

**THE DEVELOPMENT OF E-PAYMENTS AND
CHALLENGES FOR CENTRAL BANKS IN
THE SEACEN COUNTRIES**

**Lim Choon Seng, Vincent
(Project Leader)**



**The South East Asian Central Banks (SEACEN)
Research and Training Centre
*Kuala Lumpur, Malaysia***

© 2008 The SEACEN Centre

Published by The South East Asian Central Banks (SEACEN)
Research and Training Centre
Lorong Universiti A
59100 Kuala Lumpur
Malaysia

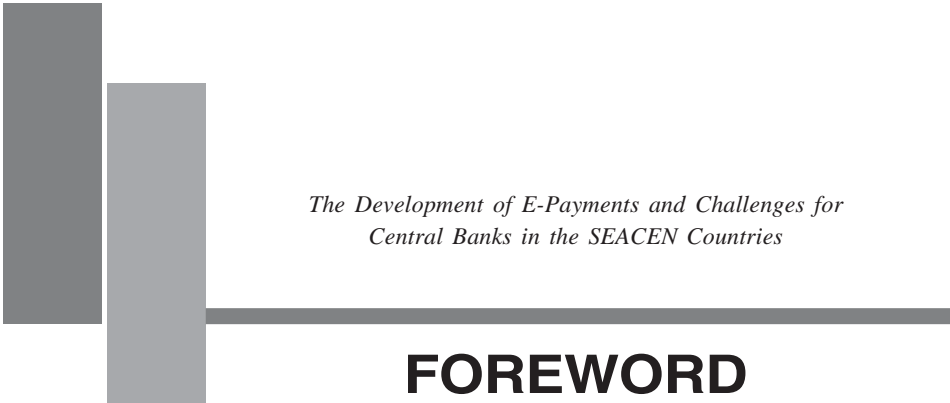
Tel. No.: (603) 7958-5600
Fax No.: (603) 7957-4616
Telex: MA 30201
Cable: SEACEN Kuala Lumpur
Website: <http://www.seacen.org>

**The Development of E-Payments and Challenges for
Central Banks in the SEACEN Countries
by Vincent Lim Choon Seng**

ISBN: 983-9478-64-8

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form by any system, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the copyright holder.

Printed in Malaysia by Graphic Stationers Sdn. Bhd.



*The Development of E-Payments and Challenges for
Central Banks in the SEACEN Countries*

FOREWORD

In recent years, the continuing evolution of e-payments has changed the payment landscape in the SEACEN countries. This study, therefore, hopes to provide readers not only with an updated version of e-payment developments in the SEACEN countries but also aims to examine some major implications of this development on the core functions of the central banks. It also intends to suggest measures to promote the development of e-payments in the SEACEN countries.

As this is a collaborative effort between The SEACEN Centre and the member central banks/monetary authorities, Mr. Vincent Lim Choon Seng, Senior Economist at the Research Division of The SEACEN Centre, who is also the Project Leader of this study, would like to thank all the country researchers and their respective central banks for their invaluable contribution in the preparation of their respective country chapters. Mr. Lim wishes to gratefully acknowledge the helpful comments and suggestions from Dr. Choong Lyol Lee, Professor of Economics, College of Economics and Business, Korea University. He also wishes to thank colleagues of The SEACEN Centre for their kind assistance. However, views presented herein are those of the authors and do not necessarily reflect those of The SEACEN Centre nor its constituent member banks and monetary authorities.

Dr. A. Karunasena
Executive Director
The SEACEN Centre
June 2008

TABLE OF CONTENTS

	<i>Page</i>
Foreword	iii
Table of Contents	iv
Executive Summary	xii

PART I: INTEGRATIVE REPORT

CHAPTER 1: THE DEVELOPMENT OF E-PAYMENTS AND CHALLENGES FOR CENTRAL BANKS IN THE SEACEN COUNTRIES

By Lim Choon Seng, Vincent

1.	Introduction	1
2.	Outline of E-payments	2
3.	The Development of E-payments in the SEACEN Countries	5
3.1	The Salient Features of E-payments in SEACEN Countries	5
3.2	Main Factors Affecting the Developing of E-payments in the SEACEN Countries	8
4.	Implications of E-Payments on Monetary Policies and Central Banks	16
4.1	Impact of E-payments on Monetary Policies	16
4.2	Implications of E-payments on Central Banks	21
4.3	Impact of E-Payments on Financial Stability	24
5.	Challenges and Policy Recommendations	24
5.1	Infrastructure Development and National Agenda	25
5.2	User Awareness and Acceptance	27
5.3	Supervision	28

	<i>Page</i>
5.4 Inter-operability	31
5.5 Security	32
5.6 Taxation Issues and Official Records	33
6. Conclusion	33
References	37
Appendix A: Basic Indicators	44
Appendix B: Monetary Policy Management in the SEACEN Countries	51
Appendix C: Major Challenges of Selected SEACEN Countries	53
Appendix D: Policies and Objectives of Selected SEACEN Countries	57
Appendix E: Future Direction of E-payment in Selected SEACEN Countries	63
Appendix F: The Risk Identification and Analysis of E-Payments	65

PART II: COUNTRY CHAPTERS

CHAPTER 2: THE DEVELOPMENT OF E-PAYMENT AND CHALLENGES IN CAMBODIA

By Ly Sideth

General Overview	67
1. Cambodian Payment System	68
1.1 Payment Instruments	69
1.2 Inter-Bank Transfer	74
1.3 Cheque Clearing System	74
1.4 Legal Framework	76
2. Overview on the Development of E-payment	77
3. Strategies and Challenges in Moving towards E-payments	79

CHAPTER 3: THE DEVELOPMENT OF E-PAYMENT AND CHALLENGES IN INDONESIA

By Ida Nuryanti and Susiati Dewi

1. Development of E-payment	83
1.1 Card-based Payments	83
1.2 Network-based Payments	85
1.3 E-money	86

	<i>Page</i>
2. Impact of E-payment on Central Banking Functions	87
3. Policy Responses to E-payments	88
3.1 Regulation on Card-Based Payment Instrument	89
3.2 Regulation on Prepaid Card	91
3.3 Regulation on Internet Banking	91
4. Future Direction of E-payments	92
5. Conclusion	97
Appendix	99

CHAPTER 4: THE DEVELOPMENT OF E-PAYMENT AND CHALLENGES IN KOREA

By Electronic Banking Team, Payment Systems Department,
The Bank of Korea

1. Development of E-payment in Korea	103
1.1 Definitions	103
1.2 Development of E-payment in Korea	105
1.3 Benefits of E-payment	108
1.4 Factors Related to Promotion in Korea	110
1.5 Obstacles	111
2. Impact of E-payment on Central Banking Functions	112
2.1 Banking Channels and E-money	112
2.2 E-money System Operation in Korea	112
2.3 Impact on Central Bank Functions	113
3. Policy Responses to E-payment	115
3.1 Enactment of Regulations on E-Payments	115
3.2 Establishment of Oversight Framework for E-payment Systems	115
3.3 Promotion of ICT in the Financial Field	116
4. Future Direction of E-payment	119
References	121

CHAPTER 5: THE DEVELOPMENT OF E-PAYMENTS AND CHALLENGES IN MALAYSIA

By Adnan Mohammad

Introduction	123
1. Development of Electronic Payments in Malaysia	124
1.1 Evolution of E-payments in Malaysia	124

	<i>Page</i>
1.2 Overview of E-payments Infrastructure in Malaysia	125
1.3 Trends in Migration to E-payments	132
2. Impact of E-Payment on Central Banking Functions	137
2.1 E-payment System Risk	137
2.2 Impact of E-payments on the Effectiveness of Monetary Policy	138
2.3 Impact of E-payments on the Integrity of Payment Systems	139
2.4 Assessment of Impact of E-payments on the Overall Functions of Bank Negara Malaysia Functions	140
2.5 Conclusion	141
3. Policy Responses and Strategies Regarding E-Payments	142
3.1 Bank Negara Malaysia Objectives and Roles in Promoting E-payments	142
3.2 Policy Focus, Strategies, Initiatives and Efforts	143
4. Future Direction of E-payments	151
4.1 Emerging Issues and Challenges in E-payments	151
4.2 The Medium (5 years) and Long Term Prospects (> 5 years) and Plans Regarding E-payments	153
4.3 Summary and Conclusion	153
References	156

CHAPTER 6: THE DEVELOPMENT OF E-PAYMENT AND CHALLENGES IN NEPAL

By Bam Bahadur Mishra

1. Development of E-payment in Nepal	159
1.1 Credit Cards	159
1.2 Debit Cards	160
1.3 Internet Banking	160
1.4 Mobile Banking Stop	160
1.5 Outline of the General Payment System in Nepal	160
1.6 Factors Contributing in E-payments	162
2. Impact of E-payment on Central Banking Functions	163
3. Policy Response to E-payments	163
4. Future Direction of E-payments	165
4.1 Challenges of E-payment	166
4.2 Case of Using Debit Card, Credit Card and Internet Banking	166

	<i>Page</i>
5. Recommendations	167
6. Conclusion	168

CHAPTER 7: THE DEVELOPMENT OF E-PAYMENT AND CHALLENGES IN PAPUA NEW GUINEA

By Boniface Aipi

1. Introduction	169
2. The Payment System in Papua New Guinea	170
2.1 Paper-based Payment Instruments	170
2.2 Electronic Banking in Papua New Guinea	174
2.3 Network-based Payment System	177
3. E-payment Developments in Papua New Guinea	178
3.1 The Reasons E-payment Schemes Have Not Been Initiated in Papua New Guinea and the Constraints for Future E-payment Development	179
4. The Future of Electronic Banking in Papua New Guinea	181
4.1 Issues in Electronic Banking	182
4.2 Central Bank's Views on E-payments	185
5. Conclusion and Recommendations	187
5.1 Recommendations	188
References	190

CHAPTER 8: THE DEVELOPMENT OF E-PAYMENTS AND CHALLENGES IN THE PHILIPPINES

By Agnes S. Pantola

1. Development of E-payment in the Philippines	191
1.1 E-Payment Technologies and Products in the Philippines	191
1.2 Developments in Wholesale Payment Systems	195
1.3 Developments in Retail Payment Systems	197
1.4 Government Agencies with Electronic Payment Systems	199
1.5 Costs and Benefits of E-payments	200
1.6 Factors that Contribute to the Promotion of E-payments and Obstacles that may Hamper Further Progress of E-payment Innovations	201
2. Impact of E-payments on Central Banking Functions	202
2.1 Overview of Functions and Operations of the Bangko Sentral ng Pilipinas	202

	<i>Page</i>
2.2 BSP Report on Economic and Financial Developments First Quarter 2007	203
3. Policy Responses to E-payments	206
3.1 Speeches Excerpts from BSP Governor	207
3.2 New Central Bank Act (Republic Act 7653, June 14, 1993)	207
3.3 E-commerce Law (Republic Act 8792, June 14, 2000)	208
3.4 Manual of Regulations for Banks (MORB) – Subsection X169.2 Outsourcing of Information Technology Systems/Processes	209
3.5 BSP Circular No. 240 – Guidelines Concerning Electronic Banking Activities December 21, 2000	209
3.6 BSP Circular No. 495 – Electronic Monitoring Systems for Money Laundering	212
3.7 BSP Circular No. 511 Series of 2006 – Guidelines on Technology Risk Management	213
3.8 BSP Circular No. 542 Series of 2006 - Consumer Protection for Electronic Banking	213
3.9 BSP Circular No. 564 Series of 2007 -Valid Identification (ID) Cards for Financial Transactions	217
3.10 Memorandum No. M-2007-010 - ATM Interconnection Services May 7, 2007	218
3.11 Developments in the Oversight of Payment Systems	219
4. Future Direction of E-payments	221
4.1 BSP Contributions Towards the Advancement of E-payment Systems	221
5. Globe Telecom GCash	224
5.1 Limits to the Amount of Transactions	225
5.2 How to Start Using Gcash?	225
References	228

CHAPTER 9: THE DEVELOPMENT OF E-PAYMENTS AND CHALLENGES IN THE REPUBLIC OF CHINA (TAIWAN)

By Kuo Hsing Chang

Introduction	229
1. The Development of E-payment Systems	230
1.1 The Cost and Benefit of E-payments	230

	<i>Page</i>
1.2 Current Development of E-payment Products and Technologies	231
1.3 Current Structure and Outlook of E-payment Products	240
1.4 Key Factors Affecting the E-payment Development	244
2. The Impact of E-payments on Central Banking Functions	246
2.1 The Seigniorage	246
2.2 The Effectiveness of Monetary Policy	247
2.3 The Overall Integrity of Payment Systems	249
2.4 The Risk Identification and Analysis of E-payments	251
3. Policy Responses to E-payments	252
3.1 The Central Bank's Viewpoints on E-payments	252
3.2 Policies on E-payments Development	253
3.3 Policies to Deal with Problems Arising from E-payments	255
4. Future Directions and Plans for E-payment Development	255
4.1 The Central Bank's Efforts to Advance E-payments	256
4.2 The Expected Challenges and Problems	258
4.3 The Medium and Long Term Development Plans	260
5. Case Studies	262

CHAPTER10: THE DEVELOPMENT OF E-PAYMENTS AND CHALLENGES IN THAILAND

By Rungsun Hataiseree

Introduction	265
1. Overview of E-Payment Developments in Thailand	268
1.1 Existing E-payment Services Operated by the BOT	268
1.2 Current Developments of Other E-payment Products	271
1.3 International Comparison of E-payment Penetration	285
2. Some Reflections on the Impact of E-payment on Central Banking Functions	287
2.1 Impact of E-payments on the Operation of Monetary Policy	287
2.2 Impact of E-payment on the Overall Integrity of Payment System	291
3. Responding to New Payment Challenges Regarding E-Payments	294
3.1 Growing Reliance on the Use of Pricing Policy	295
3.2 Conducting Survey on Payment Choice by Consumers and Businesses	297

	<i>Page</i>
3.3 Setting up the New Payment Gateway Services (Thailand National ITMX)	300
3.4 Facilitating and Fostering Changes in Legal and Regulatory Framework	303
4. Concluding Remarks and Future Direction of E-payments	306
References	313

CHAPTER 11: THE DEVELOPMENT OF E-PAYMENTS AND CHALLENGES IN VIETNAM

By Le Anh Dung

1. Overview of E-payment in Vietnam	317
1.1. A Cash-based Society	317
1.2 E-payment Systems	318
1.3 E-payment Products	319
2. Costs and Benefits of E-payment	321
3. The Perceived Attitude of the Public	323
4. The Existing Structure of E-payments	323
5. Contributing Factors to the Promotion of E-payments	324
6. Obstacles to E-payment Innovations	324
6.1 Legal Framework	324
6.2 Technology Infrastructure	324
6.3 Attitude Towards Payment	325
7. Impact of E-payment on Central Banking Functions	325
7.1 Effects of Modern Inter-bank Payments on Financial Policy	325
7.2 The Degree of Impact of E-payment Innovations	325
7.3 E-payment Risk	327
8. Policy Responses to E-payments	327
8.1 General View of State Bank of Vietnam Regarding the Development of E-payments	327
8.2 Recent Policies Regarding E-payments	328
9. Future Direction of E-payments	329
9.1 SBV's Contribution to the Advancement of E-payment Systems	329
9.2 Expected Challenges and Problems	329
9.3 Medium and Long-Term Plans Regarding E-payments	330
10. Vietcombank - Success in E-payment Promotion	331
10.1 Corporate Profile	331

EXECUTIVE SUMMARY

It is noted that one of the most important factors in promoting e-payment in the SEACEN countries is providing infrastructure. However, it is e-payments users' preferences that will determine the success of any payment instruments in the long-run. Other important factors include the adequacy of the legal framework, cost/profitability for operators as well as technical issues such as interoperability. Based on the development of e-payments, the development stages in the SEACEN countries can be roughly divided into three stages, namely advanced, moderately advanced and less developed ones. Policy recommendations are then mapped to these three stages of e-payment development.

Central banks play a variety of role in the e-payment scenes. This includes policy making, licensing, supervision and as a catalyst for the promotion of e-payments. While e-payment may affect the core functions of the central banks, such as monetary policy implementation and maintaining financial stability, it is noted that currently to minimize such risks, SEACEN central banks and the relevant authorities have initiated several measures to help reduce various types of risks involved, in particular credit risk and systemic risk from the payment and settlement process. These include the enactment of regulations on e-payments and the establishment of oversight framework for e-payment systems. As this study concentrates on retail payment systems, it is useful to note that retail payment systems when compared to wholesale and corporate e-payments are less likely to propagate instability of the overall payment systems. For instance, at present, the issuance of retail e-money is too relatively small to pose a threat to financial stability.

The study also notes that market-driven supervision which emphasizes on competitions and innovations and user-focused technological-driven infrastructure development can lead to the effective promotion of e-payment development.



PART 1: INTEGRATIVE REPORT

Part I: Integrative Report¹

Chapter 1

THE DEVELOPMENT OF E-PAYMENTS AND CHALLENGES FOR CENTRAL BANKS IN THE SEACEN COUNTRIES

by
Lim Choon Seng, Vincent

1. Introduction

The use of electronic media for making payments (e-payments) is a recent and remarkable phenomenon in several SEACEN countries. The growing usage of e-payments over the last few years foreshadows the replacement of cash, which is deemed to be an inefficient and costly means of payment. This development is made possible by two main factors: the availability of information and communication technology (ICT) and the needs of consumers for more efficient payment instruments. The Bank for International Settlements, in 1996 report, stated that, while innovations of electronic money is relatively new, these innovations have “the potential to challenge the predominant role of cash for making small-value payments and could make retail transactions easier and cheaper for consumers and merchants” (BIS 1996). Since then, the world had seen quantum leaps in the development of e-payments and massive innovations in financial e-products. It is argued that the development of e-payments, which includes card-based instruments, such as credit card and e-money, and network-based instruments, such as e-banking and internet payments, will help to improve the efficiency of the financial system by reducing the cost of transactions, enhancing liquidity, and facilitating the allocation of financial resources. It is common consensus that the potential benefits of e-payments can bring significant benefits to all parties in the financial sector (Zeti 2005).

The objective of the paper is thus to (1) review and assess the development of e-payments in the SEACEN countries; (2) examine the implications of the development of e-payments on the core functions of the central banks; and (3) to provide policy recommendations.

1. Part I of this report consists of this integrative report which is partially based on the country reports. The country reports form Part II of this research project.

2. Outline of E-payments

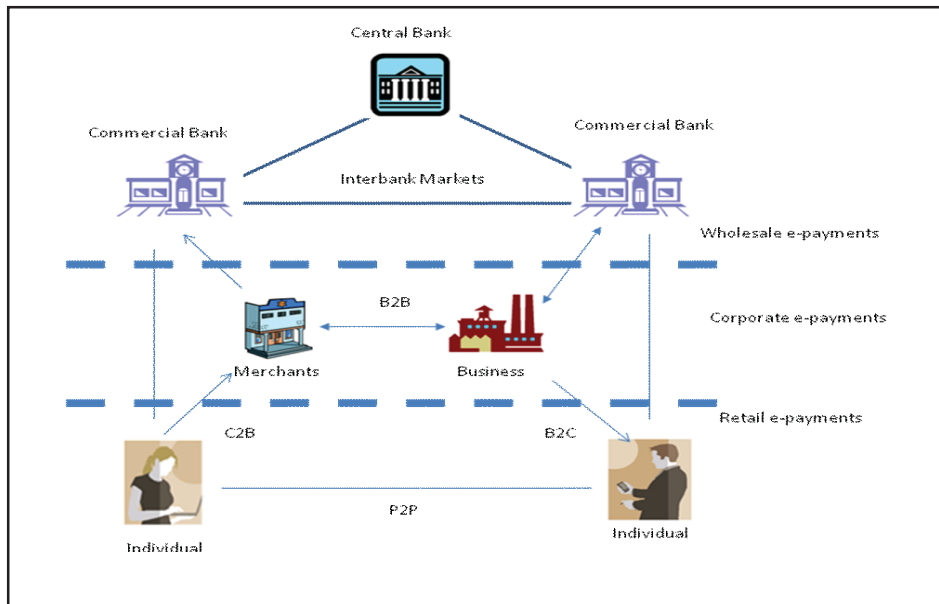
The payment and settlement system is an important infrastructure of the economy. A well functioning payment systems is necessary not only to facilitate the smooth operation and stability of the payment system, but also to ensure the effectiveness of monetary policy. E-payment is a subset of structure of the the overall payment system. E-payment is thus defined by BIS (2004) as “payments that are initiated, processed and received electronically.” E-payment services can be retail, corporate and wholesale e-payments (Tan 2004). The e-payment groupings are illustrated in Figure 1. The difference between a cash transaction and an electronic payment is that an e-payment transaction often involves a payment channel and multi-parties, which includes payment intermediaries. Payment intermediaries are those involved in payment authorisation, payment clearing and settlements (Department of Communications, Australian Government 2006). The scope of e-payment transaction is illustrated in Figure 2 and the typical payment products and payment channels are illustrated in Figure 3.

Figure 1
Payments Groupings

Payment Systems	Transaction Details
Retail Transfers	ATM Transactions Card-based E-money Electronic Money Functions
Retail Payments	Credit card Transactions Debit Cards Ttransactions Delay Debit cards Direct Debit Paperless Credit Transactions E-bills Payments
Wholesale Payments	<ul style="list-style-type: none">• LVTS (Large Value Transfer System)• ACH (Automatic Clearing House)• RTGS (Real-time Gross Settlements)• Credit-Transfer (Large Value Interbank)• Other clearing Houses• Automatic Debits

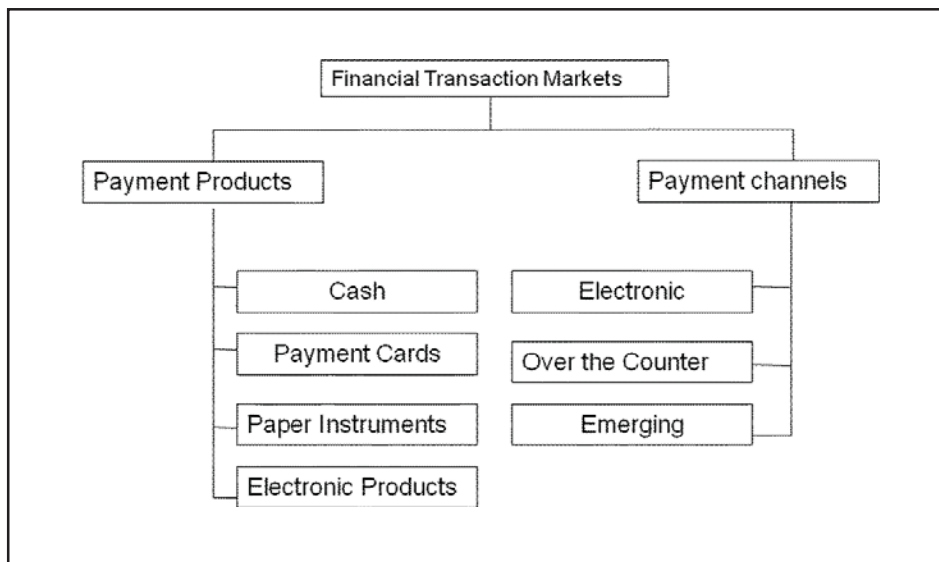
Source: Applied Communications (ACI) INC and Global Insight INC

Figure 2
Scope of E-payment Transactions



Source: Accenture Analysis 2003, cited in Tan (2004)

Figure 3
Payment Product and Channel Summary



Source: CIE and EDC, cited in Department of Communications, Australian Government 2006.

Thus, retail e-payments can be in the form of e-commerce transactions (business to consumer [B2C]); consumer to business [C2B]), or electronic payments between consumers (person to person [P2P]). In this paper, the emphasis is on the area of retail payments. Meanwhile, a retail payment system is (FSI Connect):

‘an interbank payment system for processing, clearing and settlement of a large volume of relatively low-value, non-urgent payments initiated through payment instruments such as checks, credit transfers, direct debits and payment cards. The variety of payment services is related to the type of payment instruments (checks, credit transfers), the channels through which the end user accesses the service (electronic funds transfers at the point of sale, home banking) and the institutional and infrastructural arrangements necessary for the processing, clearing and settlement of payments’ Retail payment systems are less likely to propagate instability. This is why the focus of the designers tends to be on improving their efficiency. Nevertheless, retail payment systems should be designed and operated in a way that ensures the confidence of the public in payment systems.’

In the computer age, interest in e-payments is often due to human fascination about new technology and innovation (Department of Communications, Australian Government 2006). Nonetheless, the opportunities in value-creation provided by e-payments in terms of increased convenience and a wider range of payment options (for users) and lower cost and productivity gains (for operators), are the main reasons behind the migration towards e-payments. For merchants and operators, the benefits of e-payments include (Trade online Project): (1) convenience, eliminating administrative resources required for processing invoices, cheques and cash; (2) immediacy as credit cards enable cardholders to do instant purchasing; (3) improved liquidity as payment on purchase reduces the pressure on cash flow caused by delays in invoicing; (4) potential growth of businesses as it offers customers additional payment channels via the phone, mail order and Internet, and enlarges the customer base; (5) Increased business advantage, matching the services of competitors, and possibly gaining the competitive edge; (6) Reduced risk and costs associated with handling cash and cheques; (7) Reduced risk and costs associated with non-sufficient funds (NSF) cheques and collection activities; (8) Increased opportunity for automation of accounting, banking and reconciliation processes; (9) Opportunity for decreased costs though transactional volume available with centralised shared services and reduced transaction data-entry time; and, (10) Impetus for various business re-engineering opportunities.

While e-payments are deemed beneficial, e-payment development in the area of retail payments gives rise to two major areas of concern (Allen 2003). The first concern is when e-payment transactions take place outside the existing payment system, particularly when non-financial institutions become active and emerge as big players in the markets. The second concern is the potential risk of e-payment on the overall payment and settlement system if the e-payments are allowed to operate or interact within the existing payment infrastructure.² These developments may have a significant impact on the overall payment system in respect of the risk and supervision aspects. An e-payment failure episode may damage the reputation of the overall payment system resulting in a big loss of public confidence in the payment system.

From the policy standpoint, the common concerns about e-payments include security, consumer protection and regulations (Allen, 2003). Additional matters of concern to the central bank issue from the effect of e-payments on monetary policy as well as on seigniorage revenues (BIS 1996). Thus, the key question is whether advancement in e-payment technology would reduce the capacity of central banks to implement monetary policy.

3. The Development of E-payments in the SEACEN Countries³

3.1 The Salient Features of E-payments in SEACEN Countries

In most of the SEACEN countries, electronic payments consist of both card and Internet/network-based payments.⁴ Credit cards, like in other non-SEACEN countries, are dominated by *Visa* and *Mastercard*, both of which can be issued by banks and non-banks. Prepaid and debit cards are popular, and Internet/network-based payments, such as Internet payments, Internet banking, phone banking, have seen increase usage. (See Appendix A for selected SEACEN countries).

2. The Core Principles for Systemically Important Payment Systems of the CPSS (BIS, 2001a) clearly indicates the importance of a safe and reliable payment system. One of the important functions of the central bank is oversight of the payment systems defined by (BIS, 2001b) as '[a] public policy activity principally intended to promote the safety and efficiency of payment and securities settlement systems and in particular to reduce systemic risk.'

3. Details regarding the development of e-payments are available in the individual country chapters.

4. The cheque remains one of the most popular mode of payments, although its relative usage has declined over the years in some SEACEN countries. For instance in Malaysia, the percentage of cheque usage to total non-cash retail payments stood at 56 percent in 2001, but declined significantly in 2006 to 23 percent.

All the SEACEN countries participating in this project have some forms of card-based e-payments, such as credit and debit cards, and some forms of network-based e-payment systems. However, e-payments in these countries are in different stages of development. For instance, Cambodia, Nepal, Papua New Guinea, and Vietnam are still largely cash-based societies. In Cambodia, the credit card usage is extremely low and, as of March 2007, only slightly more than six thousand cards are issued against a population of 14.2 million. Debit cards have a relatively large usage and as of March 2006, over forty thousand cards are issued. In Papua New Guinea, direct debit has become popular due to the preference of employers crediting the salaries of employees through e-payments. Other e-payment products, such as phone and internet banking, have been introduced recently. Meanwhile, limited Internet access has hampered the development of Internet banking in this group of countries. However, mobile banking has gained popularity. Nepal introduced its mobile banking service in 2004, making use of Short Messaging Services (SMS) to perform the transactions. Mobile banking is not available in Papua New Guinea although phone banking through landlines is available. Basic inter-operability, such as of ATM networks, is an issue in Papua New Guinea and Cambodia as the systems of various banks are not linked.

In some SEACEN countries, notably, Indonesia, Malaysia, the Philippines and Thailand, there are more diversified e-payment products. These include fully integrated ATM networks and a variety of network-based e-payment products, such as Internet banking and mobile-based e-payments. Credit cards, which are issued by both banking and non-banking institutions, and debit cards are widely accepted. Internet banking offers multiple facilities to access banking services, such as fund transfer, bill and loan payment, reloading of mobile prepaid cards, account balance enquiry, foreign telegraphic transfer, ordering check books and online share applications. A development in these countries, in contrast to the first group mentioned above, is the emergence of e-money, which can be issued by banking and non-banking institutions. In most cases, the non-banking issuers are mostly telecommunication companies with server-based e-money, making mobile phone as a medium to make payments. However, card-based e-money in the form of single, limited or multi-purposed cards are also popular. For instance, in Malaysia, the *MEPS Cash* and *Touch 'n GO*. In Malaysia, the *MEPS Cash* is even incorporated into the *MYKAD*, the national multi-purpose identity card issued by the National Registration Department. However, card-based e-money is mostly confined to retail payments and the transportation sector. Mobile phone e-payment technology is advanced in this group of countries. For

instance, subscribers can make on-line payments via mobile phone short-messaging-system (SMS) for utility, parking fees purchases of mobile contents and services. Mobile phone is also used to remit cash both domestically and worldwide, like the *Globe G-Cash* which turns a mobile phone into an electronic wallet. In another group of countries, namely Korea and Republic of China (Taiwan) [hereafter referred to as ROC (Taiwan)], the development of e-money products have developed into new phases, concentrating on e-commerce activities, such as the B2C and B2B e-commerce payments. The main thrust of development in Korea and ROC (Taiwan) is towards convergence network, developing e-payments into a well-integrated system with maximum interoperability. This includes integration of e-payments with Supply Chain Management (SCM), Enterprise Resource Programming (ERP) and Customer Relationship Management (CRM).

An important factor expediting the migration of cash to e-payment is the inconvenience of carrying large sums of cash compared to card and electronic payments (Jayamaha 2006). The emergence of Internet banking and e-commerce, which results in further diversification of the range of e- payment products and settlement systems, is another important contributory factor. The SEACEN region also saw some pioneering efforts in the adoption of new technology. For instance, Malaysia is the first country to launch the EMV-based Near Field Communication contactless mobile payment pilot, and the Taiwanese are the first to make contactless payment at self-service gasoline stations, using EMV-based contactless chip cards (*PaymentsNews*). In the Philippines, the *Smart Padala* is the world's first international cash remittance service linked to the mobile-phone. An important development in the SEACEN region is the growing adoption of e-money for small-value purchases (Applied Communications & Global Insight 2006).

Five SEACEN countries occupied the top 15 countries in terms of world ranking of e-payments (see Figure 4). Korea was ranked eighth in terms of e-payment by transaction volume and this represented about 2.7 percent of the world total e-payment transactions. Korea is also ranked 6th with a share of 3.5 percent of world's total in terms of retail payment (defined as credit card transactions/payments, debit card transactions/payments, delay debit card payments, paperless credit transactions, direct debit, electronic credit, e-bill payments). Singapore, Indonesia and Thailand are ranked 5th, 12th and 13th, respectively, in terms of retail transfers (defined as ATM transactions, card-based e-money, cash withdrawals and electronic money function). Korea,

Singapore, ROC (Taiwan) and Thailand are also forecasted to grow rapidly in electronic payments, with Korea forecasted to grow about 20 percent between 2004 and 2009 in terms of electronic payments and retail transactions.

Figure 4
World Ranking of E-payment Usage (top 15 countries)

Country	Electronic Payment: total transaction in 2004	Retail Payment: Total transaction in 2004	Retail Transfers: Total transaction in 2004	Electronic payments transaction growth(2004-2009(forecast) *	Retail payment: transaction Growth (2004-2009(forecast)	Wholesale payments: transaction Growth (2004-2009(forecast)
Indonesia			12 (2.1%)			
Korea	8 (2.7%)	6(3.5%)		5 (20%)	4 (20%)	
Singapore			5 (4.3%)	15 (17.5%)		
ROC (Taiwan)						14 (9%)
Thailand			13 (1.5%)			

Source: Applied Communication, INC with Global Insight, INC (2006)

* -Compounded annual growth transaction

Figure in bracket is the percentage to world transactions.

Retail transfers: ATM transactions, Card-based e-money, cash withdrawals, electronic money function-Purchases. Retail Payments: Credit card transactions/payments, debit card transactions/payments, delay debit card payments, paperless credit transactions, direct debit, electronic credit, e-bill payments. Wholesale payments: Large value transfer systems (LVTS), Automatic clearing house (ACH), Real-time gross settlements (RTGS), credit transfer-Large value interbank, other clearing house, automatic debits

3.2 Main Factors Affecting the Developing of E-payments in the SEACEN Countries

Gathering from the feedback received from the questionnaire survey of SEACEN member banks and monetary authorities for this project, it is found that the development of technical infrastructure is considered the most important contribution to the development of e-payments (see Figure 5). This is followed by user acceptance. Cost and profitability for operators is ranked third. The adequacy of the legal framework is ranked fourth among the factors and interoperability is ranked fifth. Easy entrance for operators, a proxy for enhancing competition, is ranked last among these factors. In comparison, according to the available EU surveys, user acceptance and cost/profitability for operators are ranked consistently among the top in the EU, when the above factors were considered.⁵ However, there are some major differences. Technical infrastructure

5. The EU surveys have other factors, but for the purpose of comparison, factors that are closest to our definition are picked up from these surveys. The results presented for the EU surveys thus show the relative importance in relation to these chosen factors. While the surveys may not be completely compatible, nevertheless, for comparison purposes, it provides us with some useful information. A survey of operators in the SEACEN countries is not available and is beyond the scope of this project.

is consistently ranked the lowest throughout the two surveys of EU, but inter-operability is ranked among the most important factors contributing to the developing of e-payments in the EU. Between the two surveys of the EU, there were also some differences. The e-payment providers noted that user acceptance has become the most important factor in 2005, overtaking the cost/profitability factor for profitability for operators.

Figure 5
Ranking of Factors Contributing to the Development of E-payments

Contribution factors	SEACEN	Providers: EU (2005)	Providers: EU 2003
Technical Infrastructure	1	5	5
User Acceptance	2	1	2
Cost/Profitability for operators	3	3	1
Legal Framework	4	4	4
Interoperability	5	2	3
Easy Entrance for operators	6	-	-

* 1= most important, 6 least important.

From the results of the surveys, one can make a few salient observations. Firstly, technical infrastructure is ranked the most important factor in contrast to the finding of the EU surveys. This is because, in general, in most SEACEN countries, the development of e-payments is still in the embryonic stage. From the questionnaire replies, the majority of countries are at least one to two years behind the current technology innovation with regards to e-payments. In some SEACEN countries, the development was lagged behind current technology innovation by more than three years. This made infrastructure development a crucial factor. Secondly, in the SEACEN countries, inter-operability is a direct function of infrastructure and technical innovations. Thus, policy-wise, inter-operability is only considered an important factor in the medium and long-term in the SEACEN countries. Thirdly, user acceptance and cost/profitability are ranked closely to each other because these two factors are indirectly related. When user acceptance reaches a critical mass of users, cost to operators would be lowered and profit for operators enhanced.

3.2.1 Infrastructure Development

In part, infrastructure development of e-payment is synonymous with ICT development. Looking at the world networked-readiness index (NRI), an indicator, defined by the Global Information Technology Report to measure the degree of preparation of a nation or community to participate in and benefit from ICT developments, five SEACEN countries are ranked in the top 50 countries (see Figure 6). These are Singapore (3rd), Taiwan (13th), Korea (19th), Malaysia (26th) and Thailand (37th). The NRI, which is composed of three component indices assessing: (1) environment for ICT offered by a country or community; (2) readiness of the community's key stakeholders (individuals, business and governments); and (3) usage of ICT among these stakeholders, is an indirect measure of the adequacy of infrastructure for e-payment development. Reflective of the NRI, the SEACEN countries can be categorised into three distinct groups, according to their stage of e-payment development. These are advanced (Korea, Singapore and Taiwan), moderately advanced (Malaysia, Thailand, Indonesia and the Philippines) and the less advanced countries (Cambodia, Mongolia, Sri Lanka and Mongolia). For instance, while Korea is named by Card Magazine Technology as the leading innovator of e-payments based on mobile phone technology, Cambodia's economy is highly dollarised and there is no inter-bank market and the RTGS clearing systems. Even interbank payments in Cambodia rely on cash or cheques.

Figure 6
Networked-Readiness Index 2006-2007 Rankings⁶

Country	Ranking	Country	Ranking
Singapore	3	Philippines	69
ROC (Taiwan)	13	Vietnam	82
Korea	19	Sri Lanka	86
Malaysia	26	Mongolia	90
Thailand	37	Cambodia	106
Indonesia	62	Nepal	108

Source: Global Information Technology Report 2007.

6. For the top 127 countries.

From the standpoint of infrastructural development, Internet access is also an important criterion. The user growth rate between 2000 and 2007 has been phenomenal for many countries. Vietnam, for instance, saw over nine thousand percent growth in Internet usage between the period 2000 to 2007 (see Figure 7). However, the penetration rate is still negligible as in Cambodia (0.3 percent), Nepal (0.9 percent) and Sri Lanka (2 percent). Hence, for these SEACEN countries, there is potential for a greater penetration of Internet usage as compared to the developed countries, such as Japan (68.8 percent), US (71.4 percent), Finland (62.7 percent), UK (66.4 percent), Germany (64.6 percent) and Sweden (77.3 percent). In the SEACEN region, only Korea, ROC (Taiwan) and Singapore come close to the Internet penetration of these developed countries.

Figure 7
Internet Usage and Growth Statistics for Selected SEACEN Countries⁷

Countries	Penetration % of Population	(%) Users in Asia	User Growth (2000-2007)
Brunei	47.0 %	0.0 %	486.8 %
Cambodia	0.3 %	0.0 %	633.3 %
Indonesia	8.5 %	4.3 %	900.0 %
Korea	70.2 %	7.5 %	80.8 %
Malaysia	60.0 %	3.2 %	302.8 %
Mongolia	9.1 %	0.1 %	794.3 %
Nepal	0.9 %	0.1 %	398.8 %
Philippines	15.4 %	3.0 %	600.0 %
Singapore	53.2 %	0.5 %	101.8 %
Sri Lanka	2.0 %	0.1 %	252.3 %
ROC (Taiwan)	67.4 %	3.3 %	146.0 %
Thailand	13.0 %	1.8 %	268.1 %
Vietnam	21.4 %	3.9 %	9,013.4 %

Source: Internet World Statistics

7. The data is as follows: Brunei, Malaysia and ROC (Taiwan): 30 June 07, Cambodia and Philippines: April 07, Indonesia: May 07, Korea: December 07, Mongolia: September 06, Nepal, Sri Lanka and Thailand: September 07, Singapore: September 05, and Vietnam: November 07.

3.2.2 User Acceptance and Cost/Profitability

We illustrate the importance of user acceptance in the SEACEN countries, based on the discussion by the ECB (2000). The basic principle of critical user-mass explains why policy is crucial to encourage user acceptance, when promoting e-payment products in the SEACEN countries. With e-payment products and services, the operators/providers are normally required to incur heavy fixed costs as they have to invest heavily in the latest technology in the form of hardware (such as computer terminals) and software. However, the transaction (marginal cost) will be lower relative to the cost of issuing and processing the traditional paper-based payment instruments. The marginal cost is normally in the form of telecommunication charges, etc. Therefore, for an e-payment instrument having high fixed costs but low marginal costs, it becomes feasible when the transaction volume reaches a critical mass, as represented by Point C in Figure 8. At this point and beyond, the total transaction cost will be relatively lower as the benefits of savings that could be had due to the lower marginal costs overtake any incurred fixed costs. This is reflected by the line CB which represents the lower total transaction cost between the two instruments. At this point of critical mass and beyond, the e-payment instrument becomes a more viable mode of payment than the traditional instrument with low fixed costs but high marginal costs.

