A Risk Perception Analysis on the use of Electronic Payment Systems by Young Adult

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Abstract: - The use of technology in commercial activities for many years has led to the emergence of various new supporting services in the marketplace. Among the services is the e-payment which enables payment done via the electronic medium and without involving any physical cash. E-Payment systems have received different acceptance level throughout the world – some methods of e-payment are highly adopted while others are relatively lower. Primarily, perceived risk associated to the payment systems is believed to be one of the contributing factors to the low adoption rate. This study aimed to identify young adult's perception of e-payment risk and their behaviour towards different payment methods. For the data collection purpose, survey questionnaires were distributed to students from tertiary institutions in a metropolitan city in Malaysia as the study sample. The findings showed significant difference in perceived risk between cash and E-Payment but less significant in terms of volume of purchase. We discuss the implications of the findings to service providers and policy makers and offer some recommendations to improve the e-payment systems quality. Finally, the limitations of study and future directions of research are discussed.

Key-Words: - E-commerce, payment systems, risks, cash, payment cards.

1 Introduction

As Malaysia is geared to be a fully developed country by year 2020 the interest to grow at an accelerated pace and be more competitive is paramount. Apparently, advancement in technology and aggressive adoption of technology at micro or macro level of the economy is seen as one of the critical success factors to obtain an edge and sustain in the digital economy. The benefits derived from technology adoption are tremendous - technology serves as an enabler for the production of high quality products and services, allowing firms to operate in a cost effective manner, and in some cases, widen the market reach. From a consumers' perspective, technology such as the Internet gives greater value, such as convenience, wider selection of products and services at lower prices. One of the technology-based services which provide convenience in conducting transactions is the Electronic Payment (E-Payment).

By far, E-Payment system is considered as one of the crucial support services in the supply chain spectrum of a digital economy. Efficient and reliable E–Payment systems enables faster payment, better tracking of transactions as well as transparency, in turn reduces lead time, induces cost savings and promote trusting relationships between buyers and sellers. With the rapid development and adoption of technology in activities involving financial transactions, users who assimilate and experience the quality of E-Payment technology tend to form their own perception and expectation. More affluent users may have higher expectations towards the service quality of the E-Payment system. Likewise younger consumers who are usually characterized as risk takers (higher risk tolerance) may have different perception of the E-payment system service quality. A recent survey conducted by The Nielsen Company [1] reported that there will be a positive outlook for online shopping in Malaysia and the projected transaction to reach RM5billion by 2015. Hence, the adoption rate of the E-Payment system will grow simultaneously. As of year 2010, the young adult segment aged 18 years and older, has contributed a significant amount of RM1.1million. Since young adult represent the fastest growing segment of consumers of technology-based services such as the Internet and mobile applications, a study to understand the young

adult's perception of risk in relation to E-Payment system is worthwhile.

2 Literature Review

2.1 Defining E-Payment Systems

Generally, the term 'electronic' in the E-Payment refers to the mode of payment which does not involve physical cash or money. In other words, any forms of *cashless* method which include amongst, bill payment using the automated teller machines (AT), credit and debit cards, payments via the Internet and so forth. In Malaysia, several forms of E-Payment that are widely used and they include credit cards, debit cards, smartcards (such as, MEPS cash, Touch 'n Go, Maxis FastTap), e-wallet and payment via Automated-Teller machines (ATMs).

2.2 Economic Contribution of E-Payment Systems

Despite the importance of cash as the preferred mode of payment, based on the Financial Stability and Payment Reports issued by the Central Bank of Malaysia – Bank Negara Malaysia (BNM), the use of payment cards as a form Electronic Payment (E-payment) in Malaysia has recorded a marginal increase of 4.5% in year 2009 as compared to 11.7% in year 2008[2].

