

## E-Payment in Terms of Trustworthiness among Klang Valley Community

Amirrudin Kamsin, Md Nor Ridzuan Daud, Wong Jun Bill

Faculty of Computer Science & Information Technology, University of Malaya, 50603 Kuala Lumpur, Malaysia

Tel: +603 79676349 Fax: +603 79579249

Email: amir@um.edu.my; ridzuan@um.edu.my

### ABSTRACT

*Electronic commerce (e-commerce) as we know today has evolved through various stages of technological development. Besides that, e-commerce offers various types of services and product to provide better services to the customers. However, there are many aspects which become the barriers for consumers to make an e-payment transaction on the Internet. For e-payment, trust means a person willingness to invest time, money and personal data in the e-commerce in return for a goods or a service that meet certain expectations. This research is to determine the level of trustworthiness of the e-payment for the Klang Valley community and the current e-payment system's weakness.*

### 1.0 INTRODUCTION

Nowadays, the IT technologies are becoming more advance and secure as we are one more step closer to implement a cashless society. Credit card is becoming a dominant form of payment on the web. Their electronic nature allows customers and e-commerce stores to pay and receive payment immediately. It is clear that without proper functioning of the payment and billing processes, an online company will have difficulty producing anything other than virtual profits. Electronic commerce also experiences problems such as consumers afraid to make online transactions because they do not trust the technological infrastructure that support the transactions in this virtual environment.

#### Problem Definition

A major difference between offline and online credit card transaction (e-payment) is that the credit card is physically present in an offline transaction, while in e-payment it is refer as card-not-present transaction. When fraud happen occurs online, e-commerce merchant are often helpless to protect themselves as they are unable to produce a valid record sale, such as a signed receipt because the credit card is not physically present during transaction. As for the user, exposing the number of their credit card online means facing a higher risk of fraud to occur. All a potential thief needs to commit a crime online is a valid credit card number, name and expiration date. No signature or identification is required and the thief does not even need to physically have the card. As a result, credit card fraud occurs online at least 10 times greater than credit card fraud rate in the offline world. These bring us to question the trustworthiness of e-payment among the online user.

#### Purpose of the Study

The purpose of the study is to highlight the security and trustworthiness of e-payment among community of

Klang Valley, as well as those online companies that use the e-payment transactions. The study is concentrate on the security and trustworthiness of e-payment because it is an important method that can affect both community and the online company seriously. During the online transaction, all the important and confidential information of the customers especially credit card numbers are travel over the Internet. Because of the drastic development in technology, there have much software that can be use by the hacker to retrieve the important information of customer over Internet. In addition, there also have many frauds on the online transaction. So, it is important for consumers and online companies that use the e-payment transaction, to have safe and successful transactions over the Internet.

From the study, users will know more about the security and method that the company uses to make the online transaction more secure and reliable. The company will let the users know that the security of online transaction really works in real time. So, the users can do any online transaction on Internet without any doubt. Besides, the study will also help the online company to know what's wrong with their security on Internet that may affect their business, as well as how to improve or enhance the existing security policies.

#### Scope of survey

The scope of the research is to determine the trustworthiness of e-payment among the community of Klang Valley residents. This means the survey for the project was conducted within the Klang Valley area. The trustworthiness of the e-payment that we are going to determine includes the level of the E-payment security and also the level the of the E-payment efficiency in their view, besides that, what aspect that the current E-payment system need to improve so that it can really represent the traditional payment which is pay by cash.

#### Limitation

There are a few significant limitations of the study which might lead to the unreliable of the research and it must be taken into account in interpreting the result:

- i. The project was conducted only in Klang Valley (the research area is not wide enough).
- ii. Short of number of survey correspondents (only 150 surveys were collected).
- iii. The result might be biased given by the group age, the limited Internet experience, and the

gender mix and education level of the correspondents.