Figure 8

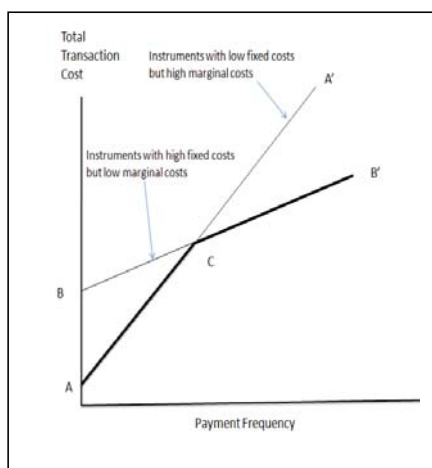
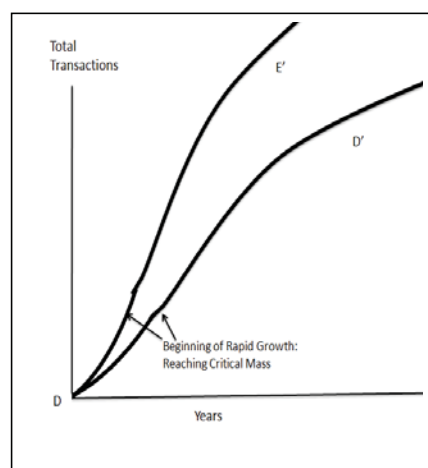


Figure 9



Source: ECB (2000) with modifications.

Furthermore, at this stage of critical mass, a few positive externalities can be derived. Firstly, when a critical mass of users is reached, merchants who have not accepted a particular e-payment instrument as a payment mode may now find it beneficial for them to adopt it. Users, on the other hand, would find it beneficial to use this particular e-payment instrument when more and more merchants adopt the e-payment mode, as it now more convenient to use such e-payments. Thus, a virtuous cycle is created. Another important effect is that once a critical mass is achieved, the cost of acquiring and introducing another new instrument can be lowered significantly. With a critical mass of users, it becomes easier for a new instrument to be introduced as users are now more aware of e-payment products. Therefore, new e-payment product can find much faster acceptance (as shown by the curve DE' compared to DD' in Figure 9). This important externality is commonly known as the “network effect,” where once a critical mass of users is reached, the broad acceptance by merchants and customers will reinforce each other (ECB 2000). However, the network effect must have the ability to maintain at least a medium term presence, and it must have a minimum geographical scale so as to avoid the excessive supply of a particular “localised” e-payment instrument (Van Hove 1999).

In the analysis of the network effect, a factor that related to user acceptance and cost and profitability of operators is inter-operability. In the e-payment environment, “*co-opetition*” in which cooperation and competition exist simultaneously among players, is important in providing a comprehensive e-payment network (BIS 2004). It is likely that once the network effect comes into play, inter-operability is more likely to take place among different modes of e-payments because of the benefits generated by the network effect. If inter-operability is encouraged in the early stage of e-payment development, operators may have the incentive to cooperate since they do not have to establish their own independent networks. However, e-payment products are highly innovative in nature, and encouraging inter-operability at an early stage may result in diminishing “product differentiation and stifled innovation” (Allen 2003). This is the dilemma facing policy-makers.

3.2.3 Legal Framework

The legal framework of a payment system defines the rights and obligations of all participants in the system. It also enables the participants to fully understand the possible financial risk they can possibly incur. The legal framework on e-payments is highly complex as it defines: (1) identification and digital authentication, given the fact that in e-payments there is often no face-to-face contact between the parties concerned; (2) payment transactions

concerning the rights and obligations of all the parties concerned; (3) data protection, data integrity and privacy issues for all the parties concerned; (4) indemnity of losses due to unauthorised transactions; and (5) money laundering issues.

In the SEACEN countries, the legal framework for payment systems is well defined, although in some countries, such as Nepal and Papua New Guinea, there is no explicit legislation to deal with the legality of e-payments. In other countries, the laws and regulations empower the central bank to coordinate and regulate the e-payment and clearing system. For instance, the Payment System Act 2003 (PSA) was enacted to designate Bank Negara as the sole authority responsible for the oversight of e-payment systems in Malaysia. In many countries, e-payment legislations consist of specialised laws and acts, for instance, the Computer-Processed Personal Data Protection Law of Taiwan and Malaysia's Digital Signatures Act 1997.

A very important piece of legislation related to e-payment is the law covering data protection and privacy. In this respect, the review is mixed. Consumer protection is explicit in the Philippines, where the BSP No. 542 Series of 2006 - Consumer Protection for Electronic Banking, was recently enacted on September 1, 2006; and in ROC (Taiwan) where the Computer-Processed Personal Data Protection Law was passed in 1995 and the Enforcement Rules of Computer-Processed Personal Data Protection Law in 1996, both of which were enacted specifically to protect consumers against theft of sensitive personal information collected and processed digitally. In some other countries, such as Korea and Thailand, the data protection laws are not specific and explicit, but are imbedded in other major laws and regulations. In Thailand, for example, one finds the Electronic Transactions Act, 2001, and in Korea, the Electronic Financial Commerce Act, 2007. However, in many other SEACEN countries such as Cambodia, Papua New Guinea and Nepal, there is no legislation on data protection. In Malaysia, the specific Personal Data Protection Bill is only scheduled to be tabled in Parliament in 2008. A recent development in the legal front is the integration of various regulations related to e-payments. For instance, following extensive reviews, the Korean Electronic Financial Commerce Act, enacted in 2007, is an example. This Act not only clarifies issues regulating to electronic banking, but also incorporates protection for consumer as well as provides the Bank of Korea legal power to collect relevant statistics, and to request the Financial Supervisory Service for inspection or joint-inspection of e-payment providers.

Figure 10
Selected Legislations and Regulations on
E-payments and Payment System

Country	Selected Laws
Korea	Electronic Financial Commerce Act 2007The ACT clarifies the basic components of electronic banking, their processes and liability issues in the case of incidents involving electronic banking. It also improves security of electronic financial transactions and related regulations to protect the consumers
Malaysia	Payment System Act, 2003 (PSA) was enacted by Parliament to set out a comprehensive regulatory oversight framework to govern the changing payment landscape.
Philippines	BSP Circular No. 542 Series of 2006 Consumer Protection for Electronic Banking September 1, 2006 - Rules and regulations concerning consumer protection for electronic banking (e-banking) products and services, for purposes of compliance with the requirements to safeguard customer information.
ROC (Taiwan)	Computer-Processed Personal Data Protection Law” put into effect on August 11, 1995, and later, on May 1, 1996, the “Enforcement Rules of Computer-Processed Personal Data Protection Law” were promulgated
Vietnam	Law on Electronic Transactions (2005)legal proof of electronic messages, agreements and signaturesBanking Electronic Transactions (2007)Accommodate for electronic transactions in the banking sector.

Source: Country reports, member central banks and monetary authorities.

According to (APEC, 2002), a “worrisome development in e-payments is that technology has evolved so rapidly that prudential regulations and existing laws are unable to cope with the ever- changing environment”. Recognising innovation and new technologies as the driving force of e-payments, the laws and regulations may have to be modified constantly to remove barriers to innovation and experimentation in the payment systems (Kohn 2006).

4. Implications of E-Payments on Monetary Policies and Central Banks

From the country papers, it is clear that e-payments have yet to gain widespread acceptance in most countries in the SEACEN region. This is due to several reasons. Firstly, is the perception of the public towards e-payments, viewing them as unsecure and unsafe in spite of the fact that there have been no major episode of fraud. This lack of understanding can be explained by the lack of technology literacy, awareness and knowledge of e-payment products and systems. Secondly, infrastructure development, both technical and physical is lacking in many SEACEN countries, resulting in unreliable network of telecommunication systems. For instance, in the countries where computerisation and telecommunication infrastructure are lacking, e-payment services cannot be provided for consumers to do simple retail e-transactions, like payment of utility bills and the like. Thirdly, in many SEACEN countries, the legal framework is inadequate, both to encourage e-payment innovations and ensure privacy for e-payment users. Furthermore, the laws and regulations are unable to keep pace with e-payment innovations. Fourthly, many e-payment products have not been able to attain critical mass of users. E-payment products are developed by different institutions, often independently of each other. Compounding the situation, businesses often prefer cash due to unwillingness to pay charges for e-payment services. Fifthly, due to proprietary rights, the development of e-payment products has resulted in fragmentation. The lack of standards gives rise to inadequate inter-operability, limiting the functionality of e-payment products and resulting in inefficiency and user inconvenience.

4.1 Impact of E-payments on Monetary Policies

The debate on the implications of e-payment technologies, particularly e-money⁸ on monetary policy is discussed in this section. Generally, e-payments are beneficial because they lower transaction cost and enhance liquidity leading to efficient allocation of financial resources. As the acceleration in e-payment development is the direct result of advancement in information technology, monetary policy can become even more effective due to more effective information flows (Woodford 2001). With reference to e-money, there is a large potential for savings, in terms of reducing the total handling cost of hard currencies. When economic agents shift their preference, e-money may replace

8. E-money is defined as 'stored value or prepaid products in which a record of the funds or value available to the consumer is stored on a device in the consumer's possession. This definition includes both prepaid cards (sometimes called electronic purses) and prepaid software products that use computer networks such as the Internet (sometimes known as digital cash) (CPSS 2000).

Figure 11
Main Challenges of Development of E-payments for Central Banks

Country	Main Challenges
Cambodia	Inadequate laws and regulations Awareness and change the behavior of the public Infrastructure development, in particular the need to establish automating check clearing and settlement
Indonesia	Interoperability and convergence among operators' system Awareness and change the behavior of the public Accurate statistical data
Korea	Security issues of e-payments Awareness and change the behavior of the public Inter-operability and compatibility Provision of payment services by the non-financial institutions
Malaysia	Infrastructure and system readiness Public awareness and confidence Pricing mechanism Cross-border issue Inter-operability
Nepal, Papua New Guinea, Vietnam	Infrastructure and system readiness Inadequate laws and regulations Public awareness and confidence
Philippines	Infrastructure and system readiness Public awareness and confidence Inter-operability
ROC (Taiwan)	Public awareness and confidence Inter-operability and compatibility Security issues

Source: Country reports of member banks and monetary authorities.

cash and even traditional bank demand deposits and other type of liquid deposits (Berk 2002).

In a simulation exercise, the currency in circulation in 2006 is used to estimate the possible savings as a percentage of GDP. For the lower limits, the currency in circulation is multiplied by the lowest possible handling cost and the upper limit by the highest handling cost among SEACEN countries estimated by the Asian Bank Journal. In terms of total migration to e-money where all the currency in circulation is converted to digital money, the indicative figures show, on average, a saving of 0.4 to 1.8 percent of GDP (see Figure 12).

Figure 12
The Cost of Handling Cash

Country	Cost of Handling One Unit of Cash in Local Currency per Transaction ^{1/}	Cost of Handling Cash in Local Currencies terms per annum ^{1/}	Total Visible and Invisible Costs and opportunity Costs to support local currency in circulation per annum ^{1/}	Lower Limits: % of GDP (2006): Total Visible and Invisible Costs and opportunity Costs to support local currency in circulation per annum ^{2/}	Upper Limits: % of GDP (2006): Total Visible and Invisible Costs and opportunity Costs to support local currency in circulation per annum ^{3/}
Indonesia	0.000767 Rupiah per 1000	280 Rupiah per 1000 Rupiah	6126 billion	0.29%	1.26%
Malaysia	RM\$0.000575 per RM1	RM0.21 per RM1	3618 million	0.40%	1.72%
Philippines	0.00041 Pesos per 10	15 Pesos per 100 Pesos	14621 million	0.34%	1.45%
Singapore	S\$0.000177 per 1	S\$0.065 per S\$1	657 million	0.47%	2.04%
ROC (Taiwan)	NT\$0.000274 per 1	NT\$0.10 per NT\$1	51982 million	0.41%	1.79%
Thailand	0.000329 Baht per 10	12 baht per 100 Baht	39889 million	0.52%	2.23%

1/ Reported by Asia Banker Journal (Source: Asia Banker Journal 1999)

2/ Lower limit % of GDP is stimulated by the author using the currency in circulation multiplied by the cheapest estimated handling cost; 6.5 percent

3/ Upper limit % of GDP is stimulated by the author using the currency in circulation multiplied by the highest handling cost estimated; 28 percent.

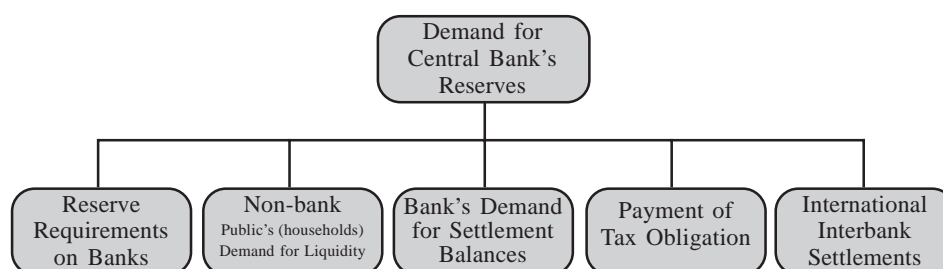
4.1.1 Money Demand

There are some concerns about how the widespread usage of e-money, which could potentially replace central bank notes, may disrupt the important functions of a central bank, particularly in the implementation of monetary policy. Theoretically, it is possible for the widespread adoption of e-payments to lead to what is called a “cashless” society”. In such a society, e-money causes a total replacement of hard currencies. In this regard, the degree to which e-money impacts on the central banking functions is dependent on how and to what extent privately issued (inside money) will substitute publicly-issued (outside money) circulating liabilities (Bullard & Smith 2003). It can be shown that when e-money is not included in the definition of monetary aggregates, such as M1, the elasticity of M1 is likely to increase.⁹ In this sense, it has been argued that e-money may have the potential to destabilise the money multiplier and to reduce demand for money. Another implication is that the substitution effect can increase the volatility of M1, making it hard to predict the monetary aggregate in the short-run (Solans 2003).

9. Furthermore, the use of other e-payment instruments, such as credit cards, can significantly alter other monetary aggregates (Allen 2003).

The demand for central bank reserves is dependent on several factors: (1) reserve requirements on banks; (2) non-bank public's demand for liquidity; (3) bank's demand for settlement balances (Freedman 2000; Arnone & Bandiera 2004); (4) payment of tax obligation (Goodhart 2000); and (5) the need for international interbank settlement. This is reflected in Figure 13. As for the reserve requirements, many developed countries have already eliminated reserve requirements as part of monetary policy although banks still hold settlement balances with the central bank (Woodford 2000). The questions, therefore, are: (1) to what extent is non-public's demand for liquidity can be substituted by e-money and; (2) how central bank's seigniorage can be affected by the substitution effect.

Figure 13
Demand for Central Bank's Reserves



Source: Haydar & Seyfettin (2006)

Central banks have an important monopoly power over the supply of currency which gives them the ability to govern the purchase or sale of currencies to credit institutions (Banque De France, 2001). This gives the central bank the ability to control short-term interest rates. This monopoly power of central banks is unchallenged, but the question is whether it is still relevant in this digital age (Freidman 1999). In this respect, Freedman (2000) sees no reasons why central banks should remain redundant. He argues that as long as central banks possess the “ability to impose terms and conditions related to the excess or shortfall of reserves or settlement balance”, central banks would remain relevant. That is, as long as settlement takes place on the books of the central bank, this will allow central banks to retain control over short-term interest rates. The focal point for the settlement of payments is to be with the central bank because the

bank is risk-free and is the lender of last resort. At present, even with network money, at the end of the day, settlement normally would have to take place on the book of the central banks, creating demand for central bank reserves (Arnone & Bandiera 2004). It is this precise reason why e-money at the current stage of development will not completely replace hard currencies.

4.1.2 Seigniorage

Seigniorage¹⁰ is roughly estimated by multiplying notes and coin outstanding by the long-term rate of interest on government securities and ‘since banknotes in circulation represent non-interest-bearing central bank liabilities, substitution of e-money for cash would lead to a corresponding decline in central bank asset holdings and the interest earned on these assets’ (BIS 1996). E-money could be a potential threat to central bank’s currencies because it is designed to make small-value payments (Berensten 1998). Looking at the currency in circulation as a percentage of GDP (see Figure 12), there is indeed a huge potential to replace the currency in circulation with e-money. In terms of currency in circulation as a percentage of central bank liabilities, cash is a significant part of the central bank liabilities for some countries, such as Indonesia, the Philippines, Sri Lanka and Thailand (see Figure 14). In this case, the substitution effect of e-money can affect the central bank’s balance sheet significantly. The estimated central bank’s seigniorage shows that the loss can be large if there were a widespread adoption of e-money. The loss of seigniorage may lessen the ability of central banks to carry out sterilisation policy effectively.

10. The seigniorage calculated is, but an indication, as it is estimated by multiplying notes and coin in circulation (as suggested by *Pedersen & Wagener 2000*) multiplied by a proxy of long-term interest rate.

Figure 14
Currency in Circulation 2006¹¹

	As a percentage of GDP	As a percentage of central bank liabilities	As a percentage of Demand Deposits	Seigniorage as a percentage of GDP
Indonesia	4.51 (06)	17.64	84.48	0.53
Korea	2.74(06)	8.63	39.89	0.13
Malaysia	6.13(06)	9.74	32.54	0.23
Papua New Guinea	2.88(04)	9.84	17.73	0.26
Philippines	5.17(06)	19.72	81.36	0.32
Singapore	7.28(06)	6.74	46.30	0.22
Sri Lanka	4.86(05)	26.76	98.48	0.44
ROC (Taiwan)	6.38(06)	8.26	10.23	0.10
Thailand	7.96(06)	16.78	235.52	0.41

Source: IMF statistics and CEIC.

4.2 Implications of E-payments on Central Banks

The development of e-payment generates two important implications for central banks. Firstly, central banks may have to rethink their operating procedures in order to effectively carry out monetary policy. Secondly, in the long run, should society become cashless, central banks may have to reorient to be more information-based.

4.2.1 Operating Procedure of Central Banks

In an e-payment economy, when private institutions are allowed to issue e-money, this development approximates the free-banking concept in United States from 1837 to 1863 where banks are free to issue their own notes, with designated securities to back them placed with state authorities (Federal Reserve Bank of

11. The interest rates are :Indonesia :Bank Indonesia Certificates (SBI) Rate (30 Days), Korea: Korea Bond Yield: Month Average: Treasury Bond: 1 Year Maturity, Malaysia: Average Malaysia Government Securities Yield (1 Year), Philippines: Average Philippines Treasury Bill Rate: WAIR (364 Days Jan-Nov), Singapore: Singapore Government Securities Yield (1 Year), Papua New Guinea: PNG Treasury bills (182 days), Sri Lanka: Government Paper Primary Yield (Bonds: 2 Years), ROC (Taiwan): Treasury bills 182 days weighted average

St. Louis 1996). A lesson from the free-banking era is that if a certain amount of regulations can assure that money are backed sufficiently, then, the privately issued money can be circulated along with hard currencies. This raises the question whether the central banking institutions are still relevant. However, according to Padoa-Schioppa (2004), the provision of final liquidity is the rationale for the existence of central banks. Private issuers may, in time of financial crisis, not act as a lender of last resort compared to central bank which enjoys the freedom from default risk (Meyer 2001). Moreover, evidence has also shown that in time of crisis, limited liquidity of private sector has prove to be ineffective without ultimate access to central bank liquidity. As discussed above, if the outstanding amount of e-money is relatively large, it can generate adverse effects on the velocity of monetary aggregates. Obviously for countries that rely on the velocity of money as a transmission mechanism for monetary policy, or for countries that are already facing difficulties in controlling monetary aggregates, e-payments, especially transactions of a cross-border nature that offer different currencies may pose further problems (Cohen 2001; BIS 1996). However, at the present moment, this may not pose a problem for SEACEN central banks. Firstly, the issuance of e-money is relatively small. For instance, even in an advanced country like ROC (Taiwan), currently, the outstanding amount of e-money is only NT\$40 million compared to the existing reserve balances of NT\$ 1145 billion. This represents less than 0.004 percent ROC (Taiwan) country report 2008). Secondly, many SEACEN central banks have avoided using monetary aggregates in their monetary policy formulation. It is noted that, in the formulation of monetary policy, the advanced and moderately advanced countries in terms of e-payments, with the exception of ROC (Taiwan), have put less emphasis on monetary aggregates (see Appendix B).¹²

Should e-money becomes widespread, the central bank may need to adjust its techniques so as to enable them to continue to “exert influence over the very short-term interest” (Freeman 2000). For instance, the central bank may need to alter its operational target by targeting an intervention band instead of operating from liquidity-based open-market operations. For example, central banks can, through unlimited standby facilities, establish a corridor for overnight interest rate. In this respect, no banks would lend or borrow at rates that are significantly different from the established interest rates. He refers this to the channel systems

12. Even then, according to Woodford (2000), while the usage of e-money can displace central bank notes, this may, in fact, be an added advantage to the central banks as the increase use of e-money can reduce risks to the central bank. This is because central bankers are less likely to be caught unaware of the fluctuation in demand and supply for central bank notes which can affect interbank market rate.

as employed by the Bank of Canada. However, as it also not expected to replace deposits, central banks may not have to adjust their operating procedures significantly (BIS 1996).

4.2.2 Central Bank Independence

Browne and Cronin (1995) note that, in the long run, in response to financial innovations, *laissez-faire* banking could eventually emerge. King (1999) takes the argument further by presenting a theoretical scenario where the payment system would one day become a pure exchange economy, where there is instantaneous verification of credit worthiness and the RTGS of private sector can occur with finality. In other words, in this scenario, some non-banks may set up rival currencies with their own payment and settlement systems. This scenario will see the complete substitutability of central bank liabilities with private sector liabilities. This would imply “the successors to Bill Gates would have put the successors of Alan Greenspan out of business” (King 1999 quoted in Hawkins 2001). Obviously in a cashless society, central banks would lose their seigniorage. However, even in a “cashless society”, the central bank can still borrow from the market in order to enforce monetary policy (Arnone & Bandiera 2004). That is, the central bank, all other participants, becomes a player in the market. However, the central bank, all other players, must have sufficient collateral in order to borrow to enforce its monetary policy. One way is for the treasury to issue risk-free securities to the central bank but this would demand a close cooperation between the fiscal and monetary authorities.¹³ Woodford (2000) and Freedman (2000) provide a similar view although they note that central banks may have to lend or borrow in a much relatively larger scale compared to the present day. Should this happen, central banks could lose instrument independence: the ability to pursue their objectives and goals.¹⁴ In this scenario, central banks may have to orientate themselves to be more market-oriented institutions, by focusing, among other things, on their ability to collect and analyse financial data (Gormez & Budd 2003).¹⁵ This refocusing of role, according to them, would assist in helping the public to “reduce imperfect information possibilities”, thus, making the selection of portfolio procedures for the different kinds of private e-monies an easier task. This extreme scenario

13. However, this is not without problem as there is the issue of fiscal solvency.

14. For inflation targeting countries, the prerequisite is central bank independence.

15. This may require a change in the legal aspects. For instance, the Bank of Korea is only able to collect data for electronic prepayment means to be included in e-money after the enactment of the Electronic Financial Transaction Act 2007 (Korean country report 2008).

of a “cashless society”, of course, raises the question of whether eventually central banks should issue their own e-money to compete with private issuers.¹⁶

4.3 Impact of E-Payments on Financial Stability

In most cases, SEACEN central banks take on a variety of roles in e-payment development, notably, policy making, licensing, supervision, and functioning as a catalyst. In some cases, the central bank is responsible to review the regulatory framework of e-payment to keep pace with the changing environment. As mentioned above, a strong motivation for promoting e-payment is the eventual improvement in the efficiency of the payment system. When the payment system becomes efficient, as in the form of e-payments, the integrity and the stability of the financial system can be greatly enhanced. A well functioning payment system is also important for the effective implementation of monetary policy so as to safeguard the monetary policy transmission. While the smooth and proper operation of e-payments can increase the overall efficiency of the financial system, e-payments, being a subset of the overall payment system, are subject to similar risks, such as operational risk, security risk, reputational risk, legal risk, credit risk, liquidity risk and systemic risk.¹⁷ For instance, inadequate supervision of non-banking institutions may lead to higher systemic and operational risks. To minimise such risks, SEACEN central banks and the relevant authorities have initiated several policy measures to help reduce the various types of risks involved, in particular credit risk and systemic risk from the payment and settlement process (Thailand Country Report). These include the enactment of regulations on e-payments, the establishment of oversight framework for e-payment systems and close monitoring of the development of e-payments.

5. Challenges and Policy Recommendations

From the country reports, as noted above, there are several challenges facing the central banks (see Appendix C). A common challenge is to create public awareness of e-payments. Lack of infrastructure, inadequate laws and regulations are the challenges facing the less developed countries with regards to e-payment

16. The survey of the member banks indicates that, at present, central banks should not issue their own e-monies to compete with other issuers.

17. However, it is noted that retail payment systems, as compared to wholesale and corporate e-payments, are less likely to propagate instability in the overall payment system.

development. The issues of inter-operability and comparability among different e-payment instruments and security are the main challenges in the developed countries. The policies and objectives of selected SEACEN countries are listed in Appendix D.

5.1 Infrastructure Development and National Agenda

One of the most important challenges facing central bankers is ensuring that the e-payment infrastructure is system-ready. In countries such as Nepal, Vietnam, Cambodia, Mongolia and Papua New Guinea, the challenge lies in providing basic to moderately advanced infrastructure to jump-start the e-payment development process. For instance, in Nepal, computerisation of banks is limited and only twenty percent of all bank branches are computerised, hampering efforts in promoting e-payments. In the rural areas, basic infrastructure, such as electrical power and the telephone system, is not available. In a study on e-commerce by Humphrey et al. (2003), it is noted that the development of e-commerce in developing countries has been hampered by inadequate domestic telecommunication infrastructure and slow connection speeds. Interestingly, they find that most e-commerce activities can function well with basic infrastructure and are not entirely dependent on sophisticated ICT requirements. Instead, they argue that cost effectiveness and reliable access to telecommunication and Internet service are more important. This essentially means that the cost of using the ICT system should be kept low. From a similar standpoint, an interesting observation about the SEACEN countries is that the development in mobile e-payment products using mobile telephone technology, such as in Korea, Singapore and ROC (Taiwan), may, in fact, help moderately advanced countries to potentially expand e-payment services to rural areas, where advanced e-payment infrastructure is lacking. For instance, from the Philippines Country Paper, it is reported that mobile phone usage in the country is one of the highest in the world relative to population size, leading to the possibility of introducing e-payment services through mobile technology in the rural areas.

For other countries with moderately developed infrastructure, it may be much easier for them to transform their economies into full-fledged e-payment economies by adopting an integrated approach, with the development of a national agenda for e-payments. Adopting a national strategic roadmap ensures that there is close corporation among the stakeholders, such as the government, the central bank and the private sector in the implementation and coordination of a strategic plan. A national blueprint may serve to balance both the demand

and supply side.¹⁸ Policy for the promotion of e-payments is often focused on reducing systematic risks and increasing the efficiency of the payment services. (Department of Communications, Australian Government, 2006). This may not be adequate as it is also necessary to consolidate and develop the e-payment infrastructure to reflect the needs of customers instead of operators of e-payments (Tan 2004). This is evident for a number of SEACEN countries which have successfully implemented e-payment systems, such as Korea, and Malaysia. In Malaysia, the central bank has formulated the e-payments roadmap which provides a high-level strategic direction for the country, in effect, making the migration to e-payment a national agenda. The Malaysian Central Bank works closely with the National Payments Advisory Council (NPAC) as the governor of the central bank is the chairman of the NPAC. The NPAC has representations from various government agencies as well as financial institutions.¹⁹ In Korea, the central bank coordinates the work of the relevant institutions in joint projects to establish the e-payment systems (such as K-cash, B2B electronic notes) and to standardise the various technical aspects through the Sectional Committee on Financial Informationalisation Promotion (SCFIP).

In addition, the development of e-payments is one area which may require government intervention. Being a critical stakeholder, direct intervention especially during the early stages of development is a necessary step, as leaving it to the free market forces to innovate may not be sufficient. For instance, in Malaysia, the government plays an active role to accelerate the migration of e-payments. It is making efforts for the acceptance of e-payment across its payment counters nationwide and also through the Malaysian Government portal, MyGovernment. In ROC (Taiwan), as early as 1999, the Ministry of Finance offered online tax payment services creating a demand for e-payments. Since 1999, the ROC (Taiwan) government has established project ABCDE, covering e-business supply chain at various stages of production to e-business services, which include payment, online financial and delivery tracking. The government can also promote e-payment further by requiring all its agencies to pay all their suppliers electronically as shown by the Australian experience (Commonwealth Electronic Procurement - Implementation Strategy 2000).

18. Promotion of e-payment should also be done in a consistent manner with other ICT policies (Comments from Professor Lee)

19. There are several ways to promote coordination, especially between the authorities and the private sector. One effective way is for the authorities to seek representation on the boards of companies involved in the implementation of e-payment to ensure the development of reliable and efficient e-payment systems. Such a system is practiced effectively by the Central Bank of Ireland (Central Bank of Ireland).

The implementation of a national agenda is also to ensure a systematic approach rather than piecemeal development. As e-payment products are normally developed separately by different institutions, proper coordination ensures standardisation and eventually inter-operability (Krueger 2001). Somehow, the development of e-payments is such that retail payment uses international recognised standards while wholesale and interbank gateway tend to be more proprietary and institution-specific. Therefore, for seamless integration from initiation to settlement, inter-operability, with the encouragement from central bank, must take place within the e-payment infrastructure.

Another important issue facing the advanced countries is cross-border e-payment infrastructure systems for payment and international portfolio settlements. As reported in the Malaysian Country Paper, issues such as jurisdictional ambiguities with regards to laws and regulations as well as consumer protection and operational risk are some important concerns. With growing international and regional trade, the development of cross-border payments must provide for secure and efficient regional electronic transactions, payments and settlements, which can facilitate regulation, supervision & monitoring of cross-border payments (Ch'ng 2004). Indeed, for many SEACEN countries, one such initiative is the *ASEANPay* (ASEAN Regional Electronic Payment Gateway Solution) which leverages on the existing Automated Clearing Houses of the respective countries.

5.2 User Awareness and Acceptance

User awareness and acceptance is cited as one of the most important factors in advancing the development of e-payments. In order to break the “cash-is-king” mentality, user acceptance involves many factors: (1) changing payment habits; (2) awareness of the availability of e-payment services; (3) security issues; (4) transparency to gain users’ confidence; (5) reputation of e-payment products. As noted above, the basic principle of critical mass users is crucial in promoting e payment products. Thus, the challenge of the central bank is to ensure that the public is made aware of the significance of e-payments. The public needs to be educated and motivated to change their payment habits through promotion of the benefits of e-payments. However, in promoting user acceptance, the dilemma is one of the “chicken-or-egg”. Consumers may wait until a specific e-payment product becomes more accessible, while merchants will not participate until the customer base has grown large enough for them to at least break even for them to operate such e-payment schemes. Promotion of the benefits of e-payment must also concentrate on the supply side. For instance, research in the

US indicates that through encouragement by businesses, consumers may be readily accept e-payment for their payment alternatives, but businesses themselves are reluctant to switch to paperless payments, for example, having their own cheques converted to e-payments. One of the reasons is that it may require a large investment in their back-office payment, billing, and accounting systems (Kohn 2006).

Another important aspect about user acceptance and awareness is the closing of information gaps through gathering of data by conducting regular surveys. This is important in two respects. Firstly, it is extremely important not only for central bank to understand the supply side which emphasises on economic and technology, but it is equally vital to recognise how users “perceive and use electronic money.” In other words, it is pertinent to understand the use of money in its “social and cultural context” (Singh 1999). Secondly, accurate surveys can ensure protection for users by ensuring that operators comply with the rules and regulations and, thus, building up public trust.

The pricing of e-payment products may also influence both user and business acceptance. Pricing of e-payment and related products may, especially at the initial stage of development, be a useful way to promote e-payments to ensure their rapid adoption so as to maximise the substitution process (Bolt, Humphrey & Uittenbogaard 2005). However, pricing may not be effective if users value other factors as relatively more important, for example, security and privacy concerns.

5.3 Supervision

In the SEACEN countries, the central bank is the main body that standardises and regulates payments. This presents the central banks with two challenges. The first challenge is not only to ensure the safety, reliability and efficiency of e-payment systems by identifying the risks and gaps of the individual systems, but also to recommend measures to mitigate such risks. This requires huge efforts as innovations and technological development in e-payments can potentially shift risks within the payment system or even increase them (Kohn 2006). The other is to safeguard against the possible impact of e-payments on liquidity and, hence, monetary policy. Various kind of risk can evolve from e-payments (see Appendix F). However, in some countries such as Korea, the central bank focuses its interest on the standards and oversight, while another authority is responsible for regulatory supervision. But more importantly, the Bank of Korea has the right of supervision in addition to oversight. The central banks of SEACEN countries perform different oversight functions with regards to e-

payments. For instance, in Papua New Guinea, as there is no specific regulatory framework for electronic schemes, all electronic products are regulated with other banking products. Thus, the Banking Supervision Department of the Bank of Papua New Guinea has the responsibility to oversee all e-payment products in the market, with other supervisory tasks. In countries with moderately developed e-payments, there is specialisation of tasks in the central bank. For instance, Bank Negara Malaysia has two departments, the Payment Systems Policy Department and the IT & DFI Supervision Department to deal with payment issues. Among their functions include supervision of the banking and non-banking institutions that are providing designated e-payment instruments. The oversight function includes undertaking macro-surveillance to ensure stability, reliability and efficiency of the payment system, and micro-surveillance which focuses on the safety and soundness of individual institutions/systems and participants in the RTGS system. The oversight activities involve monitoring, collecting information and statistics, on-site supervision and assessment against international standards. An interesting case is ROC (Taiwan) where the e-payment supervision is part of the Payment and Settlement Section in the Department of Banking, but a task-group, comprising 10-12 people from different departments (Financial Examination, Information, and Legal Affairs), implements the payment system oversight.

With increasing liberalisation of the banking sector, e-payment operators have proliferated in the non-banking sector in many SEACEN countries. From standpoint of e-money, the issue is whether non-banking institutions should be allowed to issue e-money and how to supervise them. In the European Union, initially only banks are allowed to issue e-money. Most SEACEN countries allow non-banking institutions to issue e-money. There are notable exceptions, for instance, ROC (Taiwan). An obvious advantage of allowing e-payments to be provided by non-banks, such as telecommunication companies and Internet providers, is that they can leverage on their network expertise (BIS 2004). There are a few other reasons why it may be better to allow non-banking institutions such as telecommunication companies to issue e-money (Grigg 1999). Firstly, banks generally are riskier. Secondly, banks in many countries are over-supervised resulting in their “unwillingness to deviate” from what are regarded as commonly accepted practices. This results in clustering, where every bank operates in very similar fashion to each other. Thirdly, generally, banks are less innovative than telecommunication and IT companies by virtue of their conservative behaviour. Fourthly, the IT architecture that is needed to operate e-money schemes may complicate the overall IT structure of the banks. Lastly, the success of an e-payment scheme depends not only on innovation of IT, but

in persuading potential users to use the products. Banks are at a disadvantage because they are generally not good marketers of products.

If only banks are allowed to issue e-money, the e-money simply becomes a part of the existing banking system. However, if non-banking institutions are allowed to issue e-money, the supervision of these institutions may pose a challenge to the central banks. They may require different regulatory regimes as their risk profiles may be different from that of financial institutions. The common argument is that the supervisory regimes of banks may be too restrictive for non-bank issuers. One way is for the regulators to treat these non-banks as non-institution-oriented firms as opposed to the structured banking institutions. However, others have suggested that in order for banks to compete with high-tech money servers, policy-makers must apply the same standard across the board, such as rules and capital requirement on money and loan creation, to these non-banking institutions (Solomon 1999). The evolution of e-payments depends much on technical innovation, and tighter regulations may stifle innovations and competition. Therefore, an important aspect is the possible trade-off between supervision and competition.

With regards to the supervision of non-bank issuers of e-money, the regulatory requirements prescribed by the international directive of the EEC (Papametiou 1999) should be sufficient. These are in the area of (1) redeemability, in which issuers of e-money must be legally obliged to convert e-money into central bank currency, if requested by e-money holders; (2) restriction to expand businesses, in which non-banking institutions are prohibited to extend their businesses beyond closely related business. This is to ensure there is no the inherent risk to other businesses as well as make certain the accounting book is not over duly complicated; (3) restriction on investment decisions, where there are some forms of regulations on the investment decisions made concerning the money they receive in exchange for the issuance of e-money; and finally (4) factual disclosures of information in which such disclosures must be easily available to the public. In this sense, financial reports should be made available at least once every six months with information on prudential requirements, such as corporate structure, minimum capital, asset-liability management, liquidity, foreign exchange risk, interest rate risk, restrictions on activities, management, systems and controls (Dorsey and Whitney, 2003). Finally, e-money issuers must be controlled that they do not over issue money that might lead to defaults and payment system gridlock. One simple way to do this is by the normal assessment procedure, such as the CAMELS-like ratings (Fullenkamp & Nsouli 2004).

5.4 Inter-operability

Inter-operability is defined by the Institute of Electrical and Electronics Engineers (IEEE) as “the ability of two or more systems or components to exchange information and to use the information that has been exchanged.” There are two reasons why central banks are encouraging inter-operability. Firstly, inter-operability ensures the e-payment systems offered are efficient and cost-effective, and, secondly, it ensures e-payments are more accessible and offer greater convenience for users. That is, inter-operability enhances efficiency by reducing cost through the sharing of networks to create a ubiquitous e-payment payment platform. However, for inter-operability to take place, strategic initiatives among providers are just as important as the convergence of technology. Inter-operability involves strategic cooperation among these operators. For instance, banks and switching companies came together in Indonesia to establish a national standard for the ATM cards in order to create inter-operability amongst the ATM cards. Inter-operability among operators may imply having only a few operators dominate the market (Van Hove 1999). In this sense, bigger firms having cost advantages are likely to do better than smaller firms. Bigger firms have the edge to integrate the necessary infrastructure as well as cooperate with other service providers.

Two other factors are posited why larger and incumbent firms are favoured (Choi, Stahl & Whinston 1997). Firstly, the success of e-payment product hinges much on the quality of services, and larger firms have economies of scale to invest more on quality. Secondly, larger and incumbent firms with a reputation established in the “physical” markets normally also enjoy a better reputation in the e-payment markets, and therefore are able to command consumers’ faith and trust in the firms providing the services. Newer firms are often at a disadvantage. Therefore, the authority may have to consider the trade-off between inter-operability and competition. For instance, in Singapore, to ensure inter-operability of its contactless card system through the Singapore Standard for Contactless e-Purse Application (CEPAS), as of April 2007, the authority chose to allow only two compatible cards, namely, the “*CashCard*”, introduced by Network for Electronic Transfers (Singapore) Pte Ltd (NETS), established in November 1996, and the “*ez-link Card*,” introduced by EZ-Link Pte Ltd in April 2002. On the other hand, innovative e-payment solutions are frequently the result of exploiting proprietary technologies which encourages competition. Therefore, the authorities must ensure minimum prerequisites for open access to encourage new participants. From the legal aspects, new entrants must be accorded the right to access the network and the access fee set is not prohibitive to prevent “outsiders” from joining the network in the first place (Krueger 1999).

It must also be realised that it may be difficult to impose inter-operability due to commercial reasons (Lee 2008).

5.5 Security

Security of e-payments is one of the most important issues influencing user acceptance as well as reducing the system's vulnerabilities to operational risk.²⁰ Security of e-payment products is important especially when the e-payment transactions are done through "open" systems. Therefore, one challenge to central banks is whether and how to supervise the computer networks of the commercial banks, if parts of these networks utilise third-party open systems, such as those provided by Internet service providers (Khiaonarong 2001). Even then, proprietary connections are also vulnerable. For example, according to the Vietnam Country Report, over 30 percent of the commercial banks' websites may be vulnerable to critical security threats. Vietnam also lacks a Certification Authority for the promotion of e-payment and e-commerce. In ROC (Taiwan), the Shared Internet Banking System uses Secure Electronic Transaction (SET) standards for e-commerce purpose, and the Taiwanese authorities have set up the Certificate Authority and constructed the Public Key Infrastructure (PKI). In Malaysia, with the implementation of the Financial Process Exchange (FPX), which uses authentication and certification, Internet-based transactions are secured, enhancing public confidence. Many SEACEN countries, like Singapore, have implemented a two-factor authentication for all Internet banking systems, which uses multiple layers of security and defence-in-depth control techniques (Monetary Authority of Singapore 2007).