E-payment confers various benefits both to consumers as well as businesses [3]. From a consumers' point of view, e-payment provides convenience and time savings. On the other hand, merchants' or service providers' would benefit from faster payment process. E-payments have taken significant percentages as compared to the country's Gross Domestic Product (GDP). Among the greatest turnover of E-Payments as compared to the GDP are the credit Interbank GIRO and credit card. The breakdown of the percentage of GDP to the E-payments from year 2006 until year 2010 is shown in Table 1 [3].

Table 1: Percentage to GDP of the E-Payments [4]

Turnover to GDP	2006	2007	2008	2009	2010
Credit card	8.3	8.8	8.8	10.2	10.4
Charge card	0.4	0.4	0.4	0.6	0.7
Debit card	0.1	0.2	0.3	0.4	0.6
E-money	0.2	0.3	0.3	0.3	0.4
Interbank GIRO	8.0	10.4	12.1	16.0	16.6
Malaysian Electronic Payment System (MEPS) Direct Debit	(No data)	0.1	0.1	0.3	0.5
ATM	0.4	3.6	2.6	2.9	4.1

Credit cards and debit cards are widely used in many business transactions. Among the largest business activities in which purchases are transacted with these two types of E-payment cards are retail purchases such as from hypermarkets, clothing stores and others; professional services which also include medical, insurance, accounting, auditing; fuel or petrol; mail and telephone order; food and restaurant; and utilities. The breakdown of volume and value of these business activities for year 2009 and 2010 is shown in Table 2 [5].

Table 2: Five Largest Business Activities conducted in Malaysia where its purchases were using Credit Card and Debit Card [5]

Business activities	2009		2010	
	Volume	Value	Volume	Value
	% share of total for credit card			
Fuel/petrol	31.9	8.3	31.3	7.6
Retail	26.3	31.4	27.3	31.1
Professional and commercial services	9.4	20.1	11.0	21.6
Mail and telephone order	6.9	8.4	6.7	7.5
Utilities	5.3	5.2	5.2	4.7
Others	20.1	26.7	18.5	27.5
	% share of total for debit card			
Retail	48.9	35.2	49.2	34.7
Fuel/petrol	23.3	4.8	21.3	4.4
Professional and commercial services	6.8	9.2	8.1	10.8
Food and restaurant	6.5	2.9	6.2	2.9
Utilities	3.1	2.1	3.9	2.6
Others	11.4	45.8	11.2	44.8

The examination of risk factors could determine the success of e-payment as well as internet payment system implementation [6] It also affects the level of trust of a company and its offerings [7 - 8].

2.3 consumers Perceived Risk and the Adoption of E-Payment

Despite the increase usage of E-Payment by the consumers in general, the use of E-Payment among young adult is relatively low. As this group of consumers is forecast to be the heavy users of e-payment system in the near future due to their technology literacy and income levels, studies to understand young adult behaviour towards e-payment system merit further investigation. One of the ways to encourage wider usage of E-Payment is to understand the perception of risks by the users, in turn the understanding will assist service providers and policy makers to offer better services and introduce policies to mitigate risks and exposures to risks.

Hence, this study aims to achieve the following objectives:-

1. To determine the difference perceived important risk dimensions between cash and E-Payment;
2. To explore whether the level of perceived risks differ among cash and E-Payment; and
3. To examine the difference in level of perceived risks in large and small amount purchases.

In Malaysia, the common E-Payments instruments particularly in retail businesses are credit cards, charge cards, debit cards, and e-money. Their description within Malaysian's context is presented in Table 3[9].

Table 3: The E-Payment instruments used in Malaysia [9]

Credit cards	A credit card enables its holder to buy goods and services with a credit line given by credit card issuer and the amount will be settled at a later date. Cardholders are billed on a monthly basis and cardholders would have to bear finance charges (interest) on the outstanding amount if payment is not made by the due date.
Charge cards	The functionality of a charge card is similar to a credit card. However, charge card holders must settle their outstanding amount in full by the due date every month. Since charge cards are often associated with prestige, the fees are generally higher than credit cards.
Debit cards	A debit card is a payment card where the transaction amount is deducted directly from the cardholder's bank account upon authorisation.
E-money	E-money is a payment instrument that contains monetary value that has been paid in advance by the user.

