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Consumers' Adoption of B2C E-Commerce in Macao

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Abstract: This research sets out to determine factors that influence consumers' adoption of B2C E-commerce in Macao. While prior research has shown that there are many factors that influence E-commerce adoption, this research hypothesized that two variables – namely, trust and willingness to use credit cards for online transactions – influence E-commerce adoption in Macao. This research further hypothesized that trust and willingness to use credit card interact to influence adoption. Using data collected from a questionnaire survey, the results of this study found that the two hypothesized variables are positively related to intention to adopt E-commerce. The results also support the interaction effect. The nature of interaction showed that trust is related to E-commerce adoption only when willingness to use credit card for online transaction is high. Also, willingness to use credit card for online transaction is related to E-commerce adoption only when the level of trust is high. These results provide a richer understanding of the relationship between the hypothesized variables and E-commerce adoption. This study also collected interview data related to Internet users' adoption of E-commerce. The interview data provide a better understanding on why Macao people are afraid of using credit card for online transactions. The researchers gathered more information about interviewees' credit card usage and habits, their attitudes toward credit card security, and their thoughts regarding identity theft. The interviews also uncovered other factors that may influence E-commerce adoption.

Keywords: E-Commerce Management; E-Commerce adoption.

I. Introduction

The internet has played an increasingly important role in people's daily life. One important feature provided by the Internet is that it creates an innovative channel called the electronic commerce that enables people to do business through the network. E-commerce is currently revolutionizing the way people work. Many commercial establishments as well as researchers are keen to determine the factors that influence people to engage in E-commerce. Although numerous studies have been conducted, they were carried out mostly in a western setting. Few studies exist on E-commerce in less developed places, such as Macao, a special administrative region of China. The researchers, being residents in Macao, are interested to determine the

factors that influence consumers' adoption of E-commerce in Macao.

There are few statistics on the popularity of E-commerce in Macao. A study by Cheung and Wang (2004) has found that about 57 percent of household in Macau has Internet connections. This figure suggests a potential pool of E-commerce users exists. This study, therefore, focused on B2C E-commerce in Macao and it sought to determine the factors that influence consumers' adoption.

A literature review on EC adoption has found that trust is a variable that is extensively emphasized in prior research. Even though the literature stressed the importance of trust in E-commerce, empirical research has found there was only a small variance between trust and adoption of E-commerce. Bhattacharjee (2002) has pointed out that trust explained only 13 percent of the users' willingness to transact online. This result is surprising. No explanations have been provided for the low variance. One motivation for this research, therefore, arises from the curiosity to further examine this relationship.

Given that the context of this research is in Macao, the researchers are interested to know if consumers' willingness to use credit card for online transactions would affect adoption of E-commerce. In Macao, credit card facilities are reasonably accessible from financial institutions. People in Macao, however, may not be easily persuaded to use credit cards online because of some inherent fear they have regarding its usage. The willingness to use credit card for Internet transactions, therefore, is chosen as a variable that warrants closer attention in this research.

This study develops and tests a model that determines the factors that underlie people's adoption of E-commerce in Macao. Specifically, this study hypothesizes and tests the relationship of two independent variables that influence the adoption of E-commerce. The two independent variables are perception of trust in E-commerce and willingness to use credit card in electronic transactions. The dependent variable is the adoption of E-commerce. Besides linear relationships between the independent and dependent variables, this research also tests the presence of an interaction effect created by the two independent variables. Prior research has not examined or explored the interaction effect.

It should be noted that even though there may be many factors that could influence the adoption of E-commerce, this research has chosen to focus on two salient variables – namely, trust and willing to use credit card for online transactions. Technical dimensions of E-commerce are not included in this research.

II. Factors influencing usage of E-commerce

Chang et al. (2004) have done a thorough review of the literature on factors that influence usage of B2C E-commerce. Their review found that many variables influence usage. They include security, risk, trust, willingness to use credit card in electronic transactions and others. The following sections review these variables.

II.1 Security in E-commerce

Internet security is very important to E-commerce users. As the internet is a public network, it is possible for hackers to steal passwords and personal information. Hackers can also impersonate users and perform illegal transactions over the internet. For example, there are hackers who use other people's name and password to perform illegal financial transactions to obtain money or goods.

Although academics and industry have known about the security problems (Bhatnagar et al., 2000; Suh and Han, 2003), these problems have been accommodated rather than corrected. As a result, there have been more and more cases of wide-scale security infractions throughout the network over the last few years. For example, there have been reports that credit card information has been stolen due to breaches in security (Bergstein, 2005).