A major step towards enhancing security for card-based e-payments is the migration of magnetic strips to chip technology for credit cards. For example, in Malaysia, since the completion of the migration of the EMV chips in 2005, credit card fraud has declined from RM69.9 million in 2004 to RM18.3 million in 2006, a drop of more than 70 percent (Bank Negara Malaysia 2006). Enforcing and encouraging operators to migrate to chip technology is therefore essential. Malaysia became the first country in the Asia Pacific region to fully migrate to the chip environment. Chip migration has also been implemented in other SEACEN countries such as Indonesia, Korea, Singapore, the Philippines and ROC (Taiwan). In Indonesia, the deadline for implementing the chip technology,

20. For instance, in a recent survey of Finnish customers, it is noted that security and trustworthiness are most important consideration for users to adopt a new payment instrument (Dahlberg & Öörni 2006).

particularly for credit cards, is end of December 2009. A possible policy option is to use the “liability shift” policy where non-EMV compliant party will bear the fraud liability. Interestingly, as noted by the Indonesian Report, the country may anticipate a movement (spill-over) of fraud from neighboring countries who have already implemented the chip technology. Setting up a hotline for fraud reporting is another way to reduce fraud, and it also acts as an informational centre regarding e-payments. For instance, in ROC (Taiwan), the “165 Anti-Fraud Hotline” received, on average, about 4500 phone calls per day requesting assistance.

The other area of concern for central banks is the possible usage of e-payments for money laundering and other criminal activities. To curb money laundering, the central bank should ensure that the operators have proper record-keeping. One can also review the ease of making fund transfers anonymously, the maximum amount held on a particular product, and the maximum allowed for such transfer, particularly cross-border transactions. But then again due consideration must be given to migrant workers who need to transfer fund back home to their families efficiently. Foreign pensioners who have settled in this part of the world may also need to receive money from their overseas pension funds (ACI Worldwide).

5.6 Taxation Issues and Official Records

For total integration, the central banks can encourage valued-added services (VAS) (ECB 2005). VAS service can be in the form of e-invoicing and e-reconciliation. With VAS, e-payments can be totally paperless and cash-free. Therefore, related to VAS is the recognition of electronic records for tax purposes by the authorities. The development of e-payments should be in such a way that taxpayers are able to account such payments for tax purposes. This is also important from the perspective of user acceptance. Therefore, an appropriate level of accountability in e-payment systems is needed to “reduce the need for costly ‘after-market’ adjustments to the systems of taxpayers including businesses, customers and payment system providers” (OECD). The successful implementation of VAS would require coordination among the various government agencies and the central bank.

6. Conclusion

Based on the discussion above, the development paths can be roughly divided into three stages, namely, short-term, medium-term and long-term. As

noted above, in the SEACEN region, the development stage of e-payment can be roughly divided into three groups. Therefore, the development paths of possible measures can be mapped to the various stages of e-payment development. For instance, the short-term policy recommendations can be applied for the less advanced countries. As the development of e-payments progresses (the future direction of e-payment of selected countries is listed in Appendix E), medium-term policy recommendations then become applicable. A summary of policy recommendations across the different stages of e-payment development is presented in Figure 15.

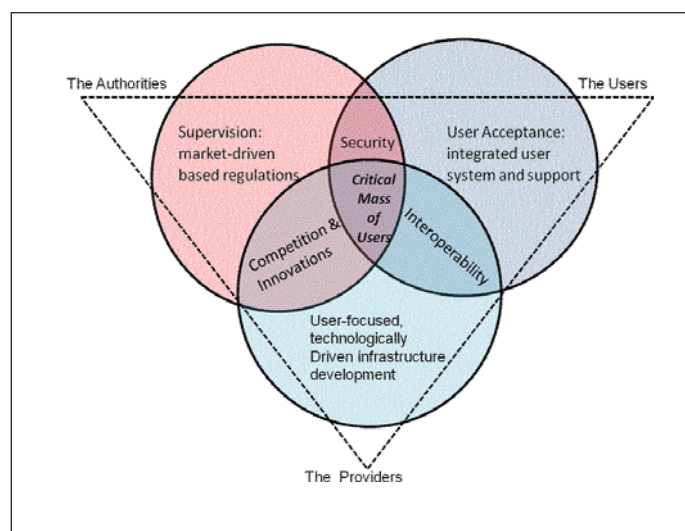
Figure 15
A Summary of Possible Policy Recommendations

	Short-Term (Less Advanced Countries)	Medium-Term (Moderately Advanced Countries)	Long-Term (Advanced Countries)
Technical Infrastructure	Mapping infrastructures, introduction of basic infrastructure, like Internet banking, etc	Develop a national agenda to standardise standards. Promote inter-operability e.g. inter-operability of ATM, integration of securities settlement, ACH and foreign exchange into RTGS. Promote Internet access and mobile payment system. Infrastructure development must also be at the demand side.	Promote inter-operability nationwide by instituting standards and security measures. To develop local e-payment into an ubiquitous e-payment payment platform. Develop and harmonise across border e-payment systems, international portfolio settlement, etc.
User Acceptance	Educate potential users and instill market awareness. Appropriate fee structures to encourage consumers and businesses alike.	Increasing security, transparency and customer protection. Closing the information gaps by conducting regular consumer payment behavior studies and surveys and develop data bank concerning consumer payment behavior. Appropriate fee structures to encourage consumers and businesses alike.	Appropriate fee structures to encourage consumers and businesses alike. Encourage value-added services (VAS) of e-payments.
Cost and Profitability for operators	Mapping the problems and provide incentives for operators	Examine pricing formula and putting in place fair incentives for all operators	Encourage inter-operability to increase efficiency
Legal Framework and Supervision	Mapping the legal issues and risk potential. Basic regulation on payment systems.	Set up regulation, align with international best practice; digital signature, etc. Customer privacy and protection. Taxation Issues and records.	Harmonising cross-border laws and regulations
Entrance for Operators	Government involvement	Encourage coordination and cooperation among operators; Public/private partnership	Inter-operability among operators

Sources: Country Reports and Country Presentations at the 2nd Workshop on E-payments, The SEACEN Centre.

As noted in the surveys, the most important step towards promoting e-payment in the SEACEN countries is the provision of infrastructure. The development of infrastructure is highly dependent on the incentives and initiatives of the relevant authorities. At the initial stage, the authorities, including the central bank, can act as a catalyst in the development of e-payment, by working with the private sector to identify and, if appropriate, address the barriers to e-payment system innovations (Kohn 2006). For instance, in Malaysia, the relaxation of banks to operate their own payment gateway services has led to greater competition and better choice and services for the users. Another catalyst provided by the Malaysian Central Bank is to allow non-banks to issue credit card as long as they establish a joint-venture company with banks, or that they are able to establish credit mechanisms from banks (Zeti 2003). The development of e-payments is somehow related to advancement in ICT innovations which, according to Moore's Law, will see exponential growth of computing power. In light of this, it is also important to realise that many countries have seen the banking sector investing heavily in innovative products that had failed badly (BIS 2004). Hence, it is e-payment users' preferences that will determine the success of any payment instruments in the long-run. To summarise, the factors that can generate a critical mass of e-payment users are: supervision that is market-driven, emphasizing competition and innovation, and user-focused, technological-driven infrastructure development (see Figure 16).

Figure 16
Interaction of Various Contributing Factors



E-payments do not necessarily pose a direct threat to central banks *per se* as many jurisdictional aspects of e-payments, such as licensing, approval and reporting requirements for operators, lie within the authority of central banks. In fact, the advancement in ICT is likely to enhance the entire monetary transmission mechanism through progressive changes in the structure of the financial markets. The dilemma is, when central banks promote a total “cashless” society, they may have engineered their own demise by making themselves redundant with no or little role to play in monetary policies. Therefore, while concerted efforts have been made to promote cashless payments, it is equally important for SEACEN central banks to understand the implications for monetary policy so that necessary preparations could be made to ensure that the conduct of monetary policy will not be impeded. However, as reported in the country chapters, at the present moment, this is not much of a concern simply because the proportion of e-money issued is relatively small.

References

1. Aciworldwide, Payments Systems in the Next Decade: The Drive to Convergence, <<http://www.aciworldwide.com/pdfs/ConvergencetrendsFLUS3122.pdf>>.
2. Allen H, (2003), "Innovations in Retail Payments: E-payments", *Bank of England Quarterly Bulletin*: Winter.
3. APEC Working Group on Electronic Financial Transactions Systems (E-FITS), Final Report, 26 July 2002.
4. Applied Communications (ACI) INC and Global Insight INC, Global Electronic Payments, Market Study and Forecast, 2006, <http://www.aciworldwide.com/pdfs/2006_Payments_Market_Study.pdf>.
5. Arnone M and Bandiera L, (2004), "Monetary Policy, Monetary Areas, and Financial Development with Electronic Money", IMF Working Paper, no.WP/04/122.
6. Asian Banker Journal, (1999), Cost of handling Cash in Asia.
7. Bank Negara Malaysia, (2006), Financial Stability and Payment Systems Report.
8. Berensten A., (1998), "Monetary Policy Implication of Digital Money", KyKlos, Vol.51.
9. Berk JM, (2002), "Central Banking and Financial Innovation", Paper Presented in the 22nd NBP Conference on Monetary Policy in the Environment of Structural Changes, Federal Reserve Bank New York, European Central Bank and of the Annual Meeting of the Western Economic Association, San Francisco.
10. BIS, (2004), E-payments without Frontiers, Issues Paper for the ECB Conference, 10 November.
11. BIS, (1996), Implications for Central Banks of the Development of Electronic Money, October, < <http://www.bis.org/publ/bisp01.pdf>>.
12. BIS, (2001), The Core Principle Core Principles for Systemically Important Payment Systems, CPSS Publications, No 43, January 2001.

13. BIS, Recommendations for Securities Settlement Systems, Committee on Payment and Settlement Systems, Technical Committee of the International Organization of Securities Commissions, November 2001b.
14. Bolt W, Humphrey D., (2005), "Uittenbogaard R, The Effect of Transaction Pricing on the Adoption of Electronic Payments: A Cross-Country Comparison", September 24, Federal Reserve Bank of Philadelphia, *Working Papers*, No.05-28, <<http://www.phil.frb.org/files/wps/2005/wp05-28.pdf>>.
15. Browne FX. and Cronin D. (1995), "Payment Technologies, Financial Innovation and Laissez-Faire Banking", *The Cato Journal*, Vol.15, No.1, Spring/Summer.
16. Card Technology Magazine, <www.cardtechnology.com>.
17. Central Bank of Ireland, Central Bank Policy, Official Website, <<http://www.sedlabanki.is/?PageID=207>>.
18. Ch'ng E, (2004), ASEANPay – "What's the Story?", Powerpoint Presentation, Presented at the Payments in the Americas organized by the Federal Reserve Bank of Atlanta, 7-8 October 2004.
19. <<http://www.frbatlanta.org/invoke.cfm?objectid=C3FA0FAF-05F6-83C3-B429D13375ED8D1F&method=display>>.
20. Choi SY, Stahl D.O., Whinston A.B., (1997), "Electronic Payments and the Future of Electronic Commerce", The Centre for Research in Electronic Commerce, Graduate School of Business, The University of Texas at Austin, 1997, <<http://crec.mcombs.utexas.edu/works/articles/cyberpayments.html>>.
21. Commonwealth Electronic Procurement - Implementation Strategy, Better Practice Checklist for Electronic Payment, Australian Government, Dept of Finance and deregulation, April 2000.
http://www.agimo.gov.au/publications/2000/04/better_practice_checklist_for_epayment
22. CPSS Survey of Electronic Money Developments, Publications No 38, May 2000.

23. DahlbergT and Öörni A., (2006), “Finnish Consumers’ Expectations on Developments and Changes in Payment Habits Survey in Connection with the Research Project on ‘Finnish Payment Habits 2010, Bank of Finland, Research Discussion Papers 32.
24. Department of Communications, Information Technology and the Arts, Australian Government, Exploration of Future Electronic Payments Markets, June 2006.
<http://www.d.bcde.gov.au/__data/assets/pdf_file/0013/40522/Exploration_of_Future_Electronic_Payments_Markets.pdf>.
25. Dorsey and Whitney, (2003), Electronic Money,
<http://www.dorsey.com/files/tbl_s21Publications%5CPDFUpload141%5C274%5CElectronicMoney24Mar03>.
26. ECB , (2000), “Issue Arising from the Emerging of Electronic Money”, *Monthly Bulletin*, p.52.
27. ECB, Report on Retail payment innovations, (2005),
<<http://epso.intrasoft.lu/papers/Report-Retail-payment-innovations-2005.pdf>>.
28. Federal Reserve Bank of St. Louis, (1996), Regional Economist, April,
<http://findarticles.com/p/articles/mi_qa3678/is_199604/ai_n8755671>
29. Freedman C., (2000), “Monetary Policy Implementation, Past, Present Future, Will Electronic Lead to the Eventually Demise of Central Banking”, *International Finance*, Vol.3, no.2.
30. Freidman B.M., (1999), “The Future of Monetary Policy: The Central Bank as an Army with Only a Signal Corps?”, *International Finance*, Vol.2, No.3.
31. Friedman, B.M., (2000), “Decoupling at the Margin: The Threat to Monetary Policy from the Electronic Revolution in Banking”, *NBER Working Paper*, No. 7955.
32. FSI Connect , Retail payment system Course, < www.FSIconnect.org>.

33. Fullenkamp C. and Nsouli SM, (2004), "Six Puzzles in Electronic Money and Banking", *IMF Working Paper*, no. WP/04/19.
34. Grigg, Response to Policy Questions Presented by European Commission, Joint Research Centre (JRC) and Institute for Prospective Technological Studies (IPTS) on Study on Electronic Payment Systems on behalf of the Committee on Economic and Monetary Affairs and Industrial Policy of the European Parliament 20th January 1999<C:\e-payment\q ana asearch.htm>.
35. Goodhart C.A.E., (2000), "Can Central Banking Survive the IT Revolution?", *International Finance*, Vol.3, no.2.
36. Gormez Y. and Budd C.H. (2003), "Electronic Money Free Banking and Some Implications for Central Banking", The Central Bank of the Republic of Turkey, *Discussion Papers*.
37. Hawkins J. (2001), "Electronic Finance and Monetary Policy", *BIS Papers*, no. 7.
38. Haydar A. and Seyfettin A. ,(2006), "The Reflections of New Economy on Monetary Policy and Central Banking", 24 May 2006, *MPRA Paper* No. 603, <[Http:// mp.ra.ub.uni-muenchen.de/ 603/](http://mp.ra.ub.uni-muenchen.de/603/)>.
39. Humphrey J., Mansell R., Paré D., Schmitz H., (2003), "The Reality of E-commerce with Developing Countries", London School of Economics and Political Science (LSE) and and the Institute of Development Studies (IDS), March 2003,< <http://www.gapresearch.org/production/Report.pdf>>.
40. Institute of Electrical and Electronics Engineers, (IEEE), (1990), Standard Computer Dictionary: A Compilation of IEEE Standard Computer Glossaries. New York, NY.
41. Jayamaha R., The Significance of Payment Reforms in Financial System Stability, Opening Address by Ranee Jayamaha, Deputy Governor of the Central Bank of Sri Lanka, at the Seminar on Payment Systems and Cheque Imaging, organised by the Royalist Bankers' Club, Colombo, 25 May 2006.
42. Khiaonarong T., The Oversight of Payment Systems, Paper Presented at the at the Asia Pacific Finance Association (APFA) Conference held at the Shangri-La Hotel, Bangkok, Thailand on 24 July 2001.

43. Kohn D.L., Investing in Payment Innovations- a Federal Reserve perspective, Remarks by Mr Donald L Kohn, Member of the Board of Governors of the US Federal Reserve System, at the 2006 Payments Conference, Federal Reserve Bank of Chicago, Chicago, 11 May 2006, <<http://www.federalreserve.gov/newsevents/speech/kohn20060511a.htm>>.
44. Kruegen M., Convergence Between E-Payment And Communications Sectors, Chapter 3, Final Report to the European Parliament Committee on Industry, External Trade, Research and Energy (ITRE), Prepared by IPTS, ISIS, SPRU and TNO-STB, Sevilla (2001), <http://www.paysys.de/download/ITRE%20Study.pdf>.
45. Krueger M., In: Future Bottlenecks in the Information Society. Final Report to the European Parliament Committee on Industry, External Trade, Research and Energy, (ITRE), prepared by IPTS, ISIS, SPRU and TNO-STB, Sevilla (2001), <http://www.paysys.de/download/ITRE%20Study.pdf>.
46. Lahdenperä H., (2001), "Payment and Financial Innovation, Reserve Demand and Implementation of Monetary Policy", Bank of Finland, *Discussion Paper*, No. 26.
47. Lee C.L., (2008), Comments of this Draft, Professor of Economics, College of Economics and Business, Korea University.
48. Masi P., (2002), Electronic Payments and the Future of Electronic Commerce, Paper Presented in The Implementation of E-signatures in Payment Systems::Open Issues and Possible Solutions, ECB Conference on e-payments, Frankfurt 19 November, <<http://www.ecb.int/events/pdf/conferences/epayments-masi.pdf>>.
49. Member Central Banks and Monetary Authorities, Country Reports of the SEACEN Project on the Development and Challenges of E-payments for Central Banks in the SEACEN Countries, 2008.
50. Mesonnier J.S., (2001), "Implications for Monetary Policy of the Development of Electronic Money: a Review of Recent Debate", Economic Analysis and Research Directorate, Monetary and Financial Policy Analysis Division, *Banque De France Bulletin Digest*, No. 92, August, < bulletin French good.pdf>, No 7853, August.2000.

51. Meyer L.H., (2001), The Future of Money and of Monetary Policy, Remarks by Governor Laurence H. Meyer, at the Distinguished Lecture Program, Swarthmore College, Swarthmore, Pennsylvania, December 5, The Federal Reserve Board, <http://www.federalreserve.gov/boarddocs/speeches/2001/20011205/default.htm>.
52. Monetary Authority of Singapore (MAS), Building Confidence in E-payments and Internet Banking Systems, MAS Annual Report 2006/07, <http://www.mas.gov.sg/about_us/annual_reports/annual20062007/28_building.htm>.
53. OECD Centre for Tax Policy and Administration, Tax Administration Guidance -Electronic Payment Systems Tax guidance series, <<http://www.oecd.org/dataoecd/29/27/31663069.pdf>>.
54. Padoa-Schioppa T., (2004), Regulating Finance: Balancing Freedom and Risk, Oxford University Press.
55. Papameletiou D., (1999), Study on Electronic Payment Systems for the Committee on Economic and Monetary Affairs and Industrial Policy of the European Parliament, Institute for Prospective Technological Studies, Seville, May.
56. Payments News, EMVChip Card Deployment in Visa Asia Pacific, <http://www.paymentsnews.com/2006/10/emv_chip_card_d.html+emv+philippines&hl=en&ct=clnk&cd=4&gl=my>.
57. Pedersen E.H. and Wagener T., (2000), Compilation of Seigniorage Monetary Review - 4th Quarter. <[http://www.nationalbanken.dk/C1256BE9004F6416/side/Monetary_Review_4_Quarter_2000/\\$file/nb02.htm](http://www.nationalbanken.dk/C1256BE9004F6416/side/Monetary_Review_4_Quarter_2000/$file/nb02.htm)>.
58. Report on Retail Payment Innovations, (2005), <<http://epso.intrasoft.lu/papers/Report-Retail-payment-innovations-2005.pdf>>.
59. Ruengvirayudh R., Benefits, Strategies and Challenges in Moving Towards Cashless Economy: Country Summary, Powerpoint Slides Presented at the 5th Meeting of Directors of Payment and Settlement Systems of Asia-Pacific Central Banks, Bangkok, Thailand, 30 November-2 December 2006.

60. Singh S. (1999), "Electronic Money: Understanding its Use to Increase the Effectiveness of Policy", *Telecommunications Policy*, Vol. 23.
61. Solomon E.H., (1999), "What Should Regulators do about Consolidation and Electronic Money?", *Journal of Banking & Finance*, Vol.23.
62. Tan, M., (2004), *E-payment: The Digital Divide*, Singapore University Press.
63. The Global Information Technology Report, <<http://www.weforum.org/en/initiatives/gcp/Global%20Information%20Technology%20Report/index.htm>>.
64. The SEACEN Centre, Monetary Policy Management in the SEACEN Countries, Document Prepared for the SEACEN EXCO Seminar on Building Credibility for Effective Monetary Policy, 25 January 2008, Phuket, Thailand.
65. Trade Online Project, Electronic Payments Benefits, <http://www.electronic-payments.co.uk/benefits_index.jsp>.
66. Van Hove, L., (1999), "Electronic Money and the Network Externalities Theory: Lessons for Real Life", *Netnomics*, Vol. 1.
67. Woodford M., "Monetary Policy in a World without Money", *NBER Working Paper*.
68. Woodford, Michael, (2000), "Monetary Policy in a World without Money," *International Finance*, Vol. 3. no.2.
69. Zeti A.A., (2005), Migration to E-payments, Keynote Address by Dr Zeti Akhtar Aziz, Governor of the Central Bank of Malaysia, at the Payment Systems Forum and Exhibition 2005, Kuala Lumpur, 28 November.
70. Zeti A.A., (2003), Electronic Payments in Malaysia, Speech by Dr Zeti Akhtar Aziz, Governor of the Central Bank of Malaysia, at the Promotion of Electronic Banking and Payments Launching Ceremony, Electronic Banking: The Way Forward, Kuala Lumpur, 8 May.

Appendix A

Korea

Basic Indicators

	2002	2003	2004	2005	2006	1Q2007	2Q2007
Population (thousands)	48,518	48,824	49,053	49,268	49,624	...	...
Nominal GDP(bill.Won)	684,264	724,675	779,381	810,516	847,876	...	...
Cash in Circulation End of (bill.Won)	24,174	24,491	24,882	26,136	27,843	27,782	26,996
Exchange rate average (Won/1 US\$)	1251.24	1191.89	1144.67	1024.31	955.51	938.9	929.26

Statistics Usage of Various Cashless Payments: Value of Transaction Per Capita

(Thousand Korean Won)

	2002	2003	2004	2005	2006	1Q2007	2Q2007
Large Value clearing systems(BOK-Wire)	469,311	463,170	549,129	612,292	643,418	n/a	n/a
Cheques	60,934	54,275	43,109	39,776	73,025	n/a	n/a
Payment cards							
1. Credit card	12,761	9,861	7,186	7,321	7,475	n/a	n/a
2. Debit card*	1.56	1.27	55.00	161.32	250.74	n/a	n/a
3. Charge card	...	...	5.31	10.71	14.68	n/a	n/a
4. E-purse (multi-purpose cards, etc.)	...	...	2.55	2.41	2.27	n/a	n/a
Please specify Other Categories: a bill	50,084	40,369	25,078	19,407	27,088	n/a	n/a

*check card included

Statistics Usage of Various Cashless Payments: Volume of Transaction Per Capita

	2002	2003	2004	2005	2006	1Q2007	2Q2007
Large Value clearing systems(BOK-Wire)	0.0312	0.0326	0.0350	0.0403	0.0420	n/a	n/a
Cheques	22.4	19.8	17.6	16.5	23.1	n/a	n/a
Payment cards							
1. Credit card	46.05	44.98	46.31	54.16	63.07	n/a	n/a
2. Debit card*	0.0241	0.0185	1.605	4.040	6.677	n/a	n/a
3. Charge card	...	...	0.12	0.22	0.31	n/a	n/a
4. E-purse (multi-purpose cards, etc.)	...	...	3.22	3.12	3.22	n/a	n/a
Please specify Other categories: a bill	0.1602	0.1391	0.1275	0.1154	0.1122	n/a	n/a

*check card included

Other Useful Statistics (per 1000 of population)

	2002	2003	2004	2005	2006	1Q2007	2Q2007
No of ATM terminals (CD terminals included)	1.362	1.642	1.648	1.684	1.740	...	...
No of electronic funds transfer at point of sale (EFTPOS) or Electronic Data Capturing (EDC)	...	...	...	...	...	...	...
Number of payment cards							
Credit card	2,162	1,924	1,753	1,755	1,863	n/a	n/a
Charge card	...	...	219	261	282	n/a	n/a
Debit card*	1,347	1,348	1,528	1,657	1,818	n/a	n/a
E-purse (multi-purpose cards, etc.)	...	...	125	159	178	n/a	n/a
Internet user	541	598	644	670	688	n/a	n/a
Number of subscribers of internet banking**	365	466	495	543	724	n/a	n/a

*check card included

** corporation included, overlapping subscribers included

Number of Participants and Instrument Issuers (end of)

	2002	2003	2004	2005	2006	1Q2007	2Q2007
Large Value clearing systems (BOK-Wire)	126	128	123	123	122	123	123
Payment cards							
1. Credit card	...	24	24	24	23	22	22
2. Debit card*	...	17	21	21	20	20	20
3. Charge card	...	14	17	17	17	18	18
4. E-purse (multi-purpose cards, etc.)**	16 (5)	16 (5)	16 (5)	16 (4)	15 (3)	15 (3)	15 (3)
Internet banking	22	23	22	22	21	21	21
Please specify Other Categories:							

*check card included

** () is number of brand (k-cash, visaCash, mondex, etc.)

Malaysia

Basic Indicators

	2002	2003	2004	2005	2006	1Q2007	2Q2007
Population (million)	24.5	25.3	25.9	26.4	26.9	27.0	27.1
Nominal GDP (RM mil)	383,213	418,469	474,048	519,451	572,555	144,415	153,812
Cash in Circulation (RM mil)	23,896.8	26,101.4	28,616.9	30,177.6	33,519.4	33,836.8	33,612.7

Statistics on Usage of Various Non-cash Payments: Value of Transaction Per Capita (RM)

	2002	2003	2004	2005	2006	1Q2007	2Q2007
Large Value clearing systems	493,526.5	528,482.2	690,061.8	731,617.4	928,420.1	249,490.7	282,081.5
Cheques	48,699.8	49,855.1	52,451.1	51,467.0	53,584.9	15,032.6	15,825.5
Payment cards	1,031.7	1,159.6	1,348.6	1,550.1	1,766.5	484.4	489.3
1. Credit card	3.0	3.5	6.4	9.9	15.2	8.5	10.3
2. Debit card	73.1	74.9	78.8	78.7	81.9	19.3	20.3
3. Charge card	9.2	22.4	28.4	36.9	41.5	10.7	12.2
4. E-purse (multi-purpose cards, etc. ¹)							
5. Others:							
Please specify							
Other Categories:	192.7	294.5	544.5	997.3	1,700.2	515.9	542.4
i) Interbank GIRO	82.4	392.6	552.3	705.1	1,059.4	349.3	474.2
ii) Internet banking	n/a	n/a	n/a	0.2	0.3	0.1	0.
iii) Mobile banking							

¹ Touch 'n Go and MEPS cash

Statistics on Usage of Various Non-cash Payments: Volume of Transaction Per Capita

	2002	2003	2004	2005	2006	1Q2007	2Q2007
Large Value clearing systems	0.1	0.1	0.1	0.1	0.1	0.02	0.02
Cheques	7.9	7.7	7.7	7.6	7.5	1.9	2.0
Payment cards							
1. Credit card	5.2	5.8	6.4	7.0	7.8	2.1	2.1
2. Debit card	...	...	0.1	0.1	0.1	0.1	0.1
3. Charge card	0.3	0.3	0.3	0.2	0.2	0.1	0.1
4. E-purse (multi-purpose cards, etc. ¹)	3.1	7.6	10.8	13.8	16.0	3.8	4.4
5. Others:							
Please specify Other Categories:							
i) Interbank GIRO	...	0.1	0.1	0.4	0.7	0.2	0.2
ii) Internet banking	0.1	0.3	0.5	0.7	1.0	0.3	0.4
iii) Mobile banking	n/a	n/a	n/a	...	...	...	...

Other Useful Statistics (per 1000 of population)

	2002	2003	2004	2005	2006	1Q2007	2Q2007
No of ATM terminals	0.17	0.17	0.19	0.22	0.23	0.23	0.24
No of electronic funds transfer at point of sale (EFTPOS) or Electronic Data Capturing (EDC)	0.05	0.53	0.68	3.9	5.81	5.86	6.00
Others:							
No of cash/cheque deposit machines (CDMs)	n/a	0.06	0.06	0.10	0.11	0.12	0.13
Number of payment cards							
Credit card	177.8	201.5	254.2	296.0	328.4	336.5	344.8
Charge card	14.0	12.1	10.9	9.1	10	8.7	8.6
Debit card	n/a	111.7	395.3	593.8	691.3	720.1	763.4
E-purse (multi-purpose cards, etc. ²)	n/a	n/a	163.3	214.4	241.4	251.4	265.3
Others:							
Internet user	107	114	127	139	140	140	143
Number of subscribers of internet banking	42	69	78	96	118	135	149

¹ Touch 'n Go and MEPS cash

² Touch 'n Go only

... Negligible

Nav Not available

Number of Participants and Instrument Issuers

	2002	2003	2004	2005	2006	1Q2007	2Q2007
Large Value clearing systems	55	54	52	55	53	54	54
Payment cards							
1. Credit card	19	19	18	19	18	18	18
2. Debit card	8	9	13	13	13	14	14
3. Charge card	5	5	5	5	6	6	6
4. E-purse (multi-purpose cards, etc.)	3	4	5	7	11	15	15
5. Others:							
Internet banking	12	13	14	14	16	17	17
Please specify Other Categories:							
i) Interbank GIRO	13	14	13	17	16	18	18
ii) Mobile banking	1	3	4	5	6	6	6

ROC (Taiwan)

Basic Indicators

Unit: Billion NT\$

	2002	2003	2004	2005	2006	1Q2007	2Q2007
Population (1000)	22453	22535	22615	22690	22790	22880	22902
Nominal GDP (billion NT\$)	10293	10519	11066	11421	11859	3099	2906
Cash in Circulation	527	608	670	730	759	822	774

Statistics Usage of Various Cashless Payments: Value of Transaction Per Capita

Unit: 1
NT\$

Value	2002	2003	2004	2005	2006	1Q2007	2Q2007
Paper-based							
Checks	1424531	1252629	1176078	1056060	1047784	242002	241507
Card-based							
1. ATM cards	307709	318660	374530	399912	384379	102360	98507
2. Credit cards	38926	44331	55450	62627	60553	14904	15719
3. Debit Cards	9	6	5	4	3	0	0
4. E-Purse(MPSVC)	2	3	2	1	1	0	0
Electronic-based							
1. FEDI	35452	60484	97900	108594	106757	28977	29168
2. FXML	0	2	57	599	851	280	367
3. Internet Banking	241	346	438	604	588	4003	4493
4. Mobile banking	138	257	349	317	281	61	61
5. Bill Payment	0	0	159	423	1224	101	760
6. On-Batch Media	7126	9940	13708	12781	22642	275	410
7. ACH	134	3328	9330	17320	26678	6425	10043
8. E-Check	0	0	0	0	19	11	15
Large Value EFT							
1. CIFS	6835033	7132416	8563431	10854077	10736419	2477972	2572133
2. NIRS	3462165	3713823	4290427	4362671	4562484	1126661	1166885

Statistics Usage of Various Cashless Payments: Volume of Transaction Per Capita

Volume	2002	2003	2004	2005	2006	1Q2007	2Q2007
Paper-based							
Checks	7.25	7.03	7.06	6.81	6.55	1.58	1.50
Card-based							
1. ATM cards	25.25	27.09	30.46	32.05	31.93	7.94	8.06
2. Credit cards	13.90	17.05	20.54	23.19	23.42	5.67	5.97
3. Debit Cards	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4. E-Purse(MPSVC)	0.01	0.01	0.01	0.00	0.00	0.00	0.00
Electronic-based							
1. FEDI	0.04	0.07	0.10	0.12	0.12	0.03	0.03
2. FXML	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Internet Banking	0.00	0.00	0.01	0.01	0.01	0.15	0.16
4. Mobile banking	0.00	0.01	0.01	0.01	0.01	0.00	0.00
5. Bill Payment	0.00	0.00	0.06	0.21	0.35	0.06	0.17
6. On-Batch Media	0.26	0.23	0.24	0.14	0.42	0.14	0.15
7. ACH	0.01	0.12	0.34	0.66	1.26	0.26	0.31
8. E-Check	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Large Value EFT							
1. CIFS	0.02	0.02	0.03	0.03	0.04	0.01	0.01
2. NIRS	2.85	3.03	3.38	3.56	3.61	0.89	0.91
Total	49.59	54.65	62.23	66.80	67.73	16.72	17.27

Other Useful Statistics (Per 1000 of Population)

	2002	2003	2004	2005	2006	1Q2007	2Q2007
No. of ATM	1	1	1	1	1	1	1
No. of EFTPOS	5	5	6	7	8	8	8
No. of debit card POS	0	0	0	0	0	NA	NA
No. of Payment Cards							
1. ATM card	3899	4300	5023	5742	5981	6106	6183
2. Credit card	1407	1680	1954	2005	1682	1634	1606
3. Debit card	1102	1329	1593	1821	1953	NA	NA
4. E-purse(MPSVC)	3	21	186	97	83	78	35
Internet user	383	462	496	617	646*	NA	NA
Internet bank scribers	NA	NA	NA	NA	NA	NA	NA
Mobil bank scribers	NA	NA	NA	NA	NA	NA	NA

*: A number of Internet subscribers available in June, instead of December, 2006.

Number of Participants and Instrument Issuers

Volume	2002	2003	2004	2005	2006	1Q2007	2Q2007
Paper-based							
Checks	234	237	238	237	250	252	257
Card-based							
1. ATM cards	365	365	364	357	355	355	355
2. Credit cards	55	55	55	52	48	48	48
3. Debit Cards	22	22	20	19	19	19	19
4. E-Purse(MPSVC)	126	213	325	337	332	333	333
Electronic-based							
1. FEDI	36	37	35	32	29	27	27
2. FXML		8	14	15	15	17	17
3. Internet Banking	47	38	37	34	34	32	32
4. Mobile banking	12	12	12	11	11	10	10
5. Bill Payment			364	363	343	343	343
6. On-Batch Media	350	363	364	363	363	364	364
7. ACH	368	388	386	382	375	374	376
8. E-Check		1	9	9	9	9	9
Large Value EFT							
1. CIFS	125	104	102	101	97	91	91
2. NIRS	413	398	391	381	378	378	378

Appendix B

Monetary Policy Management in the SEACEN Countries

Country	Objectives	Current Regimes	Monetary Policy Rule	Networked-Readiness Index 2006-2007 Rankings
Singapore	Price stability as a sound basis for sustainable economic growth	Exchange rate targeting since 1981	Modified McCallum policy rule	3
ROC (Taiwan)	Financial stability; Sound banking operations; Internal and external currency stability; Economic development	Monetary targeting since 1992	Taylor rule and monetary condition index	13
Korea	Price stability; Financial stability	Inflation targeting since 1998	Taylor-type nonlinear rule as a reference	19
Malaysia	Sustainable economic growth with price stability	Interest rate targeting (since April 2004) with a managed float exchange rate regime (since July 2005)	None	26
Thailand	Price stability conducive to sustainable economic growth	Inflation targeting under managed float exchange rate regime since May 2000	None	37
Indonesia	Price stability; Exchange rate stability	Inflation targeting since 2005	None	62
Philippines	Price stability	Inflation targeting since 2002	Taylor rule as an input to overall assessment	69
Vietnam	Domestic currency stability; Price stability; Socio-economic development	Monetary targeting	None	82
Sri Lanka	Economic and price stability	Monetary targeting since 1980s	None	86
Mongolia	Price stability	Monetary aggregates targeting	None	90
Cambodia	Exchange rate stability; Price stability	Exchange rate targeting since 2000	None	106
Nepal	Price stability; Securing a reasonable level of international	Exchange rate peg with Indian rupee	Liquidity rule	108

Nepal	Price stability; Securing a reasonable level of international	Exchange rate peg with Indian rupee	Liquidity rule	108
Brunei	Monetary stability	Currency board system since 1967	None	N/A
Fiji	Price stability; Maintaining an adequate level of foreign reserves	Credit targeting since December 2006	-	N/A
Myanmar	Currency stability; Economic development	Monetary aggregates and international reserves targeting	None	N/A
Papua New Guinea	Price stability	Monetary aggregates targeting	None	N/A

Source: The SEACEN Centre 2008 and Global Information Technology Report 2007
N/A: Not Available

Major Challenges of Selected SEACEN Countries ¹

Appendix C

<i>Country</i>	Challenges	Socio-economic/Cultural factors
<i>Cambodia</i>	<ul style="list-style-type: none"> • Highly depending on Dollar 	<ul style="list-style-type: none"> • People are not aware of banking services
<i>Indonesia</i>	<ul style="list-style-type: none"> • Banks have their own priority to develop/offer new payment instruments • Still low rate of banked people • Interoperability between switching companies 	<ul style="list-style-type: none"> • Safety is the major concern • Availability of instruments • Fear of debt burden; debit card is more popular than credit card • Difference regions, difference acceptance
<i>Korea</i>	<ul style="list-style-type: none"> • Higher settlement risk from non-bank (due to less-regulated than banks) • Financial crimes (hacking) increases • Lack of interoperability of private sectors in system development 	<ul style="list-style-type: none"> • Widespread use of internet and information technology facilitate development and usage of e-shopping, internet and mobile banking • Gravitation of the population to major cities facilitates usage of e-payment for public transportation and retail shops

<i>Malaysia</i>	<ul style="list-style-type: none"> • Low penetration of point-of-sale terminals, limited funds transfer functionalities in ATMs, limited success in e-money (other than in the transportation sector) and mobile payment trials • Change user mindset towards ICT and e-payments • Provide convenient access points for consumers • Increase consumers' familiarity and confidence with online payments • Promote payment innovation • Low penetration of personal computer per household, internet and broadband access 	
<i>Nepal</i>	<ul style="list-style-type: none"> • Infrastructure Development • Validity of e-signature. • No proper legal provision in e-banking and e-money. • Privacy of customer in e-banking and e-money payment since data are stored in an electronic device which in case of theft will be revealed without proper authorization. 	<ul style="list-style-type: none"> • Low customer awareness about technicalities of e-money counterfeiting
<i>Papua New Guinea</i>	<ul style="list-style-type: none"> • Infrastructure development • Legal issues 	

<i>Singapore</i>	<ul style="list-style-type: none"> • Provide effective and efficient alternatives to cash (challenge to find an infrastructure that is more cost effective, convenient and secure to use than cash) • Internet banking security due to a marked rise in the sophistication and rate of online phishing scams and other targeted attacks • Acceptance to public 	
<i>Sri Lanka</i>	<ul style="list-style-type: none"> • Settle all financial market transactions in one single system • Promote interoperability • Change the preference of using cash for small value payments and paper based checks for relatively large payments • Prevent misuses and eliminate frauds and ensure integrity of issuers 	<ul style="list-style-type: none"> • Traditional preference for paper based • Concerns on security and accuracy of e-payments • Limited access to e-payments
<i>ROC (Taiwan)</i>	<ul style="list-style-type: none"> • People's payment habits (cash is widely accepted since people used to shopping at traditional markets and paying at sight while checks are widely used in business circle with well understanding between counterparties) 	Consumers widely use ATM and credit cards because of widespread ATM machines, more card acceptable shops and encouraging by offering "buy now pay later" schema

	<ul style="list-style-type: none"> • Security concerns, according to many reports about the events of invasions and frauds in phone/internet banking or thefts, counterfeits 	
<i>Thailand</i>	<ul style="list-style-type: none"> • Process of legal amendment is uncontrollable (time, substance) • E-payment needs additional investment in technology and requires readiness of both business and its counterparties • Check is fast and convenient as e-payment • Unacceptable e-document 	<ul style="list-style-type: none"> • Choosing instruments depends on experience, trust and attitude of senior management • Senior managements are unfamiliar with new technology • Using e-payment is more complicated than check • Reconciliation with paper easier than electronics

1. Based on Ruengvirayudh (2006) with modifications.

Policies and Objectives of Selected SEACEN Countries¹

Country	Policies	Coverage of the plan/Major sectors targeted	Strategies
Cambodia	Towards a safe, sound and efficient financial system	Government institutions	<p>Immediate priorities</p> <ul style="list-style-type: none"> • Automating cheque clearing and settlement • Develop national wholesale e-payment system • Bring money lenders and changes into formal regulatory framework • Comprehensive development of NBC information technology/management of information systems • Strengthen NBC and judicial implementation/enforcement <p>Intermediate priorities</p> <ul style="list-style-type: none"> ▪ Expand payment system access to licensed MFIs ▪ Provide collateralization of payment system exposures ▪ Continue capacity building at NBC and banks ▪ Customer education and awareness activities