At a general level, as users interact with a new technology, they will learn the usefulness as well as the risks associated with the technology. Technology Acceptance Model (TAM) proposes that an increase in perceived usefulness leads to a greater intention to use [10]. This study extends this proposition to infer that perceived risk influences the intention to use the e-payment system. While there are other factors affecting consumers' adoption of technology, perceived risk is an impediment to the adoption of e-payment system [11] [12]. In brief, perceived risk may influence the attitude and behaviour of consumers towards the e-payment services [13 -14].

Perceived risk is defined as an assessment of uncertainties or lack of knowledge about the distribution of potential outcomes [15] and the uncontrollability of outcome attainment [16]. In the case of using the e-payment services, it is possible that consumers may perceive disclosing their credit card information as risky, and they have no control over this [17]. Chellappa and Pavlou [18] describe information security as the subjective probability with which consumers believe that their personal information will not be viewed, stored or manipulated during transit or storage by inappropriate parties, in a manner consistent with their expectations.

Indeed, uncertainties about how their financial information is treated by service providers and/or merchants will increase perceived risk associated with electronic transactions. This study adapts the notion proposed by Theory of Reasoned Action (TRA) [19 - 20] and TAM [21 - 22] and suggests that the higher the perceived risk (perception) the lower the risk tolerance (attitude) and the less likely the intention to use (behaviour). Extending TRA and TAM suggestions, it seems plausible to suggest that the higher the perceived risk, the less likely consumers could possibly be satisfied, loyal and retained. That is, unless firms provide reliable and superior quality of service, firms may have difficulties in satisfying consumers, more so in gaining their loyalty and retaining them. Given the likelihood that perceived risk is associated with transactional information [23] this study measures consumers' perceived risk by their behaviour towards these transactional activities.

That is, perceived risky activity includes any transaction using the ATM cards, debit cards and online payment facilities such as the Internet-based auto-debit, Paypal and so forth. Due to relatively low participation rate in e-payment, therefore it seems reasonable at the point of time this study was conducted, to assess the consumers' perception of the level of risk associated with various e-payment methods as listed above.

From the stakeholders' perspective, benefits, costs and risks are the determinant of successful diffusion of the E-Payment among the consumers, merchants, financial institutions and infrastructure providers [24].

Meanwhile, the Internet, which is one of the most popular channels involving e-payment, is fast becoming popular among Malaysians and this is obvious with the rise in the percentage of users, that is, from 17 percent in the year 2001 to 57 percent in the year 2008, with usage levels increasing annually [25]. A report by Malaysian Science and Technology Information Centre on the Internet population for the year 2008 showed that Internet users comprised mainly those who have received tertiary education and more in the science

stream, professionals or those at management levels, above average household income level, youth and those who live in an urban locality [26].

The tertiary students are great prospects to the merchants as they will soon enter the job market as executives, knowledge and skilled workers with promising and stable income, thus having better purchasing power [27]. Therefore, studies to better understand these young adult behaviour; their perception and expectation of services; perceived risk and risk tolerance levels are mandatory so as to assist the service providers to effectively plan the design of products and services as well as better improve the quality of services, in turn leading to higher consumers' acceptance rate.

Students at the tertiary level are pursuing their study in the institutions of higher learning offering courses leading to the awards of matriculation certificate, diploma, first degree and postgraduate degree qualifications. The duration of study for a bachelor degree programme is 3 years and the programmes of study at this level are provided by both the public and private education sectors and attracting many international students [28].

