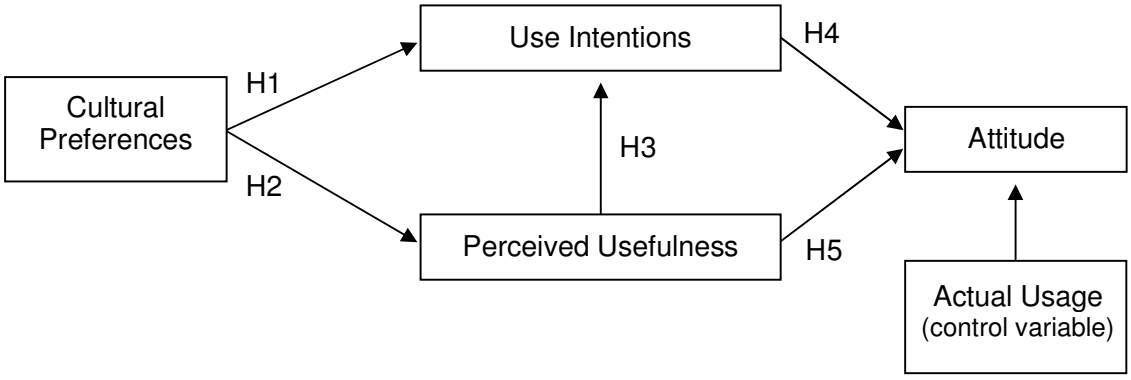

Figure 2. Proposed Theoretical Extensions to TAM

The theory of reasoned action (TRA) [28] indicates that a person's intentions toward behavior are influenced by perceptions and attitudes toward anticipated outcomes, which may be influenced by opinions and subjective norms of the social environment. Intentions lead to actions, or lack thereof, depending if the perceptions of the situation are perceived as positive or negative by the individual. Fishbein and Ajzen stated that a person's behavior is determined by intentions to perform the behavior and that these intentions are a function of attitude toward the behavior. Figure 3 illustrates the original TRA model.

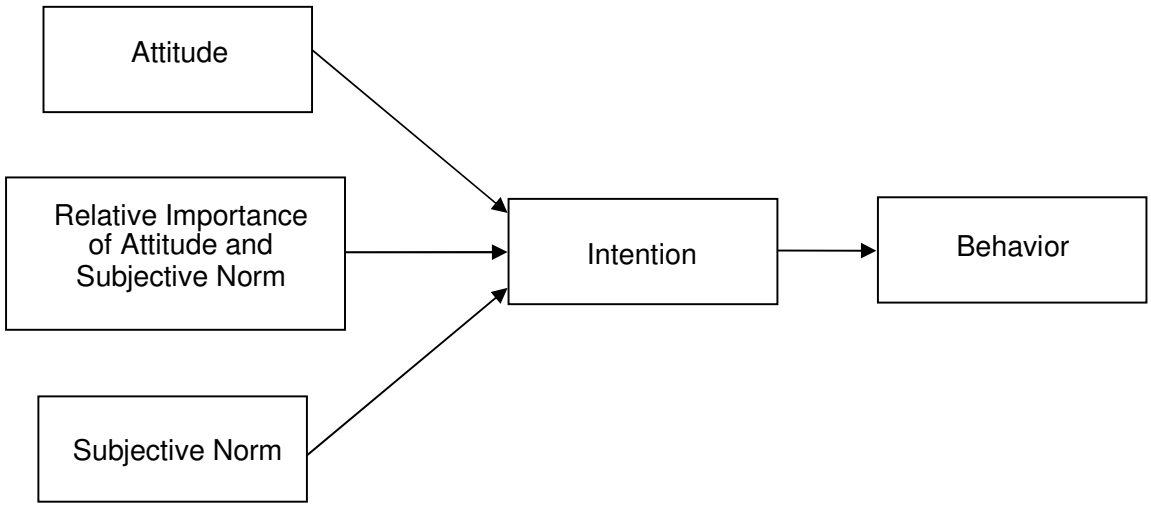

Figure 3. Theory of Reasoned Action (TRA) (adapted from Fishbein and Ajzen (1975))

Davis [29] used TRA in the context of technology usage as a basis for TAM. TAM replaces TRA's attitude measures with the two technology acceptance measures of perceived ease-of-use and perceived usefulness. Perceived usefulness is defined as the degree to which a person believes that using a particular system would enhance performance. Perceived ease-of-use is the degree to which a person believes that using a particular system would be free from effort. Venkatesh and Davis [12] and Venkatesh, Morris, Davis, and Davis [13] extended the TAM to explain perceived usefulness and intention-to-use in terms of social influence and cognitive instrumental processes. The extended model was tested in voluntary and mandatory settings.