1. Based on Ruengvirayudh (2006) with modifications.

“Financial Sector Blueprint called for 2006-2015”	Government institutions	<p>Intermediate priorities</p> <ul style="list-style-type: none"> ■ Move inter-bank credit information system into private sector ■ Support development of new financial products <p>Long-term priorities</p> <ul style="list-style-type: none"> ■ Review banking law and regulations ■ Review depositor protection system
To provide various payment instruments available	(no specific)	<p>Short-Medium term</p> <ul style="list-style-type: none"> • Spread Implementation of national clearing system to all BI branches national-wide • Promote micro payment usage, e-money • Expand RTGS coverage to corporate securities settlement system and PVP • Establish sound legal basis <p>Long term</p> <ul style="list-style-type: none"> ■ Educate people

Korea	<ul style="list-style-type: none"> • To promote transition from paper-based to e-payment • To avoid duplicated investment • To ensure security and stability of the systems 	e-commerce (G2B, B2B, B2C)	<ul style="list-style-type: none"> • short-run: expand e-payment usage to meet user needs • medium-run: promote technology and processing standard (each IC card will be designed to store multiple information (credit card, e-money, personal identification)
Malaysia	<ul style="list-style-type: none"> • To promote the migration from paper-based system to e-payment • To Improve the efficiency level of the payment systems 	no specific sector is being targeted but rather a holistic approach adopted	<ul style="list-style-type: none"> • Improve the country's payment infrastructure • facilitate the adoption of e-payments in government sector • Increase accessibility, improve service level and promote a widespread use of e-payments
Philippines	To eliminate the related risk in e-banking services	<ul style="list-style-type: none"> ■ e-payment and collection system for government ■ Mobile e-money 	-

<p>Singapore</p>	<p>A mission to promote a sound and progressive financial services centre</p>	<p>(no specific)</p>	<ul style="list-style-type: none"> • To enable commerce through developing a next-generation e-payment infrastructure • To reduce paper-based transactions and double transaction value of card-based payments, e-money schemes and mobile payment by 2010 (one goal of intelligent nation 2015) • internet payment and banking via various media initiatives • Financial Services Development Fund to support the development of e-financial services and infrastructure • Giro for bills and salaries of government sector • The SACH upgraded GIRO from manual delivery of magnetic tapes to a browser-based e-GIRO system • Liberalization of the issuance of e-money/Stored Value Facilities (SVF) <p>Electronic payment for Shares (EPS) and Electronic Share Application (ESA), e-payment for investors</p>
-------------------------	---	-----------------------	---

<p>Sri Lanka</p>	<p>To act as a facilitator, if necessary as a leader to achieve the objectives of ensuring the availability of nationwide safer and efficient e-payment systems at an affordable price for operators, participants and customers</p>	<p>Wholesale and retail e-payment means/systems</p>	<ul style="list-style-type: none"> • Have a meaningful dialogue on national payment system issues • Get active participation of relevant stakeholders in deciding policies, plans and standards • Adopt more holistic and collaborative approach to promote interoperability, through the establishment of a link between systems • Leave a direct role in providing retail e-payment to the market players • Remove impediments for innovative e-payment instruments to reach the level of customer • Effective supervision and oversight to minimize risks and increase efficiency of e-payments • Ensure business continuity of SIPS
-------------------------	--	---	--

ROC (Taiwan)	<ul style="list-style-type: none"> To develop and maintain an e-payment environment with security, efficiency and practices In 2000, government issued policies to deepen IT infrastructure and application in order to cut down the telecommunication and ISP's service charges so as to promote e-commerce, e-shopping and e-government services during 2001-2011 	Focus on inter-bank funds transfer systems ranking by transaction size and importance to economic development	<ul style="list-style-type: none"> Build legal basis for e-payment and oversight Reshape the payment system into a modern and well-integrated system with the capacity of interoperability and straight through processing
Thailand	Appropriate usage of payment means in order to promote efficiency & cut down	14 target sectors : financial markets transaction, public transportation, education, retails, insurance, government agencies, media (newspapers, radios and televisions), real estate, leasing, public utilities, health care, manufacturing, agriculture, cash management, tourism	<ul style="list-style-type: none"> Appropriate pricing structure Customise e-payment services to serve needs of each sectors Revise rules, regulations, or legal frameworks Educate stakeholders

Future Direction of E-payment in Selected SEACEN Countries¹

Countries	Future Direction of e-payment
Cambodia	“Financial Sector Blueprint called for 2006-2015”
Indonesia	<ul style="list-style-type: none"> • Promoting interoperability between switching companies • Issuing Electronic Information and Transaction Act, Fund Transfer Act and remittances regulation in 2006 • Allowing rural banks to play bigger role in payment system • Plan to issue more details of regulation on e-money in 2006
Korea	<ul style="list-style-type: none"> • The use of electronic funds transfer services through multi-channels
Malaysia	Continue policies and objectives
Nepal	Consumer protection act and electronic signature validation some of the legal issues to be addressed
Philippines	<ul style="list-style-type: none"> • RTGS settlement for sale and purchase of equities traded through the Philippine Stock Exchange and primary auction and redemption of government securities • To prescribe policies and guidelines in the adoption of e-payment and collection system for government transactions

1. Based on Ruengvirayudh (2006) with modifications.

Singapore	Continue policies and objectives
Sri Lanka	The payment policy and action plan (2007-2010) to improve efficiency and reduce cost of e-payment
ROC (Taiwan)	Moving toward to the era of e-commerce
Thailand	<ul style="list-style-type: none"> • ITMX , a national payment gateway to support multi-channel and retail e-payments for domestic and cross-border transaction • Common ticket for public transport • ASEANPay, an infrastructure for retail funds transfer across Southeast Asia

The Risk Identification and Analysis of E-Payments ¹

Various kind of risk can evolve in e-payments. These are:

a. Operational Risk

Operational risk arises from the potential loss due to significant deficiencies in system design which lead to reliability or integrity issues. It may impair the system's ability to complete settlement, create liquidity pressures for system as a whole, curtail the system's ability to monitor and manage its credit exposures and result in errors, delays, or frauds in system operation. It is inherent that the system is exposed to the risk of an interruption or break-down of systems due to system obsolescence, incompatibility and design flaws. Over reliance on outsourcing may also expose the system to operational risk of not properly mitigated. Operational risk could also arise from customer misuse. The risk may be heightened if the customers are not adequately educated about the importance of security precautions.

b. Security Risk

Security risk arises with respect to the controls over access to the systems. Controlling access to the systems has become increasingly complex due to expanded computer capabilities, access points, and extended use of communication path. Due to its nature, e-payment systems and products may be subjected to external and internal attacks. For example, inadequate controls could result in virus injection or successful attack by hackers, who could access, retrieve and use confidential customer information. A non-secure electronic transmission could allow criminals to gain access to customer information.

c. Reputational Risk

Reputational risk is the risk of significant negative public opinion the results in a critical loss of funding or customers. It may involve actions that create a lasting negative public image of overall business operations. Reputational risk may undermine public confidence and impair the ability to establish and maintain customer relationship. Reputational risk may also arise as consequences to the operational and security risks.

1. This section, with some modifications, is extracted from the country reports of Malaysia and ROC (Taiwan).

d. Legal Risk

Legal risk arises from violation of, or non-conformance with laws, rules, regulations, or where the legal rights and obligations of parties to a transaction are not well established. A risk can also arise from the failure of the legal system to support the rules and procedures of the settlement system. Given the new nature of many e-payment activities, rights and obligations of parties to such transactions are uncertain. It also entails the uncertainty of transaction enforcement and thus exacerbates other risks, such as credit or liquidity risk, relating to the integrity of transactions.

e. Credit Risk

Participants will not settle obligations either when due or at any time thereafter due to default or insolvency. Credit risk can be divided into the pre-settlement risk and the settlement risk. The former is also called replacement cost risk, that is, the risk of loss of unrealized gains on unsettled contracts with the defaulting participant. The replacement cost depends on the volatility of the transaction price and the amount of time that elapses between the trade date and the settlement date. The latter is sometimes termed principal risk, the risk of the loss of payments made to the defaulting participant prior to detection of the default.

f. Liquidity Risk

Participants will settle obligations late rather than at due date. The costs associated with liquidity risk depend on the liquidity of the markets in which the affected party must make its adjustments; the more liquid the markets, the less costly the adjustment.

g. Systemic risk

The failure of one participant renders other participants unable to meet their obligations when due. Such a failure may cause significant liquidity or credit problems and, as a result, might threaten the stability of financial markets and payment systems by transmission from one financial institution to another.



PART 2:

COUNTRY CHAPTERS

Chapter 2

THE DEVELOPMENT OF E-PAYMENT AND CHALLENGES IN CAMBODIA

by

Ly Sideth¹

General Overview

When the three Indochina countries, Cambodia, Vietnam and Laos, gained independence from France in 1954, the Indochina Bank Note Printing Institute was closed down in order to terminate its alliance of a joint currency with Vietnam and Laos. The National Bank of Cambodia was established on December 23, 1954. The National Bank of Cambodia closely served the Sangkum Reas Niyum national construction policy from 1953 to 1970. This consisted, in part, of closing local and foreign private banks and re-established them as state-owned banks.

From late 1970 to January 1975, the banking system was once again liberalised and private banks could operate under the supervision and regulation of the National Bank of Cambodia, just as the state banks did. During the Pol Pot regime from April 1975 to January 1979, the entire banking system infrastructure, including the National Bank of Cambodia's building, was destroyed and the use of the existing Riel banknotes was stopped.

The National Bank of Cambodia called the *People's National Bank of Kampuchea (PNBK)* was re-established on October 10, 1979. Riel banknotes were once again re-issued as the country's legal tender. From 1989, the banking system was reformed gradually under the supervision and direction of the PNBK. The provincial and municipal banks were transformed into specialised provincial and municipal banks, economically and financially autonomous and operating only in the province where they were located.

The increase of banking institutions imposed a heavy supervisory burden on the National Bank of Cambodia which strengthened its management capacity

1. Author is Deputy Division Chief of the Exchange Management Department of National Bank of Cambodia.

in order to fulfill its role as a central bank. A large number of the banks were inactive and some were poorly managed and prone to taking excessive risks. Accordingly, public confidence in the banking system (as well as mutual confidence among banks) remained very low.

To remedy this situation as well as to strengthen the banking system, in early 2000, the NBC conducted a bank re-licensing programme based on the Law on Banking and Financial Institution promulgated in November 1999. As a result, sixteen banks were de-licensed and put under liquidation. Four of these banks proved to be insolvent while twelve were closed on a voluntary basis.

Peace finally came to Cambodia in 1993 after a long period of domestic strife and international isolation. Subsequently, the banking system has recorded an increase in foreign currency deposits. From 1999 until now, the ratio of foreign currency deposits to officially recorded broad money has increased from 65 percent to 75 percent. In December 2005, 94 percent of loans were denominated in US dollars.

1. Cambodian Payment System

The Cambodian financial system mainly comprises 16 banks, six special purpose banks and the National Bank of Cambodia (NBC), which is the central bank. There are also a number of micro-financiers engaged in small-scale lending funded by diverse funding (NGOs are categorised as micro-financiers).

The NBC has statutory responsibility for oversight of the payment system and through regulation (Prakas) has established clearing arrangements for the exchange and settlement of cheques. These arrangements provide for banks to form an advisory committee. In addition, the Bankers' Association is responsible for providing resources for training, developing an inter-bank market, and establishment of a central credit register.

Obligations arising between providers of non-cash payment services are settled through clearing accounts maintained at the NBC. The payment system in Cambodia is cash-based, with a high rate of dollarisation. The majority of business transactions are settled in US dollar with the KHR, the second most-used currency, being the currency of choice at the lower end of the retail market and in the informal sector.

The cheque is the most commonly used non-cash payment instrument and, as a result of dollarisation, clearing arrangement caters for both U.S dollar and

KHR cheques. The volume of cheques processed through the Payment Clearing House (PCH) is low, although it is showing increasing tendencies. As with cash, the US dollar denominated cheque is the most widely used, constituting in excess of 90 percent of the volumes through the PCH.

There is currently no inter-bank market in Cambodia and inter-bank transfers, although minimal, take place by means of cheques drawn on the National Bank of Cambodia (NBC) by the banks against the current accounts held in the NBC. These are specially presented by the payee bank to the NBC for immediate processing (crediting of their current account) and are not processed through the PCH in the manual clearing system.

Several of the commercial banks have implemented credit card systems in conjunction with *Visa* and *Master* card. ATM terminals are in evidence at some of the banks that provide a twenty-four hour service for cash withdrawal (U.S dollars and KHR in some cases and U.S dollars only in order) and access to account balances. There is no shared infrastructure or inter-face between banks. Some of the banks, however, are developing their communication networks and ATM's terminals can now be accessed by all customers of the relevant banks and not only by customers of the branch of the bank at which ATM's are placed.

Money transfer systems are available in Cambodia (Money-Gram and Western Union) but in general prove to be relatively expensive and are used mainly for international transfers. Domestic transfers between other provinces of Cambodia are transacted by means of cheques, even in the case of non-account holders who purchase cheques from the bank and mail them to the recipient, or by other informal means.

There are no other payment services evident, although pressure is building from the Treasury, business and private users for the provision of additional payment channels, e.g. a credit transfer system to reduce the country's dependence on cash for the payment of government salaries and collection of customs and excise duties and government taxes.

1.1 Payment Instruments

1.1.1 Cash

Currency is seen as a convenient and popular form of payment in Cambodia. Low-denomination U.S dollar currency is a widely accepted substitute to KHR. Large- value U.S dollars, however, are not always accepted by small businesses

and the informal market sector. Any business not accepting KHR is liable to a severe penalty.

In 1995, the NBC issues coins in four denominations (KHR 50, KHR 100, KHR 200, and KHR 500) and banknotes in ten denominations (KHR 100, KHR 200, KHR 500, KHR 1000, KHR 2000, KHR 5000, KHR 10,000, KHR 20,000, KHR 50,000, and KHR 100,000). Currently, coins are no longer used for any payments, but are still legal tender.

In order to improve security against counterfeiting, the NBC decided in April 2001 to introduce a new series of the NBC notes (KHR 50,000, KHR 10,000, KHR 5,000, KHR 1,000 (2006), KHR 500 (2003), and KHR 100 notes).

Figure 1
Share of Cash in GDP

Ratio	2003	2004	2005	2006
Cash / GDP	4.76%	5.12%	4.98%	5.37%

1.1.2 Cheques

A cheque is, of course, an instruction on paper from a payer to his or her bank to pay a specified amount to some other party, with that amount being debited to the payer's bank account. The party who receives the check is, until good value has been received, an unsecured creditor of two parties – the would-be payer and the would-be payer's bank. The payee will not receive good value if the would-be payer has insufficient funds in his bank account or if the would-be payer's bank itself fails before good value has been delivered.

Cheques are perhaps the most typical paper-based payment instruments. They are widely used for transactions between individuals, businesses, and government. While the cheque is the most popular non-cash method of transferring money, Cambodia does not have a culture of cheque use. The use of cheques is mainly confined to corporations. Both U.S dollar and KHR checks circulate in the system, but the U.S dollar cheque is more widely used, forming in excess of 90 percent of the volumes cleared through the Phnom Penh Payment Clearing House.

Figure 2
Riel-denominated Cheques Cleared from 2004-2007 (August)

	Volume				Value (billion riel)			
	2004	2005	2006	2007 (August)	2004	2005	2006	2007 (August)
Checks	22,443	18,078	16,622	10,260	311.17	502.83	540.17	441.86
Percentage change	*25%	-19%	-8%	—	52%	62%	7%	—

* Growth rate from previous year 2003

Figure 3
USD-denominated Cheques Cleared from 2004-2007 (August)

	Volume (thousand transactions)				Value (million dollars)			
	2004	2005	2006	2007 (August)	2004	2005	2006	2007 (August)
Checks	165.54	199.84	260.32	206.13	1,295.87	1,818.33	2,894.23	2,899.61
Percentage change	*22%	21%	30%	—	39%	40%	59%	—

* Growth rate from previous year 2003

1.1.3 Payment Cards

As the Cambodian economy picks up, there are increasing pressure on the banks to provide a larger variety of payment instruments more suited to the requirements of both the business and private users. Already banks are beginning to develop strategies to cater for this demand by expanding their branch networks, updating the bank communication systems, providing Internet access to business, implementing salary payroll systems and developing centralised accounting systems. A group of five banks are exploring, together with Visa International, the provision of a transaction switching infrastructure in Cambodia, which will enable them to provide inter-operable ATM and Debit Card facilities for their customers.

The use of plastic card as a means of payment is in its infancy in Cambodia. The NBC, in its function as overseer of the payment system, is concerned that issuance of credit cards in Cambodia is occurring in the absence of an appropriate legal framework or regulation. The existing Cambodian legislation gives the NBC a payment system and consumer protection mandate and the *Law on Banking and Financial Institutions* strengthens the NBC's powers in this regard. While the NBC does not have any particular regulatory model in mind, it has observed that other countries in the region, such as Thailand, have restrictive legislation.

Credit Cards

Currently, only banks are authorised to issue credit/debit cards in Cambodia. As of March 2007, the total number of credit cards issued by banks was 6,230. In view of the resident population of 14.2 million, the average number of credit cards owned by residents is still low. There are only six banks issuing credit cards in Cambodia.

Most of the credit cards issued by the issuing institutions are for general purpose. These cards are normally categorised as platinum, gold or classic, according to the services offered on each card and the income eligibility criteria. It is a common practice that the issuing institution, at the request of a cardholder, issues a supplementary card to another person who is usually an immediate family member of the cardholder. The types of credit cards mentioned above are nevertheless not exhaustive. From time to time, new types of credit cards may be introduced into the market to meet customer needs and cater for changes in market conditions.

Several banks are providing credit card facilities in conjunction with MasterCard, Visa International, and those cards are used for both domestic transactions and facilities are generally available for international use by tourists at hotels and other tourist venues.

Debit Cards

Infrastructures are in place to facilitate electronic payments at point-of-sale using a plastic card. The point-of-sale infrastructure enables cardholders to access funds held in transaction accounts by using debit cards. Only a few banks are in the process of implementing point of sale (POS) units for use in conjunction with credit cards.

Bank cards are mostly debit cards, which can be used to execute both payments and cash withdrawals through a nation-wide network of POS terminals and ATMs. Debit card payments ranked second behind cheques in terms of number of transactions in 2006.

By the March of 2006, there were 40,652 cards (Debit cards) in circulation, equivalent to less than one percent of the adult population. Some of those cards also allow payments to be made abroad (to merchants affiliated to either Visa Card or MasterCard).

ATM and Point of Sale (POS) Terminals

Several of the banks are providing ATM's at their branches or at the other popular venues throughout Phnom Penh. These ATM's provide for the withdrawal of both U.S. dollars and KHR in some cases and for U.S. dollars only in others as well as for account balance information. Although banks are developing links between their branch networks, currently there is no inter-face between banks and these ATMs cater only for customers of the specific bank.

As of March 2007, there were 102 ATM's terminals throughout Cambodia. Those terminals can be accessed with *Visa* or *MasterCard* for withdrawal of money, both US dollar and domestic currency.

Point of Sale terminals are gradually being installed, but are still very few in number. Direct crediting of public salaries currently appears to be offered by only one bank which is ANZ Royal Bank and applies only for the senior public servants of government's two ministries: Ministry of Economic and Finance and Ministry of Health.

Prepaid Cards

Prepaid cards are divided into three types: mobile phone, Internet and gasoline. Currently, all mobile phone companies provide prepaid services for their customers. Some Internet service providers have introduced the Internet prepaid cards for accessing Internet without a billing schedule. There are no registration fees, no monthly charges, it simply pays for actual time spend online. For petroleum prepaid cards, there are also a few firms to provide the prepaid cards for people to fill gasoline. The benefit is that customers who use the prepaid cards can enjoy cheaper price than people who pay by cash.

Electronic Payments Via Direct Entry

The direct credit system has been used by businesses and governments the past few years for crediting of salaries. To initiate a payment, the payer provides details of the payment and the beneficiary's bank account to his or her own bank. Direct debits, on the other hand, involve a payer providing an ongoing authorisation to another party to request a debit to his or her account. Direct debits are often used for recurring payments, such as utility bill payments.

Internet Banking

Some commercial banks provide services through their Internet banking facilities, such as account balance summary, request for account statements, and funds transfer between own accounts or third-party accounts.

1.2 Inter-Bank Transfer

1.2.1 Domestic Transfer

There is no inter-bank money market in operation in Cambodia, resultantly the requirement for inter-bank transfers are generally processed by means of cheques drawn on the NBC, which are specially presented to the NBC by the payee bank for immediate processing. The Bankers' Association has initiated a project to develop an inter-bank market and some banks have established bilateral stand-by arrangements for overnight liquidity. However, as Cambodian banks generally have a high level of surplus liquidity, the establishment of an inter-bank money market is not seen as a priority, other than by a few banks.

1.2.2 Foreign Transfers

Foreign transfer of funds between banks in Cambodia and their various foreign correspondent banks are made via the SWIFT system.

1.3 Cheque Clearing System

The clearing house, owned and operated by the National Bank of Cambodia, was established in December 1993, to clear the KHR cheques. The supervision of the Clearing House was initially under the Issue Department, but it was shifted to the Banking Operation Department on June 1, 1996. Due to an increase in USD from the payments of goods and services and the increasing needs of

commercial banks to clear the USD cheques, the Prakas on USD-cheque and Riel-cheque clearings were issued at the end of 2000.

So far, the clearing house in Phnom Penh has 20 members for clearing USD-denominated cheques and 17 members for KHR-denominated cheques. There are two clearing sessions for both the USD and KHR cheques on every business day. According to the statistics, there is evidence of a clear trend of increasing use of USD cheques within the banking system. The USD cheques accounted for 90 percent of total cheques. During the first five months of 2007, on average, the transaction volume and value of cheques settled daily through the clearing house in Phnom Penh is about 1,200 items and USD 16,580,841.00, respectively, compared with the figures for first five months of 2006 of 1,027 and USD 10,992,075.00, respectively.

In 2006, the National Bank of Cambodia established another two clearing houses, one in Sihanouk Ville and the other in Siem Reap province, but the volume of cheques processed at these clearing centres is still low compared to the volume at the Phnom Penh Head Office.

The forward presentment session starts at 9:30 am every morning of business days. All members sit around the table to exchange cheques with each other. Every forward cheque is stamped with the collecting bank name and date of forward. According to the Prakas relating to the clearing house, a participant who arrives more than five minutes late will not be allowed to present his/her cheques, but he/she must accept the presented cheques from other members.

As the clearing session begins, cheques are exchanged between the members accompanied with the prepared PPC001 form, listing the numbers and amounts of each cheque and the calculated total value. The officials of the clearing house are responsible for imputing the data which are prepared by sending banks into the clearing software to produce the PPC002 and PPC003. The PPC002 form shows the net settlement for each member bank and the PPC003 represents the daily clearing activities. Three copies of each form will be given to concerned members.

As defined by the NBC, there are 18 criteria for any cheque to be returned. If one or more information relating to any cheque forwarded falls into these 18 criteria, the cheque has to be returned to the collecting bank through the clearing house. Dishonoured cheques will be presented by the receiving banks not later than 3 pm on the same day, specifying the reason of return and the name of the receiving banks on the reverse of the cheque. The returned cheques could not

be returned more than two times and each returned cheque will be charged USD 2.00 for the USD-cheque and Riel 8,000 for the KHR-cheque. The procedures for clearing the returned cheques are the same as for forwarding cheques in the morning.

Because there is no network connection, the copy of PPC002 and PPC003 are forwarded by hand to the Account Management Division of the Banking Operation Department for credit or debit to the appropriate accounts of members. Any bank that does not have sufficient funds to cover its obligation is allowed to top up its balance within two hours. For the returned cheque, the settlement will be reversed and the result in the afternoon is the final one.

To ensure the smooth clearing and avoid settlement risk, all participating banks are allowed to open term-deposit accounts at the NBC. This term deposit can be used as collateral for overdraft facility provided by the NBC. Since most of banks have excess liquidity, there are only few banks that have maintained such accounts with the NBC.

The current clearing and settlement system takes three days for bank customers to withdraw the fund, which means on Day 3, after he/she deposits his/her cheque at the bank. However, for the bank itself, the fund may be available on Day 2. Most of cheques that the banks present at the clearing house are the cheques they receive from their customers on the previous day. In the best case if ATM is installed, the fund can be available to the ATM users on the Day 2.

1.4 Legal Framework

Cambodia is a constitutional monarchy which was restored in 1993 after a long period of disruption. Cambodia's legal framework dates from this restoration as earlier frameworks are considered to have been extinguished. The body of legislation that has been enacted or drafted in respect of the Cambodian legal system, draws upon French law as this is considered to be closest to the civil code used prior to the Khmer Rouge takeover.

The payment system in Cambodia is supported by the following legalisations:

- The law and conduct of National Bank of Cambodia (the Royal Kram NS/RKM/0196/January 26, 1996), which establishes the powers and responsibilities of the National Bank of Cambodia.

- The Law on Banking and Financial Institutions (the Royal Kram NS/RKM/1199/13 November 18,1999), which gives the NBC powers to supervise and regulate the banking system and “its related activities such as the money market, the inter-bank settlement system and financial intermediation,” and
- The Law on Negotiable Instruments and Payment Transactions, as adopted by the National Assembly on September 19, 2005, which governs negotiable instruments and payment transactions and covers bank accounts and the operation of the payment system. In addition to this Law, the NBC has established other three Prakas with regards to Payment Clearing Systems, Control of Systemic Risk of Payment Systems, and Prakas on the Operation of Settlement Accounts.

Of particular importance to the payment system is the Law on Banking and Financial Institutions, Article 40 (3h) which states, “the central bank shall be empowered to issue regulations for the implementation of this law which authorise the central bank to determine, in particular, the condition applicable to the banking and financial operations that may be carried out in their relations with customers.” In addition, banking operations is defined by Article 2 to include “the provision of means of payment to customers and processing of said means of payment in national currency or foreign exchange.”

Specific power over inter-bank settlement is provided to the NBC by Article 40 (6) which states, “it organises or supervises any interbank settlement system.” The authority (the NBC) shall define, after having consulted the profession, a corpus of rules of good conduct aimed at ensuring customer protection in particular concerning transparency, openness, and the level of charges and remuneration in banking or financial operations.”

Article 226 of the Law on Negotiable Instruments and Payment Transactions gives the NBC a broad mandate to oversee and regulate the payment system “to the greatest advantage of the people of Cambodia”, with respect to safety, efficiency, risk control, and competition, consistent with the overall stability of the financial system.

2. Overview on the Development of E-payment

Currently, the NBC is studying the issues of e-payments in Cambodia. This is one area which should be studied over the longer term and integrated into the payment system reform project as a lower priority item. From the NBC perspective, it is a relatively low priority issue as there are more important issues than moving funds electronically between banks.

Inter-bank payments currently rely heavily on cash or cheques. There are very few inter-bank electronic payments at this time while there are some electronic payments made between some organisations and where the beneficiary and the ordering party have accounts at the same bank. Even in some of these cases, the money is drawn out within a day or two after pay-day. There are some merchants willing to take debit cards, but there is no inter-bank exchange capability (i.e. unless the Visa experience becomes a reality in a short time.)

The National Bank of Cambodia, a central bank, has no fixed view on these types of payments at this time. The NBC will support any private sector initiative for inter-bank clearing and settlement as long as there is no payment system risk liability or settlement risk on the part of the central bank and that all settlements will meet the Core Principles for payment systems.

There are no plans to introduce e-payment systems at this time but it will be part of the NBC's longer term strategy. Under the technical assistance of the Asian Development Bank, the NBC recently established a strategy and roadmap for modernising the existing payment arrangement towards developing the National Payment System in Cambodia. In order to implement the strategy successfully, it requires a concerted effort between the NBC and all depository banks. To proceed with the strategy and roadmap, a Memorandum of Understanding between the NBC and all depository banks is established and scheduled to be signed in the middle of November 2007.

The main challenges and constraints in developing an e-payment system are as follows:

Challenges: Customers rely on the banking system for introducing e-payments systems with the rules fully documented and maintained and enforced; assure that the banks have adequate systems and infrastructures to support the e-payment processing requirements and to contain or mitigate the payment system risks.

Constraints: People are accustomed to cash and do not rely much on banks; people think that the government will be watching over them (issue of privacy); limited infrastructure; cost-benefit analysis in view of limited banking population; authorities believe that there are other higher priority initiatives for payment system reformation.

3. Strategies and Challenges in Moving towards E-payments

The NBC has clearly set its objectives towards a cashless economy. The principal mission of the NBC set by the Law on the Organisation and Conduct of the National Bank of Cambodia (Central Bank Law) is to determine and direct the monetary policy within the framework of Cambodia's economic and financial policy aiming at maintaining price stability in order to facilitate economic development

Although Cambodia is a cash-based economy, the NBC has its objective to move towards a cashless economy. Therefore, in 1999-2000 Cambodia and ADB have worked together to develop a long-term strategy for Cambodia's financial sector called "Financial Sector Blueprint called for 2001-2010", which has been updated to cover 2006-2015, with the objectives to reflect the Cambodian Government's achievements, strengthen confidence in Cambodia's financial system, and establish a sound market-based financial system to support resource mobilisation, effective financial resource allocation and broad-based sustainable economic growth.

Concerning the cashless economy, the NBC has initiated measures to develop its national payment system in 2005 by setting up a Strategic Committee for payment system development and Payment Policy Unit (PPU) in order to study and conduct the stock-taking. However, as one of the less developing countries and a highly dollarised economy, in order to support and develop its payment system, Cambodia needs more laws and regulations and technical assistance, especially from the advanced countries.

Although the cheque is a paper-based financial instrument, it is the first step to change the behavior of the public and to show that financial instruments are cost efficient. With the close cooperation with the Ministry of Economy and Finance (MEF), the government institutions are the first target. The government's expenditures and revenues are now carried out through the banking system. Recently, the salaries of high ranking officials in the Ministry of Economy and Finance and Ministry of Health have been disbursed through bank accounts. It is worthwhile to note that, prior to 2005, tax-payers were required to pay tax directly to the Ministry of Economy and Finance, the National Treasury, today tax collection is done through the banking sector.

The strategic elements toward cashless economy have been identified in the updated financial sector blueprint for 2006-2015. These strategies are divided into three priority categories: immediate, intermediate and long-term priorities.

Immediate Priorities

- Automating cheque clearing and settlement.
- Development of national wholesale electronic payment system (including support for inter-bank market), initially with banks and specialised banks as participants.
- Bringing money lenders and changers into the formal regulatory framework, initially through registration and filing requirements.
- Comprehensive development of the NBC information technology/management of information systems to support functions.
- Strengthening NBC and judicial implementation/enforcement.

Intermediate Priorities

- Expanding payment system access to licensed MFIs.
- Providing collateralisation of payment system exposures through short-term government securities.
- Continue capacity building at NBC and banks.
- Customer education and awareness activities.
- Moving the inter-bank credit information system into the private sector, including establishing the necessary supporting legal and regulatory framework to support its functioning.
- Supporting the development of new financial products/activities in the context of equal treatment of providers and financial stability.

Long-Term Objectives

- Comprehensive review of banking law and regulations to update/improve as necessary.
- Review of depositor protection system.

The major challenges for Cambodia to develop its payment system are dollarisation and the public's confidence in the banking system.

As noted above, most Cambodian people are not aware of banking services. They prefer to keep their money at home rather than with financial institutions. Cash, especially US dollar, plays an important role as the means of payment for daily transactions. These are the challenges the monetary authority faces in implementing monetary policies efficiently as well as in developing a payment system.

The financial system in Cambodia consists mainly of banking institutions. Although credit and debit cards have already been introduced, they are not widely used. Many banking institutions have installed ATMs at several main business

centers in the major cities in the country. This effort to facilitate cash withdrawal and thus attract bank deposit seems to be fruitful to some extent where we see total value of deposits increased by 16 percent between 2004 and 2005 and the number of customers increased by 38 percent between 2004 and 2005. The NBC has committed to develop the payment system to facilitate payment transactions and reduce risk and cost overall the system.

Cambodia's first financial sector blueprint for the period 2001-2010, focusing on competition between banks and other financial institutions, and safe and sound financial system, has been carefully implemented. In 2005, in line with the changes in the financial environment, some objectives and priorities have been updated. Now, the so called "The Updated Financial Sector Blueprint 2006-2015" is the national roadmap towards a safe, sound, and efficient financial system. To achieve these goals, appropriate legal and regulatory framework as well as civil codes must be established to support new banking products and services and assure equal benefit to all stakeholders.

Some local banking corporations have started to introduce their financial products (e-cards), in 2003 while others have started doing so in 2005. There is a slight increase in the card business from year to year in terms of number of issuers and users. Still, the paper-based instruments are predominant in terms of transaction volume and value, as compared with e-cards.

Chapter 3

THE DEVELOPMENT OF E-PAYMENT AND CHALLENGES IN INDONESIA

by

Ida Nuryanti and Susiati Dewi¹

1. Development of E-payment

Developments in information technology have impacted the banking and business world. They have spurred innovation and competition in the field of services, particularly payment services, including e-payment through banks. The development of e-payments in Indonesia is highlighted by the development of card-based payments, network-based payment instruments, and e-money.

1.1 Card-based Payments

The card-based payment instruments in Indonesia are primarily credit cards, ATM cards, and ATM/debit cards. In terms of volume and value, card-based payment transactions have been growing significantly over the years. The dominant credit card brands are *Visa International* and *MasterCard*, and the rest of the other issuers are *Diners*, *JCB*, and *Amex*. Certain banks also issue proprietary credit cards.

Banking as well as non-banking institutions are eligible to act as issuers of credit cards, ATM cards, and ATM/debit cards. Non-banking institutions eligible to act as issuers of credit card are licensed by the Ministry of Finance to conduct credit card activity, whereas non-banking institutions eligible to act as issuers of ATM card and ATM/debit cards are authorised to accept deposits from the public.

By the end of September 2007, there are 21 credit card issuers (19 banks and 2 non-bank), 53 ATM card issuers, and 37 ATM/debit card issuers in Indonesia. During the month, the transaction value recorded about US \$ 610

1. Ms Ida Nuryanti and Ms Susiati Dewi are Senior Legal Analyst and Analyst respectively, at the National Payment System Development Bureau, Directorate of Accounting and Payment System, Bank Indonesia.

million for credit card and US \$150 million for ATM/debit card, while the number of cards issued reached 8.78 million for credit card, 2.49 million for ATM card, and 31.19 million for ATM/debit card.

The value of card transactions from 2000 – 2006 are presented in Figure 1, and the number of card-based payment instruments issued over a similar period are shown in Figure 2.

Figure 1

The Value of Card Transaction
(IDR Trillion)

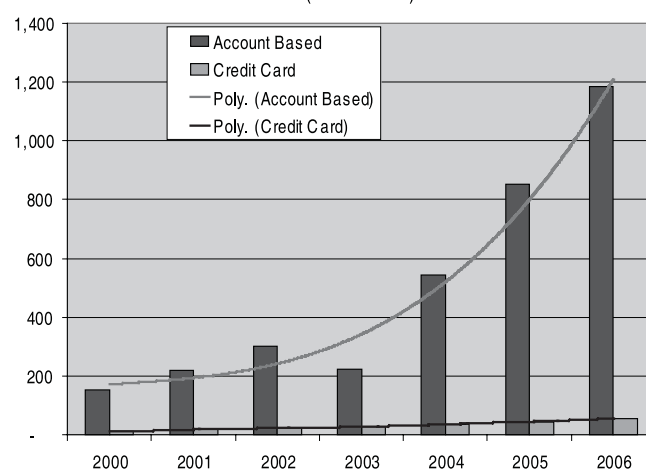
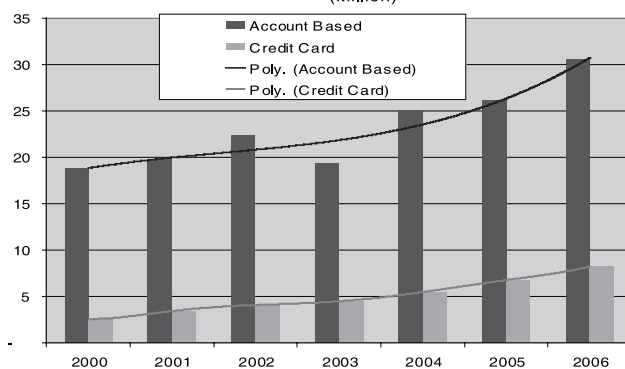


Figure 2

The Number of Card
(Million)



1.2 Network-based Payments

Network-based payment represents one of the innovations in banking services as banking business moves towards information technology-based that is more efficient for banks and more practical for customers. In Indonesia, network based-payment is highlighted by the development of e-banking, phone banking, and Internet banking. Under Bank Indonesia's regulation, the banks that operate network-based payments are required to apply risk management effectively in the operation of such payment services.

The number of Internet subscribers in Indonesia is about 1,500,000 as the end of 2005. However, the absolute number of Internet users cannot be precisely determined. Internet users may be more numerous than subscribers since one personal computer (PC) is often used by three to five people. This makes the number of Internet users in Indonesia more unpredictable.

Indonesia is the largest archipelago country in the world with more than 16,700 islands, spreading across 5,000 km of the equatorial line (Source: Indonesia Bureau of Statistics). Information technology plays a crucial role to facilitate economic development and integration. Compared to other countries in Asian region, Internet usage in Indonesia is still low where Internet penetration in Indonesia is only around 31 percent.

Banks in Indonesia have introduced a variety of services through the Internet parallel to the IT innovations in the financial sector. Currently, Internet banking provides a variety of transactions, among others electronic fund transfer to other banks, electronic payment of electricity, phone bill, and account balance inquiry. By July 2007, there are 19 banks providing corporate/wholesale Internet banking services and 14 banks providing consumer Internet banking services in Indonesia.

Figure 3 provides the number of Internet subscribers and users in Indonesia.

Figure 3
Number of Internet Subscribers and Users in Indonesia.

Year	Subscribers	Users
1998	134,000	512,000
1999	256,000	1,000,000
2000	400,000	1,900,000
2001	581,000	4,200,000
2002	667,002	4,500,000
2003	865,706	8,080,534
2004	1,087,428	11,226,143
2005*	1,500,000	16,000,000

Source: Indonesian Internet Provider Association – APJII

1.3 E-money

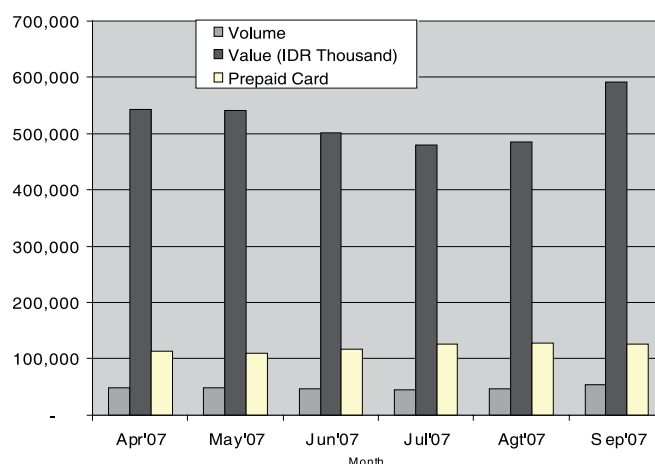
E-money is a relatively new phenomenon in Indonesia as compared to credit card, debit card, and ATM card, which have been in the market for some time. E-money is issued not only in chip-based products, but also in server-based products.

At present, there are four e-money operators authorised by Bank Indonesia, consisting of two banks and two non-banks. Given the fact that Bank Indonesia has been receiving numerous applications by business entities for licence to act as e-money issuers, we predict e-money activities will grow rapidly in Indonesia.

Currently, non-banks that issue e-money are predominantly telecommunication companies. It is to be noted that one of the most important prerequisites in conducting e-money activity is infrastructure or technology readiness. The kind of e-money commonly issued by the telecommunication companies is server-based e-money product, using cellular telephone as a channel for making payments.

As at the end of September 2007, the number of prepaid cards issued in Indonesia was 126,211 cards and the value of the transaction reached IDR 591,356,572. The data of prepaid transactions in Indonesia from May to September 2007 is presented in Figure 4 below.

Figure 4
Prepaid Card



2. Impact of E-payment on Central Banking Functions

E-payment improves efficiency of the payment system as it lowers the opportunity cost in handling cash. Furthermore, e-payment lowers the cost of transaction between issuers and consumers, and provide fee-based income to the service-providers by charging of transaction fees and monthly fees. Beside those advantages, issuing e-money gives the issuers interest-free debt financing through a floating fund.

E-payment usage, particularly card-based payment instruments, not only sidesteps the problems in carrying a large sum of money but also increases the potential in increasing consumption rate. The ease and convenience in using card-based payment instruments could lead raise the velocity of money.