2.4 Dimensions of Perceived Risk

Previous studies concerning identifying consumer's perceived risks, many have argued that the following types of risk are involved in consumers' decisions: physical, performance, psychological, financial, and time-loss [29 - 32]. The same dimensions of risks are chosen in their research in relation to age, perceived risks and satisfaction in consumers' decision making [33].

The respective five selected risk perceptions adapted from Ho *et al.*, [34] are summarized as shown in Table 4 below:-

Table 4: Brief description of the risk perceptions

Risks	Brief description
Physical risk	The risk of loss of cash or card or possible injury to the user. For example, hurt or injured if one is robbed.
Performance risk	The risk that a mode of payment is not acceptable or incurs extra charges for using it as a mode of payment.
Psychological risk	The risk that the use of that mode of payment will affect the self-image of the user or the perceived image of the user from others point of view.
Time-loss risk	The risk that the use of that mode of payment will take more time than another mode of payment.
Financial risk	The risk that the use of that mode of payment will cause financial loss. Situations in which it is not refundable or the transaction is not reversible.

3 Research Methods and Design

The research instrument for this study was survey questionnaire and the measurement scale used in this study was adapted from a study on the Electronic Fund Transfer of Point-of-Sale (EFTPoS) by Ho *et al.* [35].

Using a convenience sampling, self-administered questionnaires were distributed to 400 respondents in December 2009. These respondents were drawn from students pursuing their tertiary education in the private higher educational institutions (PHEIs). The respondents were undergoing their study programmes at these institutions either on conventional learning or on distance learning in Klang Valley, a metropolitan area in Malaysia which is highly populated with Internet users and technology savvy populace.

The questionnaire consisted of three parts. The first part was designed to collect general information about the usage of ATM and other payment cards. The second part was concerned with the risks perception associated with the use of cash which consisted of two sub-sections namely small purchase and large purchase. The third part was related to the risk perception associated with the use of E-payment. The questionnaires also described each key term used i.e. ATM cards, e-Debit, and E-payment. For small amount of purchases, respondents were asked to respond *to purchase of clothes* where the transaction amount was not more than MYR 100 as a given situation. Similarly, *purchase of a hand phone* with the amount of MYR 1 000 was chosen as a given situation for large amount of purchases.

In this study, the participation by the tertiary students was voluntary. In the context of data collection, each respondent was cordially invited by the researchers to participate in the survey. Upon obtaining respondent's consent, he/she was asked to personally complete the questionnaire. Eventually, 400 participants offered their views and participated in the survey. Out of the 400 participants responded to the questionnaire, 64 responses were discarded due to incomplete data leaving only 336 questionnaires were found usable for analysis. The statistical programme namely IBM SPSS Statistics 19.0 was used for the data analysis. The results of descriptive analysis are summarized in Table 5.

Table 5: Summary of Respondent Profiles (Sample Size = 336)

Respondents Characteristics	Sub-Profile	Percentage
Gender	Male Female	40.8 59.2
Age	Less than 20 20 to 30 31 to 40 41 to 50 51 and above	48.2 45.5 3.3 2.7 0.3
Level of education currently pursuing	Matriculation Diploma Bachelor's Degree Postgraduate Others	39.6 5.7 50.0 4.2 0.6
Programme of Study	Business Arts Engineering and Technology Sciences Others	61.3 20.5 10.1 2.7 5.4

Table 5 shows that majority of the participants were female (59.2 percent), age less than 20 years old (40.8 percent). Half of the respondents were pursuing bachelor's degree (50 percent) and more than half were enrolled in business-related programmes (61.3 percent) which is within the norms in accordance to the statistics published by the Ministry of Higher Education [36].