## 2.0 LITERATURE REVIEW

### Existing E-Payment System

#### Example 1: AirAsia

##### Overview

AirAsia is Asia's first low fare, no frills, airline serving domestic and international routes from its hubs in Malaysia and Thailand. Since its inception in December 2001, AirAsia has revolutionized air travel in Malaysia and singularly grown the air travel market in the region through its low fares model, and innovative distribution channels. The airline has been awarded "Asia Pacific Airline of the Year 2003" by Centre of Pacific Aviation (CAPA).

##### The AirAsia Website and Online Ticket

The online services of AirAsia have been launched since 2002. From the website, users are allowed to check flight schedule and other information like travel agencies, its promotion and etc. Besides, users also can buy its flight ticket through the website and in the year of 2003, there are approximately 40% of its overall bookings are made through their online e-payment system (Jake 2004) [8]. From this figure, we believe that the company's implementation of the online ticketing has been a successful one.

Basically, AirAsia solves the security of their e-payment system by using two methods – users need to login to the main page and secondly, the system is designed as a SSL (Secure Socket Layer) web which is the similar architecture of most of the existing e-payment systems. SSL is originally developed by Netscape and it has been widely used by the World Wide Web for authenticated and encrypted communication between clients and servers.

Currently, AirAsia e-payment system provides only one payment method – credit card. Initially, the MasterCard was the only credit card that used for the transaction. However, for now, both MasterCard and VisaCard can be accepted as modes of payment for the online service.

#### Example 2: eBay

##### Overview

Founded in September 1995, eBay is the world's online marketplace for the sale of goods and services by a diverse community of individuals and businesses. Today, the eBay community includes tens of millions of registered members from around the world and it offers a wide variety of features and services that enable members to buy and sell on the site quickly and conveniently [6]. People visit the eBay marketplace to buy and sell items in thousands

of categories including antiques and art, books, business, clothing, computers, real estate and etc.

##### The Online Payment

Since eBay is the online marketplace, it should have a service that allows their customer to do their money transaction. This service is accomplished by PayPal. However, their clients also can use credit card for the payment.

##### What is PayPal?

PayPal is the world's largest online payment network, serving over 50 million members in 45 countries [13]. It provides the world's first instant and secure online payment services. With PayPal, individuals and businesses can send and receive payments through the Internet. This revolutionary new service provides a safer, faster, easier, and cheaper way to move money in today's digital economy. PayPal is using the best commercially available technology and procedures to protect the security of individuals online transactions. PayPal automatically encrypts confidential information in transit from client computer to their computer using Secure Socket Layer with an encryption key length of 128-bits which is the highest level commercially available. Besides, the PayPal Buyer Protection provides online trading community a safer and more secure business environment in dealing their goods.

##### What is Electronic Payment?

Electronic payment (e-payment) is the latest method of payment which is expected to grow tremendously with more and more users prefer to shop online rather than the traditional way of trading. As technology becomes more and more advancing, the method of payment has also evolved from barter system through bank notes, checks, credit cards, and at present the electronic payment systems. E-payment has become a very important means of payment as it is considered the most effective way to make payment in this presently modern style of living. Just like the traditional method of payment which faced with security problems such as counterfeit bank notes, bounce checks must have data integrity and authorization to ensure that all communications between both parties must be secured from undetectable modification and only authorized user can make the necessary transactions. Confidentiality is where all sensitive Internet communications and transactions, such as the purchase content, amount, identity of buyer and credit card information must be kept secret. Availability and reliability is the underlying networking services and all software and hardware components are sufficiently dependable.

According to Schudelaro (1997) [15] electronic payment can be divided to two kinds: The remote access payment instruments and electronic money instruments. The remote access payment instrument is an instrument which permits users to access the money in their bank account of a particular bank and

with proven identity such as personal identification number (PIN) will be able to instruct the bank to transfer the required amount of money to a payee. Among the popular examples for remote and forge signatures. Electronic payments also faced such kind of problems with the additional threat: Unlike paper, digital “documents” can be copied perfectly and arbitrarily often; digital signatures can be produced by anybody who knows the secret cryptographic key; a buyer’s name can be associated with every payment, eliminating the anonymity of cash (Asokan et al., 1997) [2].

