# Consumer Acceptance of E-Commerce in Korea and China: The Effects of National Culture

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## Abstract

*With e-commerce becoming international, understanding the effects of national culture in consumer acceptance of e-commerce is required. This study examines consumer e-commerce acceptance in Korea and China. The research model consisting of perceived usefulness, perceived ease of use, trust and perceived risk was proposed, and the hypotheses based on Hofstede's cultural dimensions of power distance, individualism/collectivism, masculinity/femininity, uncertainty avoidance and long-term orientation, were established.*

*The results show that perceived usefulness contributes less to consumer acceptance of e-commerce in China than it does in Korea. In addition, perceived ease of use contributes more to consumer acceptance of e-commerce in China. Trust contributes significantly to consumer acceptance of e-commerce in both countries, but perceived risk didn't influence consumer acceptance of e-commerce in either country.*

*The contribution of this study is to provide strategic insights for successfully managing cross-cultural e-commerce.*

**Key Words and Phrases:**
e-commerce, national culture, TAM (technology acceptance model), Hofstede, trust, cross-culture

## I . Introduction

Electronic commerce based on the Internet has been disseminated rapidly in developing countries as well as in advanced countries. The proliferation of a Free Trade Agreement (FTA) that is a premise of regional economic integration among countries accelerates change in the current e-commerce environment, targeting members of a country to extend e-commerce to include other country members.

Despite this, e-commerce is actively used in most countries including developing countries, and e-commerce is rapidly becoming global. Most e-commerce researches have been conducted almost exclusively in advanced countries such as the U.S. and have generally ignored the possible effects of national culture (Gefen & Heart, 2006) in spite of the effect that the differences in national culture can cause in e-commerce behavior (Kacen & Lee, 2002;

Lynch & Beck, 2001).

Accordingly, the purpose of this study is first, to verify the consumer acceptance model of e-commerce developed by advanced countries' researchers through applying it to developing countries and second, to explore the differences of consumer e-commerce acceptance between nations as influenced by national culture.

To attain the objectives of this study, we examine consumer acceptance of e-commerce in Korea and China, with the research model adapted from Pavlou's (2003) study, and the hypotheses based on Hofstede's (1984) national culture framework.

The next section will introduce the conceptual background of this study including the meaning of national culture and the research about consumer e-commerce acceptance.

## II . Conceptual Background

### 2.1 National culture and cultural differences between Korea and China.

Culture is *"the collective programming of the mind that distinguishes the members of one group or category of people from another"* (Hofstede, 1984). Therefore culture can be classified as nation, geography, race, religion, gender, generation, organization, etc. Thanks to the ease of data gathering (because a nation as a political unit provides statistical data) and the legitimacy of studies highlighting cooperative ties between nations, national culture has been frequently used in culture related studies (Hofstede, 1996).
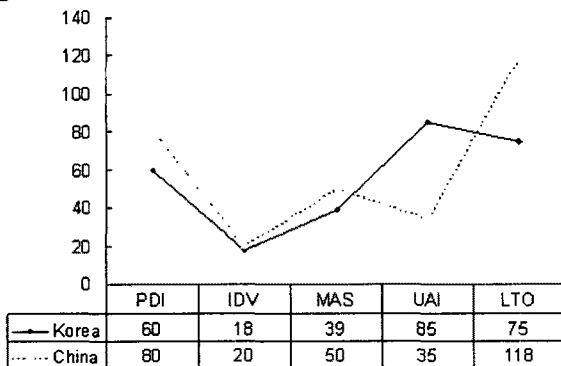
Several scholars have proposed appropriate dimensions for conceptualizing and operationalizing culture (Soares et al., 2007). Nevertheless, Hofstede's cultural dimensions are the most widely used in psychology, sociology, marketing, and management studies (Sondergaard, 1994; Steenkamp, 2001). Hofstede's cultural dimensions were derived from research exploring thousands of respondents in over 60 countries. The dimensions have been widely validated by theoretical and empirical evidence. Hofstede's cultural dimensions are as follows.

1. Power distance (PDI) refers to the extent to which the less powerful members of organizations accept that power is distributed unequally.
2. Individualism (IDV) and its opposite collectivism

refer to the extent to which a society emphasizes the role of the individual as opposed to that of the group.