II.2 Risk in E-commerce

E-commerce users need to take more risks compared to traditional commerce users (Martinsons, 2002). For example, E-commerce users may receive services or products that are below their expectations and they have minimal recourse because the legal protection for E-commerce users varies from country to country. Web retailers may also take advantage of the distant and impersonal characteristic of E-commerce to mislead consumers (Pavlou, 2003). Some of the risks that E-commerce users face include economic risk (lost of money), personal risk (safety of the goods or services), seller performance risk (careless control of the buying process) and privacy risk (revealing consumers' private information).

II.3 Trust in E-commerce

Rotter (1971) has pointed out that trust is the expectation that commitments undertaken by another person or organization will be fulfilled. Trust also involves a person's willingness to be vulnerable to the actions of another person or people (Mayer et al., 1995). That is, the parties will protect the right of the other party involved. Trust is very important in many social and business activities.

Suh and Han (2003) have pointed out that trust is important because there are uncertainties and risks involved in E-commerce. Gefen (2002) has also emphasized the importance of trust in E-commerce because of the less verifiable and less controllable business environment in the Internet. Kim and Prabhakar (2004) argued that consumers'

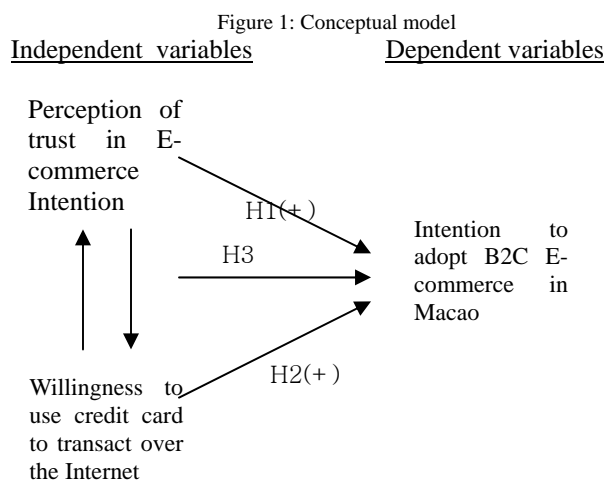
lack of trust in the electronic channel is a possible reason for the delayed acceptance of the Internet as a retail distribution channel. Indeed, prior studies have found that there is a significant positive impact on overall trust affecting people's usage of online shopping. (Bhattacharjee, 2002; Gefen, 2000; Gefen et al., 2003; Yoon, 2002).

II.4 Willingness to use credit card in E-commerce

Suh and Han (2003) pointed out that even though the number of Internet users has increased dramatically, many are not willing to use credit card over the internet because people do not have confidence in E-commerce security. Based on volume, credit cards and charge cards were the most common payment methods used in the U.S. (Sienkiewicz and Bochicchio, 2002). In some countries outside of America, using credit card for online transactions may not be popular. Many Internet users are afraid of security issues when they send credit card information over the Internet. When their personal information is sent through the Internet, they are exposed to hackers who may be able to intercept their information.

III. Hypothesis development

In this study, the researchers selected two of the more compelling variables that may impact E-commerce adoption in Macao. The intention is to develop a parsimonious model. Figure 1 shows the model. As shown in the figure, the dependent variable is the intention to adopt E-commerce. The two independent variables are (i) the perception of trust in electronic transactions and (ii) willingness to use credit card in electronic transactions. The following paragraphs describe the variables as well as the hypotheses developed for the research.



- Intention to adopt E-commerce in Macao

Intention to adopt E-commerce is used as a proxy for adoption of E-commerce. Longitudinal data are required to measure adoption of E-commerce. As this study used cross

sectional data, intention to adopt E-commerce is used as a proxy. According to prior research, intention is the best predictor of behaviour (Ajzen, and Fishbein, 1980). Prior research has used intention to adopt E-commerce as a proxy for E-commerce adoption (Cao and Mokhtarian, 2005).