B. Cultural Differences

The study of cultural differences originates and is credited to Hofstede [33, 34]. Hofstede [33, p. 260] defines culture as "the collective programming of the mind which distinguishes the members of one human group from another." He suggests that regional, ethnic, religious and linguistic affiliations cross national cultures are hierarchically more important than other aspects such as social class and gender. For example, a person living in Mexico and raised in the Catholic faith may find much in common with an Irish Catholic even though they differ in ethnicity, language, and country of origin.

Hofstede [34] classified country-driven culture along four dimensions: individualism/collectivism, power distance, uncertainty avoidance, and masculinity/femininity. Individualism and collectivism refers to a strongly coupled social network where patterns of behavior have strong norms that guide acceptable and unacceptable behavior and a strong sense of group identity is present. China falls into this category. Some of the collectivist nature of China is due to Communism but prior to the Communist revolution, collectivism was already present. The influence of the writings of Confucius, for example, is still apparent today. Individualism is on the other end of this spectrum. In an individualistic society, the autonomy of the individual is valued more strongly, that is, individuals are more likely to move geographically away from their family units and are free to move from one social group to another. The United States (US) is considered to be very high on the individualistic dimension. Power distance is

defined as the extent to which a society accepts unequal power distribution between people and their institutions. In countries with large power distance, decisions are highly centralized and hierarchical in nature. Small power distance-oriented countries are likely to decentralize decision-making and be more participative. China is considered a high power distance culture while the United States (US) is a low power distance culture. Uncertainty avoidance is the level of risk taking that the culture reflects. Cultures that avoid uncertainty and ambiguous situations are more likely to have rigid rules and a low tolerance for new ideas and uncommon behaviors. Cultures with a high level of risk taking are likely to have fewer rules and tolerate, or even encourage, new ideas and uncommon behaviors. China is considered to be high on uncertainty avoidance whereas the US is low on this dimension. Masculinity/Femininity. Masculine cultures are more assertive and competitive and value materialistic signals of success; feminine cultures value human relationships, quality of life, and concern for others. Both China and the US are considered strongly masculine cultures.

Researchers have studied the role that cultural differences play in the adoption process of information technology [15, 37, 38, 39, 40, 41]. National culture was found to affect information technology (IT) adoption [15] across six different technologies, including the Internet, over a ten-year period in thirty-one countries. This particular study used dimensions of Hofstede's [33] cultural determinants including individual/collective, power distance, uncertainty avoidance, masculinity/femininity, and income levels. The study found that countries with high levels of individualism, low power distance, high uncertainty avoidance, and increased culturally feminine (versus masculine) were more likely to adopt technologies after controlling for personal income and other economic conditions. More recently, culture has been studied by Triandis [35] as an individual's characteristic way of perceiving the man-made part of one's environment. Triandis reports that culture is a learned behavior comprised of attitudes, feelings, and actions and that cultural embedding influences an individual's perceptions of societal norms, roles, rules, and values. Cultural levels include such social identity aspects as language, gender, race, religion, country of origin, profession, and urban versus rural locale [36].

Another cultural study focusing on email adoption found that TAM held true for users in Switzerland and the US but did not hold for Japan [42]. This finding indicates that some cultural aspects of Japan, and possibly within other Asian countries, may not influence technology acceptance. Determining what specific cultural influences exist has implications for successful marketing and adoption of software products in the Japanese market and possibly the Asian market as a whole.

Fewer studies have explored culturally-related technology adoption in less developed countries. Rose and Straub [18] found that TAM held across five Arabic countries. Another study investigating differences between Indian and American e-commerce acceptance found that perceived relative advantage, ease-of-use, compatibility, and demonstrable results differed across the two cultures [40]. Koeszegi, Vetschera, and Kersten [43] found that within a negotiation-based environment, users from high-context cultures exchanged more messages than users from low-context cultures. Even though these findings indicate that cultural differences may be key determinants at the individual level, others have found that corporate-level culture may be influenced by variables such as cost-effectiveness and risk [44].