Generally, electronic payment systems must exhibit integrity, authorization, confidentiality, availability, and reliability (Asokan et al., 1997) [2]. Online stores access payment instruments are credit, debit, deferred debit and charge cards. The electronic money instrument is a reloadable payment instrument on which value units are stored electronically in a stored-value card or a computer memory.

### **Trust**

Trust is undoubtedly an important feature of our daily life. Without a background of trust, we would suffer from a loss of our precious things. In the context e-commerce, trust means a user’s willingness to spend money, time and give their personal data to the e-commerce store in return of merchandise and services that meet their expectations. The more the consumer trusts an e-commerce store, the higher risk he or she is willing to take when dealing with the website. Trust has been an important research that must be conducted for an e-payment system development. Lanford & Hubscher [11] reported that trust is the key success for electronic commerce. Also Doney and Cannon (1997) [4] defined trust as an important qualifier for a purchase decision.

From a study conducted by Consumer WebWatch shows that there are less than 30% of online shoppers trust online stores and 80% feel it is important that online stores should be trustworthy [3]. Quelch and Klein (1996) [14] conjecture that in the early development of the Internet, trust is a very crucial factor in encouraging purchases over the Internet. Electronic commerce is much interrelated with electronic payment, as online transactions will only occur when consumers feel safe and protected to shop online. Thus, consumers’ undecided mind of whether to make any online transactions or electronic payment has been recognized as one of the most important factor for any online transactions to occur (Ang et al, 2000) [1].

The users of e-payment system are mostly afraid of two types of risks: financial risks (the translation can be fraudulent) and identity risks (the possibility of misuse or fraudulent use of personal information). Dowling and Staelin (1994) [5] defined risk as a consumer’s perceptions of the insecurity and undesirable result of one engaging in a transactions

activity. The Internet is a global, open and ever changing marketing channel. It is very difficult for a person, an organization or even government to control to what extent the e-commerce site is trustworthy enough for consumers to make an online transactions. Nowadays, consumers are more educated and aware of their consumer’s rights so it is very important that an online store have all the necessary security features such as passwords for those who intend to make transactions, encryption, digital certificates, digital signatures and Secure Sockets Layer (SSL) (Asokan et al, 1997) [2]. However, this solution doesn’t automatically make the web site trustworthy. The implemented security techniques should be visible and clearly explain to the user.

There are several factors that influent trust in e-payment systems: privacy, information credibility and ease of use. Privacy concerns usually follow security concerns in survey. People are sensitive about their personal information. Web merchants are usually only ask for the necessary information and provide explanations about why the requested information is needed and assure about security of personal information given by user. Company information and information about the offered services should be clear, easy to find and up to date. The design of the web site or web application is easy to use and users are happy to visit the site.

## **3.0 METHODOLOGY OF SURVEY**

### **Survey Sampling Techniques**

The sampling technique we used is to define a subset of a whole survey population. It is a repeatable plan developed to randomly choose a sample capable of meeting the survey’s goals. Random sample of a suitable size is taken, so we will be able to make statistical inferences to describe the population based on the results of our sample survey. The reason for taking a random sample is to maximize the probability that our sample is representative of the population from which it is drawn.

There are few sampling techniques, which we performed:

- i. Randomization – a sampling technique characterized by having no predetermined pattern or plan for selecting sample data.
- ii. Stratification – a systematic sampling technique that attempts to reduce the variance of estimates by spreading out the sampling.
- iii. Cluster sampling
- iv. Model based sampling

### **Type of Sampling Error**

As with any survey, opinion surveys are subject to various types of error survey results may incorrectly reflect the population of interest. Errors in opinion surveys have two main sources: sampling and

measurement (response) difficulties. There are four main types of sampling and measurement problems.

- i. Sampling- Survey data will also always have sampling error since multiple samples from the same population are likely to collect data from different population members.
- ii. Non-response Error- In addition, because some people refuse to participate, survey data suffers from non-response error.
- iii. Response Error- Finally, even if a potential respondent can be contacted and agrees to participate, they may not answer the survey questions accurately or consistently causing response error.