- Perception of trust in electronic transaction

Traditional commerce is the main channel for doing business in Macao. Macao has a small geographic area of about 26 square kilometres. Shopping for most products and services is easy and convenient. Furthermore, Hong Kong, which is considered a shopping paradise, is just an hour's ferry ride away. People will avoid using E-commerce unless they have trust in it. Macao is a Chinese and Portuguese society. If people want to buy things from foreign countries' websites, the buyers frequently need to have good knowledge of English in order to complete the transaction. When people want to use electronic transaction and they do not have a clear understanding of the terms and conditions, they become vulnerable. Trust, therefore, plays a very important part in E-commerce. Even though prior research had shown that there is a positive relationship between trust and E-commerce adoption, this study seeks to affirm that the relationship holds true in the Macao business environment. Hypothesis 1, therefore, is as follows:

H (1): When people have a higher perception of trust in E-commerce, their intention to adopt E-commerce will be higher.

- Willingness to use credit card in E-commerce

Most E-commerce transactions are carried out using credit cards. When people use credit card in E-commerce, they need to provide their credit card number and personal information to the other party. After the other party receives the money from the buyer's credit card account, the goods or services will be delivered to the buyer. It is simple and convenient to use credit card payment in E-commerce transactions. Some people feel, however, it may not be safe to transmit credit card information over the Internet because the Internet is a public network and as such, information provided in the transaction may be stolen. Also people fear that information related to the E-Commerce transactions may be abused.

Human nature is such that we always need a sense of security. We need to protect our personal information. E-commerce is still a new mode of doing business compared to traditional commerce. People need to bear certain risk when using the credit card for E-commerce transactions. Their personal data may be stolen. For these reasons, people may hesitate when they shop online. Hence the following hypothesis:

H (2): When people have a higher willingness of using credit card in E-commerce, their intention to adopt E-commerce will be higher.

- Interaction effect

As mentioned previously, prior empirical research has found only a small variance between trust and adoption of E-commerce. This is surprising, given that trust has been emphasized extensively in the literature. It is possible that trust interacts with another variable to influence E-commerce adoption. Figure 2 shows it is possible that when there is low willingness to use credit card for electronic transactions, trust does not have any relationship with intention to adopt E-commerce. Similarly, figure 3 shows that when there is low trust in E-commerce, willingness to use credit card does not have any relationship with intention to adopt E-commerce.

Based on the hypothesized interactive effect, a set of topology is proposed for the various groups of E-commerce adopters. Figure 4 shows the topology. The figure shows that people with low trust in E-commerce and low willingness to use credit card in E-commerce are classified as non-adopters. People with high trust in E-commerce and low willingness to use credit card in E-commerce are classified as ready but afraid category. People with low trust in E-commerce and high willingness to use credit card in E-commerce are classified as not ready but willing category. People with high trust in E-commerce and high willingness to use credit card in E-commerce are classified as adopters.

Figure 2: Trust and adoption of E-commerce

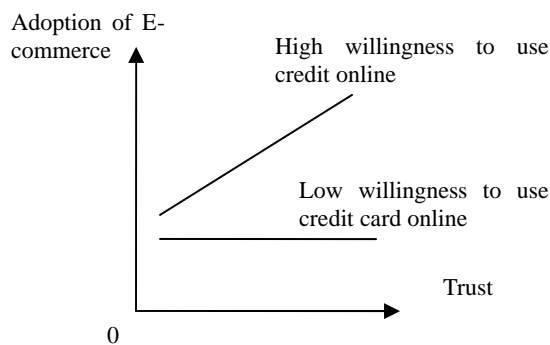


Figure 3: Willingness to use credit card and adoption of E-commerce

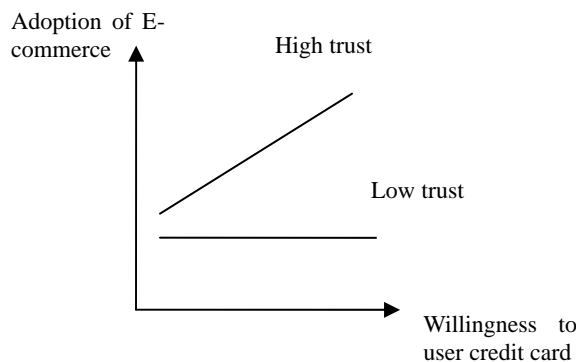
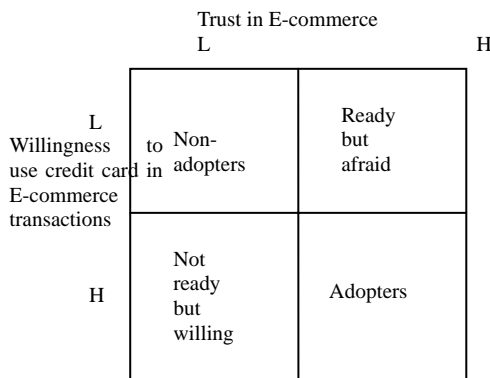


Figure 4: Topology of E-commerce adopters



Based on the above discussion, the following hypothesis is developed for this study:

H(3): Trust and willingness to use credit card interact to influence intention to adopt E-commerce.