III. Hypotheses

Using the theoretical model shown in Figure 2, we put forth hypotheses that extend TAM to include the role of cultural preferences in the acceptance of technology (attitude) and actual usage (behavior) [45, 46, 30, 47]. Our first set of hypotheses

proposes that preferences for culturally-specific user interface features will significantly influence intention to use and perceived usefulness.

H1. Cultural preferences will relate positively to use intentions.

H2. Cultural preferences will relate positively to perceived usefulness.

As discussed earlier, from TRA [28] and TAM [30] we posit that:

H3. Perceived usefulness will relate positively to use intentions.

TAM also states that if a subject perceives that the technology is useful, the individual will have a more positive attitude towards the technology [30, 13]. We investigate this relationship through the following hypotheses:

H4. Perceived usefulness will relate positively to attitude.

H5. Use intentions will relate positively to attitude.

Prior studies have investigated the relationship between usage and attitude in competing directions. For example, Chau [48] found that a more positive attitude toward technology increased usage. Others have found that the longer a person uses an information technology the more positive his or her attitude will be regarding the technology [49]. Since actual use is generally collected as a self-report measure [50, 51], we investigate usage as a control variable on attitude. Hence,

H6. Actual usage will relate positively to attitude.

IV. Questionnaire Translation and Interpretation

This study also investigates differences in subject responses to the research instrument as a factor of culture. In the past, most studies used a single version of the research instrument and presumed that subjects understood the questions, symbols, and terminology used throughout the instrument [5]. As described by Choong and Salvendy, accuracy of text translation is often not fully verified, most issues of translation accuracy focus on dates, times, and other surface-level issues. Our approach differs by first performing multiple translations and validations to and from the subjects' native language, and second, to investigate cultural assimilation differences by administering the research questionnaire to subjects from the same culture, but located in different countries.

V. Methodology

A. Subjects

Subjects were recruited from two educational institutions in China. One setting was a technical school that is comparable to a vocational technical school in the US. These students have a limited command of the English language, therefore, only the Chinese version was administered to this group. The second pool of subjects consisted of

undergraduate seniors studying at Shandong University in Jinan, People's Republic of China. Subjects in this pool received both the English and Chinese versions of the questionnaire. The order of administration was randomly manipulated in order to control for history and fatigue effects.

A total of 198 subjects were recruited, with one hundred and four subjects receiving the Chinese version only and 94 subjects receiving both the English and Chinese versions. The sample consisted of 114 males (57.6%) and 82 females (41.4%); 57 males and 46 females took the Chinese version only; 57 males and 36 females received both the Chinese and English versions. The mean age of the subjects was 21 years. Overall, ages ranged from 18 to 36 years. All of the subjects spoke Chinese as their first language and identified themselves as Han Chinese rather than one of the several ethnic minorities.

Cultural differences within China are generally a factor of one's status. To test for possible status effects (i.e., bias), subjects were asked the question "Think about your family's status in your home culture, while you were growing up. How much do you think you had more opportunities, compared to the average person? (For example, you might have had a better education or more contact with new technologies.)". This question was measured on a 6-point Likert scale with anchors of "Not Much" to "A Lot". The mean response was 3.84, which indicated that the subjects viewed their status as slightly above average (stdv=1.48). From this analysis the researchers believe that the subject pool correctly represents college-age technology users within the Chinese population.

B. Questionnaire Development

Items for the survey instrument were adapted from prior research [30, 52, 20, 5, 53, 12] constructs and items are reported in the appendix. All items loaded above the .40 minimum as recommended by Nunnally [54].

Two Chinese nationals, with an excellent command of the English language, translated the questionnaire from English to Chinese. The instrument was back-translated into English by a Chinese-American professor. The research team analyzed and resolved differences between versions until it was determined that the two versions were virtually identical. Two other Chinese national translators reviewed and reworked subtle issues in the instrument, at which time the instrument was reviewed again by the Chinese-American professor.