### Survey Method

Surveys can be divided into two broad categories, which are the questionnaire and the interview. Questionnaires are usually paper-and-pencil instruments that the respondent completes. While, interviews are completed by the interviewer based on the respondent says.

- i. Questionnaire  
There are many ways we can conduct a survey through questionnaire including mail survey, group questionnaire, online website and others.
- ii. Interview  
There are few ways we can conduct an interview. In the personal interview, the interviewer works directly with the respondent. Whereas, the telephone interviews conduct through phone enable a researcher to gather information rapidly.

It's hard to compare the advantages and disadvantages of the major different survey types. Even though each type has some general advantages and disadvantages, there are exceptions to almost every rule. Here's our general assessment. After considering the pros and cons we choose those conduct a questionnaire through groups.

### Design Question Needs

#### Determine Type Question

We decided to use Structured (Fixed-format question) type in our survey questions. There are a few varieties of structured questions that we have considered which are Dichotomous questions, scale-based questions and multi-option variable. To ease the procedure of answering for the respondents, we use multi-option variable type of questions. For this kind of question, the respondents need to select any of the option that we have prepared for them. This mean we must be careful when we analyze data from a multi-option variable. It is because this type of variable act though each option is a separate variable.

### Target

#### Form Distribution

Firstly, we distribute the form to each of our member. Then, we are separated among our individual. Each of us will then distribute the form of survey according to

different area in Klang Valley. The survey participants must be age 15 and above and must be Malaysian citizen. There are no other specific criteria that we to tend considerate when doing sampling. Thus, those who are not among the working class, not having IT background or internet connection at their home can participate in the survey. However, due to obtain more specific and reliable information about online payment and other information needed in the research, we tend to concentrate on those who had internet connection and those who perform payment online.

### Success Measures

We have fixed our duration for conducting the survey into 2 weeks. After that, we will collect back our questionnaire and we will pick out 150 forms as our data for analysis. The scope of our survey might not be that big because of our lack of people in our group which is restricted to six persons.

### Completion Criteria

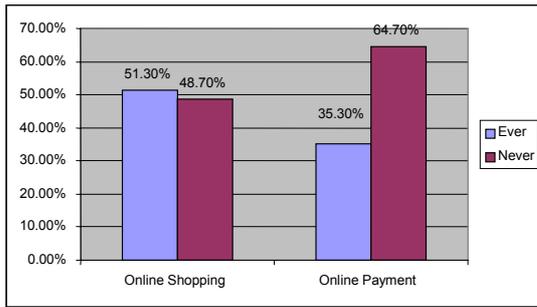
After the requirement gathering, we have choose our survey methodology, determine relevant format to design our questionnaire using multiple-option format and also design the question to obtain information from the respondent. We also determine the distribution of our form to obtain the best information and scope.

## 4.0 ANALYSIS

In this section, we begin with giving brief analysis of respondents' background and experience on making online payment. Next we present result about the variables of respondents' trust in e-payment on Internet.

### Background

Figure 1 shows the respondents' involvement on online shopping and making online payment on the World Wide Web. The result shows that 48.7% of the community in Klang Valley never done any online shopping before, while 51.3% had done so. There are approximately 35.3% of the respondents had made online payment whereas 64.7% never make online payment or e-payment. From the graph, we notice that there is a big difference between number of respondent who do online shopping and make online payment. This implies that people who usually do online shopping is not necessary choose to do the online payment. Many of the respondents who do not make any online payment because they felt doubtful on the new payment method. Other reasons were they do not have a credit card and some of them are not computer literate.