According to research conducted by Bank Indonesia in 2006, e-payment usage may not have implications on monetary policy as long as e-payment development is considered as part of monetary policy from the start. However, e-money issued by banks in large amount results in shifting from deposit to

floating fund that is still in the liability side of bank's balance sheet. When the issuer is non-bank institutions, e-money usage may lead to a decline in bank's deposit if floating fund is not maintained in the banks.

E-payment development has a positive correlation with velocity of money in Indonesia, which implies that e-payment usage has replaced cash in economic activity. Furthermore, based on empirical study, the usage of e-payment diminishes cash demand, it means that e-payment may replace cash in economic transactions. Decrease in demand for cash may translate to a reduction in the cost of printing money.

In order to enhance effectiveness of risk management of e-payment activities, Bank Indonesia requires banks to engage internal and external auditors to periodically evaluate and audit the e-payment activities. If necessary, Bank Indonesia may inspect the effectiveness and adequacy of the risk management.

With regard to e-banking, it provides significant benefits for bank as an operator. However, as an operator of e-banking, bank also faces the risks associated with such activities, such as the risks arising from strategy, reputation, and operation (including the risk of security and legal, credit, market, and liquidity). While e-banking does not create new risks, unlike other banking services product through other media, it has the potential to magnify the existing risks. Therefore, bank needs to identify, measure, monitor, and control such risks.

3. Policy Responses to E-payments

Card-based payment in Indonesia has been operating under a robust legal basis, ensuring legal certainty much needed by users and operators, since two years ago. Bank Indonesia policies on card-based payment principally place emphasis on the following three regulating aspects.

First, payment system aspect. This aspect consists of, among others, approval and reporting requirements for operators (issuer, principal and acquirer), power of oversight for Bank Indonesia, and security measures that need to be observed in card-based payment activity. This policy is directed at ensuring that card-based payment instruments can be used securely, efficiently, promptly and reliably.

Second, prudential regulation aspect. To ensure the quality and integrity of the credit card applicant, Bank Indonesia stipulates that applicants of credit

cards must be of a minimum age and income bracket. The issuer is required to observe a prescribed credit limit. To enhance security and minimise fraud, Bank Indonesia requires issuers to take measures to enhance the security features of their cards and processing system. It is mandatory for card issuers to migrate to chip technology, particularly for credit cards, by the end of December 2009. This requirement is premised on the view that a card-based payment instrument is a payment instrument similar to cash, and, for that reason, public trust in such instrument need to be maintained. In a broader sense, the security of card-based payment instrument needs to be enhanced continuously in order to ensure a secure and smooth payment system in whole.

Third, cardholder protection aspect. Under this aspect, issuers must provide clear information to customers how the interest is calculated and be transparent in offering a facility that may impose additional fee to the cardholder. Issuers must also put in effort to educate the cardholders in using their cards. For collection of payment, issuers are required to follow specific guidelines should they choose to employ a third-party collector to do the collection.

3.1 Regulation on Card-Based Payment Instrument

Under Bank Indonesia's Regulation on Operation of Card Based Payment Instrument, banking and non-banking institutions may act as issuers of credit card, ATM card, and debit card. Non-banking institutions eligible to act as credit card issuers are licensed by the Ministry of Finance to conduct credit card activities. On the other hand, non-banking institutions eligible to act as ATM/debit card issuers are authorised to accept deposit funds from the public, pursuant to the legal provisions governing these non-banking institutions. Banks and non-bank institutions intending to act as issuers of credit card, ATM card, or debit card are required to obtain approval from Bank Indonesia.

The issuers of credit card, ATM card, or debit card are required to put in place risk management practices in compliance with the provisions of Bank Indonesia on risk management. Risk management in the issuance of credit card consists of, among other things:

- Applicants for the main cardholder must be at least 21 years old or are married, and for supplementary cardholders, the applicants must be at least 17 years old or are married. These requirements are intended to serve as a base that the cardholder is mature and sensible in using his/her card. The minimum age requirement is necessary considering that the credit card agreement is a contract between a bank and the cardholder. Therefore, the

minimum age of the applicant must be in compliance with the applicable Civil Law concerning the legal age for entering contracts and incurring contractual liability.

- The requirement of a minimum monthly income three times the regional minimum wage is imposed to ensure that the cardholders will not use their credit card as main source to cover their living expenses. Furthermore, it is to restrict credit card usage to people capable of setting aside their income in order to pay off their debt. The imposition of the minimum income requirement is also to educate consumers that the credit card is essentially meant as a payment instrument for the ease and convenience of consumers, and not as a tool to raise consumption ability.
- The maximum credit limit stipulated is two times the monthly income to control the cardholder's consumption and ensure the cardholder's payment ability. It sends an important message to the cardholders for them to realise that the credit card is an uncollateralised credit facility charging a relatively high interest rate of 36 percent up to 60 percent per annum.
- The minimum monthly payment amount stipulated is 10 percent of the total billing, so that cardholders are not saddled with the high interest rate imposed on the outstanding balance.

To increase security and assist issuers in managing their liquidity, issuers are to observe the security and controls in the issuance of ATM cards, which include the following measures, among others:

- The maximum nominal limit of transferable funds between accounts through ATM machine shall be set at IDR 10,000,000 (ten million rupiahs) per account in one day.
- The maximum cash withdrawal limit using ATM card and credit card on ATM machines shall be IDR 10,000,000 (ten million rupiahs) per account in one day.

Besides the requirement for the implementation of risk management to minimise fraud and to increase public trust on card-based payment instrument, the issuers are required to enhance the security of the technology used in their cards and payment system.

Relating to the oversight of the card-based payment systems, the card issuers are required to submit a report to Bank Indonesia concerning their activity in conducting card-based payment on a periodic basis and at any time as deemed necessary.

3.2 Regulation on Prepaid Card

Currently, prepaid cards are subject to the same regulation as other card-based payment instruments. Recognising that the existing regulation does not fully cover the development of software-based e-money products, Bank Indonesia is now drawing a specific regulation on e-money that covers card-based (including prepaid card) and software-based e-money products, which expected to go into force at the end of this year.

According to the Bank Indonesia Regulation on Operation of Card-based Payment Instrument, prepaid cards may be issued by both banking and non-banking institutions. The provision for non-banking institutions to issue prepaid cards is to utilise the potential of these institutions in offering wider range of payment products to customers. Banking and non-banking institutions intending to act as prepaid card issuers are required to obtain approval from Bank Indonesia. The approval from Bank Indonesia is required to protect users of the prepaid card, secure the public's trust in the payment instrument, and enable Bank Indonesia to carry out its task to monitor the money in circulation. To increase security and support preventive actions against money laundering crimes, the maximum limit on stored value for prepaid cards shall be IDR 1,000,000 (one million rupiahs).

Relating to the oversight of prepaid card activity, issuers are required to submit a periodic report to Bank Indonesia and at any time deemed necessary.

3.3 Regulation on Internet Banking

Basically, the principles applied to bank risk management are generally applicable to Internet banking. In particular, the risk management principle of Internet banking can be divided into three parts that are inseparable and complement each other, namely, active control of the bank's board of commissioners and board of directors, security control, and management of the legal and reputation risks.

The bank's board of commissioners and board of directors are responsible for developing the bank's business strategies and establishing effective management control.

The security and control process requires the special attention of management. In offering Internet banking services, the banks are to provide adequate safeguards which include examination of the customers' identities, authentication of transactions, application of the principle of separation duties, control over the use of the right to access to the system, maintenance of data integrity and confidentiality of important information on internet banking.

In order to protect the banks against the legal and reputation risks, the banks are required to carry out the Internet banking services timely and consistently in accordance with customers' expectations. In order to meet the customers' expectations, the banks shall have the capacity, business continuity, and effective contingency planning. Furthermore, the banks that operate Internet banking shall apply the risk management to the Internet banking activity effectively, including:

- active supervision of the board of commissioners and the board of directors;
- security control;
- risk management, particularly with regard to the legal and reputational risks.

In accordance with Bank Indonesia regulation on Internet banking, to improve effectiveness of the risk management, the banks shall periodically evaluate and audit the Internet banking activity, by using the internal auditor or external auditor. If necessary, Bank Indonesia may inspect the effectiveness and adequacy of the risk management, particularly in connection with the Internet banking activity at the banks.

4. Future Direction of E-payments

Based on the conditions of the e-payment industry as described above, Bank Indonesia, as regulator, aims to develop an e-payment industry that can support the formation of a less cash society. To move towards such a society, Bank Indonesia, as the payment system authority in Indonesia, supports the development of non-cash payment instruments.

Currently, one of the interesting trends in e-payment industry is the significant growth of e-money in some countries. This kind of non-cash payment instrument is mostly used in retail or micro payment transactions. Some of the reasons behind such trend are the high cost of cash handling and the aim to enhance payment efficiency. A similar trend is taking place in Indonesia where many parties have started to develop e-money, even though it is still at the early stage.

To encourage market players to develop a variety of e-payment instruments is a challenge to Bank Indonesia. Accordingly, Bank Indonesia needs to create a conducive environment and infrastructure. Besides the development of legal framework, inter-operability and convergence are very important in creating national efficiency. In this regard, Bank Indonesia, as a payment system authority in Indonesia, may act as a facilitator and catalyst in integrating market players' needs.

To strengthen the legal framework for e-payment activity, particularly e-money products, Bank Indonesia is currently taking steps to issue a specific regulation on e-money that covers card-based (including prepaid card) and software-based e-money products. Essentially, the e-money regulation should cover the following aspects:

Proposed Regulatory	Description
<p>Type of issuer</p> <p>Type of approval</p>	<p>A bank and non-bank institution may become an issuer of e-money.</p> <p>Registration : for the issuers having floating fund below the threshold stipulated by Bank Indonesia.</p> <p>Licence : for the issuers having floating fund above the threshold stipulated by Bank Indonesia.</p> <p>Bank who shall act as an issuer is required to report to Bank Indonesia under regulation on development of banking product.</p>
General principles	<ul style="list-style-type: none"> • Electronic value of e-money is required in Rupiah. • Principally, e-money is a payment instrument. If the issuer provides fund transfer facility for the e-money, it must obtain a licence from Bank Indonesia as a money remitter. • E-money must be accompanied by refund facility. • Banks and non-bank institutions are eligible to act as issuers provided they have operational office in Indonesia.
Prudential principles	<ul style="list-style-type: none"> • The maximum limit on store value of e-money shall be IDR 1,000,000 (one million rupiahs). • The issuers should ensure that they are able to accomplish their payment obligation to the merchants and holders. • The issuers should have in place adequate policies, procedures and systems for e- money operation, including contingency plans to address operational disruptions. • The issuers should ensure that their e-money product operate in a secure and reliable manner. • The issuer should ensure that its e-money product comply with all relevant laws and regulations pertaining to money laundering.

Proposed Regulatory	Description
Management float	<ul style="list-style-type: none"> • The issuers are required to manage their floating fund separate from their asset and working capital funds. • The issuers with floating fund above the threshold are required to appoint a bank as a guarantor.
Consumer protection	<ul style="list-style-type: none"> • The agreement between issuer and cardholder should be: <ul style="list-style-type: none"> - easily accessible and understood by the card holders. - clearly state the rights and obligations between the parties. • The issuer should ensure that the cardholders are provided with other relevant information relating to the usage of e-money.
Supervision	<ul style="list-style-type: none"> • Bank Indonesia shall conduct on-site examinations and off-site supervision of issuers. • The issuers are required to submit written reports periodically to Bank Indonesia concerning activity conducted in e-money.

Apart from the above, Bank Indonesia continuously strives to develop e-payment industry that is operating in a healthy and efficient environment, along with applying customer protection principle to maintain public trust in using card based payment instruments. Some of the measures taken by Bank Indonesia are presented below:

1. Enhancing the efficiency of e-payment industry by creating interoperability and convergence among operators' system. Bank Indonesia hopes that interoperability and convergence will bring more benefit to public.

To create interoperability, particularly on ATM card industry, one of Bank Indonesia's efforts is to facilitate banking associations and switching companies, which are members of Payment System Communication Forum, to agree to set a national standard for ATM card.

2. Requiring operators to migrate to chip technology. Evidently, there are some weaknesses in magnetic stripes, particularly in term of security. Even though incidents of card fraud in Indonesia are relatively low, the migration to chip technology is the right thing to do, in line with the change to chip technology in neighboring countries like Malaysia, Singapore, Hong Kong and Thailand. Moreover, with the implementation of liability shift in Asia Pacific by Visa International since the beginning of 2006, operators who implement chip technology will be free of risk that may be incurred due to liability shift. Bank Indonesia hopes that operators of credit card in Indonesia will switch to chip technology by December 2009, followed by ATM card and debit card afterwards. Meanwhile, e-money product is required to use chip technology from the start.
3. Providing accurate statistical data of e-payment industry and ensuring that operators comply with Bank Indonesia regulation, including customer protection principles. Accurate statistical data will help the regulator in making the right policies in developing a healthy e-payment industry. Operators' compliance with regulation, especially to consumer protection principles, is of a great importance since public trust is one of the main factors to develop the industry. In this regard, Bank Indonesia continuously develops a suitable oversight concept in order to have a healthy, secure and efficient e-payment industry.

In addition, Bank Indonesia is currently in the process of evaluating the credit card regulation. The evaluation is based on the industry readiness in managing its risk related to credit card activity. At present, the evaluation is

focused on the regulation regarding to prudential aspect, among others, minimum payment 10% of total billing, maximum nominal limit of cash withdrawal and transferable funds between issuers through ATM machine.

5. Conclusion

- Development of e-payment in Indonesia is characterised by the development of credit card, ATM card, debit card, network-based instrument, such as e-banking and internet payment, and e-money.
- In terms of volume and value, card based payment transactions in Indonesia, particularly for credit card, ATM card, and debit card grow significantly over the years. On the other hand, the emergence of e-money starts to grow. The numerous applications submitted to Bank Indonesia for license to issue e-money, indicate that e-money will grow rapidly in Indonesia in the near future.
- E-payment not only provides efficiency but also reduces transaction cost between issuers and consumers. According to research conducted by Bank Indonesia in 2006, e-payment usage does not have implications on monetary policy as long as e-payment development is considered as part of in monetary policy from the start. However, e-money issued by banks in large amount could lead to shift from deposit to floating fund that is still in liability side of bank's balance sheet. When the issuer is non bank institutions, e-money usage has the potential to reduce bank's deposit if floating fund is not maintained in the banks.
- Bank Indonesia's policy on e-payment principally emphasises on three regulating aspects. First, payment system aspect, consists of, among others, regulations to ensure that e-payment instruments can be used safely, efficiently, promptly and reliably. Second, prudential regulation aspect, consists of regulation to ensure the quality and integrity of e-payment activity and to enhance security and minimising fraud on e-payment activity. Third, cardholder protection aspect, consists of regulation to encourage issuers to implement consumer protection aspects and to educate cardholders in using their cards.
- As regulator, Bank Indonesia wants to develop an e-payment industry that supports the move towards a less cash society. As such, Bank Indonesia needs to create a conducive environment. Besides the development of legal framework, interoperability and convergence is very important in creating

national efficiency. In this regard, Bank Indonesia, as payment system authority in Indonesia also acts as a facilitator and catalyst in integrating market players' need.

- Among others, the outstanding policy issues on e-payment activity in Indonesia, particularly card based payment and e-money are interoperability of systems, standardisation of ATM and Debit systems, and oversight (managing e-money floating fund).

Figure 5
The Value and Volume of Credit Card Transactions

Period	Cash Withdrawal		Expenditure	
	Value (IDR Million)	Volume	Value (IDR Million)	Volume
September 2007	263,868.58	373,580	5,839,723.43	9,711,458
August 2007	288,938.53	422,098	6,106,348.73	10,762,492
July 2007	289,323.62	416,683	6,264,582.51	10,928,378
June 2007	256,442.00	374,292	5,581,847.31	10,075,739
May 2007	290,435.26	425,385	5,781,067.10	11,341,233
April 2007	272,958.42	414,409	5,067,888.26	9,540,421
March 2007	281,907.79	423,291	5,142,922.07	9,626,404
February 2007	247,122.88	380,528	4,522,213.89	8,849,052
January 2007	293,236.95	448,995	5,308,543.96	10,169,130
December 2006	260,768.13	396,222	5,072,207.37	9,606,110
November 2006	291,263.32	444,969	4,750,764.99	9,167,386
October 2006	246,734.34	364,001	4,869,743.40	9,762,183
September 2006	289,957.65	465,126	4,668,728.10	9,489,456
August 2006	299,847.63	468,038	4,720,982.19	9,486,662
July 2006	300,299.74	473,387	4,690,590.82	9,070,085
June 2006	303,547.42	479,651	4,407,449.05	8,817,102
May 2006	328,930.45	530,474	4,562,754.30	9,211,244
April 2006	297,354.04	498,694	3,970,386.83	8,146,915
March 2006	314,059.17	685,307	4,282,029.79	8,680,550
February 2006	282,808.59	490,442	3,790,391.64	7,946,883
January 2006	289,009.12	687,547	4,053,476.73	8,533,967

Figure 6
The Value and Volume of Account Based Card
(ATM and ATM/Debit Card)

Period	Cash Withdrawal		Intrabank		Interbank		Expenditure	
	Value*	Volume	Value*	Volume	Value*	Volume	Value*	Volume
September 2007	50,272,766.74	73,239,965	94,711,299.65	17,129,995	1,525,167.09	760,521	2,668,794.83	5,391,893
August 2007	48,654,793.69	81,457,795	96,132,515.50	16,942,256	1,339,455.75	721,489	2,377,977.48	4,856,980
July 2007	49,650,927.55	74,254,133	101,688,208.96	17,104,233	1,321,206.33	669,850	2,428,300.65	5,034,160
June 2007	45,759,249.34	69,557,938	91,648,231.40	16,030,192	1,147,587.83	590,699	2,312,110.56	4,762,415
May 2007	45,403,255.10	69,732,157	92,316,514.09	16,596,130	1,120,768.46	581,840	2,266,510.94	4,660,490
April 2007	41,932,403.46	65,056,450	75,756,169.00	14,186,867	952,647.43	503,677	2,088,097.97	4,388,525
March 2007	44,282,397.00	68,609,912	72,605,832.12	14,381,585	949,754.75	522,323	2,164,541.29	4,526,222
February 2007	38,487,265.51	59,135,509	60,447,835.15	12,309,782	822,367.21	515,335	1,796,169.87	3,784,201
January 2007	41,715,204.26	64,397,710	68,691,335.75	13,372,189	866,206.05	460,470	2,207,957.46	4,522,708
December 2006	43,632,776.03	66,692,887	70,112,193.36	14,602,502	838,042.83	447,738	2,300,261.84	4,668,076
November 2006	39,025,713.97	61,317,201	64,169,906.71	13,897,487	731,764.68	406,643	1,895,161.70	3,753,833
October 2006	43,023,621.55	66,227,925	55,457,897.30	13,589,245	707,017.44	404,014	2,173,912.90	4,918,443
September 2006	40,174,817.35	62,794,016	58,427,997.87	13,791,352	641,583.17	368,919	1,888,900.08	3,843,391
August 2006	40,350,606.74	62,830,145	61,111,436.04	13,721,184	595,913.57	356,481	1,833,695.71	3,810,126
July 2006	40,645,339.31	64,120,787	56,305,702.21	13,499,813	553,746.58	342,025	1,859,723.23	3,961,223
June 2006	37,883,736.36	60,256,978	57,831,812.37	13,374,980	517,434.64	327,793	1,704,788.05	3,580,610
May 2006	37,719,882.65	60,752,713	61,484,071.16	13,165,845	486,440.69	327,796	1,699,928.01	3,672,060
April 2006	34,969,257.87	57,082,272	51,825,535.47	11,946,540	399,859.60	267,910	1,649,139.33	3,697,806
March 2006	36,771,308.70	60,925,957	57,677,740.36	12,990,709	447,910.96	257,284	1,737,940.30	4,042,078
February 2006	32,552,904.41	53,608,233	49,441,577.16	11,446,092	336,899.77	203,251	1,541,168.76	3,437,622
January 2006	35,072,863.73	57,098,772	48,906,823.69	11,683,015	331,471.66	201,125	1,684,518.26	3,882,899

* Value on IDR Million

Figure 7
The Number of Cards

Period	Credit Card	ATM Card	ATM +Debit Card	Prepaid Card
September 2007	8,782,402	2,497,616	31,191,941	126,211
August 2007	8,643,471	2,452,085	30,751,781	127,562
July 2007	8,507,704	2,453,961	30,210,886	127,012
June 2007	8,443,861	2,396,216	29,628,467	116,888
May 2007	8,392,734	2,257,822	29,105,943	-
April 2007	8,338,377	2,220,185	28,951,736	-
March 2007	8,194,908	2,192,203	28,467,610	-
February 2007	8,336,598	2,167,086	28,101,234	-
January 2007	8,284,668	2,095,878	28,058,176	-
December 2006	8,215,923	1,509,038	28,147,121	-
November 2006	8,246,240	1,496,733	27,591,546	-
October 2006	8,220,190	1,485,437	27,137,765	-
September 2006	8,185,091	1,441,494	26,752,600	-
August 2006	8,141,978	1,419,164	26,215,573	-
July 2006	8,108,865	1,393,326	25,709,446	-
June 2006	8,060,807	1,365,053	26,266,143	-
May 2006	8,306,329	1,310,792	25,865,912	-
April 2006	8,333,266	1,337,924	25,336,627	-
Mart 2006	8,306,407	1,322,094	25,089,270	-
February 2006	8,310,109	1,342,434	24,546,255	-
January 2006	8,274,706	1,312,125	24,035,777	-

Figure 8
The Number of Prepaid Card Transactions

Period	Number of Prepaid Card	Transaction Volume	Transaction Value (IDR)
September 2007	126,221	54,917	591,356,572
August 2007	127,562	47,407	484,778,045
July 2007	127,012	45,887	480,545,017
June 2007	116,888	46,888	500,996,929
May 2007	109,220	49,198	540,621,035
April 2007	113,401	49,548	543,495,372

Chapter 4

THE DEVELOPMENT OF E-PAYMENT AND CHALLENGES IN KOREA

by

Electronic Banking Team^a
Payment Systems Department
The Bank of Korea

1. Development of E-payment in Korea

1.1 Definitions

The terminology relating to payment systems has developed steadily as payment and settlement infrastructures have evolved.

Some definitions of terms¹ as used in Korea are as follows:

The term “electronic financial transaction” means any transaction whereby a financial institution or an electronic financial service provider provides financial items and services through electronic apparatuses (hereinafter referred to as the “electronic financial business”) and the users use them in a non-facing and automated manner without any direct contact with the financial institution or the employees of the electronic financial business operator;

The term “electronic payment transaction” means any electronic financial transaction in which the person performing payment (hereinafter referred to as the “payer”) has a financial institution or an electronic financial business operator transfer money to the person receiving payment (hereinafter referred to as the “payee”) using any electronic payment means;

The term “means of access” refers to any device or information falling under any of the following categories which is used to make a transaction request in an electronic financial transaction or to secure the authenticity and accuracy of the users and the contents of such a transaction:

-
- a. Mr. Jaeho Yoon, Economist, Payment Systems Management Team of the Payment Systems of Treasury Service Department, The Bank of Korea was presented at both workshops.
 1. Electronic Financial Transactions Act, 2007. 01

- (a) An electronic card or other electronic information;
- (b) An electronic signature creating key and digital certificate specified in the Digital Signature Act;
- (c) A user number registered with a financial institution or an electronic financial business operator;
- (d) Bio-information of a user;
- (e) Any password required for use of any device or information covered in categories (a) or (b) above;

The term “electronic payment means” indicates any means of payment by an electronic method such as electronic funds transfer, electronic debit payment, electronic prepayment, electronic money, credit card, electronic bond, etc.;

The term “electronic funds transfer” means any transfer of funds made in any manner falling under any of the following categories from an account opened with a financial institution or electronic financial business operator (limited to any account linked to a financial institution; hereinafter, the same shall apply to another account through an electronic apparatus,) for the purpose of transferring funds between a payer and a payee:

- (a) A payment request made by a payer to a financial institution or electronic financial business operator; and
- (b) A collection request made by a payee (hereinafter referred to as a “collection transfer”) to a financial institution or electronic financial business operator;

The term “electronic prepayment means” refers to any certificate, or information on any certificate, of transferable monetary values stored and issued in electronic form, which satisfies all of the following requirements (provided, that it does not include electronic money):

- (a) Use for the purchase of goods or services from a third person other than the issuer (including specially related persons prescribed by Presidential Decree) and payment of the prices thereof; and
- (b) Use for the purchase of goods or services included in not less than two business categories;

The term “electronic money” means any certificate, or information on any certificate, of transferable monetary values stored and issued in electronic form, which satisfies all of the following requirements:

- (a) Use within the areas and by the chain stores which meet the standards prescribed by Presidential Decree;
- (b) Use to meet the requirements of subparagraph 6 (a);
- (c) Use to purchase goods or services included in not less than five business categories as prescribed by Presidential Decree;
- (d) Issuance in exchange for the same value of cash or deposits; and
- (e) Exchange for cash or deposits under guarantee of the issuer.

As defined in the Electronic Transactions Act, in Korea, electronic money is distinguished from electronic prepayment means in terms of areas of usage, the variety of business categories in which usage is allowed and redeemability.

The means of access is also defined as enabling authentication of the customer.

1.2 Development of E-payment in Korea

The payment and settlement system of Korea was for a long time heavily dependent on paper-based payment instruments. This is attributable to the traditional strong preference for cash as a payment instrument and the well-developed bill and cashier's cheque system. Nevertheless, the use of non-paper based payment instruments has grown steadily since the 1980s, with the establishment of inter-bank funds transfer systems, such as the Inter-bank Funds Transfer System and the Inter-bank CD System. The spread of e-commerce transactions and introduction of Internet banking in recent years are accelerating the movement towards further diversification of the range of e- payment and settlement systems.

Figure 1
Volume

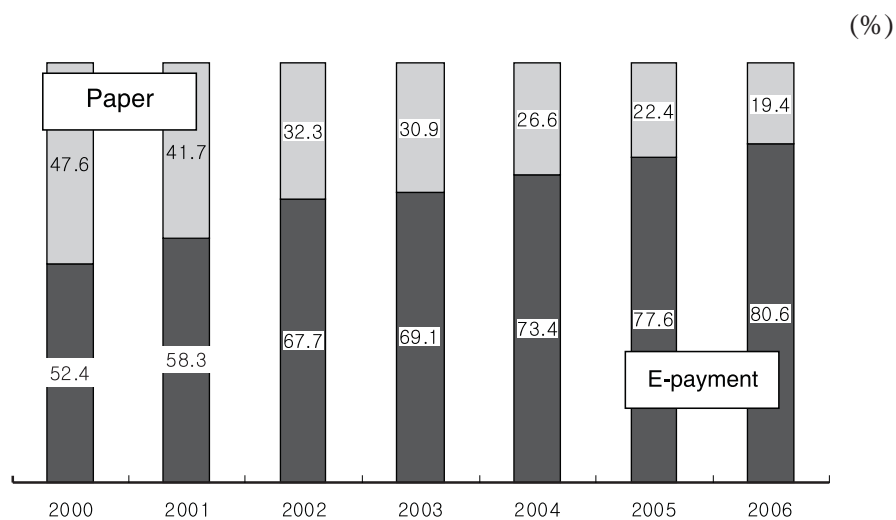
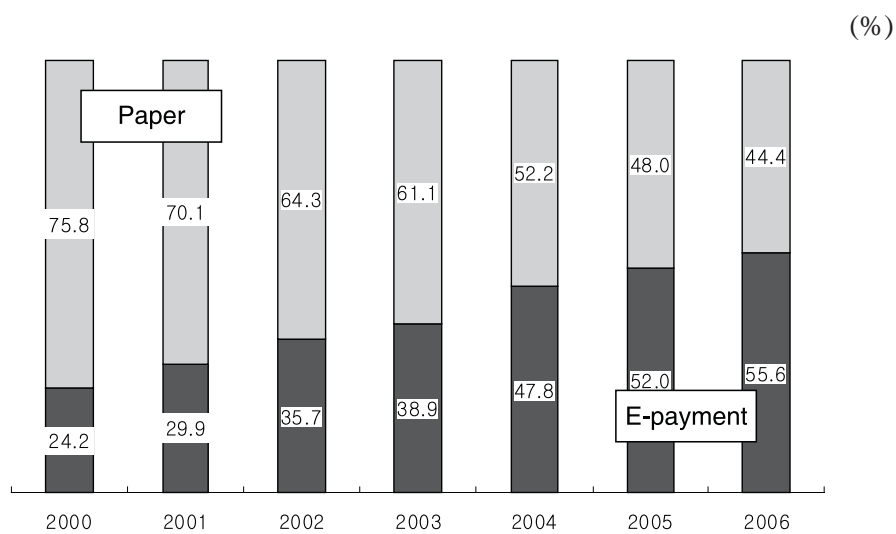


Figure 2
Value

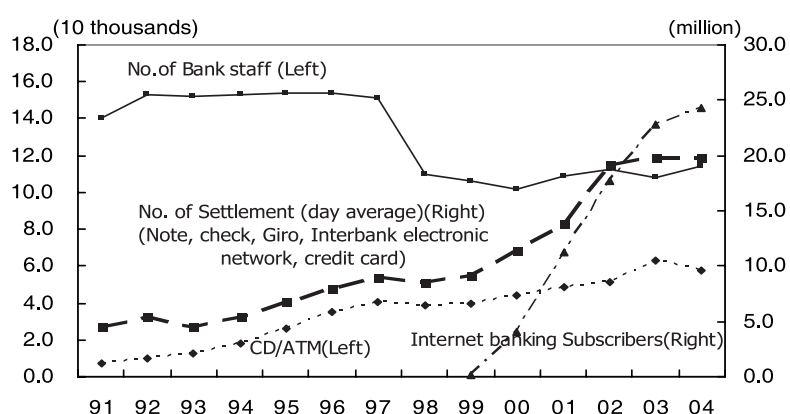


Note: The paper-based systems are notes, cheques, etc.

The e-payment systems are the inter-bank electronic networks, CD/ATM networks, B2B and B2C payment systems, credit cards, debit cards, check cards, e-money etc.

Figure 3 shows the trends of number of bank staff and e-payment channels;

Figure 3
Bank Staff and E-payment Channels



There are many retail payment systems in Korea: the Cheque Clearing System, the Giro System, the IFT Network, the CD Network, the Electronic Banking System (HOFINET), the CMS Network, the Local Bank Network (BANKLINE) and the K-CASH Network. In addition, there are also the B2C & B2B Electronic Commerce Payment Systems, which support e-commerce activities.

Figure 4
Retail Payment System Types

Classification	Objects of Settlement	Introduction	Settlement Method
Clearing	Bills, Cheques, and Payment certificates	1910	Paper
Giro system	Sales, Insurance, Telephone, Public utility fees, Salary account transfers	1977	Paper & Electronic
CD Network	Savings withdrawals, Fund transfers, Credit card cash advances	1988	Electronic
IFT	Retail fund remittances	1989	Electronic
EFT/POS	Fund transfers from accounts linked with debit cards	1996	Electronic
CMS Network	Large-sum fund transfers	1996	Electronic
Local Bank Shared System (BANKLINE)	Account deposits/ withdrawals, Transfers	1997	Electronic
K-CASH Network	K-CASH fund transfers	2000	Electronic
E- Banking System	Phone/ Firm/ Internet banking transfers	2001	Electronic
B2C E-Commerce Payment System	B2C e-commerce transaction fund transfers	2000	Electronic
B2B E-Commerce Payment System	B2B e-commerce transaction fund transfers	2002	Electronic

1. 3 Benefits of E-payment

The reason why banks are introducing e-payment systems is the benefits they confer: cost reduction to the banks and convenience to customers.

1.3.1 Cost Effectiveness

Although it is very hard to calculate the cost effectiveness of e-payment systems precisely, some examples can demonstrate it.

Figure 5
Comparison Between Teller and Internet Banking

(Korean Won)

Method of Funds transfer	Cost	Transaction Fee	Profit/loss
Teller	5,053 (\$5.05)	3,000 (\$3.00)	- 2,053 (\$2.05)
Internet banking	137 (\$0.14)	500 (\$0.50)	+ 363 (\$0.36)
Profit from system change			+ 2,416 (\$2.42)

Note: Based on data from one commercial bank branch in Korea (2004. 07)

If the bank changes its teller system to internet banking, it profits US\$2.42 per transaction. The user, meanwhile, could profit US\$2.50 per transaction.

1.3.2 Convenience

E-payment systems can support financial services anytime, and anywhere, at lower prices.

Figure 6
Convenience of E-payment

Teller		E-payment transactions			
		CD/ATM	Internet/ tele-banking	Mobile banking	TV banking
Time	09:30-16:30	08:00-23:30	Some banks – 24 hours; Others – 07:00 – 23:00		07:00-23:30
Place	Bank branch (Teller)	Bank branch or shop, street, etc.	Office, home, etc.	Anywhere	Home
Fee	3.0 US\$	0.6-1.8 US\$	0.4-0.6 US\$	0.4-0.6 US\$	0.5 US\$

Note: Time means the time when fund transfer is available. Fees are for 100 US\$ fund other banks.

1.4 Factors Related to Promotion in Korea

With the changing economic landscape, such as the rapid development of information communication technology (ICT), the diversification of customer desires, the increasing labour costs of financial institutions and the dramatic rise in payment and settlement volume, informationalisation of the financial industry has made progress. By coping with these changes appropriately and promoting financial informationalisation efficiently, the financial industry has been able to achieve various objectives, including same-day settlement, solution of financial space and time-limit problems, laying the foundation for the introduction of developed financial skills, systematic collection and management of financial information, etc.

Financial informationalisation in Korea has been promoted not only by the official promotion organisation, the Sectional Committee on Financial Informationalisation Promotion (SCFIP), but also by the financial institutions themselves. However, most large-scale projects, requiring the mutual cooperation of more than two institutions, have been promoted through the SCFIP in accordance with the related acts and regulations.

The SCFIP deliberates on important matters concerning the overall business of informationalisation of financial institutions, including the formulation of the basic plan for Financial Informationalisation Promotion (FIP), FIP performance evaluations, connection with external computer networks, etc. The SCFIP also has three of its own sub-committees, specifically covering the areas of banking, securities, and insurance. Administrative matters are dealt with by its Secretariat, managed by the Bank of Korea.

Looking at other factors, both widespread use of the Internet and advancements in ICT have facilitated development and usage of e-shopping and Internet/mobile banking in Korea. As of June 2006, about 26.4 percent of the population subscribed to broadband Internet services in Korea. This was the fourth highest rate in the world according to the OECD. The ICT infrastructure could support an environment in which customers can easily make use of e-payment and lower the e-payment costs for banks and customers.

The high population density in major cities is also facilitating development and usage of e-payment instruments for such purposes as access to public transportation and purchases in stores.

1.5 Obstacles

1.5.1 Security Issues

E-payments are non face-to-face services, which mean they are usually done online. Thus, financial institutions determine customers' legitimacy by their input information, which can be forged more easily than in face-to-face interactions.

As they are non paper-based systems, the electronic messages which e-payment systems make use of can be easily attacked as well.

The security issues could bring about another potential risk. Usually, e-payment instruments have no systemic risk so far, but they may engender reputational risk, which is when customers lose trust in the e-payment instruments, and go back to paper-based payment.

The security issues might be mainly concerned with this reputational risk in the long run.

1.5.2 Inter-operability or Compatibility

The lack of inter-operability or compatibility among merchants and regions could be a roadblock to e-payment promotion, as e-payment instruments are developed separately by institutions. Protection of institution's business rights is important, but the user convenience and reduction of infrastructure costs which are achieved by inter-operability could be more important than their rights. It is therefore desirable for the market players to compromise.

1.5.3 Provision of Payment Services by the Non-Financial Institutions

While provision of payment services by the non-financial institutions may give more choices to the users of various e-payment services, it also creates more complexity and difficulties with regard to risk management. The non-financial institutions in the payment and settlement systems, therefore, must be monitored closely, and the sound legal basis for oversight of such institutions has to be in place.

2. Impact of E-payment on Central Banking Functions

There has been no clear evidence of impacts on central banking functions so far. However, some papers² predict that such impact will appear in due course. In most of these papers, the impact of e-money is what is most focused on, rather than that of e-payment systems as a whole.

2.1 Banking Channels and E-money

“In an efficient payment system, payments are effected quickly, securely and at low cost. In order to increase efficiency in the payment system, it is important that customers are motivated to choose the most cost-effective payment services.”³ Some e-payment systems provide cost-effective banking channels, such as electronic & mobile banking, inter-banking networks, etc. They involve the transactions between financial institutions and customers (or other financial institutions).

For efficiency of the payment system, banks should have incentives to develop new instruments and to invest in new technology, and the central bank should facilitate these banking channels & networks.

However, e-money is different from these traditional banking channels as e-money products do not require on-line authentication/authorisation or debiting of customer bank account for each transaction.⁴ This characteristic of e-money is very much similar to cash, which means e-money is likely to substitute cash and have more impact on the central bank policies than any other e-payment means.

2.2 E-money System Operation in Korea

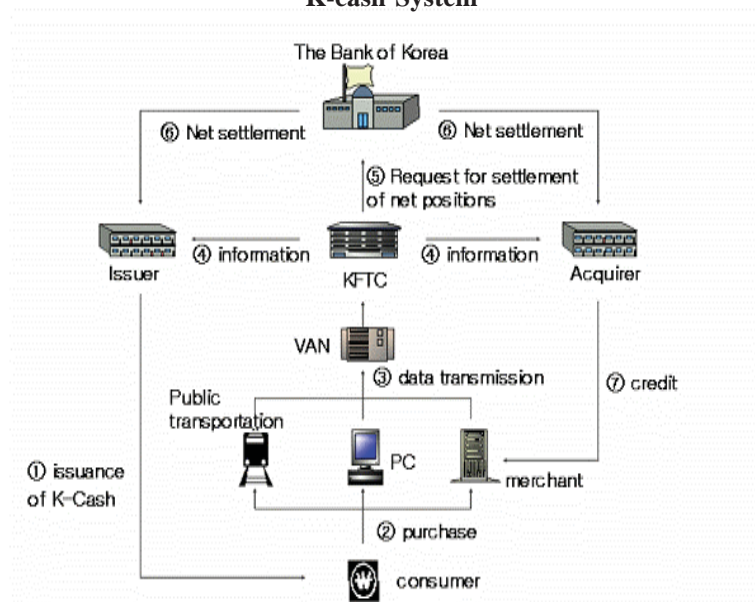
One of the e-money systems in Korea, K-cash, is operated by the KFTC.

2. See the reference [2], [4], [5], [6].

3. Norges Bank, “Annual Report on Payment systems 2005”, May 2006.

4. Some prepaid products use computer networks, such as Internet, but the main concept of e-money is to be used as cash which do not need the access to bank accounts or to identify the owner.

Figure 7
K-cash System



The information on net clearing positions is transmitted to the Bank of Korea for settlement on various institutions' current accounts at the Bank of Korea.

2.3 Impact on Central Bank Functions

Although the development of e-payments has not directly affected the core functions of the central bank, the central bank's role in the payment and settlement systems, which is to promote safety and efficiency of e-payment to ensure the validity of monetary policy, have expanded and become more important.

2.3.1 E-payment and Central Bank

While the spread of e-payments has potential to raise the efficiency of the financial economy, it could also increase systemic risk.

It is essential for the central bank to ensure safety and efficiency of e-payments for stability of the financial system and for its conduct of monetary policy. E-money, in particular, may replace cash to change the money demand, which could have direct impact on the monetary policy and the amount of

currency in circulation. Most studies in general predict that spread of e-money could undermine effectiveness of the monetary policy.

2.3.2 Role of the Bank of Korea in E-payment Systems

Enhancement of Efficiency

The Bank of Korea is promoting the use of e-payments as a way to enhance efficiency of the payment and settlement system in Korea.

In order to maximise efficiency, for example, the Bank of Korea has coordinated joint projects among the relevant institutions to establish the e-payment systems (such as K-cash, B2B electronic notes) and to standardise various technical aspects.

Ensuring Safety

As the spread of e-payments could raise concerns about systemic risk, the Bank of Korea is working to devise various measures to ensure safety of the e-payment systems.

Monitoring

Although the impact of e-money in terms of the effects of the replacement of legal tender and on monetary policy has been insignificant thus far, the Bank of Korea has been carefully monitoring the e-money systems along with other prepayment systems mindful of the experience with credit cards, which spread very rapidly in a short period of time. The scope of the Bank of Korea's

Figure 8
Proportion of E-money in M1, 2006

	Unit	2006 1Q	2006 2Q	2006 3Q	2006 4Q
E-money	Mill. won	10,972	10,701	10,682	10,539
M1	Bill. won	326,601	325,027	327,958	340,951
E-money/M1	%	0.003	0.003	0.003	0.003

Note: Electronic prepayment means are not included in this data. In accordance with the Electronic Financial Transactions Act, the Bank of Korea has been able to collect these data from 2007. If electronic prepayment means are added, the proportion of e-money in M1 will be increased.

monitoring includes non-financial institutions that are involved in the e-money systems.