The English version of the questionnaire was administered in a pilot study to fifteen Chinese students attending college in the US. The students found the survey items clear and understandable, with no discernable differences between the two versions of the instrument. With the help of these students and the Chinese-American professor, the Chinese version of the instrument was formatted to appear as similar as possible to the English version. Since Chinese characters require more space than English characters, a smaller font for the Chinese version of the instrument was utilized, otherwise, the two versions of the instrument were identical.

C. Measures

1. Cultural preferences. This variable represents culturally-specific user interface features preferred by the Chinese subjects. This variable originated from studies that have determined that individual preferences for interface features are important to interface design and system use [55, 6, 56, 57, 12, 13]. To identify the specific interface

characteristics most valued by these subjects, a sequence of interface features were listed [58, 20]. Subjects were asked to rate their preference for each feature using a reverse-coded, six-item Likert scale with anchors of "Strongly Like", "Like", "Slightly Like", "Slightly Dislike", "Dislike", and "Strongly Dislike". Results indicated preferences for two interface features – bright colors and sound. The two item cultural preference measure was then subjected to reliability analysis by computing the average variance extracted (AVE) and internal composite reliability (ICR) (similar to a Cronbach alpha) [59] using outputs produced by PLS Graph version 3.0 [60]. The resulting AVE was .64 and ICR was .78. Both statistics were above the minimum cutoff values of .50 [61, 66] and .70 [59, 66]. The construct was accepted for convergent and discriminant validity.

2. Use intentions. This four-item construct was adapted from Davis [29] and Venkatesh and Davis [12]. The construct was measured on a 6-point Likert scale with anchors of "A lot better" to "A lot worse" (reverse coded). The AVE and ICR for the construct were .49 and .79. Although the AVE was marginally below the recommended .50 cutoff, the composite reliability was believed to be strong enough to warrant acceptance.

3. Perceived usefulness. Perceived usefulness has different meanings depending on context. For example, Nielsen defined usefulness as whether a system can be used to achieve desired goals [67]. Others have defined usefulness as a composite construct consisting of utility and usability [68, 67]. Utility addresses the issue of whether the system can do what is needed whereas usability concerns user perceptions of being able to use the system to complete work tasks in an efficient manner. In essence, this construct represents the degree to which an individual believes that using a particular system will enhance his or her performance [29]. Usefulness is an antecedent to attitude since a system can be very elegant and aesthetically pleasing but if it is not perceived as useful, an individual probably will not use it. Evidence shows that usefulness varies from culture to culture [69].

Perceived usefulness was measured using a two-item construct that focused on the productivity and effectiveness of using computers to perform work tasks. The Fornell and Larcker analysis [59], performed on outputs produced by PLS Graph v3.0, resulted in strong statistics: AVE=.77 and ICR=.87.

4. Actual Usage. This single item measure asked subjects: "How many hours in a normal week do you use a computer? (Write a number between zero and 40)." Subjects reported an average usage of 12.5 hours per week (stdv=12.38 hours). The mean number of hours was 12.47 (stdv=12.39).

5. Attitude. This construct represents the degree to which a user's need to perform specific tasks are met by a system [70]. Satisfaction is a positive affect resulting from the evaluation of system usage. Expectation-confirmation theory explains how satisfaction is formed [71]: users have certain expectations; they confirm (or disconfirm) the expectations and, as a result, form a feeling of satisfaction. Thus, satisfaction necessarily involves some comparison of expectation versus experience. For example, one may have very high expectations of fun before interacting with the system, then interact and enjoy the interaction, but not as much as expected, and therefore leave unsatisfied [73]. Thus, to capture expectations, satisfaction, and experience, attitude was assessed using a four-item measure. Items were measured on a 6-point Likert scale with opposing anchors such as "Terrible" versus "Wonderful" and "Dull" versus "Stimulating". The construct met the minimum AVE of .50; the ICR was .79.

D. Analysis

Table 1 reports the means, standard deviations, and correlations among the study variables. As shown, attitude and usefulness correlated at .61. However, and as reported above, both constructs met or exceeded the minimum acceptable psychometric properties and were discriminately valid based on the Fornell and Larcker [59] methods.