III. 1 Research method

Quantitative and qualitative approaches were used to conduct the study. The following sections discuss these approaches.

III. 2 Quantitative approach

The quantitative aspect of this research made use of data that have been collected from a E-commerce questionnaire survey. The respondents for the survey were Internet and E-commerce users in Macao. The questionnaires were distributed to 250 Internet and E-commerce users. They comprised colleagues, office workers, and postgraduate students studying at the University of Macao. Respondents participated in the questionnaire survey voluntarily. The respondents were assured that the information gathered in the survey will be kept confidential. The questionnaire did not require respondents to identify themselves.

The questionnaire items were in English. As most respondents read Chinese, a Chinese translation was provided. To minimize translation errors, the draft Chinese version of the questionnaire was translated back to the English version to ensure translation errors were minimized.

From the data collected, the researcher made use of data for two global measures. They were (i) perception of trust in electronic transaction and (ii) willingness to use credit card in electronic transactions. Data for two items measuring intention to adopt E-commerce were also used in this research. All measures used in the research are shown in Table I. The data were based on a seven-point Likert-type scale.

Demographic data were also collected during the survey. These include gender, age, occupation, income, education level, experience using the Internet, and online habits of the respondents. The software named SPSS (Statistical Package for Social Science) version 12 was used for data

analysis. Moderated multiple regression was used to analyse the data.

Table I: Measurement

| Measurement items * | Variables to be measured |
|------------------------------------------------------------------|----------------------------------------------------------|
| a. I am not willing to use my credit card in online transactions | Willingness to use credit card in electronic transaction |
| b. E-commerce is not trustworthy | Perception of trust in electronic transaction |
| c. I will try my best to avoid using E-commerce | Intention to adopt E-commerce |
| d. In the coming future, I would not use E-commerce | Intention to adopt E-commerce |

* items were reverse coded.

III. 3 Qualitative approach

This study also conducted semi-structured interviews to collect qualitative data. The purpose of the interviews was to obtain a richer understanding about B2C E-commerce adoption in Macao. Specifically, the interviews were motivated because it is possible that there are some underlying reasons for the Internet users' perceptions regarding trust in E-commerce and their willingness to use credit card for online transactions. The interviewees were chosen based on the researchers' contacts. The interviews were conducted in company premises such as meeting rooms or at a quiet place where the interviews were free from disturbances. The third author conducted separate interviews for seven interviewees. Each interview lasted about 20 minutes. A set of questions was prepared to guide the interviews. Before the interviews, the researcher asked permission to record the interviews. The interview data were then transcribed and analyzed.

IV Data analyses

To analyze the data collected, the survey responses were first coded and input into the SPSS data sheet. The following sections describe the survey respondents and the results of analyses for the survey data. They also describe the analyses of qualitative data.

IV. 1 Descriptive statistics for survey data

Among the 250 questionnaires distributed, 178 were answered completely. Thirty four were incomplete and 38 did not return the questionnaires. The response rate, therefore, was 71.2%. Table II shows the demographic characteristics of the survey respondents. The table shows that majority of the respondents are between 21 to 30 years of age. Their educational level was mostly college and above and they had more than 5 years experience in using the Internet. About 67% spent between 28 to 42 hours online per week.

Table III shows the descriptive statistics. As shown in the

table, the mean score for the three variables in the table are below 4. Given that the scale for measuring the variables ranges from 1 to 7, where 1 represents “strongly disagree” and 7 represents “strongly agree” with the statement presented, and 4 is the neutral value, the mean score shows that respondents generally have low trust for electronic transactions, low willingness to use credit card in electronic transactions, and low intention to adopt B2C E-commerce.

The Pearson Correlations in Table III show that the two independent variables – perception of trust in electronic transaction and willingness to use credit card in electronic transaction – are positively correlated to intention to adopt E-commerce. There is also a positive correlation between willingness to use credit card in electronic transaction and perception of trust in electronic transactions.