3. Masculinity (MAS) and its counterpart femininity refer to the extent to which a society emphasizes traditional masculine values such as competitiveness, assertiveness, achievement, ambition, and high earnings, as opposed to feminine ones such as nurturing, helping others, putting relationships with people before money, not showing off, and valuing quality of life.

4. Uncertainty avoidance (UAI) refers to the extent to which people feel threatened by uncertain, unstructured situations and ambiguity.

5. Long-term orientation (LTO) stands for the fostering of virtues oriented towards future rewards, in particular perseverance and thrift. This dimension represents a range of Confucian-like values and was termed Confucian Dynamism.

The scores on five cultural dimensions of Korea and China reported in the Hofstede-related website (http://www.geert-hofstede.com/index.shtml) are shown in Figure 1.



| | PDI | IDV | MAS | UAI | LTO |
|---|---|---|---|---|---|
| Korea | 60 | 18 | 39 | 85 | 75 |
| China | 80 | 20 | 50 | 35 | 118 |

<Figure 1> scores on cultural dimensions of Korea and China

As shown in Figure 1, Korea and China had notably different scores on all cultural dimensions except the IDV dimension.

## 2.2 Electronic Commerce Acceptance

Early e-commerce researchers proposed that security of payment, trust of vendor, and privacy polices were the reasons that people were reluctant to shop online (Cole, 1998; Hoffman et al., 1999; Dontije & Olthof, 1999).

Later, Jarvenpaa & Tractinsky (1999) empirically verified that trust is a main factor in choice of shopping. Consequently, most e-commerce studies focused on trust and were designed to find the antecedents and consequences of trust (Gefen, 2000, 2002; McKnight et al., 2002; Sultan et al., 2002; Yoon, 2002).

Also, Davis' (1989) technology acceptance model (TAM) proposed the variables of perceived usefulness, perceived ease of use, and trust as key drivers of e-commerce acceptance and these were empirically tested in several studies (Chircu et al., 2000; Gefen et al., 2003).

Lastly, Pavlou (2003) proposed and empirically tested the consumer electronic commerce acceptance model that integrated trust and perceived risk with TAM variables. We will employ Pavlou's (2003) e-commerce acceptance model as basic model for this research.

## III. Research Model and Hypotheses

In order to examine consumer e-commerce acceptance in Korea and China, the research model proposed is based on Pavlou's (2003) model of trust and perceived risk, together with the TAM variables of perceived usefulness and perceived ease of use, and influenced by Hofstede's five cultural dimensions. Figure 2 represents the research model.
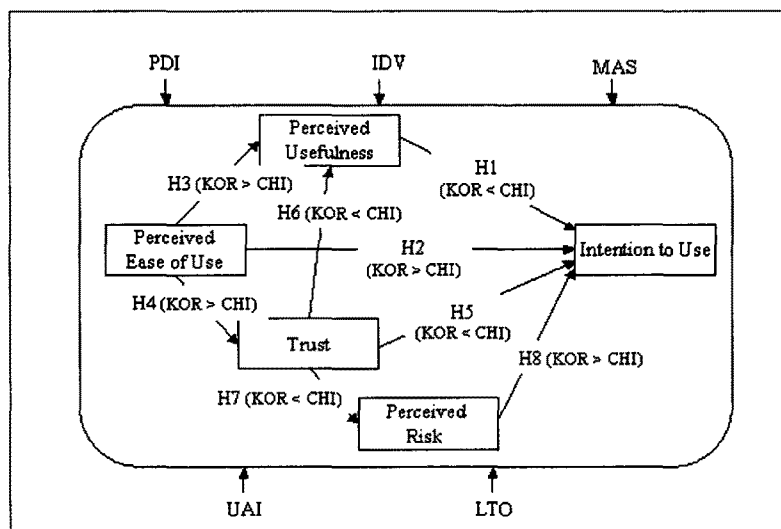


<Figure 2> Research model

Wi & Karahanna (2006) argued that because perceived usefulness is closely related to achievement of work goals and advancement, the higher the degree of masculinity, the higher the effect of perceived usefulness on IT adoption. MAS scores of Korea and China are 39, 50, respectively.