The reliability of scales can vary depending on the sample with which it is used. Therefore it is necessary to check that each of the scales used is reliable with the particular sample [37]. The scales used for this study were fairly reliable measures of variables under study as evident in the alpha values ranging between 0.6 and 0.7 [38]. The reliability of the measurement scales are shown in Table 5 below:-

Table 5: Cronbach's Alpha for the measures used in the questionnaires

Measures	Items	Cronbach's Alpha
Risk Perceptions using Cash	10	0.63
Risk Perceptions using E-Payment	10	0.68

4 Findings

4.1 Risk dimensions among cash and E-Payment

Since the relative ranking of small amount purchases and large amount purchase were similar, mean scores of small and large amount of purchases were used to compare the relative importance of the risk dimensions among cash and E-Payment.

The results of the mean scores are shown in Table 6 and Figure 1 respectively:-

Table 6: Risk Dimensions against the Cash and E-Payment

Risk dimensions	Physical Risk	Performance Risk	Psychological Risk	Time Loss Risk	Financial Risk
Mean scores for cash	3.63	4.94	3.87	3.69	3.79
Mean scores for E-Payment	4.17	3.57	3.54	3.91	3.42

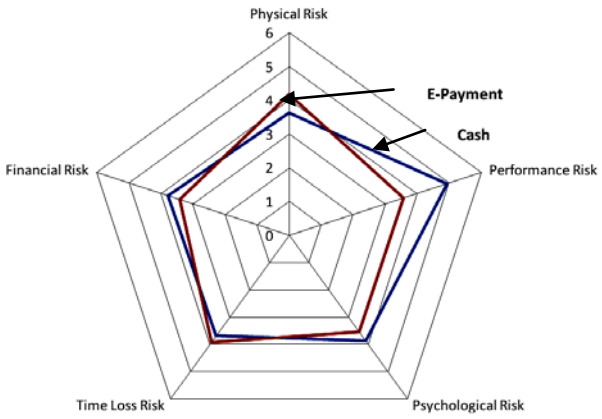

Fig. 1: A spidergram of the risk dimensions against the Cash and E-Payment

The results can be summarised as follows (> stands for relatively higher than):

- Cash: Performance Risk > Psychological Risk > Financial Risk > Time Loss Risk > Physical Risk;
- E-Payment: Physical Risk > Time Loss Risk > Performance Risk > Psychological Risk > Financial Risk

Overall, the following observations can be made:

• Cash has the lowest physical risk while E-payment has the highest physical risk;
• Time loss risk and psychological risk contrast to each other in both Cash and E-Payment; and
• The relative importance ranking of the five risk perceptions are different among cash and E-Payment.

4.2 Comparison of Each Risk Perceptions among Cash and E-Payment

Paired sample T-tests is used when two sets of observations relate to the same respondents [39]. To confirm that the respondents have significant differences in their perceived risks for cash and E-Payment, matched paired samples T-tests were conducted on 95% confidence interval of the differences and the result is summarised in Table 7.

Table 7: Differences of Perceived Risks against Cash and E-Payment

Small Amount of Purchases					
Pair	Risk Perceptions	Mean		T-value	Sig. (2-tailed)
		Cash	E-Payment		
1	Physical	3.71	3.57	1.84	0.066
2	Performance	5.06	3.53	15.12	0.000*
3	Psychological	3.84	3.46	4.43	0.000*
4	Time-loss	3.64	3.89	-2.88	0.004*
5	Financial	3.74	3.36	3.79	0.000*
Large Amount of Purchases					
Pair	Risk Perceptions	Mean		T-value	Sig. (2-tailed)
		Cash	E-Payment		
6	Physical	3.55	4.12	-5.65	0.000*
7	Performance	4.82	3.61	13.37	0.000*
8	Psychological	3.91	3.63	1.99	0.048*
9	Time-loss	3.76	3.93	-2.17	0.031*
10	Financial	3.89	3.47	4.18	0.000*
* The difference was significant at the 0.05 level, with most at the 0.001 level.					

The result has shown that there are significant differences in almost all the perceived risks between cash and E-Payment.

4.3 Impact of the Amount of Purchases

Next, an analysis was conducted to compare the perceived risks between small and large amount of purchases by the cash and E-Payment methods. The results are tabulated in Table 8.