IV. 2 Hypotheses testing

The hypotheses were tested using regression analyzes. The tests used three regression models. Each model corresponds to the hypothesis to be tested. For example, Model 1 has one independent variable and one dependent variable. The independent variable is the perception of trust in electronic transaction and the dependent variable is the intention to adopt E-commerce. After Model 1 has been tested, a second independent variable – which is the willingness to use credit card in electronic transactions – is added to the regression. Model 2, therefore, comprises two independent variables and one dependent variable. Hypothesis 2 is tested using Model 2. After testing Model 2, an interaction variable – which is created by the multiplication of the first two independent variables based on their centered scores – is added into the regression model. The new model, which is model 3, is used to test hypothesis 3.

Table II: Demographic characteristics of respondents (N=178)

| | | Freq | Percentage |
|------------------------|-------------------|------|------------|
| Gender | Male | 102 | 57.3 |
| | Female | 76 | 42.7 |
| Age | 21-30 | 128 | 71.9 |
| | 31-40 | 50 | 28.1 |
| Occupation | Student | 14 | 7.9 |
| | Employee | 123 | 69.1 |
| | Official | 9 | 5.1 |
| | Businessman | 10 | 5.6 |
| | Others | 22 | 12.4 |
| Monthly Income | Below \$5,000 | 8 | 4.5 |
| | \$5,000-\$8,000 | 66 | 37.1 |
| | \$8,001-\$12,000 | 39 | 21.9 |
| | \$12,001-\$20,000 | 58 | 32.6 |
| | \$20,000 or above | 7 | 3.9 |
| Education level | Secondary | 17 | 9.6 |
| | College or above | 161 | 90.4 |

| | | | |
|-------------------------------------|--------------------|-----|------|
| | above | | |
| Experience in using Internet | 3 years to 5 years | 17 | 9.6 |
| | Above 5 years | 161 | 90.4 |
| Online habit | 14 to 28 hours | 49 | 27.5 |
| | 28 to 42 hours | 119 | 66.9 |
| | Above 42 hours | 10 | 5.6 |

Table III: Descriptive Statistics

| Variables | N | Mean | Std Dev | Correlations* | |
|--------------------------------------------------------------|-----|------|---------|---------------|-------|
| | | | | T | W |
| Perception of trust in electronic transaction (T) | 178 | 2.97 | 1.61 | - | - |
| Willingness to use credit card in electronic transaction (W) | 178 | 3.41 | 2.09 | 0.456 | - |
| Intention to adopt E-commerce (A) | 178 | 3.35 | 1.16 | 0.418 | 0.363 |

*All correlations are significant at $p < 0.01$

Table IV summarizes the results of regression analyses. The table shows that in Model 1, the beta for the independent variable is positive and significant. Hence, hypothesis 1, which states that when people have a higher perception of trust in E-commerce, the more they will adopt the use of E-commerce, is supported.

Table IV also indicates that there is a significant increase in R-squared when Model 1 progressed to Model 2. The increase indicates that the addition of the second independent variable – willingness to use credit card in online transactions – provides additional explanatory power to the regression model. Note that the betas for the two independent variables are significant. Hence, hypothesis 2, which states that when people have a higher willingness of using credit card in E-commerce, the more people will adopt the use of E-commerce, is supported.

Table IV: Results of regression analyses

| Variables in model | Model 1 | Model 2 | Model 3 |
|--------------------------------|---------|---------|---------|
| Constant | 2.456** | 2.256** | 2.357** |
| Perception of trust | 0.302** | 0.230** | 0.188** |
| Willingness to use credit card | - | 0.121** | 0.106** |
| W x T | - | - | 0.163** |
| R2 | 0.175 | 0.212 | 0.236 |
| Change in R2 | - | 0.037** | 0.024** |

** $p < 0.01$

The centered scores of the two independent variables were used to calculate the interaction term in model 3. This was done to mitigate the problems of multicollinearity (Aiken and West, 1991). The results of the regression analyses show that there is a significant increase in R-squared when the interaction variable is added to Model 2. This result indicates that the interaction variable provided significant explanatory power to Model 3. Note that the coefficient of the interaction variable is significant. The value of the VIF for the interaction term is 1.239, which is within the limit that indicates multicollinearity is not a concern. The results, therefore, supports hypothesis 3, which states that trust and willingness to use credit card interact to influence usage of E-commerce.