3. Policy Responses to E-payment

There are three major accomplishments of the Bank of Korea in relation to e-payments: enactment of regulations on e-payments, establishment of oversight framework for e-payment systems, and promotion of ICT in the financial field.

3.1 Enactment of Regulations on E-Payments

The Bank of Korea has played a major role in establishing the Electronic Financial Transactions Act, which came into effect in January 2007.

The new law clarifies the basic components of electronic banking, their processes and liability issues in the case of incidents involving electronic banking.

Moreover, it makes clear the scope of electronic banking service providers and the contents of their business operations, and provides the legal grounds for collection of statistic, supervision and inspection by the relevant authorities, including the Bank of Korea.

The new law also improves the security of electronic financial transactions and related regulations to protect the consumers.

3.2 Establishment of Oversight Framework for E-Payment Systems

The Electronic Financial Transactions Act grants the Bank of Korea the right to request materials and compile statistics, and to make request to the Financial Supervisory Service for inspection or joint-inspection of electronic payment service providers.

Article 41 (Bank of Korea's Request for Submission of Materials, etc.):

- (1) When the Monetary Policy Committee deems it necessary for performing monetary credit policies and facilitating operation of the payment and settlement systems in relation to electronic payment transactions, the Bank of Korea may request a financial institution or an electronic financial business operator to submit materials. In this case, the scope of materials so requested shall be limited to the minimum extent necessary in

consideration of the work burden of the financial institution and electronic financial business operator concerned.

- (2) When the Monetary Policy Committee deems it necessary for performing monetary credit policies, the Bank of Korea may demand that the Financial Supervisory Service inspect; jointly with the Bank of Korea, any issuer of electronic currency, or financial institution or electronic financial business operator registered to perform electronic funds transfer services.

Article 47 (Statistical Research on Electronic Financial Transactions):

- (1) The Bank of Korea may conduct statistical research on electronic financial businesses and electronic financial transactions in order to grasp the present conditions of electronic financial transactions and to establish and implement effective monetary credit policy. In this case, it may request a government agency, financial institution, corporation or other organisation related to electronic financial transactions to submit the necessary relevant materials.
- (2) Any government agency, financial institution, corporation or organisation related to electronic financial transactions requested to submit such materials as stipulated in paragraph (1) shall comply with such requests, unless there are justifiable grounds for not doing so.
- (3) Necessary matters concerning the objects, methods and procedures of the statistical research under paragraph (1) shall be prescribed by Presidential Decree.

3.3 Promotion of ICT in the Financial Field

The SCFIP, which is operated under the Framework Act on Informationalisation Promotion, is a cooperative group for promoting ICT in the financial field. The main roles of the SCFIP are to develop joint projects on e-payment systems, such as K-cash, to devise measures to ensure safety of e-payments, and to standardise ICT and work process.

The SCFIP and the Framework Act on Informationalisation Promotion

As governmental recognition of the importance of financial informationalisation improved steadily from the early 1980s, the financial field was selected, along with the administration, education, research, national defense and social security field, as one of the nation's key fields, which should be informationalised through establishment of its own computer network. To promote informationalisation in the financial field, the Committee on Financial Computerisation, chaired by the governor of the Bank of Korea, was inaugurated in September 1984, under the jurisdiction of the Committee on Computer Networks Adjustment, a governmental organisation.

After the Act on the Promotion of Computer Networks Supply and Usage came into force in May 1986, the Committee on Financial Computerisation was renamed as the Committee on Financial Computer Networks Promotion, and its business field was expanded from the bank industry into the non-bank financial industry as well, including such areas as securities, insurance and merchant banking.

With the enactment of the Framework Act on Informationalisation Promotion in January 1996, the official government organisation overseeing informationalisation was changed from the Committee on Computer Networks Adjustment to the Committee on Informationalisation Promotion. According to Article 8 of the Act, the Committee on Informationalisation Promotion shall establish a working-level committee to facilitate efficient operation of the committee. It shall also establish a sectional committee for each sector in order to efficiently proceed with informationalisation. In line with this Article, the Committee on Financial Computer Networks Promotion was, in June 1996, renamed as the SCFIP.

The SCFIP also has three of its own subcommittees, concerned especially with Banking, Securities and Insurance. Administrative matters are dealt with by its Secretariat, managed by the Bank of Korea.

And the SCFIP has three working groups, Working committee, Standardisation Committee, and Safety Counter-measures Committee.

(Working Committee)

The purpose of the Working Committee for FIP is to carry out SCFIP efficiently. The Working Committee consists of general managers of the departments in charge of FIP-related tasks. Its chairman is currently the SCFIP Secretariat Director, the Director General of the Bank of Korea Payment Systems Department. The Working Committee deliberates in advance on each of the following matters:

- Matters which the Secretariat Director deems necessary to examine specially and technically, prior to deliberation on them by the SCFIP;
- Matters related to the expense sharing method and range;
- Other matters delegated by the SCFIP.

(Standardisation Committee)

The purpose of the Standardisation Committee is to efficiently promote standardisation tasks related to financial informationalisation. The number of Standardisation Committee members can be as many as 10 persons including its chairman, the Deputy Director of the Secretariat, who has the right to commission committee members from among participants' staffs recommended by working committee members. The Standardisation Committee examines the following matters in advance:

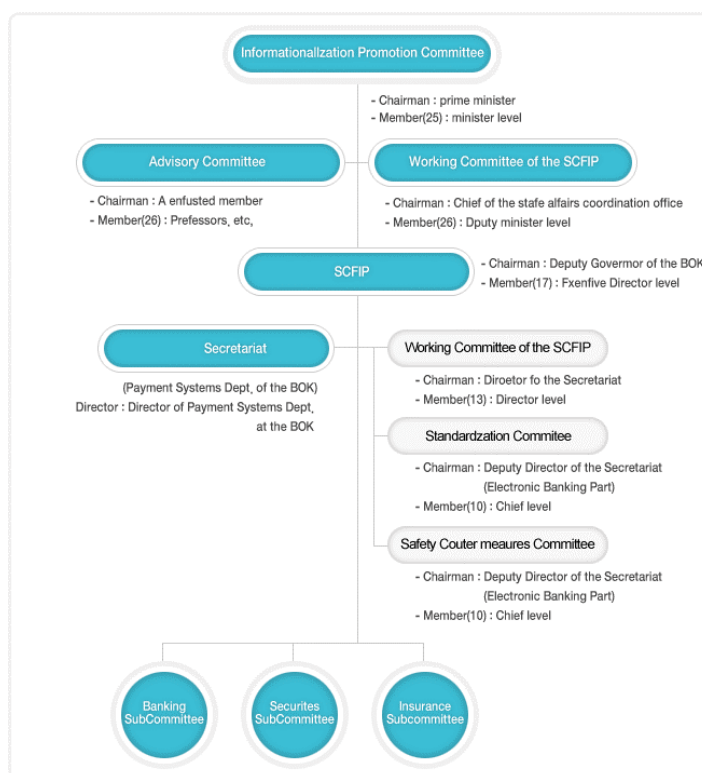
- Details of suggestions on standardisation;
- Processes needing standardisation, plans for standardisation, etc.;
- Other matters as requested by the Secretariat, related to.

(Safety Counter-measures Committee)

The purpose of the Safety Counter-measures Committee is efficient promotion of tasks related to safety counter-measures of the Financial Information Networks. The membership of the Safety Counter-measures Committee is limited to a maximum of 10 persons, including its chairman, the Deputy Director of the Secretariat, who has the right to commission members from among participants' staffs recommended by members of the working committee. The Safety Counter-measures Committee examines the following matters:

- Matters related to the formulation of safety counter-measures for the Financial Information Networks;
- Emergency counter-measures against computer glitches, accidents etc.;
- Other matters as requested by the Secretariat, related to safety counter-measures for the Financial Information Network.

Figure 9
Sectional Committee on Financial Informationalisation Promotion (SCFIP)



4. Future Direction of E-payment

As mentioned in the previous section, the Bank of Korea has been continuously monitoring the e-payment systems and leading them toward desirable directions.

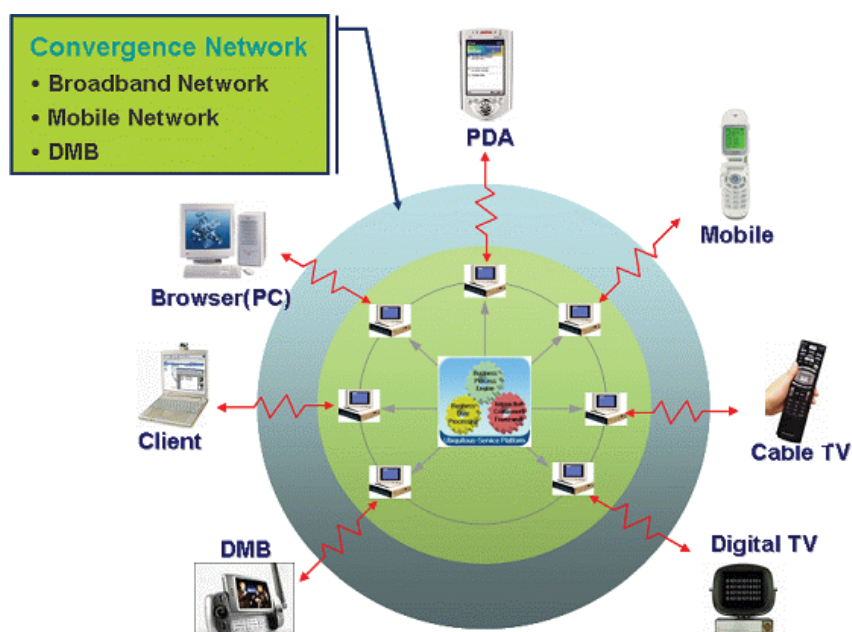
However, developments in information and communication technologies have been progressed more rapidly exceeding our expectation. Thus, the impact of e-payment might increase all of a sudden in the near future.

The share in total payments of e-payment relative to that of paper-based payment is expected to rise thanks to the continuous development and spread of various new e-payment instruments. In particular, the use of electronic fund transfer services, such as Internet/mobile banking and IC card-based payments,

including credit cards, e-money, pre-paid cards and debit cards, is expected to increase very rapidly.

Thus, a ubiquitous payment environment in which financial services can be provided to anyone, at anytime and any place with any device will be realised someday, with financial transactions capable of being made through various media, such as IC cards, the internet, mobile equipments and TV, etc.

Figure 10
U-payment Channels



This shows how the customer can access his/her bank. Banks must operate a server for each channel. But, with development of the convergence network, all channels will be integrated in the near future, hence, the so-called u-payment era.

References

1. BIS Committee on Payment and Settlement Systems, (2005), "Central Bank Oversight of Payment and Settlement Systems", *BIS Working Paper*, 05.
2. Connel Fullenkamp and Saleh M. Nsouli, (2004), "Six Puzzles in Electronic Money and Banking", *IMF Working Paper*, 02.
3. The Electronic Financial Transactions Act, (2006), 04.
4. Jane Kaufman Winn, (1999), "Clash of the Titans: Regulating the Competition between Established and Emerging Electronic Payment Systems", *Berkeley Technology Law Journal*, 05.
5. Marco Arnone & Luca Bandiera, (2004), "Monetary Policy, Monetary Areas and Financial Development with Electronic Money", *IMF Working Paper*, 07.
6. Michael Woodford, (2000), "Monetary Policy in a World Without Money", Princeton University, 06.
7. The Bank of Korea Act, (2007), 01.
8. The Bank of Korea, *Payment Systems in Korea*, (2005), 11.

Chapter 5

THE DEVELOPMENT OF E-PAYMENTS AND CHALLENGES IN MALAYSIA

by

Adnan Mohammad¹

Introduction

There has been a visible trend in many countries to progress towards electronic payments (e-payments), in the recent years. Several SEACEN countries, including Malaysia, have embarked towards this direction to move to e-payment to replace cash, which is argued to be an inefficient and costly means of payment.

The development of e-payments will help to improve the efficiency of the financial system by reducing cost of transactions, enhancing liquidity, and facilitating better allocation of financial resources that can bring significant benefits to all parties in the financial sector. However, it has also been debated that the development of e-payments may raise a number of policy issues for the central banks' point of view because of central bank's general interest in the payment systems. It has been argued that e-payments may have the potential to destabilize the money multiplier and to reduce demand for physical money. The use of electronic money (e-money) as a means of payments is likely to create close substitutes for physical cash which would speed up the velocity of narrow money or may even replace traditional bank demand deposit and other liquid deposits. As a result, it may have an impact on demand for central bank's reserves

1. Author is from the Payment Systems Section of the IT and DFI Supervision Department of Bank Negara Malaysia. This report is prepared as part of the SEACEN research project, and provides an overview of the development of an e-payment in Malaysia, discusses its implication on the core functions of Bank Negara Malaysia as well as the policy responses and strategies taken in promoting e-payment. The author wishes to express his gratitude to Dr. Aluthgedara Karunasena, Executive Director, Dr. Junggun Oh, Director of Research, Mr. Vincent Lim Choon Seng, Senior Economist, and other staff from The SEACEN Centre, and staff of Payment Systems Policy Department (PSPD), Bank Negara Malaysia for their helpful comments and suggestions. He also wishes to thank Mr. Mahdi Mohd Ariffin, Director and other staff from IT and DFI Supervision Department, Bank Negara Malaysia for their support and contributions. The views expressed in this report are those of the author and should not be taken as the official views of Bank Negara Malaysia.

and reserve requirements and consequently the ability of central banks to influence interest rates. This raises the question of whether the development in e-payments would reduce the capacity of central bank to promote financial stability as well as economic growth.

The purpose of this study is to highlight the development of e-payments, in the area of retail or micro payments, in Malaysia, and examine whether the development of e-payments in related area would have an impact on the core functions of Bank Negara Malaysia.

This study is conducted for the research programme of The SEACEN Centre which sees the participation of representatives from other central banks from the SEACEN countries.

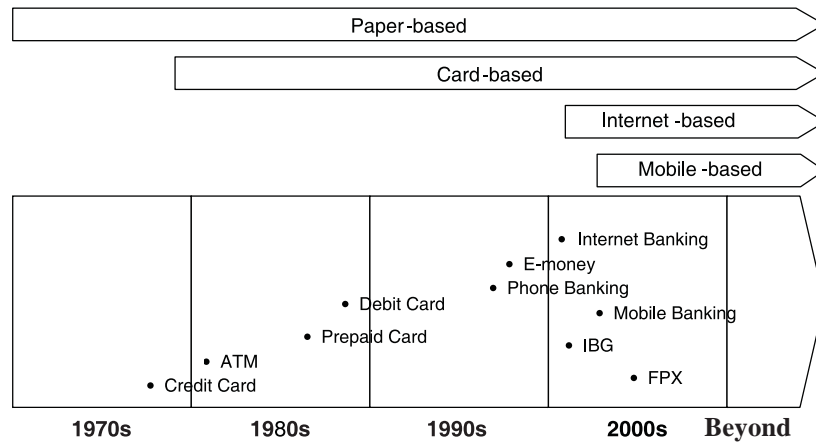
1. Development of Electronic Payments in Malaysia

1.1 Evolution of E-payments in Malaysia

Over the decades, the payment systems in Malaysia have evolved significantly in line with the technological advancement. During the past few years, significant progress has been achieved in improving the e-payment systems infrastructure. Significant changes in payment industry also can be seen by an increased participation of non-banking institutions in payment system's product development and innovation. The evolution of e-payments in Malaysia can be broadly characterized by the following developments:

- The deployment of the card-based payment systems (beginning in late 1970s);
- The implementation of network or Internet-based based payment systems (beginning in late 1990s); and
- The introduction of mobile-based payment systems (in mid 2000s).

Figure 1
Evolution of Retail E-payment Systems in Malaysia



During the years, several card-based payment instruments were being deployed with the introduction of credit card in late 1970s. The use of Automated Teller Machine (ATM) cards and system as an electronic channel has been prominent since its introduction in early 1980s. To ensure safety in retail payment methods, the banking industry had migrated fully to the chip-based infrastructure for ATM and credit card in 2004 and 2005 respectively. The prepaid and debit cards were introduced in late 1980s, although its usage for making retail payments only became common in early 2000s. In line with the development and advancement in the information and communication technology and infrastructure, the new and modern payment services based on network and Internet are increasingly being offered beginning late 1990s. The e-money schemes and services were introduced in late 1990s and followed by the Internet and mobile-based banking and payment in early 2000s.

1.2 Overview of E-payments Infrastructure in Malaysia

In general, payment systems infrastructure in Malaysia is classified into three categories i.e. payment systems, payment instruments and payment channels as described in Table 1 below.

Table 1
Categories of Payment Systems in Malaysia

Payment Systems	Payment Instruments	Payment Channels
<ul style="list-style-type: none"> ■ RENTAS (RTGS) ², RENTAS – USD CHATS ³ and SPICK⁴ ■ Financial Process Exchange (FPX) and Interbank GIRO (IBG) 	<ul style="list-style-type: none"> ■ Card-based e.g. debit card, credit card, prepaid card and charge card. ■ Network/Internet-based e-money. 	<ul style="list-style-type: none"> ■ Automated Teller Machine ■ Network/Internet-based e.g. Internet banking ■ Mobile phone-based e.g. mobile payment and mobile banking

1.2.1 Payment System

The major retail e-payment systems in Malaysia are Financial Process Exchange (FPX) and Interbank GIRO (IBG).

FPX is a national Internet-based multi-bank payment gateway/infrastructure in Malaysia. It was launched in October 2004 to facilitate on-line payments for electronic commerce (e-commerce) transactions. It also provides business-to-business (B2B) and business-to-customer (B2C) payments via Internet. Currently there are 11 participating banks offering FPX services. There are also approximately 92 participating merchants, including the early adopters i.e. two universities, an insurance payment gateway and an air cargo transportation company.

IBG is an electronic fund transfer payment system designed to handle high volume of low-value interbank payment that is less than RM100,000 per transaction. It was launched by Malaysian Electronic Payment Systems (1997) Sdn. Bhd. (MEPS)⁵ in April 2000. IBG is a daily exchange of electronic transactions through MEPS system that allows transfer of funds between financial institutions. IBG transactions can be conducted via Internet banking channel as well as over the counter at participating banks. IBG funds transfer service to third parties via ATM has also been introduced (by one of the banks) in March 2006. To date, there are 18 participating banks (14 commercial banks, 2 Islamic banks and 2 developmental financial institutions) are offering IBG services.

2. RENTAS is the real time gross settlement system
3. RENTAS-USD CHATS is the Payment Versus Payment (PvP) infrastructure for settling interbank Ringgit-US dollar trade transactions established in 2006 in collaboration with Hong Kong Monetary Authority
4. SPICK is the national image cheques clearing system
5. MEPS is a payment consortium, wholly owned and supported by local commercial banks and Islamic banks

1.2.2 Payment Instrument

The Payment System Act 2003 empowers Bank Negara Malaysia to designate a payment instrument as a designated payment instrument (DPI). Payment instruments that have been designated as a DPI are e-money, credit, debit and charge instruments.

Debit cards are being provided by both international and domestic service providers. Currently there are six and three issuing banks that provide debit cards in collaboration with Visa Electron and Mastercard Electronic service providers, respectively. With debit card facility, the cardholder can effect a purchase with no finance charges. For each transaction, to effect payment, the customer's bank account will be withdrawn directly. The spending limit is represented by the amount of funds available in the account. The total number of debit cards has increased from 15.6 million in 2005, 18.6 million in 2006 to 21.8 million in 2007. Total number of purchases recorded in 2005 was 2.1 million and has increased to 4.2 million in 2006, and 9.0 million in 2007.

There are two major credit card brands available in Malaysia i.e. Visa and MasterCard. These cards are issued by 18 card issuers including two issuers issuing credit cards based on Islamic principles. Issuers require the prior approval of Bank Negara Malaysia to issue credit card. The credit card issuers are subject to guidelines on credit card operations issued by Bank Negara Malaysia. Malaysia is one of the few countries in the world that has adopted the Europay-Mastercard-Visa (EMV) standard on a national scale for credit card issuance in 2004 in order to improve consumers' confidence and mitigate fraud. Following the upgrading of the credit card infrastructure to EMV chip card technology, Visa International and MasterCard Worldwide, have rolled out their contactless credit cards, Visa Wave and MasterCard PayPass respectively. The contactless credit cards combine contact EMV chip cards with contactless technology. These cards do not require customers' signature and remove the need to physically swipe or insert the card into a card reader. With this technology, payments are made using radio frequency, providing customers a simple, fast, secure and convenient way to make payment. Total number of credit cards has increased from 7.8 million in 2005, 8.8 million in 2006, to 9.9 million in 2007.

Charge card brands available in Malaysia are Malayan Banking Berhad Amex (American Express), Diners Club, MBf, iSynergy, HSBC Amanah and Al-Rajhi which are issued by six card issuers. Issuance of charge cards is also subject to prior approval of Bank Negara Malaysia. Malaysian charge cardholders' spending has increased to RM2.2 billion in 2007 with 73%

transactions done locally. However, the usage of charge card was insignificant compared to the usage of credit cards. This is largely due to the nature of charge card where the whole outstanding balance is to be settled by due date.

There are three types of e-money schemes available in Malaysia. They are classified into card-based, network-based and mobile-based e-money. These schemes provide consumers with additional payment methods for purchases using card, over the Internet as well as the convenience of using mobile phones for payments.

There are three types of card-based e-money (or Stored Value Card (SVC)) currently available i.e. single, limited and multi-purpose SVC cards. SVC cards are issued by both, banking and non-banking institutions. SVC cards available in Malaysia are MEPS Cash and Touch n' Go cards and are ideally used for small value purchases. The issuance of limited and multi-purpose SVCs is subject to Bank Negara Malaysia's prior approval.

MEPS Cash is the national card-based e-money application, which is incorporated in the Bankcard⁶ and MyKad⁷. MEPS Cash was launched in 2002 as an alternative e-payment mode to using cash for making retail payments. Total number of MEPS Cash in circulation has increased to 44.5 million in 2007. As at December 2007, there were 13,739 MEPS Cash merchants nationwide.

Touch 'n Go Electronic Payment System (Touch 'n Go), a smartcard that contains electronic cash, is one of card-based e-money application and one of the alternative payments widely used in the transportation sector. Touch 'n Go card can be used for toll fare, parking and transport fare in Malaysia. A user simply touches his Touch 'n Go card at designated toll booths, on the buses or at the Light Rail Transit (LRT) station gates and the toll or fare is deducted electronically from the card in an instant. The Touch 'n Go application is currently available in the Touch 'n Go generic card, MyKad, Zing Card and hybrid co-branding credit card. The total number of card in circulation as at end 2006 was 6.5 million. As at December 2007, the number had increased to 8.1 million.

6. Bankcard is a chip-based payment card with multiple applications issued by local financial institutions

7. MyKad is a Malaysia Government multi-purpose identity card issued by National Registration Department

MOLePoints, an Internet-based e-money, was launched in June 2002. It is an e-distribution system that aggregates online content and e-services for consumers using physical outlets as payment collection points. The recorded number of accounts in 2006 was 111,110 and 12,419 for local and international respectively. The numbers have increased to 174,908 and 13,922 respectively in December 2007.

PosPay, another example of the Internet-based e-money scheme is provided by PosPay Exchange Sdn. Bhd. (PESB). PESB started to commence its Internet-based e-money scheme in August 2006. The service facilitates customers to make online payments via Internet. Services available include bill payments, purchases of contents and services such as ringtones, prepaid airtime reload, wallpapers and games. Total number of subscribers in 2006 was 7,071 with 62 payment/purchase terminals. As at December 2007, the numbers had increased to 9,885 subscribers and 123 terminals. Subscribers may load funds into their PosPay account via Internet banking, the post offices and PosPay branches.

Mobile Money, a mobile phone-based e-money scheme began in May 2006 and is provided by Mobile Money International Sdn. Bhd. (MMISB). The service facilitates subscribers to make online payments via mobile phone short messaging system (SMS) for utility bills, parking fees, purchases of mobile contents and services such as wallpapers, prepaid airtime reload and games at over 11,127 participating merchants as at December 2007. Subscribers may load funds into their Mobile Money account via Internet banking, ATM and the cash deposit machines provided by participating commercial banks. Total number of subscribers in 2006 was 16,117 with 1,170 reload terminals. As at December 2007, the number of subscribers had increased to 26,103.

Malaysian Mobile Services Sdn. Bhd (MMSSB) commenced its mobile based e-money scheme i.e. Maxis e-money in January 2007. The service which uses SMS is available to both Maxis Communication Berhad's (Maxis)⁸ postpaid and prepaid mobile phone subscribers. The service currently could be used at 36 merchants and facilitates subscribers to purchase goods and services, transfer e-money to friends and family, top-up prepaid mobile phone account and pay Maxis postpaid mobile phone bills. Total number of subscribers of the scheme as at December 2007 is 13,750.

8. Maxis is a mobile phone service provider based in Malaysia

E-Debit is a domestic electronic payment service where consumers pay their purchases using Bankcard and PIN. This scheme enables on-line payments for purchases at the point-of-sales of participating outlets via Bankcard / ATM card with an on-line PIN verification. For every transaction, payment is debited directly from the card holders' bank account. MEPS provides the central switching system to support the E-Debit transactions between the participating issuing and acquiring financial institutions. To-date, there are 10 participating (issuing) banks and more than 24,000 participating merchants/outlets that accept E-Debit payment. The number of issued card has increased from 14.5 million in 2006 to 17.4 million in 2007. Total number of purchases recorded in 2006 was 1.8 million and 2007 was 4.5 million.

1.2.3 Payment Channels

E-payment channels available in Malaysia are ATM, Internet banking and mobile banking. ATM is one of the payment channels widely being used in Malaysia. All domestic and foreign banking institutions in Malaysia had migrated from using magnetic-stripe ATM cards into a chip-based ATM cards that offer a high standard of security to deter counterfeiting (cloning of cards), since 1 October 2003. Apart for cash withdrawal, the use of ATM has grown to include payment transactions such as bill payments, reloading of Touch n Go cards and fund transfer. Other example of ATM electronic payment transactions available is the Initial Public Offer (IPO) share subscriptions. To date, there are 12 and 10 banking institutions offering bills payments and share application services via ATM, respectively. MEPS provides switching services for 'not-on-us' ATM transactions to facilitate inter- bank withdrawal or other arrangement. MEPS also provides clearing and settlement services between participating banks. Currently, there are approximately 5,500 ATMs on MEPS Shared ATM Networks, serving approximately 14 million card holders. MEPS has collaboration with other countries in operating network switching to provide ATM regional link that facilitates cross border ATM withdrawal arrangements with countries including Indonesia, Singapore and Thailand. The MEPS-Artajasa⁹, MEPS-NETS¹⁰ and MEPS-ITMX¹¹ network arrangements were launched in December 2005, March 2006 and October 2006 respectively. The number of participating banks in the regional link is provided in Table 2 below.

9. ATM Regional Link with Indonesia

10. ATM Regional Link with Singapore

11. ATM Regional Link with Thailand

Table 2
ATM Regional Link Participating Banks

ATM Regional Link	Country	No. of Banks
MEPS-Artajasa	Malaysia	6
	Indonesia	12
MEPS-NETS	Malaysia	3
	Singapore	1
MEPS-ITMX	Malaysia	1
	Thailand	2

Source - Payment Systems Policy Department, Bank Negara Malaysia

In addition to MEPS, four locally-incorporated foreign-owned banks had teamed up and established a new shared ATM network known as HOUSE. HOUSE launched in July 2006, is a switching centre for ATM transactions for foreign participating banks. Its establishment is in line with the recommendation in the Financial Sector Masterplan to allow locally incorporated foreign banks to set up an alternative shared ATM network to provide greater customer convenience and competition in the payment system. Interbank funds transfer capability will be offered in the future.

Internet banking services are currently being provided by majority of the banking institutions. Such services provide convenience, affordable accessibility and greater outreach to banking services especially in effecting funds transfer, bill and loan payments, reloading of mobile prepaid airtime, account balance enquiry, foreign telegraphic transfer, online share application service for initial public offering and other facilities. Currently, 18 banking institutions (9 domestic banks, 8 foreign banks, 1 Islamic bank and 1 DFI) provide Internet banking services with a total of 4.6 million registered users as at December 2007. The penetration rate of Internet banking subscribers to population and Internet subscribers is 13.5% and 96.4% respectively. The industry average for active Internet banking subscribers is about half of total subscribers. About 20% of the Internet banking transactions are transactional and the remaining are non-transactional.

Mobile banking services are currently provided by 7 banking institutions. Amongst services provided are account enquiries, own account funds transfer,

bill payments, reloading of mobile prepaid airtime and prepaid top-up. Total number of mobile banking subscribers as at December 2007 was 345,700. The penetration rate of mobile banking subscribers to population and mobile phone subscribers is 1.3% and 1.5% respectively. About one third of the mobile banking transactions are from mobile phone prepaid top-up or reload.

1.3 Trends in Migration to E-payments

As shown in Table 3, the cash in circulation (CIC)-to-GDP ratio has been declining from 6.2 % in 2003 to 5.7% in 2007. However, CIC per capita (see Table 4) has increased from RM1,030.9 in 2003 to RM1,322.1 in 2007. While the declining in CIC-to-GDP ratio indicates a declining role of cash in the economy, cash remains a highly popular form of payment in Malaysia.

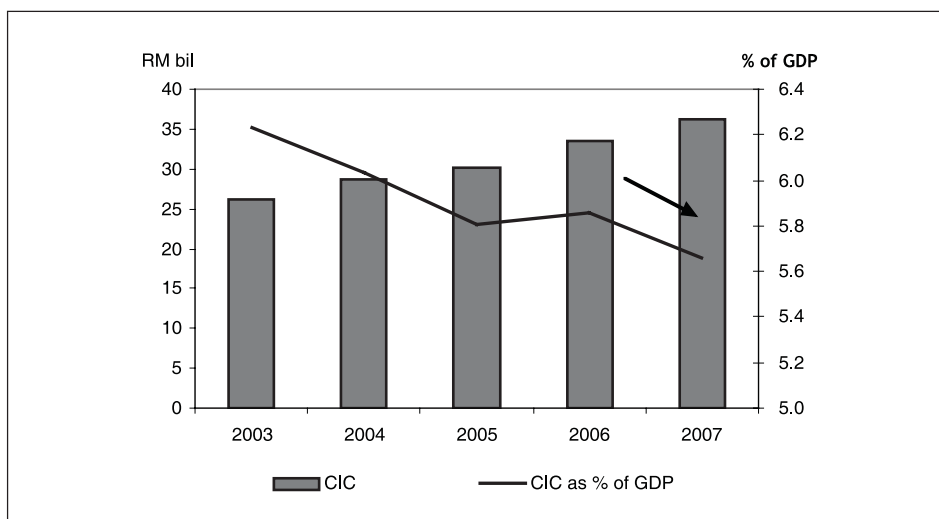
Table 3

Basic Payments Indicator

	2003	2004	2005	2006	2007
Population (million)	25.3	25.9	26.4	26.9	27.5
Nominal GDP (RM mil)	418,769	474,048	519,451	572,555	641,499
Cash in Circulation (CIC)(RM mil)	26,101.4	28,616.9	30,177.6	33,519.4	36,290.8
Percentage of GDP:					
CIC	6.2	6.0	5.8	5.9	5.7
Cheque	301.4	288.3	261.4	251.8	267.2
E-payments	9.4	10.9	13.6	17.0	20.1

Source - Payment Systems Policy Department, Bank Negara Malaysia

Chart 1
Cash in Circulation (CIC)



Source - Payment Systems Policy Department, Bank Negara Malaysia

Table 4
Statistics on Usage of Various Non-cash Payments:
Value of Transaction Per Capita (RM)

2003	2004	2005	2006	2007	
CIC	1,030.9	1,106.6	1,144.0	1,245.6	1,322.1
Cheque	49,855.1	52,841.7	51,467.1	53,584.9	62,443.1
E-Payments					
1. Credit card	1,159.6	1,348.6	1,550.3	1,767.2	2,047.3
2. Debit card	3.5	6.4	9.9	24.1	42.9
3. Charge card	74.9	78.8	78.7	82.0	81.7
4. E-money	22.4	28.4	37.3	47.3	59.2
5. IBG	294.5	544.5	997.3	1,700.2	2,439.2
6. FPX	-	0.1	0.5	0.9	16.6
7. Internet banking	403.9	552.7	705.1	1,059.4	1,765.2
8. Mobile banking	NA	NA	0.2	0.3	0.3
9. ATM	NA	6.2	145.1	79.8	161.4

Source - Payment Systems Policy Department, Bank Negara Malaysia

NA Not Available

... Negligible

Table 5
Statistics on Usage of Various Non-cash Payments:
Volume of Transaction Per Capita

2003	2004	2005	2006	2007	
Cheques	7.7	7.7	7.6	7.5	7.7
E-Payments	13.8	17.6	21.6	28.0	32.5
1. Credit card	5.8	6.4	7.0	7.8	8.7
2. Debit card	...	0.1	0.1	0.2	0.3
3. Charge card	0.3	0.3	0.2	0.2	0.2
4. E-money	7.6	10.8	13.9	19.2	22.3
5. IBG	0.1	0.1	0.4	0.7	1.0
6. FPX	-	...	...	...	...
7. Internet banking	0.3	0.5	0.7	0.1	1.5
8. Mobile banking	NA	NA	...	...	...
9. ATM	NA	...	0.1	0.1	0.1

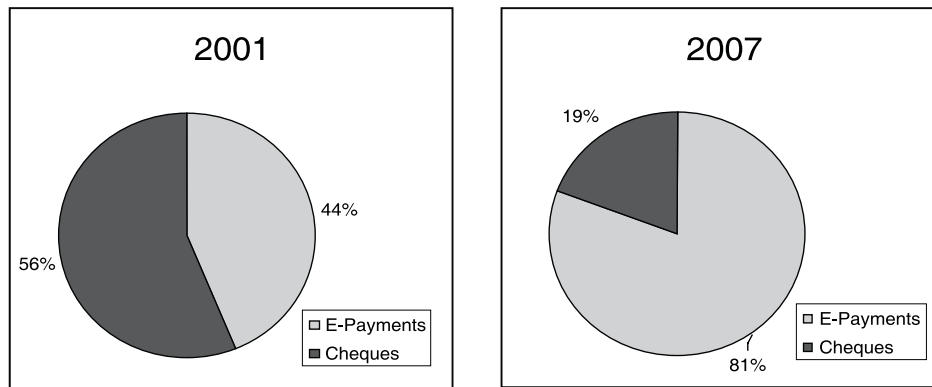
Source - Payment Systems Policy Department, Bank Negara Malaysia

NA Not Available

... Negligible

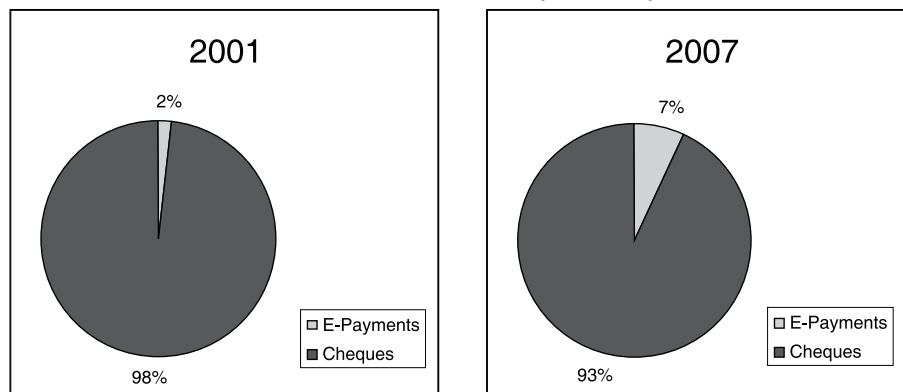
Over the recent five years, total non-cash retail payment transactions had increased significantly. The payment mode shifted from cheques to more electronic payments over the same period. In 2001, cheques dominated total non-cash retail payments at 56%. In 2007, cheques accounted for only 19% of total non-cash retail payments. This suggests that while cheques continue to be important, they have been replaced to certain extent by greater usage of electronic alternatives.

Chart 2
Share of Retail Electronic Payments by Volume



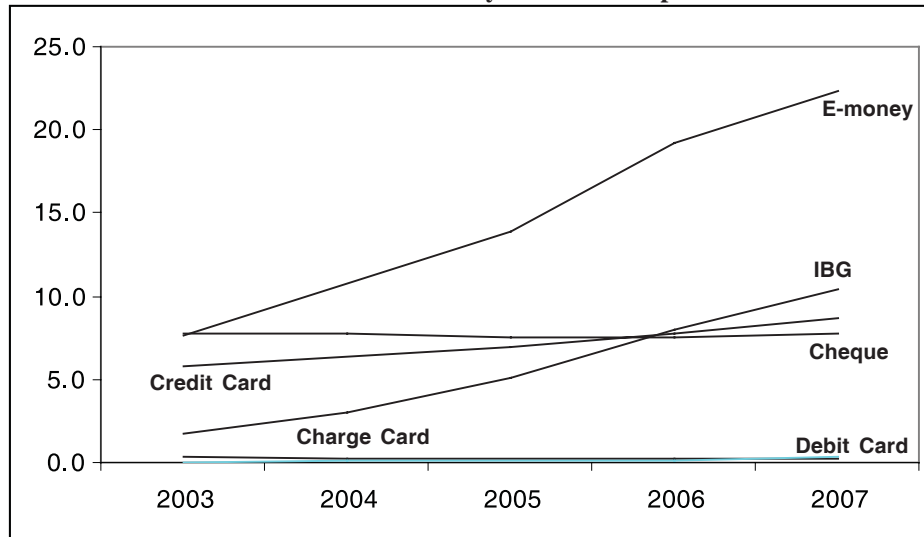
Source - Payment Systems Policy Department, Bank Negara Malaysia

Chart 3
Share of Retail Electronic Payments by Value



Source - Payment Systems Policy Department, Bank Negara Malaysia

Chart 4
Volume Non-cash Payments Per Capita



Source - Payment Systems Policy Department, Bank Negara Malaysia

Over the past few years, the volume of e-payments has increased by 34.1% annually. Among the various types of e-payments, payment cards experienced the biggest growth in terms of numbers followed by e-money. The most prevalent payment card used in Malaysia is the credit card with a card based of approximately 9.9 million.

E-money is gaining popularity with consumers as it represents half of the volume of non-cash transaction today. E-money recorded a stable growth rate of 30.2% per annum in terms of transaction value over the last four years. However, its use continues to remain mainly in the mass transit sector. Significant growth has also been seen in the use of IBG system. The IBG system recorded a high growth rate of 162.2% per annum while internet banking is becoming an increasingly important channel for banks to provide banking services to consumers. Consumers, on the other hand continue to show a growing interest in using Internet banking as e-payment media. Internet banking has been recording an average of annual increase of 74.2% and 93.7% in terms of volume and value respectively since 2001. There is a notable growth for the debit card, particularly with the increase in the number of terminals and merchants that accept the interbank e-debit transactions and also additional financial institutions participating as acquirers. Debit cards are starting to gain some progress in the payments arena where their usage has grown at a rate of 114.4% and 81.3% in

terms of volume and value respectively in 2007. The domestic debit card has a high card base of 17.3 million.

Whilst there has been promising growth in e-payments, the payment system in Malaysia remains predominantly paper-based with cheque payments still accounting for 93% of the total value of non-cash payments in 2007. The development of e-payments in Malaysia is currently constrained by a few factors. Among the main factors identified are the low penetration of point-of-sale terminals, inconvenient services such as limited payment and fund transfer functionalities of ATMs, the limited success in e-money and mobile payment trials, lack of participation of banks in payment systems and inefficiency of pricing model. The low number of personal computer per household and the low penetration in terms of Internet and broadband access are additional factors that inhibit the e-payments growth¹².

2. Impact of E-Payment on Central Banking Functions

The development of e-payments has the potential to challenge the effectiveness of monetary policy and the overall integrity of the payment systems that would have an impact on financial stability. It has the potential to challenge the role of cash for making payments. While this development promotes competition and innovation, it also introduces new risks to the overall payment systems.

2.1 E-payment System Risk

Throughout the e-payment process, there are several risks associated namely the settlement, credit, liquidity, operational, security, fraud and reputational risks. Among these risks, in general, it would appear that the operational risk, reputational risk, security risk and legal risk may be the most important risk categories for most e-payment activities as described below.