Table 1. Correlations, Means, and Standard Deviations

Variable	Mean	Std. Dev.	1	2	3	4
1. Cultural Preferences	4.92	0.88				
2. Use Intentions	5.11	0.76	0.28***			
3. Usefulness	4.78	1.15	0.21**	0.25***		
4. Use Hours	12.50	12.38	0.25***	-0.09	0.12*	
5. Attitude	4.54	1.04	0.19**	0.16*	0.61***	0.21**

Listwise analysis using SPSS, N=198

* $p < .05$

** $p < .01$

*** $p < .001$

VI. RESULTS

The hypothesized relationships among the study variables were tested using partial least squares analysis using PLS Graph version 3.0 [60]. PLS Graph is a structural equation modeling tool that utilizes partial least squares analysis, with bootstrapping, to enhance the sample size and validity of the results by generating additional cases based on the observed data submitted for analyses. Partial least squares analysis is appropriate in this research, over covariance-based approaches such as AMOS and LISREL, for several reasons. Prior research has shown that PLS is well-suited for experimental research in which issues of causality or prediction are being considered [60, 61, 73]. PLS is more tolerant of distributional assumptions [62, 63], can be used in studies involving reflective or formative indicators without running the risk of Heywood cases [64], does not suffer from model identification issues that can occur when reflective and/or formative constructs are analyzed (Haenlein 2004), and is more suited to investigations involving assessment of variance (such as the current study) over other SEM methods [65]. On the other hand, it must be understood that PLS Graph does not produce fit statistics as does other structural equation modeling tools (e.g., Lisrel, Amos). Thus, researchers focus on interpreting path loadings, average variance extracted (AVE), internal composite reliability (ICR), and percent variance explained (i.e., R^2) to determine if the hypothesized relationships are supported.

As shown in Figure 4, H1 predicted a significant relationship from cultural preferences to use intentions. This relationship was significant and yielded a strong path loading of .32 ($p<.01$). This is the most important contribution that this study makes to the understanding of the role of culture and cultural preferences to use intentions. This understanding can serve to inform web designers and other human-computer interface

designers when they localize software for specific cultures that cultural preferences should be studied and then utilized in software interface design.

H2 was supported indicating a significant effect from cultural preferences to perceived usefulness (b=.23, p<.01). This finding is quite interesting. The link between cultural preferences and perceived usefulness tells us that different cultures place more or less importance on perceived usefulness. If we generalize these findings to all Chinese users, it appears that Chinese users place great importance on the usefulness of software.

H3: perceived usefulness had a significant effect on use intentions, producing a path loading of .30 (p<.001). This finding has been confirmed in multiple studies and is born out in this study as well. If a software package is not perceived to be useful, then most users will not even attempt to use the software, regardless of the ease of use of the software.

H4, which hypothesized a significant effect of perceived usefulness on attitude was significant (b=.35, p<.001). Again, our data reconfirms the original Davis [12, 13] TAM model which posits a relationship between perceived usefulness and attitude.

H5 (use intentions to attitude) was not significant (b=.15ns). We expected that use intentions would relate to attitude as consistent with the Theory of Reasoned Action [28], however, the authors note that TAM [12,13] does not include attitude, and that attitude itself may be the most difficult construct to measure.

H6 found support for the influence of use hours on attitude indicating that increased usage resulted in a more positive attitude toward technology (b=.18, p<.01). Unlike H5 (use intentions to attitude) we do find a relationship between usage amount and attitude. This result is interpreted as the more a user uses software, the more positive the user's attitude becomes. This finding makes a good case for immersing users into software as quickly as possible so that attitudes become more and more positive.