Given that there is a significant interaction effect, the researcher proceeded to examine the nature of the interaction effect. First, the researcher divided the respondents into two groups – those with low and high willingness to use credit card in electronic transactions. Respondents who have W less than or equal to 3 were grouped as people who have low willingness to use credit card in electronic transaction. There are 108 respondents in this group. Respondents with W greater than or equal to 5 were grouped as having high willingness to use credit card in electronic transactions. There are 53 respondents in this group. Regression analyses were carried out to determine how trust and intention to adopt E-commerce relate to each other in these two groups.

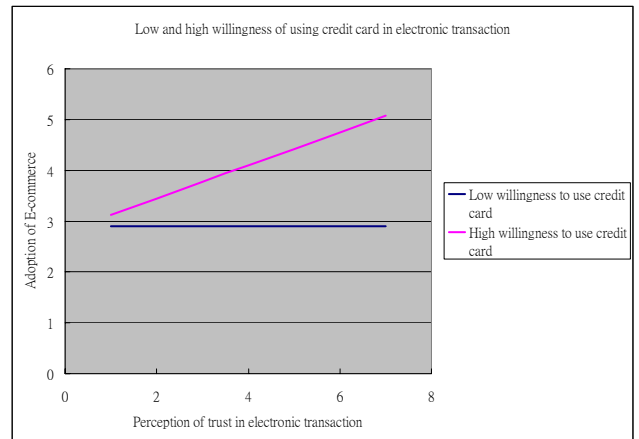
Table V summarizes the results of the regression for the groups with low and high willingness to use credit cards for online transactions. Figure 5 provides a graphical representation of the results shown in Table V. The graph in Figure 5 shows that when people have low willingness to use credit card in electronic transactions, the level of trust is not related to intention to adopt E-commerce. This is unlike the case when there is high willingness to use credit card in electronic transactions. In this case, the level of trust is positively related to intention to adopt E-commerce.

Table V: Regression analysis of low and high willingness to use credit cards

| Variables in model | Low willingness to use credit card | High willingness to use credit card |
|---------------------------------------------------|------------------------------------|-------------------------------------|
| Constant | 2.905** | 2.798** |
| Perception of trust in electronic transaction (T) | 0.072 | 0.325** |
| R2 | 0.009 | 0.278 |

** p<0.01

Figure 5: Graphical representation of low and high willingness to use credit cards



The study also divided the respondents into those with low and high perception of trust in electronic transactions. For respondents with T less than or equal to 3, they are grouped as people who have low perception of trust in electronic transaction. For respondents who have T greater than or equal to 5, they are grouped as having high perception of trust in electronic transaction.

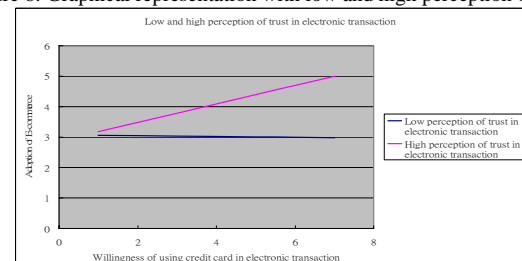
Table VI summarizes the results of the regression for the groups with low and high trust in E-commerce. Figure 6 provides a graphical representation of the results shown in Table VI. The graph in Figure 6 shows that when people have low trust in E-commerce, the level of willingness to use credit card for electronic transactions is not related to intention to adopt E-commerce. This is unlike the case when there is high trust in E-commerce. When there is high trust, the willingness to use credit card for E-commerce transaction is positively related to intention to adopt E-commerce.

Table VI: Regression analysis with low and high perception of trust

| Variables in model | Low Trust in E-commerce | High trust in E-commerce |
|----------------------------------------------------------|-------------------------|--------------------------|
| Constant | 3.075** | 2.880** |
| Willingness to use credit card in electronic transaction | -0.014 | 0.303** |
| R2 | 0.000 | 0.360 |

** p<0.01

Figure 6: Graphical representation with low and high perception of trust



IV. 3 Results of qualitative analysis

This study conducted separate interviews with 7 Internet users. The interviewees unanimously agreed that trust is “very important” in E-commerce. The interviewees said that in E-commerce, trading is performed without the physical interaction between the trading parties. Consumers, therefore, must trust each other completely when they are involved in E-commerce.