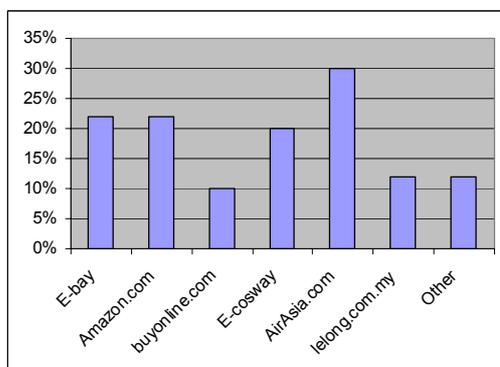
**Figure 1:** Percentage of respondent that do and do not online shopping and make online payment.

Majority of the category that ever made online payment is those from the age range of 21-30 (see Figure 2). This is probably because they have regular income and many of them own a credit card and thus they can use their credit card for online payment. There are only 3 out of 150 respondents (2%) whose age is between 15-20 are ever made their payment online. All of the 3 respondents are student and they do not own any credit card or supplementary card, so this become the barrier for them to online shopping as the most popular e-payment method is using credit card or debit card.

	AGE	Online		Total
		Ever	Never	
	15 -	2.0%	2.0%	4.0%
	21 -	5.3%	18.7%	24.0%
	26 -	16.7%	23.3%	40.0%
	31 -	4.0%	6.0%	10.0%
	36 -	3.3%	6.7%	10.0%
	> 40	4.0%	8.0%	12.0%
	Total	35.3%	64.7%	100.0

**Figure 2:** Comparison of respondents who do and do not make online payment with different group age.

Many services and products can be found in the e-commerce website. Figure 3 shows the most visited web merchants.



**Figure 3:** Percentage of selected websites for online shopping.

From the number of respondent who do online payment (53 person), 67.2% of them suggest that e-payment is convenient. Most of the web site is designed user friendly and it is easy to use for the

users. Furthermore, nowadays people prefer to buy thing without travel around to avoid traffic. On the other hand, 40% of them claimed that e-payment is saving their time. Overall of this, 92.5% of the community satisfied with the current online purchase as the product or service they purchased delivery on time.

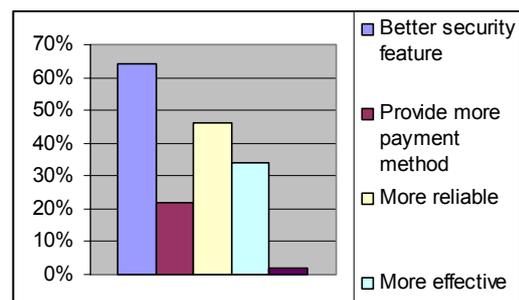
**Trustworthy of E-Payment**

There are several methods to do transaction on the Internet. However, the result shows that credit card dominants the highest percentage of the payment method. 94.3% of the 53 person use credit card to purchase goods and services. This result is correspond to what we have expected because credit card payment is the most popular method that offered by most e-commerce website.

Around 83% from those who make online payment did not face any problem with the transaction they had done before. This means 17% of them have had problem with the e-payment and the number is too high from the perfection. Thus, we do not believe that the result is correct. However, the e-payment systems should be more reliable and secure so that the errors made in the system can be reduced.

Trustworthiness of the e-payment system has been the most important criteria of a person to purchase online. 64% of the respondents trust the online payment and the rest feel that the current system do not secure enough and they scared that their personal information will be stolen, some of them afraid of the case of fraudulent, and others do not trust the web merchant.

Besides that, the result of the survey shown that the current E-payment system should be improved with better security features (64%). This suggests several things. Web merchants have at least addressed basic security concerns over the e-payment, while Internet users, despite wanting to see better security features, there are still a number of respondents use the e-payment and have faith the web merchants would make their sites even more secure. On the other hand, 46% of the respondents wanted more reliable e-payment system, 34% wanted effective online payment service and 20% expect more payment methods.



**Figure 4:** User's demand of better e-payment system.

## 5.0 DISCUSSION AND CONCLUSION

The main objective of this paper is to study the perceptions of trustworthiness of the Internet among the Klang Valley community. While online shopping has become a trend among consumers, especially among the young and working class because of their steady income and most of them owned at least a credit card. Some of the reasons why consumers choose to shop online are because of convenience, to avoid traffic jam and save time. However they are also skeptical about the method of payment which posed a greater risk for them, compared to the traditional way of trading.