Table 8: Differences of Perceived Risks against small and large amount of purchases

Cash					
Pair	Risk Perceptions	Mean		T-value	Sig. (2-tailed)
		Small Amount	Large Amount		
1	Physical	3.71	3.55	1.72	0.086
2	Performance	5.06	4.82	3.29	0.001*
3	Psychological	3.84	3.91	-0.88	0.378
4	Time-loss	3.64	3.74	-1.28	0.201
5	Financial	3.74	3.85	-1.28	0.203
E-Payment					
Pair	Risk Perceptions	Mean		T-value	Sig. (2-tailed)
		Small Amount	Large Amount		
6	Physical	4.22	4.12	1.22	0.222
7	Performance	3.57	3.61	-1.20	0.230
8	Psychological	3.46	3.62	-1.17	0.241
9	Time-loss	3.36	3.92	-6.39	0.000*
10	Financial	3.36	3.47	-1.46	0.145
* The difference was significant at the 0.05 level.					

Generally, performance risk is lower with larger amount of purchases in cash payments while time-loss risk is lower for small amount of purchases in E-Payment. However, the differences between other perceived risks are negligible.

Below are the findings of this study which fulfill the research objectives as shown in Table 9:-

Table 9: Summary of the findings

Statements	Results
There are differences in relative importance ranking in the risk dimensions among cash and E-Payment	Supported
The level of perceived risks are different among cash and E-Payment	Supported
The amount of purchases has influence on the perceived risks	Not supported

5 Discussion

From the findings, we have seen that there are significant differences among the tertiary students' in

relation to perceived risks of modes of payment i.e. cash and E-Payment. However, the young adult consumers are indifferent in perceived risks associated with amount of purchases. In an online and technology-based self-service environment, the degree of perceived risk is associated with perceived security of the platform as well reliability of a firm of which a consumer performs a transaction, for example, through a firm's Web site. When a consumer is engaged in a higher degree of perceived risk activity, perceived security and reliability tend to be the most critical factor a consumer would consider in his/her judgment of service quality. Hence, it is plausible to infer that perceived risk plays a moderating role in consumer satisfaction, that is the higher the perceived risk the higher consumer expectation of security practices and service reliability, which in turn would affect satisfaction. Ensuring these features available on a firm's site would increase the likelihood of ultimately gaining consumer loyalty and retention. These features were parallel to Akinci *et al.*'s study in relation to the most important criteria in consumers' selection of online banks [40].

In Malaysia, the BNM has established a wholly-owned subsidiary in October 2008 namely the Malaysian Electronic Clearing Corporation Sdn. Bhd or "MyClear" in short. Its main objective is to provide an efficient and reliable infrastructure for e-payments, interbank payment, settlement and securities services to businesses and the public in general [41].

According to a report issued by BNM [42], lack of awareness on the availability of e-payment facilities, security concerns and preference for cash are reasons for not using e-payment. Cash is perceived to be cheap, safe, convenient and fast. Education is also vital to create the awareness about the benefits of using E-Payment especially among the young generation [43].

For the private corporations, there are various initiatives taken to promote the use of E-Payment among the tertiary students who are also the young generation. One of the initiatives targeted to tertiary students which is the young generation, the cooperation between EON Bank Group and Golden Screen Cinema in promoting their EON-GSC credit cards [44].

In promoting safe and efficient payment systems particularly for E-Payment, the BNM has accorded great importance in ensuring that the major retail payment systems process payments in a timely and secure manner. Emphasis was placed on ensuring the availability of adequate internal controls and risk management practices as well as assessing contingency planning preparedness [45]. With such safety and security efforts taken by the BNM, it could lead towards reducing the tertiary students' phobia and risk perception against the use of E-Payment as their mode of payments.

In Malaysia, the Government has gazetted the Payment Systems Act 2003 to regularise and supervise the payment systems and payment instruments which includes E-Payment [46].