Uncertainty avoidance has been frequently proposed as influencing IT adoption. Straub (1994) suggested that the reason perceived usefulness didn't have the expected effect on e-mail usage by Japanese workers was because of Japan's high uncertainty avoidance culture. Png, Tan, & Wee (2001) proposed that higher uncertainty avoidance countries were less likely to adopt information technology infrastructure (frame relay). UAI scores of Korea and China are 85, 35, respectively.

Therefore, the following hypothesis can be established.

Hypothesis 1. The effect of perceived usefulness on intention to use in consumer acceptance of e-commerce will be stronger in China.

Effort-free use is more concerned with creation of a pleasant and less frustrating work environment, and such quality of work life concerns are typically feminine values (Wi & Karahanna, 2006). Therefore, the lower the degree of MAS, the stronger the effects of perceived ease of use. As mentioned above, the MAS score of Korea is lower than that of China. Therefore, we establish the following three hypotheses.

Hypothesis 2. The effect of perceived ease of use on intention to use in consumer acceptance of e-commerce will be stronger in Korea.

Hypothesis 3. The effect of perceived ease of use on perceived usefulness in consumer acceptance of e-commerce will be stronger in Korea.

Hypothesis 4. The effect of ease of use on trust in consumer acceptance of e-commerce will be stronger in Korea.

Uncertainty avoidance is expected to be intimately associated with trust. Uncertainty avoidance refers to *"the extent to which people are threatened by uncertain, unstructured situations, ambiguity"* (Hofstede, 1980). Also, trust is known to reduce social uncertainty (Gefen, 2000; Luhmann, 1979). Therefore, trust will have less effect on people's behavior in a high uncertainty avoidance culture. As mentioned above, UAI scores of Korea and China are 85, 35, respectively.

Hypothesis 5. The effect of trust on intention to use in consumer acceptance of e-commerce will be stronger in China.

Hypothesis 6. The effect of trust on perceived risk in consumer acceptance of e-commerce will be stronger in China.

Long-term orientation might be the most influential cultural value affecting the relationship between trust and perceived usefulness. Scholars who study economics or rationality recognize trust as a calculative process and trust itself as a mechanism that reduces transaction cost (Williamson, 1975,1985). This, from an economist's point of view, trust is similar to perceived long term usefulness. Long-term orientation *"stands for the fostering of virtues oriented towards future rewards"* (Hofstede, 2001). Therefore, trust may be strongly connected with perceived usefulness in the high long-term orientation culture such as China.

Hypothesis 7. The effect of trust on perceived usefulness in consumer acceptance of e-commerce will be stronger in China.

Uncertainty avoidance and perceived risk can be regarded as similar constructs. Therefore, we establish the following hypothesis.

Hypothesis 8. The effect of perceived risk on intention to use in consumer acceptance of e-commerce will be stronger in Korea.

## IV. Research Methodology

### 4.1 Data collection

In order to test the hypotheses, data was collected from university students in Korea and China. Usable questionnaires from Korea (128) and China (187) were used for analysis. The profile of respondents is shown in Table 1.

<Table 1> Demographic profile of respondents

| Measure | Value | Number (percent) | | | |
| --- | --- | --- | --- | --- | --- |
| | | Korea | | China | |
| Gender | Male | 64 | (50.0) | 24 | (12.8) |
| | Female | 64 | (50.0) | 163 | (87.2) |
| Age | Below 20 | 5 | (3.9) | 19 | (10.2) |
| | Over 20 | 123 | (96.1) | 178 | (89.8) |
| Degree of Internet experience | < 3 year | 7 | (5.5) | 48 | (25.7) |
| | >= 3 year | 121 | (94.5) | 139 | (74.3) |
| Frequency of Internet shopping | < 1/ a month | 103 | (80.5) | 15 | (8.0) |
| | >=1/ a month | 25 | (19.5) | 172 | (92.0) |

### 4.2 Measurements development

The questionnaire used for data collection contained scales to measure the various constructs of the research model. The measurements were adapted from Gefen et al.'(2003) and Pavlou' (2003) studies. Individuals indicated their agreement or disagreement with the survey items using a seven-point scale, and data analysis proceeded in

two stages. First, a validity test on the research measurements was conducted by confirmatory factor analysis. Second, an analysis of the structural equation model followed for testing the associations in the research model.