Credit card is the primary method of payment for online transactions. By choosing credit card over the Internet, which is in a card-not-present environment, users are exposed to greater risk of fraud. Several factors that influence trust in e-payment system are privacy, information credibility and ease of use. Trustworthiness has become an important criterion for online transactions. While majority of users might choose online shopping, but they don't really trust the method of payment because they felt that the current security system is not safe enough, personal information may leak and some even don't trust the web merchant. Thus electronic payment systems must exhibit integrity, authorization, confidentiality, availability and reliability. With these attributes, it is hope that e-payment will gain more popularity and trust from consumers.

From the survey, we concluded that several needs are not met related to consumer interests: reduce consumers' risk and establish good relationships with consumers and e-commerce website should have strong reputations. Electronic payments might not completely replace traditional payment systems, but there is plenty of room for improvement to make it a more reliable and trustworthy.

## REFERENCES

- [1] Ang, L., Lee, B. Influencing Perceptions of Trustworthiness in Internet Commerce: A Rational Choice Framework. In *Proceedings, Fifth COLLECTer Conference on Electronic Commerce*, Brisbane, 13-14 December 2000.
- [2] Asokan, N et.al The State of the Art in Electronic Payment Systems *Computer*, September 1997, 28-35
- [3] Consumer WebWatch Research Report. A Matter of Trust: What Users Want From Web Sites. Princeton Survey Research Associates, April 16, 2002, <http://www.consumerwebwatch.org> .
- [4] Doney, P. M., & Cannon, J. P. (1997) An examination of the nature of trust in buyer-seller relationships. *Journal of Marketing*, 61, 35-51.
- [5] Dowling, G. R., & Staelin, R. (1994). A model of perceived risk and intended risk-handling activity. *Journal of Consumer Research*, 21, 119-134.
- [6] eBay Inc.(2004) *eBay Security Center*, [Online], Available: <http://pages.ebay.com/securitycenter/> [1 Aug 2004].
- [7] Egger, F. N. Affective Design of E-Commerce User Interfaces: How to maximise perceived trustworthiness. *Conference on Affective Human Factors Design*. Singapore, June 27-29, 2001, pp. 317-324.
- [8] Jake, L.S. (2003) *Malaysia takes off with no-frills airline*, [Online], Available: <https://www.airasia.com/news.php?f=aboutus/papers&p=160603> [5 Aug 2004].
- [9] Jarvenpaa, S. & Tractinsky, N. Consumer Trust in an Internet Store: A Cross-Cultural Validation. *JCMC*, 5:2, December 1999.
- [10] Keen, P. G. W. (1997, April 21). Are you ready for "trust" economy? *ComputerWorld*, p 80.
- [11] Lanford, P. & Hübscher, R. Trustworthiness in E-Commerce. *ACM Southeast Regional Conference*. Alabama, April 2004, 315-319.
- [12] Panurach, P. Money in Electronic Commerce: Digital Cash, Electronic Fund Transfer, and Ecash. *ACM 39, 6 (June 1996)*, 45-50.
- [13] PayPal (2004) *About us*, [Online], Available: <http://www.paypal.com/> [2 Aug 2004].
- [14] Quelch, J. A., & Klein, L. R. (1996). The Internet and international marketing. *Sloan Management Review*, 37, Vol. 3, 60-75. *Regional Conference*. Alabama, April 2004, 315-319.
- [15] Schudelaro, A.A.P. Electronic Payments and Consumer Protection: Should Recommendation 97/489/EC Be Replaced With A Directive? *Computer Law and Security Report 17, 2 (2001)*, 105-109.
- [16] Tan, Y.H., and Thoen, W. Formal Aspects of a Generic Model of Trust for Electronic Commerce. In *Proceedings of the 33rd Hawaii International Conference on System Sciences*, IEEE 2000.