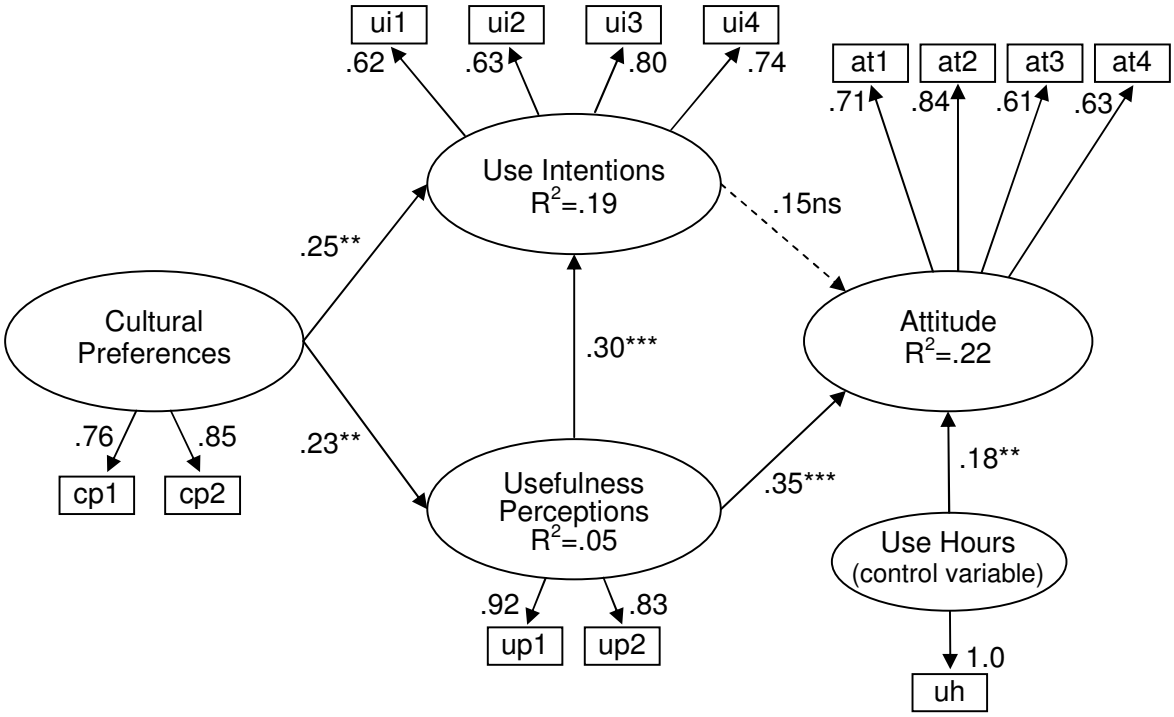

Figure 4. Results

VII. Alternate Model Testing

In an effort to confirm the intentions-to-behaviors and behaviors-to-usage relationships that are the underpinnings of the theory of reasoned action, the researchers performed alternate model testing to investigate such relationships. The theoretical model was re-specified by adding the stated links and tested in PLS Graph. Use intentions was found to be a strong and significant predictor of perceived usefulness, resulting in a path loading of .32 ($p<.001$). Usefulness was not found to impact actual usage ($b=.01ns$).

VIII. DISCUSSION

This study extends previous research on the theory of reasoned action [28] and technology acceptance model [29, 52, 13] by examining the impact of cultural preferences on perceived usefulness and use intentions. The findings confirm that cultural differences affect interface and system acceptance [5, 20, 7, 8]. Cultural groups have different preferences in design features and also in the technology acceptance process.

Support for the hypothesis of cultural preferences on use intentions is an interesting finding and suggests that the understanding of cultural preferences for software features is essential to the successful development of software for global markets [23, 73, 1]. Identifying and testing for preferences resulted in two specific user interface features; bright colors and sound, and a third possible feature – popup menus.

These findings expand the work of Marcus [8] in which tone and pitch differences, as a factor of culture, were found to differ across populations. Our work suggests that identifying and customizing features to expected user cultures (e.g., Chinese) will enhance intention to use, which in turn will result in a more positive attitude toward the software thereby increasing the likelihood of evaluation, purchase, and use [15, 74].

Use intentions did not relate to attitude at a .05 level of significance but did fall within the .10 cutoff. The fact that perceived usefulness related strongly and significantly to attitude implies that for these subjects, usefulness played a more significant role in the perceptions of the software than intentions. The finding that actual usage impacted attitude confirms results from prior research [49].

IX. Study Limitations

This study is not without its limitations, and therefore, could be enhanced with some additional work. The subject pool was adequate for all aspects of the investigation and analysis but the addition of subjects in other cultures would broaden the generalization of findings. We highlight a few examples of cross-cultural studies that can be used as models for further work in this area [75, 6, 37, 76, 42].