# V. Results

The Structural Equation Modeling (SEM) approach was used to validate the research model. PLS Graphic 3.0 was used to perform the analysis.

## 5.1 Reliability and Validity of Measurement Items

Partial Least Squares (PLS) can test the convergent and discriminant validity of the scales. In a Confirmatory Factor Analysis (CFA) by PLS, convergent validity is shown when a measurement loads highly if its coefficient is above 0.60 and loads very significantly, with t-values well within the 0.01 level, on their assigned construct (Bagozzi & Yi, 1988). Table 2 shows the factor loadings of the measurement items and t-values of Korea and China.

<Table 2> Confirmatory factor analysis results

| Construct | | Construct loading scores | | | | | t-value |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | |
| KOR | PU | PU1 | **0.753** | 0.464 | 0.256 | -0.138 | 0.396 | 14.72 |
| | | PU2 | **0.819** | 0.267 | 0.362 | 0.031 | 0.549 | 27.14 |
| | | PU3 | **0.705** | 0.311 | 0.221 | -0.148 | 0.336 | 12.13 |
| | | PU4 | **0.691** | 0.433 | 0.338 | -0.229 | 0.488 | 11.13 |
| | PEOU | PEOU1 | 0.367 | **0.750** | 0.486 | -0.185 | 0.402 | 14.51 |
| | | PEOU2 | 0.362 | **0.822** | 0.437 | -0.313 | 0.373 | 22.52 |
| | | PROU3 | 0.448 | **0.772** | 0.289 | -0.204 | 0.376 | 12.63 |
| | TRUT | TRS1 | 0.353 | 0.499 | **0.926** | -0.387 | 0.604 | 61.18 |
| | | TRS2 | 0.424 | 0.492 | **0.958** | -0.466 | 0.69 | 111.98 |
| | | TRS2 | 0.368 | 0.495 | **0.955** | -0.389 | 0.717 | 106.75 |
| | PR | PR1 | -0.159 | -0.25 | -0.34 | **0.880** | -0.312 | 20.7 |
| | | PR2 | -0.106 | -0.19 | -0.426 | **0.859** | -0.254 | 24.74 |
| | | PR3 | -0.154 | -0.334 | -0.367 | **0.853** | -0.322 | 27.66 |
| | IUSE | IUSE1 | 0.508 | 0.385 | 0.636 | -0.257 | **0.909** | 66.17 |
| | | IUSE2 | 0.603 | 0.512 | 0.666 | -0.366 | **0.926** | 41.38 |
| CHI | PU | PU1 | **0.799** | 0.544 | 0.538 | 0.117 | 0.33 | 18.44 |
| | | PU2 | **0.835** | 0.558 | 0.56 | 0.106 | 0.529 | 33.94 |
| | | PU3 | **0.722** | 0.465 | 0.386 | 0.084 | 0.327 | 17.67 |
| | | PU4 | **0.798** | 0.604 | 0.547 | 0.086 | 0.451 | 22.79 |
| | PEOU | PEOU1 | 0.587 | **0.841** | 0.523 | 0.104 | 0.524 | 28.96 |
| | | PEOU2 | 0.579 | **0.864** | 0.521 | 0.178 | 0.48 | 36.75 |
| | | PROU3 | 0.602 | **0.853** | 0.571 | 0.106 | 0.402 | 33.6 |
| | TRUST | TRS1 | 0.582 | 0.58 | **0.905** | 0.128 | 0.619 | 52.36 |
| | | TRS2 | 0.612 | 0.631 | **0.915** | 0.089 | 0.605 | 55.39 |
| | | TRS2 | 0.533 | 0.46 | **0.839** | 0.135 | 0.617 | 23.82 |
| | PR | PR1 | 0.119 | 0.123 | 0.154 | **0.925** | 0.146 | 3.92 |
| | | PR2 | 0.138 | 0.181 | 0.074 | **0.829** | 0.123 | 4.39 |
| | | PR3 | -0.004 | 0.042 | 0.064 | **0.743** | 0.022 | 2.78 |
| | IUSE | IUSE1 | 0.498 | 0.519 | 0.616 | 0.105 | **0.900** | 41.83 |
| | | IUSE2 | 0.453 | 0.47 | 0.626 | 0.144 | **0.898** | 45.67 |

The factor loadings of all items surpass the recommended level, 0.60 demonstrating convergent validity, and all t-values are also above 1.96 (Gefen & Straub, 2005).