With regards to credit cards, the interviews found that they are very popular with the interviewees. The interviewees, however, used their cards mostly offline. Not many used their cards online. They felt that there is a difference in using credit cards online and offline. One interviewee, who used her credit “10 to 20 times a month” used her credit card for online transactions only twice. She said, “When I used it (credit card) online, it makes me a bit worried.” Another interviewee said she used her card “several times a month”, but she had not used her card for E-commerce. She went on to say, “The law protection for E-commerce is not enough in Macao. ... I think E-commerce is too new in Macao. ... At this time, I think I will not use E-commerce unless it has a great improvement on protection to the user.” Another interviewee shared the same feeling. She said the reason she was not willing to use her credit card online was because she thought that the security for E-commerce is not mature.

Despite the interviewees’ worries about using credit cards online, they generally think that E-commerce is advantageous because it is convenient. They think that western countries are large and people there cannot buy things easily. Westerners, therefore, are more willing to use credit card to do online transactions. Some interviewees felt that there was no need to use E-commerce in Macao because Macao is a small place and people can buy things easily.

The interviewees felt that they have no choice but to use credit card as the payment method if they decide to use E-commerce. Some interviewees said that digital signature can help to improve security. Another interviewee suggested that government can set up a central clearing house for every E-commerce transaction.

Besides trust and willingness to use credit card online, some interviewees have alluded that factors such as price, uniqueness and convenience are factors that may influence people to use E-commerce. People will choose E-commerce when it can offer a lower price than traditional commerce. Uniqueness will attract people to use E-commerce because people will use E-commerce once they cannot find the products they want in traditional commerce. According to the interviewees, people may only use E-commerce as a substitute to traditional commerce.

A number of interviewees also said that it is easy to disguise one’s identity over the Internet, even though it required some technical skills to avoid being detected by others. Most of the interviewees agreed, however, it is difficult to detect identity theft. Due to the fear of identity

theft, many interviewees ended up not using E-commerce.

V Discussion and Conclusion

This study has obtained three significant sets of results. The first showed that Internet users in Macao generally have low trust in E-commerce, low willingness to use credit card for E-commerce transactions, and low intention to adopt E-Commerce. The second showed that Internet users’ perception of trust in electronic transaction and their willingness to use credit card in electronic transactions are both positively related to intention to adopt E-commerce. These relationships are consistent with those found in prior research. The third set of results showed that there exists an interaction effect between trust in electronic transaction and willingness to use credit card in electronic transaction on intention to adopt E-commerce. This interaction effect provides a significant contribution to knowledge as it helps to shed light on why prior research has found only a small variance between trust and adoption of E-commerce. Prior research could have obtained a higher explanatory power on the relationship between trust and adoption of E-commerce if it had taken into consideration the willingness to use credit card in E-commerce transactions.

V. 1 Managerial implications

The results obtained from this study suggest a few areas the Macao E-commerce industry should focus in order to expand the industry. First, the results showed that trust is very important. To increase adoption of E-commerce, it is important that customers be provided with a trustworthy environment. Among the many ways that might help to develop trust, E-commerce companies should consider upgrading their computer hardware and software so that with the advantage of new technologies, the companies can increase the security of the transaction environment. It will make more people trust E-commerce once the environment becomes more secure. Trust may also be developed through other means such as building a good reputation or having a good company image. Companies should think of ways that can help to develop their reputation and image so that there will be more E-commerce customers.

The results obtained from this research also imply that willingness to use credit card in electronic transaction could influence adoption of E-commerce positively. It is important, therefore, to increase willingness to use credit card in electronic transaction. Most of the Internet users interviewed said they were reluctant to use credit card over the Internet because of their concern regarding security of the Internet. It is important, therefore, to address this issue. The industry should consider using newer technologies to innovate and improve on internet security. The industry should also develop payment methods to complement or substitute credit card payment. While credit card is currently the primary method used for payment in E-commerce transactions, other methods of payment could also be developed.

V. 2 Limitations

The results obtained from this research are subject to a number of limitations. First, the results should be interpreted in the context of the research setting. The research was carried out in Macao, and as such, the results are applicable only to E-commerce in Macao. The results may not be generalizable to E-commerce in other countries. Second, the selection of respondents and interviewees for this research was based mostly on the researchers' contacts. Most participants were from similar sectors of the society, that is, they are mostly white-collar workers. Nevertheless, the researcher has found that the demographic characteristics (in terms of age and educational level) of the respondents in this study are similar to those of another study on the Internet users in Macao (Cheung and Wang, 2004).