2.1.1 Operational Risk

Operational risk arises from the potential for loss due to deficiencies in system design and/or implementation which lead to reliability or integrity issues. The system is exposed to the inherent risk of an interruption or break-down of

12. Payment Systems Policy Department, *Electronic Payment Roadmap*, Bank Negara Malaysia, 2007

systems due to system outage, obsolescence, incompatibility and design flaws. Over-reliance on outsourcing may also expose the system to operational risk if not properly mitigated and monitored. Operational risk could also arise from customer misuse or lack of understanding about security and confidentiality. The risk may be heightened if the customers are not adequately educated about the importance of security precautions.

2.1.2 Security Risk

Security risk arises with respect to the controls over access to the systems. Controlling access to the systems has become increasingly complex due to expanded computer capabilities, access points, and extended use of communication path. Due to its nature, e-payment systems and products may be subjected to external and internal attacks. For example, inadequate controls could result in virus injection or successful attack by hackers, who could access, retrieve and use confidential customer information. A non-secure electronic transmission could allow criminals to gain access to customer information.

2.1.3 Reputational Risk

Reputational risk is the risk of negative public opinion that results in a critical loss of funding or customer base. It may involve actions that create a lasting negative public image of overall business operations. Once aroused, it may undermine public confidence and impair the ability to establish and maintain customer relationship. Reputational risk may also arise as consequences to the operational and security risks.

2.1.4 Legal Risk

Legal risk arises from violation of, or non-conformance with laws, rules, regulations, guidelines or where the legal rights and obligations of parties to a transaction are not well established. Given the new nature of many e-payment activities, rights and obligations of parties to such transactions are uncertain or there may be gaps that have yet to be identified.

2.2 Impact of E-payments on the Effectiveness of Monetary Policy

It is commonly agreed that central banks can control short-term interest rates because they are the monopoly supplier of currency. In addition, the short-term interest rates also can effectively be controlled with the reserve requirement i.e. deposits placed by banks with the central bank. In this context, it is argued

that innovations in e-payments especially in form of e-money will have the potential to eliminate the need for conventional bank money. As e-money penetration increases, cash and deposits would disappear. Hence, the central bank's position as the monopolist controlling the supply of currency and reserves might no longer be relevant and would no longer have the ability to influence interest rate¹³.

The use of e-money could potentially have an effect in the demand for monetary aggregate and on the formulation of monetary policies. E-money could lead to shift of the velocity of the money which might reduce the usefulness of the monetary aggregate. It is conceivable that a very extensive substitution could complicate the operating procedure used by central bank to set money market interest rate. Widespread use of e-money would speed-up the velocity of narrow money and substituting use of cash. Since banknotes in circulation represent non-interest-bearing central bank liabilities, a substitution of electronic money for cash would lead to a corresponding decline in central bank asset holdings and the interest earned on these assets that constitutes central bank seigniorage revenue. If the spread of e-money were extensive enough, the loss of seigniorage could become a concern to central banks which might in consequence become more dependent on other sources of revenue¹⁴.

2.3 Impact of E-payments on the Integrity of Payment Systems

Growing volume of e-money transactions is argued may have rise the concern over the potential risk of the overall payment systems that might have had on the financial system stability. Following to the policy liberalization, more e-money issuers have entered the market which was traditionally confined to banks. The entry of non-bank e-money issuers may carry risks include the operational risk associated with the failure of these institutions that in consequence may produce adverse impact to the overall payment system stability. It is also been argued whether the failure of one participant is likely to have any major impact and threaten the viability and the reputation of e-payment systems as a whole.

13. Benjamin M. Friedman, *The Future of Monetary Policy: The Central Bank As An Army With Only A Signal Corps?*, National Bureau of Economic Research, 1999

14. Bank of International Settlements, *Implications for Central Banks of the Development of Electronic Money*, 1996

2.4 Assessment of Impact of E-payments on the Overall Functions of Bank Negara Malaysia

In case of Malaysia, currently there has been no strong evidence indicating the impact of e-payments on the operation of monetary policy. This is partly due to the relatively small size and slow progress of e-payments transactions when compared with the currency supply. Although the role of cash is declining (as indicated in Table 3), cash remains a highly popular form of payments in Malaysia. E-money payments are still at the development stage and there is no indication that e-money would replace physical cash at least in the near future. Although the number of non-bank institutions offering the e-money services increases, with the exception of Touch 'n Go, others are yet to gain prominence.

Although, the volume of IBG and credit card transactions for payments has been increasing on a yearly basis, they account for only 4.7 % of the total value of non-cash retail payments. The charge card and e-debit have yet to make any significant development and the e-money accounts for only 0.07 % of the total non-cash retail payments value and have thus far could not make significant impact.

It is argued that the development of e-money is not going to remove the demand for currency¹⁵. Furthermore, even if the demand for currency should disappear, the central banks would still be able to set the country's nominal interest rate. The reserve base of the central bank requirements can be extended to issuers of e-money so as to treat it in similar way to short-term bank deposits to safeguard the effectiveness of monetary policy. As long as some form of ultimate recourse to central bank remains, the ability of central bank to influence money market interest rate will be maintained¹⁶.

All in all, the above suggests that currently the threat may be posed by the use of e-payments is quite remote and has yet to reach or produce a concern for the monetary policy. Furthermore, since e-money is expected to substitute only cash rather than the deposit, it is highly unlikely that the current monetary policy operating techniques will need to be adjusted significantly¹⁷.

15. C. A. E. Goodhart, *Can Central Banking Survive the IT Revolution?* London School of Economics, 2000

16. E. D. Solans, *Financial Innovation and Monetary Policy*, European Central Bank, 2003

17. Bank of International Settlements, *Implications for Central Banks of the Development of Electronic Money*, 1996

As with other payment and banking products, the various emerging risks may affect the integrity of the systems, thus the risks will have to be properly mitigated and managed. In response to such potential risks nevertheless, Bank Negara Malaysia has proactively been formulating a regulatory framework which focuses on the safety and efficiency of the payment systems which is aimed to minimize risks, to promote consumers' interest and confidence. Bank Negara Malaysia has also been actively involved in ensuring that the payment systems in Malaysia are competitive and resilient by streamlining its role and functions in respect of e-payments as well as facilitating in infrastructure building to improve e-payments services and standards. Among the recent initiatives taken is the issuance of various guidelines that outline broad principles and minimum requirements to be undertake by payment instrument issuers to mitigate risks in payment instruments (refer to credit card, charge card, debit card and e-money) operations. The guidelines outline the risk management framework and principles that establish among others, the prudential requirements, effective management oversight over the risks, establishing security and fraud measures, financial risk, consumer protection as well as continuity of the operations.

The safety and efficiency of the payment system are important to ensure consumers' confidence in payment systems. To enhance the safety of payment systems, measures were taken to ensure the retail payment facilities are safe and secure. Proactive measures were also taken in collaborative with the industry players to mitigate the risk of fraud and to reduce the system's vulnerabilities and exposure to operational risk. Initiatives taken for example include the migration to chip-based environment to strengthen the security standard for ATM and credit cards, to reduce counterfeiting of cards. Measures to address Internet banking fraud were also introduced.

2.5 Conclusions

As discussed above, currently there was no strong evidence indicating the adverse impact arising from the development of e-payments on Bank Negara Malaysia's functions. The impact of e-payments on the effectiveness of the operation of monetary policy is remote. With proper risks management framework that has been put in place, there has been no concern for the threat of e-payments development on the integrity of the payment systems that would impact the financial stability. Due to its many benefits, the promotion of the migration from paper-based payment to e-payments is being accelerated in many ways.

From our perspective, a strong motivation for promoting e-payment is the eventual savings from the reduction of cost for handling paper and coins for example in processing and printing, and the more efficient and faster distribution of money in electronic form in the financial system that generates economic value. In addition to cost savings, e-payments also provide benefits to consumers and merchants in many ways and provide greater certainty and security of payment compared to cheque payment¹⁸.

Research studies conducted revealed that paper-based payment instruments are more costly to operate than electronic-based payments. Studies made also suggest that the shifting from an all paper-based payment to an electronic-based payment will generate annual savings of about 1% of GDP¹⁹

International studies conducted also showed that electronic payments (e-payments) using electronic money (e-money) such as debit cards for instance, are less costly compared to cheque payment or cash. Payments via cheques, for example, are inefficient and costly due to labour and processing costs. These include the physical handling of cheques, the cost of paper, printing of cheques, processing cheques and transportation.

3. Policy Responses and Strategies Regarding E-Payments

3.1 Bank Negara Malaysia Objectives and Roles in Promoting E-payments

The promotion of a safe, progressive and efficient payment system is one of the main pillars of Bank Negara Malaysia. Bank Negara Malaysia has the significant role to play in the development and improvement of the country's major payment system infrastructure, ensuring their robustness and effective mitigation of systemic risks in the payment systems.

18. VISA International, Global Insight Inc., *The Virtuous Circle: Electronic Payments and Economic Growth*, White Paper 2003

19. (i) VISA International, Global Insight Inc., *The Virtuous Circle: Electronic Payments and Economic Growth*, White Paper 2003

(ii) D. Humphrey, M. Willeson, G. Bergendahl and T. Lindblom, *Cost Savings from Electronic Payments and ATMs in Europe*. Federal Reserve Bank of Philadelphia and University of Gothenburg, 2003

In November 2003, the Payment System Act 2003 (PSA) was enacted by Parliament to set out a comprehensive legal and regulatory oversight framework to govern the payment system. The Act appoints Bank Negara Malaysia as the sole authority responsible for the oversight of payment systems in Malaysia. The objective of PSA is to ensure the safety, soundness and efficiency of the payment systems infrastructure, and to safeguard public interest.

Under the Act, payment system operators are required to obtain a notification from Bank Negara Malaysia before operating a payment system while issuers of a designated payment instrument (DPI) are required to obtain necessary approval from Bank Negara Malaysia prior to the issuance of the DPI.

In safeguarding the public interest, Bank Negara Malaysia exercises its regulatory powers and oversight function through the PSA. In its oversight role, Bank Negara Malaysia supervises through on-site examinations and monitors activities of major payments operators and designated payment instruments issuers to ensure that they continue to operate in a sound manner. The off-site monitoring is also complemented with on-site examinations to identify gaps that need to be addressed to ensure sustainability of operations and compliance with regulatory requirements.

Bank Negara Malaysia also continues its role as a facilitator in coordinating industry efforts to enhance the payment system infrastructure and also address common security threats on an industry-wide basis.

3.2 Policy Focus, Strategies, Initiatives and Efforts

3.2.1 Enhancing Competition and Increasing Efficiency

Payment system efficiency is contributed by several factors which include quality of payment services, variation of payment product and services, wider access to usage, the level of expediency in clearing and settlement as well as pricing mechanism. Bank Negara Malaysia in collaboration with the industry continues with greater concerted effort to facilitate enhancements of payment efficiency in the payment systems via increased competition and innovation.

The efficiency of a payment system is influenced by the accessibility of the payment system to service providers, market players and users. To further improve the efficiency, further enhancements were made to the e-payment systems. Notable developments in this area were for example the participation of the additional members in the IBG and the shared ATM networks. Access

points for businesses and consumers to make Internet-based payments were also enhanced with the implementation of FPX.

Since its implementation, the IBG system, which is largely accessible through the commercial banks, is seen to have the potential to become a major retail payment system that would reduce the use of cheques given its increasing popularity with businesses and consumers. To further spur the growth of IBG usage, an IBG Review Team was formed in November 2004 to address key issues and formulate strategies to encourage users of cheques to migrate to using IBG. Recognizing that a wide accessibility to IBG is beneficial, Bank Negara Malaysia promoted an open access policy to IBG. This was done by encouraging the removal of barriers of access and entry to include institutions other than banking institutions. Following the initiatives, the increase in IBG transactions was noted mainly due to the recruitment of corporate users by banking institutions and the increase in the Government payments made through IBG.

The MEPS shared ATM network allows member institutions to leverage on each other's ATMs, resulting in cost savings in infrastructure development while allowing customers wider accessibility through a larger pool of ATMs. In 2006, MEPS with the support from Bank Negara Malaysia, took the initiative to enhance the domestic shared ATM network to enable the public to make funds transfer within their own accounts or to another person's account in another bank. The service, which was launched in November 2006, enables the member banks to improve operational efficiency by leveraging on available ATM networks to utilise a more cost effective channel for domestic interbank funds transfer on a real-time basis. This in turn, reduces visits to bank branches and promotes an efficient and safe way of transferring funds. With the participation of all member banks, the public would be able to make interbank funds transfer using their ATM cards at over 5,900 ATMs nation-wide. The domestic banks' shared ATM channel would be enhanced further to provide for a greater range of functionalities and services in the domestic market in the future. This includes bill payments and credit card repayment services. On a separate initiative, and as a part of the efforts to enhance the ATM functionality as an e-payment access point, three financial institutions have introduced bill payments via the ATM and Cash Deposit Machine (CDM), which are installed with barcodes readers. The initiative facilitates consumers to make payments for utility bills such as water, electricity, telephone, satellite television and local council bills. With this facility, the customer can conveniently scan the bills' barcode at over 1000 ATMs and CDMs nation-wide to make payments.

The other enhancement on ATM functionality was the introduction of an IBG fund transfer service to third parties via the ATM by a bank. In expanding the usage of ATM cards regionally, MEPS has established links with three of its counterparts in the region, namely, PT Artajasa Pembayaran Elektronik in Indonesia in July 2005, Network for Electronic Transfers (Singapore) Pte. Ltd. in Singapore in March 2006 and National ITMX Co. Ltd. in Thailand in October 2006, to facilitate cross-border cash withdrawals. The facility allows Malaysian ATM cardholders travelling to these countries to withdraw cash in domestic currency at the participating banks' ATMs and likewise, their ATM cardholders at the participating Malaysian banks' ATMs at lower transaction fees compared to the current facility using international networks. The cross-border service would be expanded to include other services such as balance enquiry and funds transfer. On the other initiative, MEPS is considering other new collaboration such as regional e-debit or Electronic Fund Transfer at Point-of-Sale (EFTPOS), which would facilitate the acceptance of e-debit in the member countries.

Bank Negara Malaysia has been supportive of the FPX development to promote e-commerce facilities. Recognizing the use of an industry-wide payment platform as in the FPX which potentially has a wider reach of users, all banking institutions are encouraged to participate in the FPX to be able to provide efficient payment services to their customers.

3.2.2 New Entrants and Innovative Products in Card Sector

Bank Negara Malaysia continues to engage in facilitating towards payment efficiency by promoting innovation and competition. The policy liberalization allows the entry of non-bank credit card issuer to compete with existing players in the market. As a result, in 2006, to increase competition, credit card issuers had rolled out several co-branded cards with their businesses alliances and new attractive range of services, benefits and privileges such as free for life credit cards, cash rebates, free over limit fee, lower cash advance fee, zero-interest installment plan, flexi-pay scheme and zero-percent balance transfer that provide greater benefits to the consumers.

The initiative also saw the rolling out of contactless credit cards which are suitable for cash-based retail environment but high-volume transactions such as fast food outlets, supermarkets and petrol stations. The contactless credit card has escalated the country's EMV chip migration to the next level by offering consumers' innovative products while at the same time, allowing issuers to leverage on their investments in EMV chip technology.

Another innovative product introduced was the mobile phone-based contactless payment which combines contactless credit card technology and Near Field Communication (NFC) technology based on a contactless chip embedded in mobile phones. As for the record, Malaysia is the first country in the world to implement the Mobile Visa Wave Payment pilot.

3.2.3 Promoting E-money

Consistent with the Financial Masterplan to increase competition and efficiency in the payment systems, the policies that only allow banks to offer retail payment services were liberalized. The policy change allows more potential e-money issuers to penetrate the market. In line with efforts to migrate the country to e-payment, Bank Negara Malaysia is encouraging the introduction of innovative e-payment products and services including e-money. In this regard, Bank Negara Malaysia is formulating a regulatory framework on e-money to minimize risks associated with e-money business. The proposed e-money regulation was circulated to the industry for comments in August 2006. Bank Negara Malaysia is currently finalizing the regulation after taking into consideration the feedback from various stakeholders.

Newly introduced e-money schemes provide consumers with additional payment methods for purchases on the Internet and the convenience of using mobile phones for payments. One of the schemes, which was launched in May 2006, enables the subscriber's mobile phone to be used to receive electronic money and make payments to anyone who has a mobile phone. Subscribers can use this mode to make payments at over 9,500 participating merchants and do not have to pay any additional fees but instead stand to enjoy a cash rebate of up to 0.65%. Payments that are facilitated through this mobile payment facility include payment of parking fees, utility bills, mobile content, wallpapers, games and prepaid airtime reload apart from person-to-person transfers. The scheme enables the merchants particularly the utility and telecommunication companies to improve operational efficiency through reduction in cash management and less number of customers visiting their outlets. It also provides consumers the convenience and flexibility to make payments anytime and anywhere using their mobile phones.

3.2.4 Promoting E-debit (Domestic Debit Card)

Efforts are continuously being made by Bank Negara Malaysia in collaboration with the industry to promote the usage of e-debit to replace the use of cash for payment of purchasing. To facilitate the adoption of e-debit,

cards acceptance devices have been deployed by the acquirers to accept interbank e-debit transactions. In 2006, in promoting the usage of e-debit application in the Bankcard, a financial institution has offered a 'cash back' facility at its merchant outlets. Whilst making payment for purchases using e-debit application, this cash back facility allows the cardholder to withdraw cash at the merchant. In addition, building on e-debit application and to increase the number of point-of-sale terminals, effort undertaken includes incorporating Bankcard as a payment option in the credit card terminals.

3.2.5 Promoting Internet Banking and Payments

Bank Negara Malaysia continues its effort to promote consumers' confidence in using the Internet to access banking services. In this regard, financial institutions are encouraged to support the initiative by intensifying development and adoption of e-payment mechanisms via promoting their delivery channel in Internet banking. Notable development was the introduction of additional password protection (multi-factor authentication) for Internet banking customers which proven to be successful in combating and mitigating Internet banking fraud. Notwithstanding the low incidence of Internet banking fraud, Bank Negara Malaysia continues to monitor trends and developments and undertake necessary actions to mitigate potential risks. Efforts are also taken to increase awareness and to educate Internet banking consumers on importance of security precautions. To combat Internet banking fraud, the Internet Banking Task Force was set up in 2004 comprising industry players and Bank Negara Malaysia officials to discuss latest trends and issues on Internet banking.

3.2.6 Promoting Mobile Banking and Payment

Broader usage of mobile phones has encouraged the acceptance and growth of the mobile banking and mobile payment services in Malaysia. Mobile banking services provide an innovative and convenient way to access banking facilities. The ranges of services include own account funds transfer, bill and loan payments. The services can be expanded to take advantage of the increasing number of mobile phone users. In this regard, Bank Negara Malaysia has taken step to encourage the financial institutions to promote their delivery channel in mobile banking. Following the initiative, in facilitating mobile payments development, banking institutions are partnering with third party service providers to provide services to allow subscribers to purchase goods and services or make payments using their mobile phones.

3.2.7 Forum to Discuss Issues on Migration to E-payment

Bank Negara Malaysia organized the country's first Payment Systems Forum and Exhibition in November 2005. The forum provided a platform for the relevant stakeholders including representatives from financial institutions, payment service providers, Government agencies, corporations and industry associations to discuss issues and challenges the country faced in migrating to e-payments. A broad range of issues were discussed such as the level of public awareness and confidence in electronic payments, current hindrances in electronic payment usage, payment services and standards, and incentives to adopt the more cost efficient payment methods. The forum regarded the migration to cost efficient e-payments as a national agenda with 2010 being suggested as a target date for the full implementation of a national electronic payment roadmap. Following this, Bank Negara Malaysia has initiated the formulation of an electronic payments roadmap that provides a high level strategic direction for the country to migrate at a faster pace to e-payments.

3.2.8 Roadmap for Migration to E-payment

Malaysia has made considerable progress in building and improving the payment system infrastructure to accelerate the transition from paper-based systems to e-payments. With the necessary financial and infrastructure in place, the next step is to migrate at a faster pace into e-payments. The progression of e-payments requires involvement and commitment from various stakeholders to make the migration to e-payments on a nationwide basis successful. Focusing on the main thrust of safety, efficiency and preserving public interest, Bank Negara Malaysia has formulated the e-payment roadmap which lay down the milestones and building blocks for Malaysia to migrate to e-payment. The roadmap intends to capitalize on the high penetration of bank accounts, ATM cards and e-debit. The roadmap also intended to leverage on the significant investment made by the government and the industry in expanding the services using the Internet and mobile channels. It contains action plans that would encourage or facilitate the transition to e-payments which includes developing enabling solutions for users and defining common standards to support the growth of e-payments by encouraging more business to engage in e-commerce and e-banking.

3.2.9 Working in Partnership with the Government Sector

The Government is a critical stakeholder in the national agenda to migrate to e-payments as it can be the catalyst for the uptake of e-payments. In this

regard, the Government has demonstrated a strong commitment to adopt e-payments because of the potential efficiency gains. In this respect, the Government, together with Bank Negara Malaysia and the industry, are working together to accelerate the migration to e-payments.

In recent years, the Government sector had introduced various electronic delivery channels to facilitate convenient access for the public to transact with the Government. Efforts are being made to accept payment cards at most Government counters to facilitate consumer convenience and improvement in payment efficiency. This would pave the way for the adoption of e-payments on a national scale.

Government has announced its acceptance of payment cards in 2006 Budget. In line with this initiative, Bank Negara Malaysia had engaged the credit card industry to review the current interchange arrangements to facilitate the acceptance of credit cards in the Government sector. One of the ongoing activities is the adoption of the FPX as the payment gateway for the Malaysian Government portal, myGovernment.

Bank Negara Malaysia organized a Government sector workshop in July 2006 to provide a platform for more detailed discussions on the features of the various e-payment services offered by the payments industry and to facilitate sharing of experiences on the efficiency gained by corporate users in adopting e-payments.

3.2.10 Enhancing Safety

The safety of the payment systems is important to ensure consumers' confidence in payment systems. To enhance the safety of payment systems in general, measures were taken to mitigate the risk of fraud and reduce the system's vulnerabilities to operational risk. In this regard, Bank Negara Malaysia and relevant payments industry players have collaborated in a number of areas to ensure that retail payment facilities are safe and secure. Notable developments include the migration to a chip-based environment for ATM cards and credit cards. Measures to address Internet banking fraud were also introduced.

All domestic banking institutions had successfully replaced their magnetic stripe ATM cards with the chip-based Bankcard. With the full migration to chip-based card, there has been no report of any ATM fraud through the use of cloned ATM cards. The migration to a chip-based ATM infrastructure has resulted in the elimination of ATM fraud due to counterfeiting.

With the migration, multi-applications such as the debit and electronic purse applications have been incorporated into the ATM card to facilitate point-of-sale transactions at merchant outlets.

Bank Negara Malaysia facilitated the full migration of the country's credit card infrastructure to EMV chip standard with the completion of the conversion to EMV-compliant terminals in 2005 to become the first country in the Asia Pacific region to fully migrate to the chip environment. Prior to the implementation of EMV, Malaysia had received negative attention for credit card fraud. With the full migration to EMV, Malaysia has significantly reduced skimming or counterfeit credit fraud, boosting the confidence of the customers, tourists and merchants in the use of credit cards in the country.

In line with the growth of Internet banking, efforts were made to promote consumers' confidence in using the Internet to access banking services. In 2004, an industry-based Internet Banking Task Force was established by Bank Negara Malaysia to develop industry-wide best practices and collaborate with relevant agencies to handle security incidences. During the year, one bank introduced an additional password protection for their Internet banking consumers through a time-limited one-time use password. This measure has been proven to be successful in countering Internet banking fraud. Due to the rising of Internet-related threat, Bank Negara Malaysia issued a circular on Two-Factor Authentication for Internet Banking Services in August 2006. This regulation requires banking institutions offering Internet banking services in Malaysia to implement two-factor authentication for high-risk transactions.

3.2.11 Strengthening Oversight Functions

To strengthen its oversight function, Bank Negara Malaysia has recently realigned and strengthened its resources to provide for greater focus and more effective surveillance framework to ensure the safety and soundness of the payment systems. With the realignment, the micro (identification of emerging trends and potential vulnerabilities as well as supervisory functions) and macro (formulation of policy and strategies to promote the safety and efficiency) perspective of overseeing the industry and the individual players are segregated and carried out by two different departments.

3.2.12 Strengthening Security Standards

In the area of retail payment systems and instruments, Bank Negara Malaysia's focus has been to ensure sustained public confidence in their use to

facilitate the effective functioning of commerce. Bank Negara Malaysia continues to play its role as a catalyst in the development of the retail payment infrastructure and facilitating industry wide collaborative efforts to strengthen payment security standards.

4. Future Direction of E-payments

With the rapid technological advancements and increasing consumer demands for more efficient delivery services, the Malaysian financial landscape has continued to transition towards the increased significance of an e-payment systems and channels. Despite the progress that has been achieved, Malaysians however, remain high users of currency notes and coins. As noted in the previous section, the use of cheques is also dominant in our financial system.

4.1 Emerging Issues and Challenges in E-payments

The issues and challenges in the transition from paper-based payments to e-payments in Malaysia are multi-faceted. These generally include the areas of infrastructure and systems, business process and operating procedures and consumers' mindset, awareness and confidence.

4.1.1 E-payment Infrastructure and System Readiness

Considerable capital investment and efforts are required to provide the enabling infrastructure to enhance migration to e-payments. Currently, the existing e-payment services and products are limited, inconvenient and not meeting customers' expectation thus require continuous enhancements. The reach of payment systems also limited and should be enhanced to allow payments to be made on a wider scale to reach the public. The scope of use of the point-of-sale terminals should be extended further to cover wider sectors to encourage greater use of payment cards especially e-debit cards. Existing electronic channels such as ATM should be enhanced to include additional and attractive fund transfer and payment functionalities. Robust technology and strong internal control should be put in place to deter and prevent fraud and to protect and safeguard integrity of the systems. There is also lack of common technology standards between service providers to promote interoperability.

4.1.2 Public Awareness and Confidence

The other challenge is in developing and sustaining users' confidence and inculcating a change among the customers, apart from increasing public awareness and acceptance of the various payment channels available in the market. Consumers need to be continuously educated and motivated to change their payment habits by promoting the benefits of the use of e-payments. Promotional activities and change management programme should be put in place and continuously improved to increase public awareness and acceptance.

4.1.2 Pricing Mechanism

The current business models and pricing mechanism in Malaysia are inadvertently promoting a less efficient system. In general, the prices of payment transactions do not reflect the cost of production of the respective payment services. It therefore does not provide the right price signals for the consumers to utilize the more effective and efficient payment services. In fact, payments via cheques, which incur a large variable cost should be higher in terms of fee. In practice however, it remain popular due to perceived lower cost for payment compared to the other means of payment such as IBG payments.

4.1.3 Cross-border Issue and Jurisdiction of Supervision

Most of the e-payment systems such as e-money systems are based on technology that is designed to extend the geographic reach of service providers and customers. Such market expansion can extend beyond national borders and are relevant to the cross-border conduct of electronic money. The service providers may face different legal and regulatory requirements when they deal with customers across national borders. There may be uncertainties about legal requirements in some countries. In addition, there may be jurisdictional ambiguities with respect to the responsibilities of different national authorities. Such considerations may expose all parties to legal risk associated with non-compliance with different national laws and regulations, including consumer protection laws, record-keeping and reporting requirements, privacy rules, and money laundering laws. Operational risk could arise for one dealing with a service provider located in another country, which for that reason may be more difficult to monitor. In dealing with foreign-based service providers, or with foreign participants in e-money activities, one is subject to country risk to the extent that foreign parties become unable to fulfill their obligations due to economic, social, or political factors.

4.1.4 Money Laundering

Development of e-money may also influence money laundering and other criminal activities. Its use for such purposes would depend upon the extent to which e-money balances can be transferred without interaction with the system operator, the maximum amount that can be held on an e-money device and its record-keeping capacity, and the ease with which e-money can be moved across borders.

4.2 The Medium (5 years) and Long Term Prospects (> 5 years) and Plans Regarding E-payments

Bank Negara Malaysia has initiated the formulation of an e-payment roadmap that provides a high level strategic direction for the country to migrate to e-payments. As detailed out in the previous section, the roadmap aims to channel and coordinate industry efforts into making migration to e-payments as a national agenda. This would identify the objectives, underlying building blocks and lay the key implementation milestones up to 2010. The main focus and priority of Bank Negara Malaysia is to create a conducive environment to foster the orderly transition to e-payments.

Bank Negara Malaysia has shared the roadmap with the relevant stakeholders in the payment sector, Government Agencies and the National Payments Advisory Council²⁰ (NPAC) members. Following the consultative process, Bank Negara Malaysia has subsequently finalized the roadmap in 2007. Periodic dialogues with the relevant stakeholders will continue to be held to identify and address issues related to e-payments.

4.3 Summary and Conclusion

Payment systems infrastructure in Malaysia is classified into three broad categories i.e. payment systems, payment instruments and payment channels. There are a number of e-payment technologies and products for retail payments currently made available. Two retail payment systems currently available are the internet-based multi-bank payment gateway and interbank electronic fund

20. NPAC was established in May 2001 to serve as a reference and advisory body whilst providing market input on matters relating to payment systems in the country.

transfer system. Various options are available for retail payment instruments. These include credit card, charge card, debit card, prepaid card, e-debit and e-money. Apart from ATM, Internet banking and mobile payment or banking are amongst the retail payment channels that have been established.

Over the recent five years, there has been a promising growth in the use of e-payment. The total non-cash retail payment transactions had increased significantly and during the same period, the volume of cheques and cash payments has declined. Paper-based payment such as cheques, however remain dominant. While cheque and cash continue to be popular, electronic alternatives have continued to proliferate and flourish.

As being argued, the development of e-payments may raise a number of interrelated policy issues and concerns to Central Banks especially on the operation of monetary policy and the integrity of the payment systems. However, currently there has been no evidence indicating the adverse impact arising from the development of e-payment in Malaysia.

Bank Negara Malaysia has been very supportive on the development and the move towards e-payments. Various initiatives have been and are currently being undertaken to promote the migration to e-payments due to its many benefits. Bank Negara Malaysia has been actively playing its role in the development of e-payment systems especially in ensuring efficiency and robustness of the systems and at the same time ensuring the safety through effective mitigation of related risks. These in turn have helped to increase the overall efficiency of the payment systems in Malaysia.

Several studies have been conducted which include the study of the adoption of e-payments in Malaysia. The forum on payment systems was organized for the relevant stakeholders to discuss issues and challenges faced in migration to e-payment. Efforts also have been taken to review the existing e-payment related policy and regulatory framework.

To channel and coordinate industry efforts to pursue the national agenda into making migration of e-payment a reality, Bank Negara Malaysia has finalized the e-payments roadmap which provides a high level strategic direction for the country to accelerate the migration to e-payments.

Currently, there is a clear indication that e-payments system is going to grow and continue to develop. E-payments system is critical to facilitate the efficient payment system and indeed it is in the economic interest of Malaysia.

To participate in the global economy, the development of e-payments system should be encourage and properly governed. Nevertheless, the understanding of the implications in light of the development of e-payments especially to the operation of monetary policy is important for Bank Negara Malaysia to be able to response effectively should those implications materialized. A proper study should be undertaken to monitor and address the circumstances in a strategic manner.

References

1. Bank Negara Malaysia, (2003), Annual Report.
2. Bank Negara Malaysia, (2004), Annual Report.
3. Bank Negara Malaysia, (2005), Annual Report.
4. Bank Negara Malaysia, (2007), Electronic Payments Roadmap, Payment Systems Policy Department.
5. Bank Negara Malaysia, (2006), Financial Stability and Payment Systems Report.
6. Bank Negara Malaysia, (2007), Financial Stability and Payment Systems Report.
7. Bank Negara Malaysia, (2007), Payment Systems Handbook, Statistical Information on Payment Systems, Payment Systems Policy Department, January – July 2007
8. Basle Committee on Banking Supervision, (1998), Risk Management for Electronic Banking and Electronic Money Activities, Basle.
9. Bank of International Settlements, (1996), Implications for Central Banks of the Development of Electronic Money.
10. Benjamin M. Friedman, (1999), “The Future of Monetary Policy: The Central Bank as an Army with Only a Signal Corps?”, National Bureau of Economic Research.
11. Board of Governors of the Federal Reserve System, (2002), The Future of Retail Electronic Payments Systems: Industry Interview and Analysis, Staff Study.
12. C. A. E. Goodhart, (2000), Can Central Banking Survive the IT Revolution? London School of Economics.

13. D. Humphrey, M. Willeson, T. Lindblom and G. Bergendahl, (2003), "What Does it Cost to Make a Payment?", *Review of Network Economics*, Florida State University.
14. D. Humphrey, M. Willeson, G. Bergendahl and T. Lindblom, (2003), "Cost Savings from Electronic Payments and ATMs in Europe", Federal Reserve Bank of Philadelphia and University of Gothenburg.
15. E. D. Solans, (2003), Financial Innovation and Monetary Policy, European Central Bank.
16. European Central Bank, (2002), "E-Payments in Europe – The Eurosystem's Perspective", Issues Paper.
17. T. Khiaonarong, (2003), Payment Systems Efficiency, Policy Approaches, and the Role of the Central Bank, Bank of Finland.
18. VISA International, (2003), Global Insight Inc., The Virtuous Circle: Electronic Payments and Economic Growth, White Paper.

Chapter 6

THE DEVELOPMENT OF E-PAYMENT AND CHALLENGES IN NEPAL

by

Bam Bahadur Mishra¹

1. Development of E-payment in Nepal

Nepal is a small economy of which the banking era has not yet completed a century. 1937 was the year when first bank established in Nepal. Till 1984, there were only four banks (two commercial banks and two development banks) in Nepal, all state-owned. With the partial opening up of the economy in 1984, the first joint-venture bank was established. Presently, there are 23 commercial banks, 36 development banks and 91 finance companies. With the aid of the World Bank and IMF, the Nepalese financial sector is in the process of restructuring under the “Financial Sector Reform,” including the two government-owned banks and the Nepal Rastra Bank.

The forms of e-payment in Nepal include:

- Credit Cards (introduced by Nabil Bank in 1990)
- Debit Cards (all commercial banks)
- Automated teller machines (introduced by Himalayan Bank Ltd. in 1995)
- Electronic fund transfer at points of sale (EFTPOS)
- Internet banking (introduced by Kumari Bank Ltd. in 2002)
- Mobile banking; (introduced by Laxmi Bank Ltd. in 2004).

1.1 Credit Cards

Visa and *Master* cards are the commonly used credit cards in Nepal. These cards are used for making transactions in various outlets in the country. Credit cards are accepted for payments by merchant outlets concentrated mostly in the Kathmandu valley, the capital of Nepal, along with some big cities like Biratnagar, Birgunj and Pokhara.

1. Author is Assistant Manager of the Birgunj Office of Nepal Rastra Bank.

1.2 Debit Cards

Altogether 19 banks and financial institutions issue debit cards. Debit cards are used to withdraw cash from automated teller machine (ATMs) and to make payment of purchases by using point of sale (POS) outlets. It is important to note that very few departmental stores and restaurants have established POS machine to perform transaction through debit cards. In Nepal, people are hesitant to receive payment through electronic medium due to lack of proper education about e-payment.

1.3 Internet Banking

Internet banking in Nepal is in its infancy. Through Internet banking:

- Balance enquiry can be made.
- Amount of one account can be transferred to another in the same bank.
- Payment of utilities like electricity and telephone can be made by using the Internet.
- Payment of loans and applications for import letter of credit (L/C) can be made if there is sufficient balance available in the customer's current or saving account in the same bank.

1.4 Mobile Banking Stop

Mobile banking was introduced by the Laxmi Bank in 2004. Customers are able to make enquiries on their bank accounts with their cell phones, either using the short-messaging-service (SMS), or by calling in directly, and entering the PIN code issued by the bank. In the SMS mode, the bank's system promptly replies and provides the account balance and details of up to ten transactions. In the case of call service, the in-built system automatically provides the balance as the customer enters his/her PIN code.

1.5 Outline of the General Payment System in Nepal

Not all the banks and financial institutions are participating in the e-payment system. To date, only 15 commercial banks, two development banks and two finance companies are providing some form of e-banking services. It is to be noted that not all of these institutions extend their e-banking facilities to their entire branch network. The e-payment services are mostly provided in the capital city and some bigger cities only.

In a country like Nepal, where almost ninety nine percent of population rely on physical cash rather than electronic payment, it is not so simple just for people to consider and decide on the basis of cost and benefit of using e-payment systems. In the course of preparing this paper, I had the opportunity of visiting a few remote places to find out the perception of the people about electronic money. It was observed that people have no common knowledge about the Internet, let alone the existence of e-payments. People are quite far from all the ICT developments taking place in banking. What people know about banking is the use of physical cash for deposit and payment, but not electronic payments.

The existing structure of the Nepalese payment system is fully based on cash and cheques. Even for large-value payments, like sale and purchase of land and building, people prefer physical cash rather than receiving any other form of payment. This applies to the general population. In businesss, people prefer using cheques and drafts. The Nepal Rastra Bank operates a clearing house, with a network of six centres for performing cheque clearing throughout the country. The clearing house serves the member banks and financial institutions only. Generally, all the banks and financial institutions are members of the clearing house, the membership of which is renewed annually accompanied by a certain fee. If the cheque/draft is not local, it is not sent for collection.

As mentioned, the e-payment facilities available in Nepal are ATM service, debit card, credit card, mobile banking and Internet banking. Nepal does not have any electronic money scheme or any regulation covering e-payments. As far as the operation of debit cards are concerned, a company by the name of Smart Choice Technology (SCT) provides the switching and settlement facilities for transactions performed on ATM.

Banks have purchased their software from different vendors to provide all those services to their customers. Authenticity, inter-operability, validity and confidence solely depend on the supplier of that software. The Nepal Rastra Bank, as the central bank of Nepal and the supervisory authority of the Nepalese financial system, has initiated steps towards the regulation of electronic payment systems. The Nepal Rastra Bank disclosed, in its monetary policy of Fiscal Year 2007/08, that it has begun work to formulate regulations to provide legal ground for the oversight of e-payment systems in Nepal.

1.6 Factors Contributing in E-payments

Numerous factors contribute to the development of e-payment systems. Unfortunately, the following existing factors contribute negatively towards the development of e-payment in Nepal:

- (i) Computerisation of banks: Around 20 percent of total bank branches in Nepal's banking system are computerised. It means that the other 80 percent of the bank branches do not meet the minimum logistical requirement needed to support electronic banking.
- (ii) Infrastructure development: Telecommunication and electricity are not available throughout the country, which negatively affect the development of electronic payment.
- (iii) Development of ICT: The development of information and communication technology in Nepal is the major factor for e-payment development. Since ICT is in its infancy in Nepal, the country faces difficulty promoting e-payment development.
- (iv) People's behavior: The people in Nepal are accustomed to physical cash. Few people have confidence using e-payment. One feels safe having cash on the person. Carrying a chip representing thousands of dollars in the wallet does not give people the same feeling as they are carrying hard cash.
- (v) Regulatory arrangement: With the enactment of the Nepal Rastra Bank Act, 2002, many regulations have been formulated to strengthen the banking and financial system in Nepal. Under the provision of the Act, the Nepal Rastra Bank is empowered to issue regulatory directives for promoting the electronic payment system in Nepal. This can be viewed as a positive contributory factor.
- (vi) Initiatives from the banking sector: The banks in the private sector are spearheading the development of e-payment in Nepal. These banking institutions are acquiring software which is compatible for performing electronic payments. Yet, the reliability and prudence of such software need to be verified by the Authority.

To date, the impact of e-money on the overall payment system is nil as e-money is not in use in Nepal.

2. Impact of E-payment on Central Banking Functions

Under the Nepal Rastra Bank Act, the central bank is in charge of the formulation and implementation of monetary policy, financial sector stability, foreign exchange stability and price stability with stated level of growth. Some of the objectives seem to be conflicting, such as price stability and growth. However, considering the reality of Nepal's economic situation, the Nepal Rastra Bank has to strive to achieve its objectives.

As stated earlier, the use of physical cash is predominant in the Nepalese economy. People are lack awareness on e-payments. In addition, there are very few outlets where people can make payments using e-payment. Commercial banks and financial institutions in the private sector are introducing various non-cash mode of payment, but directives to regulate to e-payments are yet to come in force. Considering only about one percent of the population is using debit and credit card, the impact of e-payments on the core functions of the central bank is minimal. The formulation of monetary policy to manage interest rate, conduct of open-market operation to manage the level of liquidity in the economy - whether to operate a tight or loose monetary policy - are all based on reserve money. We have not considered any factor arising from the development of e-payments as impeding the attainment of monetary policy objectives.