Discriminant validity is shown when two things happen: (1) measurement items load more strongly on their assigned construct than on the other constructs in a CFA, and when (2) the square root of the Average Variance Extracted (AVE) of each construct is larger than its correlations with the other constructs (Gefen & Straub, 2004).

As shown in Table 2, all the measurement items loaded considerably more strongly on their respective factor than on the other constructs. Table 3 shows square root of AVE and the inter-construct correlations. Comparison of the correlation with the squared AVE shows that all correlations between two constructs are less than the squared AVE of both constructs.

<Table 3> Square root of AVE and inter-construct correlations and Composite Reliability

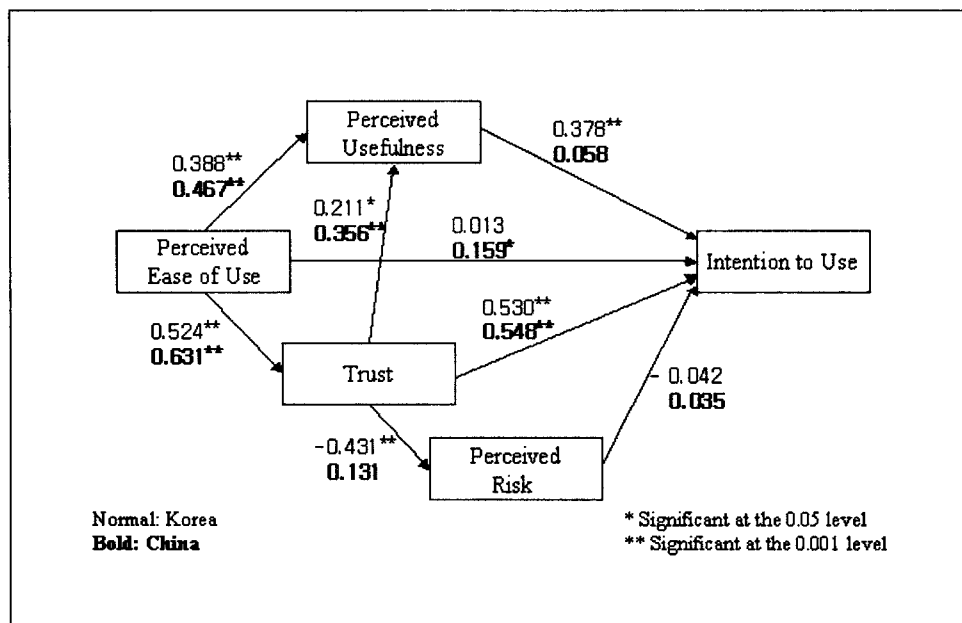| Construct | | Factor | | | | | CCR** |
|---|---|---|---|---|---|---|---|
| | | PU | PEOU | TRUST | RISK | IUSE | |
| KOR | PU | 0.789 | | | | | 0.868 |
| | PEOU | 0.691 | 0.853 | | | | 0.889 |
| | TRUST | 0.650 | 0.631 | 0.887 | | | 0.917 |
| | RISK | 0.124 | 0.151 | 0.131 | 0.836 | | 0.873 |
| | IUSE | 0.529 | 0.551 | 0.691 | 0.139 | | 0.894 |
| CHI | PU | 0.744 | | | | | 0.831 |
| | PEOU | 0.500 | 0.782 | | | | 0.825 |
| | TRUST | 0.404 | 0.523 | 0.947 | | | 0.963 |
| | RISK | -0.161 | -0.299 | -0.438 | 0.864 | | 0.899 |
| | IUSE | 0.607 | 0.492 | 0.71 | -0.342 | | 0.915 |

: Square root of AVE
**CCR : Composite Construct Reliability

In order to assess measurement items' reliability, we compute composite construct reliability coefficient. Composite reliabilities range from 0.831 (for perceived usefulness in China) to 0.917 (for trust in Korea), which exceed the recommended level of 0.70 (Bagozzi & Yi, 1988). AVE range from 0.553 (for perceived usefulness in China) to 0.843 (for intention to use in China), which also exceed the recommended level of 0.50 (Fornell, D.F. Larcker, 1981). The results, therefore, demonstrate a reasonable reliability level of the measured items.