VI. II Direction for future research

While this study has found that trust and willingness to use credit card for online transactions are variables that influence intention to adopt E-commerce, future research should explore other factors that may also influence E-commerce adoption among Internet users in Macao. For example, advertisements, government regulations, pricing strategies and after sales services may be possible factors that are related to consumers' adoption of E-commerce in Macao. Future studies may help to shed light on these factors. As suggested by the interviewees, future research may also focus on developing safer payment methods for E-commerce transactions.

References

- [1] Aiken, L.S. and West, S.G. *Multiple Regression: Testing and Interpreting Interactions*, Sage, Newbury Park, CA, 1991.
- [2] Ajzen, I. and Fishbein, M. *Understanding Attitudes and Predicting Social Behavior*, Englewood Cliffs, NJ: Prentice-Hall Inc., 1980.
- [3] Bergstein, B. (2005). Security Leak Reveals Weaknesses In Credit Card Processing System, Information Week, June 21, retrieved from <http://www.informationweek.com/story/showArticle.jhtml?articleID=164901395>
- [4] Bhatnagar, A., Misra, S., and Rao, H.R. (2000). On risk, convenience, and Internet shopping behaviour – why some consumers are online shoppers while others are not, *Communications of the ACM*, vol.43, issue 11, pp. 98-105
- [5] Bhattacharjee, A. (2002). Individual trust in online firms: scale development and initial test. *Journal of Management Information Systems*, vol. 19, issue 1, pp. 211–241.
- [6] Cao, X. and Mokhtarian, P.L. (2005). The Intended and Actual Adoption of Online Purchasing: A Brief Review of Recent Literature. Available at: <http://www.its.ucdavis.edu/publications/2005/UCD-ITS-RR-05-26.pdf> retrieved August 29, 2005
- [7] Chang, M.K., Cheung, W.M., and Lai, V.S. (2004). Literature derived reference models for the adoption of online shopping. *Information & Management*, vol. 42 pp. 543-559
- [8] Cheung, W.H. and Wang, U. (2004). Statistical Survey on the Internet Development in Macau S.A.R., Available from: <http://www.cnnic.net.cn/html/Dir/2004/02/06/2121.htm> retrieved May 31, 2004
- [9] Gefen, D. (2000). The role of familiarity and trust. *Omega-International Journal of Management Science*, vol. 28, issue 6, pp. 725-737.
- [10] Gefen, D. (2002). Reflections on the Dimensions of Trust and Trustworthiness among Online Consumers. *ACM SIGMIS Database*, vol. 33, issue 3, pp. 38-53
- [11] Gefen, D., Karahanna E., and Straub D.W. (2003). Trust and TAM in online shopping: an integrated model. *MIS Quarterly*, vol.27, issue 1, pp. 51-90.
- [12] Kim, K.K. and Prabhakar, B. (2004). Initial trust and the adoption of B2C e-commerce, *The case of Internet banking*. vol. 35, issue 2, pp. 50-64.
- [13] Martinsons, M.G. (2002). Electronic commerce in China: emerging success stories. *Information & Management*, vol. 39, pp. 571-579.
- [14] Mayer, R.C., Davis, J.H. and Schoorman, F.D. (1995). An Integration Model of Organizational Trust, *Academy of Management Review*, vol. 20, issue 3, pp. 709-734.
- [15] Pavlou P.A. (2003). Consumer Acceptance of Electronic Commerce: Integrating Trust and Risk with the Technology Acceptance Model. *International Journal of Electronic Commerce*, vol. 7, issue 3, pp. 101-134.
- [16] Rotter, J.B. (1971). Generalized Expectancies for Interpersonal Trust. *American psychologist*, vol. 26, issue May, pp. 443-450.
- [17] Sienkiewicz, S.J., and Bocicchio, M. (2002). The future of E-commerce payments. Available <http://www.phil.frb.org/pcc/conferences/futurepayments0902.pdf> retrieved June 20, 2005
- [18] Suh, B. and Han, I. (2003). The Impact of Customer Trust and Perception of Security Control on the Acceptance of Electronic Commerce. *International Journal of Electronic Commerce*, vol. 7, issue 3, pp. 135-161.
- [19] Szymanski, D.M., and Hise, R.T. (2000). e-Satisfaction: An initial examination, *Journal of Retailing*, vol. 76, issue 3, pp 309-322.
- [20] Yoon, S.J. (2002). The antecedents and consequences of trust in online-purchase decisions. *Journal of Interactive Marketing*, vol.16, issue 2, pp. 47-63.