Increasing the uptake of e-commerce has been identified as another key strategy to spur the adoption of E-Payment systems. To build user trust and confidence to transact online with the electronic businesses (e-businesses), the BNM as the Central Bank of Malaysia proposed the idea of a national trust mark scheme for Malaysia to accredit e-businesses reliability. The scheme has been approved by the Government of Malaysia in November 2010 and is expected to be operational in year 2011. Under the scheme, online businesses which have obtained certification from the appointed trust mark scheme operator may display the trust mark logo on their website which signifies fulfillment with the stringent code of practices set. The trust mark logo would assist consumers in identifying online businesses that have been accredited to exercise fair business practices, thus boosting consumers' confidence in online shopping [47].

Credit cards are widely used as a common instrument of E-Payment continued to grow value and volume. However, a 21% reduction in the number of credit cards in circulation in year 2010 is observed, mainly due to the imposition of the Government service tax since 1 January 2010[48].

On March 2011, BNM as the Central Bank of Malaysia has announced several measures to promote prudence financial management, the minimum annual income eligibility for new credit card applications has been raised from MYR 18 000 to MYR 24 000. There are also more stringent conditions imposed to credit cardholders with lower than MYR36 000 annual incomes [49 - 50].

With such changes in regulation by BNM as the Central Bank of Malaysia, debit cards could be a better E-payment instrument especially for the young adult. Apart from increased accessibility, young adult are to be made aware of the convenience of using debit cards to make payments, especially since there are no minimum qualification criteria to own a debit card and no fees and charges associated with it. With debit cards, young adult are essentially given an option to either withdraw the cash from the ATM or use the card to pay the merchants directly. Consequently, debit cards accord them with the convenience of a credit card without incurring finance charges and accumulating debt [51].

There is significant increase both in volume and value in debit cards transactions in Malaysia from 1.6 million transactions amounted MYR 0.2 billion in year 2004 to 18.4 million transactions amounted MYR 4.7 billion in year 2010[52 - 53]. Figure 2 shows the positive trends of the volume and amount in debit card

usage in Malaysia which has huge potential to be adopted by young adult.

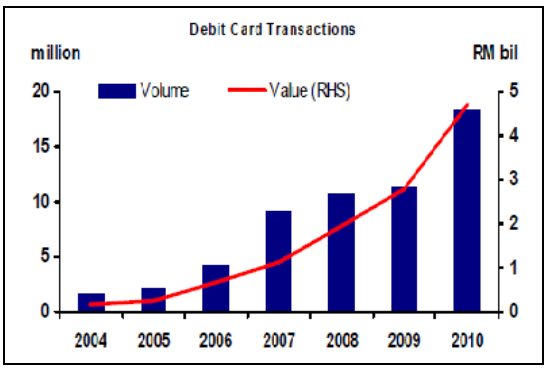

Fig. 2: The bar and line charts of the debit card transaction from year 2004 to year 2010[54]

6 Conclusion

It is important to note that this study has several limitations. Firstly, due to time constraint this study focused on the Tertiary Students in a metropolitan setting in Malaysia. Further studies should be carried out to gauge young adult perception towards e-payment from various parts of Malaysia that is from urban and rural areas. Secondly, our study assessed consumers' opinion on the use of cash and selected e-payment methods which were deemed popular among young adult. Our study had excluded other e-payment methods such as mobile payment, stored value cards and e-wallet. Since these methods may pose different risks, hence research to understand perceived risks of other e-payment methods is worthwhile.

Nevertheless, as both consumers and service providers can benefit from e-payment system leading to increased national competitiveness in the long run, in depth studies to examine the dimensions of consumers' satisfaction towards e-payment services should be emphasized. The successful implementation of e-payment systems depend on how the risk dimensions perceived by consumers as well as sellers are properly managed, in turn would improve the market confidence in the systems.

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