## 5. 2 Hypothesis Testing Results

Having assessed the structural model, we examined the coefficients of the causal relationships between constructs, which would validate the hypothesized effects. Figure 3 illustrates the paths and their significance on the structural model. The coefficients and their t-value on the structural model, and the coefficients of determination ($R^2$) for each dependent construct are shown in Table 4.

As indicated in Table 4, the most paths are significant above the 0.05 level except five paths: the paths of perceived ease of use and perceived risk on intention to use in Korea, and the paths of perceived usefulness and perceived risk on intention to use and the path between trust and perceived risk in China.

<Figure 3> PLS Results

**Perceived Usefulness**

0.388** / 0.467**  (Perceived Ease of Use → Perceived Usefulness)

0.378** / 0.058  (Perceived Usefulness → Intention to Use)

0.211* / 0.356**

0.013 / 0.159*  (Perceived Ease of Use → Intention to Use)

**Perceived Ease of Use**

0.524** / 0.631**  (Perceived Ease of Use → Trust)

0.530** / 0.548**  (Trust → Intention to Use)

**Intention to Use**

**Trust**

-0.042 / 0.035

-0.431** / 0.131  (Trust → Perceived Risk)

**Perceived Risk**

Normal: Korea
**Bold: China**

* Significant at the 0.05 level
** Significant at the 0.001 level

About 63% and 50 % of the variance of intention to use is explained by perceived usefulness and perceived ease of use, trust, and perceived risk in Korea and China, respectively (R2 = 0.628, 0.502), and about 28% and 55% of the variance of perceived usefulness by perceived ease of use and trust (R2 = 0.278, 0.554).

In the hypotheses testing, three hypotheses were supported: H5, H6, H7. As shown in Table 4, the path coefficient (H1) from perceived usefulness to intention to use in Korea is larger than it is in China (KOR = 0.378; CHI = 0.058). The path coefficient (H2) from perceived ease of use to intention to use in China is larger than it is in Korea (KOR = 0.013; CHI = 0.159). And, the path coefficient (H3) from perceived ease of use to perceived usefulness and the path coefficient (H4) from perceived ease of use to trust in

Korea were not larger than those in China. Finally, the effect of perceived risk on behavioral intention is insignificant at α = 0.05 in both countries.

## VI. Discussion

The consumer e-commerce acceptance model developed by advanced countries' researchers did not apply in China and Korea. The effects of perceived ease of use and perceived risk on intention to use in Korea are insignificant, and the effect of perceived usefulness and perceived risk on intention to use in China are also insignificant.

<Table4> Hypothesis testing results

| Hypothesis | Path | KOR | | CHI | | Result |
|---|---|---|---|---|---|---|
| | | Path coefficient | t-value | Path coefficient | t-value | |
| H1 | PU->IUSE | 0.378** | 5.91 | 0.058 | 0.65 | Reject |
| H2 | PEOU->IUSE | 0.013 | 0.18 | 0.159* | 1.66 | Reject |
| H3 | PEOU->PU | 0.388** | 4.16 | 0.467** | 7.26 | Reject |
| H4 | PEOU->TRUST | 0.524** | 7.56 | 0.631** | 11.10 | Reject |
| H5 | TRUST->IUSE | 0.530** | 6.40 | 0.548** | 6.40 | Accept |
| H6 | TRUST->RISK | -0.431** | 4.91 | 0.131 | 1.29 | Accept |
| H7 | TRUST->PU | 0.211* | 2.17 | 0.356** | 6.17 | Accept |
| H8 | RISK->IUSE | -0.042 | 0.75 | 0.035 | 0.55 | Reject |
| | Perceived Usefulness $R^2$ | 0.278 | | 0.554 | | |
| | Intention to Use $R^2$ | 0.628 | | 0.502 | | |

* Significant at the 0.05 level
** Significant at the 0.001 level

Therefore we confirmed the fact that differences in national culture can affect e-commerce behavior.