The study would benefit from additional identification of specific user interface features that are affected by cultural perceptions. Understanding these differences would lead to better interfaces, increased acceptance, and increased use [7, 9, 11, 77, 57]. The two-item construct exhibited sufficient nomological validity but could be strengthened with additional items [74]. Rewording items to eliminate reverse coding is another issue to consider in future studies.

The subjects were representative of the middle-status, college-age student group in China. Student samples have been called into question [77, 80, 81, 82] but most often in cases where results are generalized to non-student populations, which we did not do here. It would be interesting to see how the results might change if individuals with higher or lower perceived status were studied, as well as individuals from non-student groups. Status differences have been studied in other IT contexts [7, 82], expanding upon the current work would contribute to this body of research.

The research model did not include the TAM construct ease-of-use. Since the questionnaire did not ask subjects to respond relative to a specific system or group of systems, it was illogical to ask subjects about the lack of effort in using the software. Subsequent research might attempt to focus on a particular system or systems, and by doing so, include this construct to provide a complete picture of cultural preferences on all aspects of TAM.

X. Implications for Research and Practice

This study serves as a model for researchers wishing to conduct cross-cultural research in the evaluation of user interface characteristics. The systematic and iterative creation and evaluation of the study instrument proved highly successful and resulted in no discernable differences as perceived by the subjects in the pilot study.

The theoretical model and results contribute to our knowledge of factors that may influence technology acceptance. Wang and Benbasat [84] extended TAM to consider issues of trust while others have investigated issues of self-efficacy [85, 86], gender [21],

and subjective norm [12]. The more we understand issues that affect technology acceptance and adoption, the more probable we will create software that users will enjoy.

XI. Conclusion

The findings contribute to the research literature for technology acceptance, attitude toward software use and adoption, and experimental research procedures. Our findings indicate that culturally-specific user interface characteristics can be identified and used to determine effects on user perceptions of technology acceptance and attitude toward technology. These findings were found through the testing of a theoretical model that extends the technology acceptance model by adding cultural preference as an antecedent, use hours as a predictor of attitude, and attitude toward software usage as an outcome of technology acceptance. Alternate model and between-subjects tests also were performed to ensure results validity. These findings provide evidence that culturally-specific interface features can be measured and used to predict the likelihood of acceptance and use of information systems, but further, show that culture along with technology acceptance combine to affect one's general attitude toward computer use. In addition, we found that the creation of research instruments to investigate cultural differences can benefit from dual translation to and from the subject's native language, combined with repeated validation by language and software terminology experts from the various cultures that may use the software and artifacts.

XII. References

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Appendix: Constructs used in the study[1]

Construct	Item	Item Text	Loading	AVE[2]	CompRel[3]
Cultural Preferences	Anchors: Strongly like, Like, Slightly like, Slightly dislike, Dislike, Strongly dislike			.65	.79
	cp1	How much would you like it if a computer had bright colors?	.76		
	cp2	How much would you like it if a computer had sounds?	.85		
Use Intentions	How much do you think a computer would be better for performing all of the following tasks compared to completing the task by hand or with another technology? Anchors: A lot better, Better, A little better, A little worse, Worse, A lot worse			.49	.79
	ui1	Keeping records of your finances	.62		
	ui2	Keeping track of addresses	.63		
	ui3	Finding stored information	.80		
	ui4	Completing transactions (like banking)	.74		
Usefulness Perceptions	Anchors: Not Much (1), A Lot (6)			.77	.87
	up1	How much do you feel that using computers will help you be more productive (able to complete more tasks within a limited amount of time)?	.92		
	up2	How much do you feel that using computers will help you work more effectively (complete tasks correctly, in ways that you expect)?	.83		
Attitude	How would you describe computers, generally?			.49	.79
	at1	Terrible (1), Wonderful (6)	.71		
	at2	Frustrating (1), Satisfying (6)	.84		
	at3	Dull (1), Stimulating (6)	.61		
	at4	Rigid (1), Flexible (6)	.63		
Usage Hours	uh	How many hours in a normal week do you use a computer? (Write a number between zero and 40)	1.00	1.00	1.00

[1] Statistics are from PLS Graph v3.0 [60]
[2] Average variance extracted [59]
[3] Composite reliability [59]

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