In this study, only hypotheses H5, H6 and H7 were supported. Contrary to our expectations, many hypotheses were rejected. We tried to determine reasons for these results, and were dubious of the scores on cultural dimensions of Korea and China reported in the Hofstede-related website. Therefore, we developed new measurements based on Hofstede's cultural dimensions and performed a survey to collect the data from the university students that were involved in the study. The survey results are shown in Table 5.

<Table5> Survey results

| Cultural dimensions | Number of Item | Mean | |
|---|---|---|---|
| | | KOREA | CHINA |
| PDI | 2 | 2.63 | 2.83 |
| IDV | 3 | 3.43 | 2.35 |
| MAS | 2 | 3.76 | 2.88 |
| UAI | 3 | 4.49 | 3.84 |
| LTO | 3 | 5.87 | 6.28 |

As indicated in Table 5, IVD and MAS scores are distinctly different from those reported on the Hofstede-related website. The IDV scores of Korea and China reported by the Hofstede-related website were 18 and 20, respectively, but those in the new survey were 3.43 and 2.35, respectively. MAS scores are also different than expected. The MAS score of China is higher than that of Korea in the Hofstede-related website (KOR = 39; CHI = 50), but according to this survey, the score in Korea is considerably higher than it is in China (KOR = 3.76; CHI = 2.88). Therefore we can suggest that the strong relation between HI, H2, H3, H4 and MAS was not supported. Namely, because the degree of MAS is higher in Korea, it appears that the effect of perceived usefulness on consumer acceptance of e-commerce is stronger in Korea. In contrast, the effects of perceived ease of use are stronger in China. However UAI did not have a strong influence on the relationship between perceived usefulness and intention to use. On the other hand, as hypotheses: H5, H6, H7 were supported, we can note that UAI is highly related with trust.

We couldn't test the H8 because the effect of perceived risk on intention to use both countries is insignificant. The low degree of IVD can cause such problem. When national culture is centered on the collective, in these cases people generally think interdependence is important, thus tending easily to believe colleagues. Namely, maybe they are little sensitive about risk than people in individual culture.

Therefore, three theoretical propositions can be proposed through our research results.

- **Proposition 1:** The higher degree of masculinity (MAS), the higher the effect of perceived usefulness on intention to use, and the lower the effect of perceived ease of use on intention to use.
- **Proposition 2:** The higher degree of uncertainty avoidance (UAI), the lower the effects of trust on intention to use.

- **Proposition 3:** The higher degree of long-term orientation (LTO), the higher the effects of trust on perceived usefulness.
- **Proposition 4:** The higher degree of Individualism (IDV), the higher the effects of perceived risk on intention to use.

## VII. Conclusions

The diffusion of e-commerce to developing countries, and global e-commerce demand understanding of national culture for successfully managing e-commerce. This study proposed to verify a consumer acceptance model developed by advanced countries' researchers through applying it n developing countries, and to explore the differences of consumer e-commerce acceptance influenced by national culture.

To attain the objectives of this study, we examined consumer e-commerce acceptance in Korea and China. The results showed that the effects of perceived ease of use and perceived risk on intention to use in Korea are insignificant, and the effect of perceived usefulness and perceived risk on intention to use in China are also insignificant. In analyzing the differences of consumer e-commerce acceptance between the nations, perceived usefulness contributes less to consumer acceptance of e-commerce in China than it does in Korea, but perceived ease of use contributes more to consumer acceptance of e-commerce in China. Trust contributes most to consumer acceptance of e-commerce in both countries, but perceived risk didn't have any influence on consumer acceptance of e-commerce in either country. In addition, we proposed four propositions about e-commerce acceptance related to national cultural dimensions through logical deduction from the research results.

This study represents a theoretical contribution to the e-commerce literature because it is one of the first attempts to explore the effects of national culture in e-commence, and has the practical contribution of providing strategic insights for cross-cultural e-commerce success between Korea and China.

Although this study provides meaningful implications, this study has some limitations. First, most hypotheses based on the scores reported by the Hofstede-related website aren't supported. Although we estimated the reasons, we cannot be absolutely sure of our assertion. Therefore, in order to assure the results of this study, it should be retested with corrected scores on cultural dimensions. Second, this research model didn't contain national culture values. Therefore, we could not analyze the direct effects of national culture values. The research model including national culture values should be developed to test more details.

**References**
References available upon request: mail to carlyoon@empas.com