If the volume of e-payments should grow substantially in the future, the effectiveness of monetary policy implementation by Nepal Rastra Bank will be definitely affected. However, this condition is not foreseeable to happen. This is because the total value of e- payments is miniscule to affect the implementation of monetary policy, which is based on reserve money. Subsequently, the impact of e-payments on seigniorage also appears to be negligible. At present, e-payment risk in Nepal is non-existent.

3. Policy Response to E-payments

Nepal Rastra Bank, which is the sole authority designated to regulate and supervise the financial sector, is taking the first step in formulating and implementing a policy regarding e-payment in Nepal. With the inception of various e-payment modes, such as debit card, credit card, Internet banking and others, it has become imperative for the Nepal Rastra Bank to consider streamlining these products.

The Nepal Rastra Bank is focusing on the following issues to promote e-payment usage and wider user acceptance among the general public:

- a. General Legal Issue
 - b. Relevant Security Issue
 - c. Provider Issue
 - d. Payment System Issue
 - e. Supervisory Issue
 - f. Law Enforcement Issue
 - g. Public Awareness.
-
- a. **General Legal Issue:** To date, no laws and regulations have been promulgated to cover the legal status and issues of e-payments in Nepal. The Nepal Rastra Bank has placed the matter as high priority in its recent monetary policy paper and has mentioned that a legal framework will soon be established to regulate and streamline the modes of e-payment in Nepal.
 - b. **Relevant Security Issue:** The Nepal Rastra Bank and its Bank Supervision Department and Financial Institutions Supervision Department have not laid down any specific criteria to be used for evaluating the adequacy of the security features of new e-products. The Bank and/or financial institutions launch new products on their own often procuring the solutions from a renowned foreign supplier. For instance, ATMs in Nepal are run by a service provider, Smart Choice Technology (SCT), the security features of the technology used have not been inspected by the NRB Authority.
 - c. **Provider Issue:** The issue of provider of ICT solutions in the banking and financial sector should be properly addressed. The operation of e-payment system in Nepal, as of date, is based on confidence in the system provider without verification by the central bank.
 - d. **Payment System Issue:** Only debit/credit cards are in use. There are no e-money schemes operating in Nepal as yet. The Nepal Rastra Bank should develop a mechanism to address the development of a payment system in electronic mode and inter-operability of various cards in use for making payments.
 - e. **Supervisory Issue:** Under the provision of the Nepal Rastra Bank (NRB) Act, 2002, the NRB is responsible for supervising banks and financial institutions. To date, the NRB has not implemented any regulation covering

the operation of e-payment and e-money. Only the payment and settlement system based on cash and cheques come under the oversight of the NRB.

- f. **Law Enforcement Issue:** Law enforcement is a top policy priority of the Nepal Rastra Bank. Law enforcement regarding e-payments plays a vital role in the success of e-payment systems.
- g. **The Issue of Public Awareness:** The public education and awareness is high on the list of policy priorities since the general population lack awareness on usage of e-payments as an alternative to making payments by cash.

Nepal Rastra Bank is consciously striving to encourage electronic payment system. NRB is planning to introduce a framework for the smooth running of the electronic payment system by the end of fiscal year 2007/2008

4. Future Direction of E-payments

To forecast the future direction of e-payment development, it is important to review the present status of e-payment. Presently, Nepal has a card-based payment system and some form of Internet e-payment for payment of utility bills, etc. Before planning the future, the Nepal Rastra Bank should regulate the existing card-based payment system. The use of electronic money will be the next stage of development. The networking of all banks and financial institutions with a regulatory body is a function which needs to be done for the development of e-payment schemes. Enactments to provide for consumer protection, electronic signature, building up of public confidence in electronic money, and generation of accurate data, are some of the functions that need to be planned.

One of the important future functions of the Nepal Rastra Bank is to be a catalyst in creating a conducive environment for e-payment development. This includes creating inter-operability for automated teller machine cards (ATM cards), inception of electronic money, which is widely used in twenty-first century financial world, to facilitate the development of the payment system in the presence of new innovations (i.e. electronic payments by chips and network money, etc.). Side by side, it is important to anticipate potential fraud, provide safeguards, identify gaps and close loopholes when making policies. Consumer protection and electronic signature validation are some of the legal issues, to name but a few, that need to be addressed. The generation, storage and publishing of accurate data is another issue for future direction.

4.1 Challenges of E-payment

Nepal is a country where the development of ICT is rudimentary and ICT experts are few. The legal framework for ICT and e-payment development is also not adequate. Given such systemic weaknesses, the issues of security and privacy are pressing concerns considering e-banking is subject to risks of criminal attacks on bank accounts.

Some more threats/problems in e-payment system in Nepal are:

- Low customer awareness about technicalities of e-money counterfeiting.
- Validity of e-signature.
- No proper legal provision regulating e-banking and e-money.
- Privacy of customer personal information. In e-banking and e-payment, data are stored in electronic devices, which, in the event of theft, will be revealed without the authorisation and knowledge of the customer.

In the case of Nepal, the challenges of e-payment and electronic banking are more of a technical nature rather than in areas like the implementation of monetary policy and reduction of seigniorage. Because only a very small population is using e-payments, there is little likelihood for cash to be replaced by electronic money. To date, banks have not introduced any mode of electronic money and e-purse. In light of the situation, it would appear that the tools of monetary policy which the Nepal Rastra Bank is presently using are not affected by e-payments.

The development of e-payment in Nepal has been and continues to be impeded by the lack of public education and awareness on the use of electronic payment. People give more importance to cash and prefer to receive payment by cash. Only 20 percent of the bank branches in Nepal are computerised, most of which are in the urban areas. It is observed that Wingspan (owned by Bank One), First-e (Dublin-based) and Egg (British Internet-only bank owned by Prudential) are not successful in spite of their technological sophistication. It is a long way to go before 'clicks' dominate 'bricks' in the banking industry in Nepal.

4.2 Case of Using Debit Card, Credit Card and Internet Banking

Against a population of 25 million in Nepal, the issuance of bank cards is approximately 250,000 for debit cards (i.e. one percent of the population) and 125,000 for credit cards (one half of a percent). Internet banking users are

significantly less. In this situation, the effect of the usage of non-cash payments on monetary policy management is purely negligible. Our monetary policy is formulated and implemented based on the calculation of reserve money. If the transaction value of non-cash payments grow to a substantial volume, then there is some likelihood monetary policy implementation may be affected. The development of e-payments is positively co-related with the velocity of money, when the volume of e-payment transactions increases, the implementation of monetary policy will be affected.

5. Recommendations

The Nepal Rastra Bank plays a vital and key role in the oversight of the payment system whether it is based on physical cash or non-cash mode of payment. Preparation of necessary regulations covering the operation of the card-based payment system, establishment of the Real Time Gross Settlement (RTGS) system, managing inter-operability among the various cards available in the country, making public awareness about non-cash payment system are the key responsibilities of the central bank. As stated in the monetary policy of Nepal for the Fiscal Year 2007/08, the Nepal Rastra Bank should make necessary arrangement for regulating electronic mode of payment system.

Since information and communication technology (ICT) is a fundamental requirement for e-payment development, it is the responsibility of government to facilitate the establishment of private-sector telephone companies, enabling competition to allow these companies to provide service in diversified areas of the country at lower cost. It will contribute in building the capacity of banks to computerise their branch network across the whole country.

Some cases of ATM frauds have surfaced lately. It is necessary for a regulatory body to monitor such cases, identify and close the loopholes. It will be devastating to the reputation of the banks and to the confidence of depositors, if financial losses from ATM frauds rise significantly. Corrective measures should be enforced without delay to maintain the confidence of ATM users.

It is evident that Nepal has to adapt to change and move in the direction of the future towards e-money. To prepare for this, the Nepal Rastra Bank should expose and develop some of its officials to become experts in e-payment systems, by equipping them with the requisite knowledge, skills and experience in the areas where e-payments have proven to be successful.

6. Conclusion

The development of e-payment is in its infancy in Nepal. People are unaware of using non-cash payment. The development of electronic payment system is severely impeded by lack of ICT resources, lack of public awareness and lack of infrastructure (electricity, telephone services, etc.). In spite of the constraints, commercial banks and other financial institutions have introduced credit cards and debit cards, including ATMs, Internet banking, mobile banking, etc. which are mainly used by the urban population. Card payment is yet to be regulated in Nepal. The Nepal Rastra Bank is taking initiatives for regulating electronic payment system in Nepal. The effect of e-payments on the implementation of monetary policy, which is based entirely on reserve money, is almost nil.

Chapter 7

THE DEVELOPMENT OF E-PAYMENT AND CHALLENGES IN PAPUA NEW GUINEA

by

Boniface Aipi¹

1. Introduction

The payment system relates to the instruments, organisations, operating procedures, and information and communications systems used to initiate and transmit information from payer to payee and to settle (transfer) payments (T.J.T. Balino and others). That is, everything associated with the financial transaction part in exchange for the rendering of goods and services. The payment system in any country therefore provides an important role in the functioning of the financial system and the economy as a whole. It also fulfills one of the functions of money, that is, as a “medium of exchange”.

The payment system facilitates a number of functional objectives. It is purposed to:

- i. expedite the processing of payments;
- ii. reduce risks and uncertainties when dealing with non-cash payments;
- iii. enable the use of indirect monetary policy (MP) instruments; and
- iv. encourage financial market development.

Over the years, the payment system in Papua New Guinea (PNG) has evolved, incorporating new instruments and methods of payment (non-cash and electronic), with increased volume and value of payment transactions, and including new technological developments. However, much of the population, especially those in the rural areas still rely heavily on cash payment (coins and banknotes). The Bank of Papua New Guinea (BPNG) has also undertaken various reviews concerning the payment system in line with developments in the financial market and abroad. These reviews included retail banking and a survey of small-denomination currency (copper coins). There are several on-going projects and pending proposals, including the clearing and cheque matching process projects

1. Author is Senior Analyst, Research Programme, Bank of Papua New Guinea.

by the Banking Department, Real Time Gross Settlement (RTGS) by the Finance and Accounting Department, and quality of banknotes and re-opening of cash distribution centres by the Currency Department of BPNG.

2. The Payment System in Papua New Guinea

The financial system in PNG consists of four commercial banks of which three are foreign-owned, 10 finance companies, 20 savings and loan societies (credit unions), 10 superannuation (pension) funds and five life insurance companies. The total assets of the banking system (excluding the superannuation funds and life insurance companies), as at the end of March 2005, was K4.8 billion (US\$1.5 billion) of which 88 percent was held by the commercial banks. Total deposits in the banking system at the end of March 2005 totaled K3.8 billion (US\$1.2 billion), of which 91 percent belong to the commercial banks.

The payment system in PNG is mostly dominated by paper-based payment instruments, while recently introduced card and network-based payment instruments have been slow in capturing market share. Paper-based payment instruments include, cash, cheques and Postal Office transfers, while card-based payment instruments include credit and debit cards. Network-based payment instruments would include Internet, land phone, mobile phone, e-money, Bill Pay and SWIFT payment system.

Development of a centralised payment system to cater for RTGS system in PNG electronically linking all the commercial banks by setting up infrastructures that would cater for the entire country is the aim of a working committee at the BPNG. The current payment system lacks the capacity to regulate electronic and access product payments, consequently exposing bank customers to risks. The current consumer protection act, the “Bills of Exchange Act” (1976) is obsolete, providing no protection to access product consumers.

2.1 Paper-based Payment Instruments

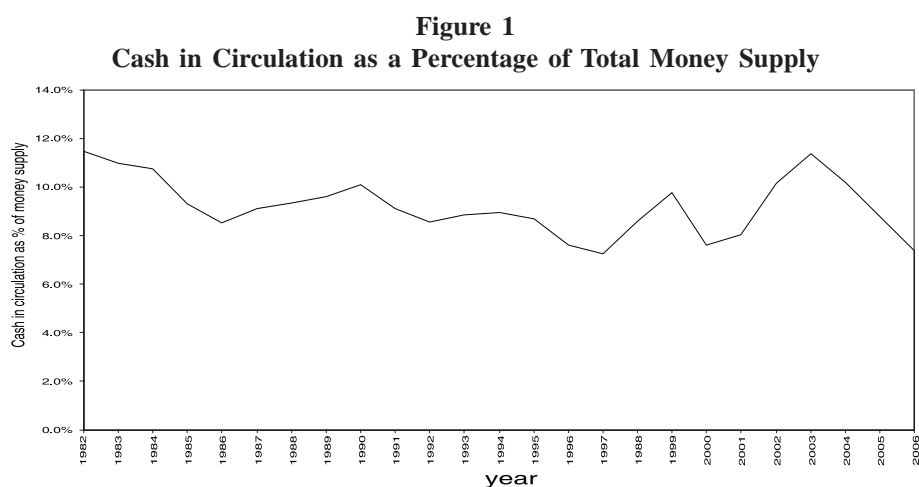
2.1.1 Cash

The Bank of Papua New Guinea (BPNG) has a monopoly on production, issuance and destruction of cash (notes and coins) circulated in the country. More than 85 percent of the country’s rural population is dependent on subsistence farming. Banking services are concentrated in the urban areas with none to minimal penetration in the rural areas. This is due to lack of fundamental

infrastructure, such as telecommunication, electricity, road networks and other associated risks, that impede banks from offering retail banking products in the rural areas. Consequently, the rural economy entirely depends on cash as a payment instrument.

Of the 15 percent urban dwellers, anecdotal evidence shows that less than three quarters are able to access other payment services, such as postal transfers, cheques, Bill Pay, debit and credit card, Internet and Phone Banking, etc. Opening new accounts with commercial banks in PNG is practically impossible for wage earners and low income earners in the informal sector due to stringent conditions set by the banks. Cash therefore remains the dominant payment instrument for the rural population and a proportion of the urban populace in PNG.

It is unlikely for electronic payment instruments to replace cash in the near future. Cash still remains the major payment instrument for majority of the populace, while the smaller privileged segment is able to access new products, such as electronic banking.



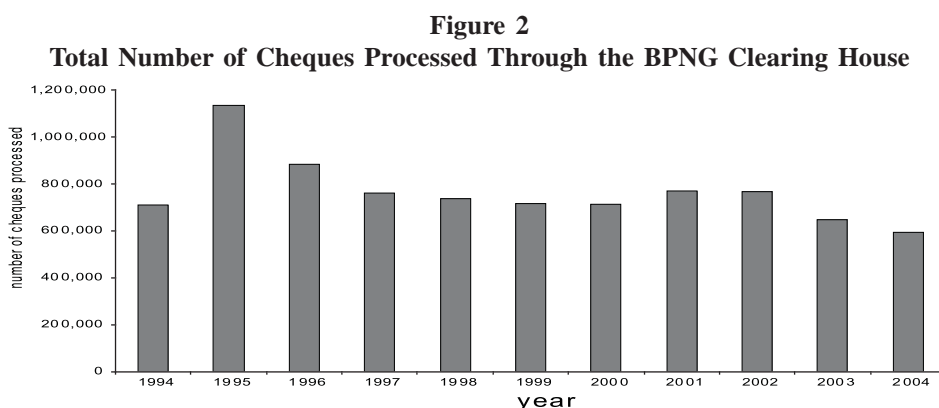
Source: Bank of PNG Quarterly Economic Bulletin, various issues and authors calculations

Figure 1 shows that cash as a percentage of money supply (M3) remains stable over the period. Electronic access products have been introduced during the late 1990's and early 2000 in PNG, but have minimal impact on the usage of cash as a mode of payment.

2.1.2 Cheques

Cheques are paid to the supplier (customer) for payment of goods and services and are drawn on the drawers account and deposited into the payees account. Cheques deposited into customers account are presented at the clearing house and delivered to the paying bank. Same-day clearance can be arranged between customer's bank and the paying bank at a higher fee.

The volume of cheque transactions is on the declining trend as a result of employers (both private and public enterprises) paying their employees through direct debit. As much as possible, many banks in the country purpose to reduce paper work and rely more on technology. Small-value transactions are settled through electronic payments while large-value transactions are settled by cheques. Figure 2 shows that the total volume of cheques cleared through the clearing house in Port Moresby has declined over the years. It is likely the usage of cheques for small-value payments would be phased out with the introduction of electronic products.



Source: Bank of PNG and Operations Reports, Various Years

Commercial banks have recently taken a step further by encoding all individual and corporate cheques for ease of intra-bank cheque clearance. Without RTGS, centralise cheque clearing for all commercial banks on real time is impossible.

2.1.2 (a) The Cheque Clearing House

The cheque clearing house is centrally located in Port Moresby, facilitated by the Central Bank of PNG and controlled by the Port Moresby Clearing House Committee, comprising senior officers from each member bank, appointed by the respective banks. The principles relating to the basic banking procedures between banks, including clearing and settlement, are governed by the “Record of Arrangement Between Banks” (RABB). The BPNG provides computer support to the clearing system for the cheque clearing operations. The cheques are cleared manually, with physical cheques cleared over the table between banks. It takes seven days to clear inter-bank cheques, while one to two days for in-house cheque clearing.

The clearing house conducts three cheque exchanges daily on Mondays to Thursdays and settlement with other banks takes place at 4:45PM daily. On Fridays, there are four exchanges with the settlement conducted at 4:30PM. At the end of each day, the central bank being the “lender of last resort” provides facilities for the commercial banks to settle their net positions. Government cheques awaiting clearance from other centers in PNG are mailed to Port Moresby for clearance by respective banks. Between banks, bank warrants can be used for special clearance.

Commercial banks in the country are already working on improving payment systems to minimise fraud, allowing ease of settlement and improving efficiency. These changes include cheque micro-encoding, cheque image clearing and the use of satellite systems in various centers, due to unreliable telecommunications links, and the introduction of generic Automated Telling Machines (ATM).

The introduction of new products and ICT-driven banking products has challenged the existing payment system that lacks the capacity to regulate these new products. Discussions are underway in the BPNG to develop a new payment system that is able to link all payment types, be it Internet banking, phone banking, cheque clearing, etc. A working committee at the BPNG is currently working on developing a RTGS system, whereby all transactions would be settled on real time. Such a massive exercise would cost the Bank millions of dollars, and as it is, commercial banks in the country are hesitant to commit any finance to espouse the project. Consequently, the project is progressing at snail’s pace.

2.1.3 Postal Transfers

Postal services are available in all major towns and cities of the country, providing a convenient means for people to transact payments. The diverse network of postal services in the country provides an appropriate avenue for payment transfers within the country, mostly between one or both parties who are unable to access banking services. The advantage with this mode of payment is that, it is fast, efficient and a secure way of settling payments or fund transfers. Fund transfers takes only less than an hour and people have found that convenient to transfer funds rather than sending it via the bank.

The rural population depends mostly on this payment mode for fund transfers, as banking services are non-existent. Where banking services are hard to access, postal services serve as a complementary system for fund transfers, while in towns and cities, postal services compete with and complement the banking system.

2.2 Electronic Banking in Papua New Guinea

Electronic payment instruments have mostly been centred on access products. Access products by definition are electronic products that draw or overdraw on their own savings account with the commercial banks, using existing domestic settlement systems. Access products in the market include credit and debit cards, Internet banking, bill pay and phone banking. Debit and credit cards have been in existence since the 1990's, while products such as bill pay, Internet and phone banking were introduced recently.

As is the case with new products, the spread of access products in the country has been very slow during its inaugural years. Nonetheless, it has slowly propagated in the past few years. Debit cards being the early e-payment product in existence has more customers than Internet, bill pay and phone banking. Banks are currently marketing the products rigorously to penetrate the market to establish a steady customer base. From its inception, formidable years of trial, advertisement and its usage have convinced consumers of its convenience. However, more are reluctant to try the new products, mindful of the associated risks.

Positive externalities have been attained by both the commercial banks and their customers with the introduction of electronic banking in the country. From the standpoint of banks, electronic banking relegates paper work, while banking becomes more convenient and easily accessible to the banking customer. Access

product customers are now able to access and settle payments from the security of their own homes or offices. The convenience and efficiency e-payment products bring to the settlement process is substantial. Businesses and individuals have embraced the new development with zeal. Access to accounts for settlement or inquiry by account holders is brought to the comfort of their homes and offices. Time and cost-saving measures brought about to businesses and individuals alike are enormous to the few that have access to these products. Access products have been used for small-value transactions at point of sale, effectively reducing cash handling by merchants and customers alike.

Anecdotal² evidence shows that the recently introduced access products, such as debit cards, phone and Internet banking, have slowly gained momentum. Their transaction volumes are increasing steadily as more people become aware of the product. These products enhance the existing settlement system, making it more convenient and accessible by consumers and do not in any way impede the payment system.

2.2.1 Card-based Payment Instruments

Card-based payment instruments, such as debit and credit cards were introduced in the late 1990's. The cards are issued primarily by the commercial banks, with no non-bank participation. Since three out of the four commercial banks in the country are foreign owned, *Master* and *Visa* cards can be used to settle both domestic and foreign obligations. On the other hand, debit cards are used only for domestic fund transfers and settlement. As non-bank e-money schemes have not been initiated in the country, the issuance of e-money and other e-money scheme related cards are nonexistent.

2.2.1 (a) Debit Cards

Since its introduction, debits cards have replaced cheque payments for wages and salaries for staff. As shown in Figure 2, cheque payment volumes have declined in the recent past, as private companies and government agencies utilise direct debit to pay their employees. Debit cards are efficient in service delivery and are cost-effective. Costs for private business, government agencies and even the banks have gone down substantially. Figure 3 shows the average fee charged by commercial banks in PNG. Service fees for paper-based payment instruments on average totalled K24.53 (US\$8.34), while fees for card- based e-payment instruments totalled K8.53 (US\$2.90). Commercial banks' push for paperless

2. Consolidated data from the commercial banks in Papua New Guinea is not available.

banking to cut costs could come to fruition, as evidenced by a slow surge in number of electronic banking clients.

Figure 3
Average Bank Fee Charges by Bank South Pacific as at 28/08/2007

	Paper Based	Electronic
Monthly Service Charges	2.67	2.25
Collection Fee	0.20	1.15
Deposits	1.00	1.00
Withdrawals	20.67	4.13
Average Total charges	24.53	8.53

Source: Bank South Pacific Website - fees

Note: Paper based include, personal cheque account, passbook and Achiever Accounts Electronic, includes kundu card and smart savers

Commercial banks extended their electronic banking networks by installing ATM's nationwide in their own bank branches. Commercial banks have invested large sums of money to purchase and install machines all throughout the country. ATM machines have been installed in most major centers in PNG, making banking more accessible in the urban areas. Customers are able to withdraw, transfer and make bill payments through the ATM's, with the exception of deposit taking. Phenomenal development and promotion of electronic banking in the country has resulted in increased usage of the product.

In conjunction with merchants, EFTPOS machines have also been installed in major outlets, allowing customers to purchase goods at point of sale and draw cash from their accounts, reducing the need to carry cash to make small-value payments. The use of EFTPOS confers a significant advantage to both merchants and banks from a reduction in the handling of cash and paper, which is risky and prone to theft.

A major glitch in the ATM and EFTPOS network of the commercial banks is that, there is no switching system. Consequently, inter-operability between different commercial banks is not possible, making it impossible for customers from one bank to draw money from another bank's ATM machine. Recently, a commercial bank in the country installed an ATM machine that can be used to

draw multiple currencies. Inception of a switching system is likely to transform and enhance the card-based payment system in the country.

2.2.1 (b) Credit Cards

Most foreign-owned banks in the country issue internationally accepted *Master* and *Visa* cards. These cards can be used for both domestic and foreign currency transactions. For domestic transactions, ATM and EFTPOS networks can be used to transact, while foreign currency transactions are acceptable worldwide. There are no non-bank credit card issuers in the country.

2.3 Network-based Payment System

Network-based products use ICT portals to transfer or make payments, using existing bank account. There are no e-money schemes in the country, as a result all network-based payment products are linked to bank accounts operated by individuals or corporations. In PNG, network-based payment products include, Internet and phone banking, mostly landlines, and the Society for Worldwide Inter-bank Financial Telecommunications (SWIFT) to settle wholesale foreign currency transactions between PNG banks and their foreign counterpart banks.

2.3.1 Society for Worldwide Inter-bank Financial Telecommunications (SWIFT)

The SWIFT system which is used for inter-bank payments between BPNG and other international banks, and is owned by member banks world-wide and provides trusted network infrastructure for payment transactions between banks. The SWIFT system has grown from an X.25 protocol system to the current Internet Portal (IP) based network. All commercial banks in the country are members and users of the SWIFT system. The system is encrypted and a secure means of settling wholesale international payments between banks.

Information flow between counterpart banks is encrypted and therefore safe for wholesale foreign currency transactions. BPNG uses the SWIFT system to settle its international obligations and manage its foreign reserves. The operation of this system has been smooth and free of glitches.

2.3.2 Internet Banking

Internet banking uses Internet portals to enquire, transfer and settle payments, drawing from customer's own bank accounts. A few private firms are already using the Internet to pay their employees by direct debiting their accounts.

Internet banking is a new product that has been introduced in the country recently. It has not as yet been successful in penetrating the market and establishing itself as a banking product. This is due to several reasons. The main reasons are Internet inaccessibility and illiteracy.

The network coverage of most ICT companies is centered in major cities and towns of the country, so connectivity is a major hindrance. Anecdotal evidence shows that less than one percent of the population is able to access the Internet. As such, the customer base for Internet banking is small.

2.3.3 Phone Banking

Phone banking is another payment instrument that has entered the banking product market. Using landlines, customers can make enquiries on their account balances, transfer or make payments from their own accounts with the banks. Instead of physically being present at the bank counter to make transactions from their accounts, customers are able to carry out normal banking transactions through phone (landlines). The inception of mobile phone banking is likely to be the next move by commercial banks in the country.

3. E-payment Developments in Papua New Guinea

There are two definitions of electronic money. E-money products are defined here as "stored-value" or "prepaid" products in which a record of the funds or "value" available to a consumer is stored on an electronic device in the consumer's possession. The second type is access products, which are products that allow consumers to use electronic means of communication to access otherwise conventional payment services, for example, use of a standard personal computer and computer network such as the Internet to make a credit card payment or to transmit instructions to make fund transfers between bank accounts (BIS, 1996).

Section 1 focuses primarily on access e-payment products. This section examines e-payment schemes, i.e. e-money that deals with multi-purpose prepaid

cards described as “electronic purse” and prepaid software products that use computer networks as “digital cash”.

E-purse is multi-purpose cards issued by banks or non-bank ICT companies. E-purse serves the purpose like that of telephone company prepaid cards. However, the difference lies in the usage of the cards. Telephone prepaid cards are used for single purpose transactions, while e-purse is multi-purpose in nature. E-purse can be used to purchase anything a card holder wants. These cards are pre-paid cards, where the value of that card can be used to purchase any products on the market. Digital cash, on the other hand, uses computer network systems. Values are stored on electronic data base, from which a client can use the stored value to purchase items via the Internet.

Commercial banks in the country have taken the lead in promoting and marketing access products, while e-payment schemes have not yet been introduced in PNG. Recent ICT developments in the country have been phenomenal and it is inevitable for e-payment schemes to enter the market in the future.

3.1 The Reasons E-payment Schemes Have Not Been Initiated in Papua New Guinea and the Constraints for Future E-payment Development

World-wide developments in the ICT industry have paved the way for the development of various payment systems apart from the traditional paper-based cheque and banknote payment system. E-payment schemes have been prompted by rapid developments in the ICT industry and they have pervaded the world, with the exception of developing countries like PNG. E-payment mechanisms that have direct links with bank accounts have been introduced in PNG, but not e-payment schemes. The following section looks at the reasons why e-payment schemes have not been introduced in PNG.

3.1.1 Current Status of ICT Development in PNG

Reliable information communication technology is a primary ingredient in the development of e-payment schemes in any country. Networks and service delivery functions of e-payment schemes are facilitated by an effective telecommunication network. The current surge in e-payment schemes world-wide is basically facilitated by new developments in the ICT industry. At the root of the ICT industry is telecommunications, which plays a pivotal role in inter-connectivity between different networks, making it the buttress of all ICT developments. Any country that wants to initiate e-payment schemes has to

develop standard telecommunication facilities as a pre-requisite to bolster developments in the ICT industry.

Furthermore, e-payment schemes need reliable telecommunication systems to facilitate service delivery. The current state of telecommunication infrastructure in the country is ill-equipped to support e-payment schemes on a large scale. Service availability to rural areas is non-existent, while cities and towns experience occasional connectivity problems. Consequently, the development of e-payment schemes in the near future is impossible, as e-payments depend entirely on relatively reliable telecommunication services.

Developments in the ICT industry have been phenomenal in the country with the introduction of Internet, as recent as the latter years of the 1990's. However, computer illiteracy is a major impediment in the development of e-payment schemes. Anecdotal evidence shows that less than one percent of the country's population is computer literate, making marketability of e-payment schemes non-profitable. Substantial amount of fixed cost required for setting up networks for e-payment schemes would outweigh the returns on investment.

The cost of telecommunication in the country is also very expensive, effectively contracting margins of telecommunication-dependent organisations. Since the telecommunication sector has been monopolised by a state entity, its inefficiencies are passed onto final consumers at higher prices. E-payment schemes that are more dependent on telecommunications network will have their margins stretched to remain competitive. Recent competition in the industry has resulted in rigorous court battles which are ongoing.

Another reason why e-payments have not yet been initiated in Papua New Guinea is because of PNG's information and telecommunications (IT) network. The IT network penetration in the country is very poor, with exorbitant prices, making access and usage of IT products available to only a privileged few. The cost structure in the IT industry is very high making it impossible to set up IT networks throughout the country.

3.1.2 Consumers

Market capacity in the country is another impediment that has stopped the entry of e-payment schemes. Anecdotal evidence shows that less than one percent of the population is computer literate and can access e-payment schemes. ICT illiteracy becomes a major impediment because e-payment schemes are primarily

facilitated by ICT. Without ICT knowledge and access, customers are unable to access e-cash or network-based payment instruments.

Closely related electronic products such as access products have not reached their maximum marketable capacity, due to lack of product knowledge by the consumers. This is compounded by a small customer base, which is basically a small segment of the country's population, impeding the penetration of access products throughout the country. Based on the experience of the inception, adoption and acceptance of access products, e-payment schemes are unlikely to enter the market in the near future.

3.1.3 ICT Policy

A country has to have a clear ICT policy to encourage competition in the ICT industry. Legal frameworks become buttresses for investors to invest in ICT businesses in the country. Without legal protection, no business would want to invest. This has been the major constraint in PNG for the ICT companies to invest. The telecommunication services provided by an inefficient state-owned monopoly failed to meet the contemporary ICT needs of the country.

Recently, a controversial private bill was to be tabled by the minister responsible for ICT. This was seen as a knee-jerk reaction to curtail the entry of a foreign ICT firm which was given the approval to compete against the inefficient state-owned ICT corporation. The bill was not passed. However, certain individual politicians used the proposed bill to effectively revoke the licence of the new entrant in the market. This subsequently resulted in a legal suit, which is currently on-going.

If an ICT policy has to be formulated, it has to be free of political interference which has been a major hindrance in allowing for competition in the industry.

4. The Future of Electronic Banking in Papua New Guinea

Significant development in ICT has stimulated the introduction of e-payment instruments by the commercial banks in the country. Development and penetration of new banking products world-wide has contributed to the inception of new e-payment instruments in the country.

In PNG, recent developments in the ICT industry have been promising for the development of e-payment schemes in the country. The telecommunications

industry in the country has been de-regulated, allowing competitors to enter the market. The incumbent in the industry is an inefficient state-owned company which has failed to provide efficient services.

The de-regulated industry has seen some improvement in efficiency and service penetration with lesser cost to customers. The competition has brought a refreshing change to an industry suffocated by a state-run monopoly and marked by high-priced inefficient services.

Though competition in the ICT industry is in the infancy stage, the intense competition between the ICT companies in the country has resulted in substantial reduction in telecommunication cost, which has filtered through to the entire country. It is therefore likely, electronic banking products would be accessible by the majority of the population in the near future.

Considering the current trend in ICT developments, the development of electronic money schemes cannot be written off. It is highly likely that competition and affordable ICT pricing would result in the development of electronic money schemes in the near future.

4.1 Issues in Electronic Banking

The negative externalities of e-payments schemes can be minimised when e-payment schemes become part and partial of the existing payment system. This means that any issuance of e-money by any other organisation or ICT companies should, by law, be allocated a quota by the BPNG to complement currency in circulation. Daily reports on e-cash and anticipated weekly transactions have to be submitted to the BPNG for monitoring liquidity in the economy. Monitoring and regulating of e-payment schemes by the BPNG is necessary for two reasons.

Firstly, consumers are risk averse, in search of assets or investments with less risk. Given such consumer behavior, ICT companies would very much want to be regulated by BPNG. Regulating and monitoring of ICT companies by BPNG becomes a buttress for the ICT's and banks that are involved in the e-payment system to access the market. E-payment scheme customers would feel secure, confident in the knowledge that the industry is regulated and the risk of loosing their money is minimised. The second reason encapsulates the essence of this paper, that is, monitoring the liquidity in the system to ensure inflationary pressure is contained at reasonable levels. The latter being the fundamental reason for monitoring and regulating e-payment schemes.

The current payment system lacks the capacity to monitor and regulate access products, let alone e-payment schemes. The BPNG has to set the pace on ICT-based banking products in order to monitor and regulate financial institutions and ICT's. Currently, commercial banks are setting the pace, introducing new ICT-based products, tugging BPNG along. It is apparent the current payment system and legislation lack the capacity to incorporate both access-based products and e-payment schemes.

When the much-anticipated RTGS becomes a reality, the regulation and monitoring of e-payment schemes will be the next step down the road. The RTGS evolves around a computerised clearing house linked to all financial institutions and ICT companies via IP, capable of clearing all payment modes on real time throughout the country. The establishment of such a network would be very costly, but, the realised benefit to the payment system and its positive externality on economic policy warrant the setting up of the RTGS.

4.1.1 Risks Associated with Electronic Banking

Electronic banking has the capacity to enhance payment systems, reduce cost and provide efficient services. However, the risks are part and parcel of the new e-payment instruments, since these payment instruments are not legal tender. The risks can be classified into two categories.

a. Transaction Risk

Since electronic payment instruments do not possess legal-tender status, there is an element of credit risk. Clients have the right to refuse accepting payments by debit or credit cards, or what is even more problematic is where ATM or EFTPOS machines are not available nearby for card holders to draw on their account or make payments. This brings into question the credibility of the electronic products that are issued by commercial banks. If these products are not legal tender, then payees have every right to refuse accepting the payment, hence bringing the payment instrument into disrepute.

Countries operating electronic payment instruments have encountered cases of fraud involving the payment instruments. Fraudulent withdrawals have been reported on several occasions where an unauthorised person uses the customer's card to access money from the account. In other cases, history or cookies from public Internet machines were used to access someone's personal information to defraud the customer. For instance, skimmers in Australia installed minute electronic devices in EFTPOS machines to copy all personal information

contained in the magnetic strips on the cards and defraud cardholders of their savings. Several cases have ensued in PNG also, where someone unknowingly discloses their PIN number, and subsequently ends up with their savings withdrawn.

b. Systemic Risk

Any failure of the payment system would cause major disruptions in the level of economic activity. Since electronic payment instruments depend upon ICT, failures such as disconnection and discontinuation of ICT services would result in disruptions to normal business transactions. It would affect liquidity if the magnitude is large enough.

System hackers pose threats to electronic payment systems. Hackers can draw on customers account without their knowledge or the bank, if the computer systems do not have firewalls to preclude hackers. This has been a major threat but, most software packages have firewalls that are proficient to ward-off any hacker threats. As software gets more complicated, banks need to be vigilant and proactive in protecting their system.

4.1.2 Legal Issues

The Bills of Exchange Act (1976), as amended, does not cover the development of new banking products. There is no provision in the Act that caters for new access products that are marketed by the commercial banks. Global developments in both ICT and banking services have driven commercial banks to develop cost effective and efficient ways in augmenting their services. The current working committee is studying the legality of the various modes of payment, incorporating an amended bill that is likely to cover all aspects of banking in the country. The current challenge is for the BPNG to develop a payment system, supported with a legal framework that will cover all aspects of payments in the country. With the influx of new technology and proliferation of enhanced products offered by the commercial banks in the country, the development of a payment system is capable of meeting the needs of current market, is of utmost priority. This responsibility is vested on the BPNG as a catalyst to initiate efficient and effective payment systems for the entire financial system of a country.

In line with these developments, the existing Bills of Exchange Act (1976) has to be amended to incorporate other payments aspects keeping in view the future of other electronic products, such as electronic payment schemes.

Electronic payment schemes, driven primarily by technology cannot be ignored in PNG. The future entrance of electronic payment schemes is unavoidable as the trend of development of ICT continues to grow at substantial pace in the country.

4.1.3 Monetary Policy Implications

Since e-money serves the two distinct purposes of money, notably, as a “store of value” and a “means of payment”, central banks no longer have monopoly on the printing, issuance and destruction of money. Consequently, the ability to influence reserve money (cash in circulation plus savings) as a monetary policy instrument becomes distorted.

If e-payment schemes exist concurrently with the existing payment scheme, it brings competition in the issuing of legal currency. Consequently, the money supply in the economy would consist of e-money, currency in circulation and demand deposits. The central bank has control of the latter, while the ICT companies or issuers are in control of former. Monetary policy would be affected dramatically, if the payment systems operate concurrently and in competition. However, the other step would be for the central bank to set guidelines for e-payment scheme operators to co-exist and cooperate within the existing payment system, so as to set quotas for the ICT companies or e-payment scheme operators to issue e-purse or digital cash, and report to the central bank on a daily basis. By doing so, the central bank will still have control over the money supply and effectively implement monetary policy through its signaling rate.

If, however, the e-payment scheme operators are allowed to operate liberally, the central bank will be able to set interest rates based not on total reserve money, but, reserve money, excluding e-money, which is a major component of reserve money. Announcing of the Central Banks monetary policy stance, by setting its signaling rate, and effectively affecting market interest rates through open market operations (OMO) would have ambiguous effect. This is a major threat faced by most countries with liberal operation of e-money schemes.

4.2 Central Bank’s Views on E-payments

An efficient payment system contributes to the maintenance of financial system stability and provides a mechanism for monetary policy transmission. One of the major responsibilities of central banks is to oversee the payment system, and become a catalyst for payment system innovations to accommodate all forms of payments, both international and domestic. It is also the responsibility

of the central bank to properly institute payment system policies and guidelines and regularly monitor the payment system of a country.

The BPNG's monetary policy operates on a reserve money principle. Notes and coins (cash) in circulation is a major component of reserve money. Any liquid product that impedes or establishes itself as a substitute for notes and coins is a threat to the formulation of monetary policy. Like any other central banks in the world, the BPNG is required to put in place policies and guidelines to regulate such products in order to preserve its monetary policy obligations.

The BPNG has not paid serious attention to e-payment schemes since the current payment system is still at its primitive stage, dependent more on cash and cheques. Furthermore, the existing payment system is regulated by an outdated Act which does not cover all other new payment instruments. Electronic products (access products) have been offered by commercial banks lately, driven by international market trends. For the time being, the BPNG has set up a working committee to look into the existing payment system and endorse changes to the payment system. The committee is taking a broad perspective of the payment and settlement system, with the focus towards the setting up of a RTGS system, which will be centrally located at the BPNG connecting all financial institutions to settle on real time.

E-payment schemes and access products are not within the scope of discussion of the working committee as these are not viewed as pressing agendas. Consequently, discussions on electronic banking have not yet been initiated at the BPNG, and there appears to be no clear direction on the move forward in electronic banking in PNG.

As commercial banks in PNG surge ahead keeping abreast of market trends by introducing electronic banking products, the central bank has not kept pace in terms of regulation and supervision and being a catalyst for the development e-banking products. The barrier behind the slow progress in moving forward with the current banking trends has been the lack of legal protection for customers of electronic banking products and best-practice guidelines for banking, particularly with regards to electronic banking.

There is an urgent need on the part of the BPNG to appraise the e-banking market and facilitate the development of electronic banking in the country, rather than allowing commercial banks to dictate the pace of e-banking development. Central banks have to be proactive in performing their role as catalyst in the development of the payment system - regulating, supervising, and controlling

the payment system, which will enhance the financial market and buttress monetary policy management in the country. If the PNG does not keep up with the changing financial landscape, this can lead to the erosion of the central bank's functions in the payment system.

5. Conclusion and Recommendations

The current payment and settlement system in PNG is still at its primitive stage where paper-based payment instruments override the other recent payment instruments, such as network and card-based payment instruments.

Although network and card-based payment instruments have been introduced in the country, they are mostly driven by the commercial banks. Consequently, BPNG has been pulled along by the developments in electronic banking in the country. BPNG's responsibility as the overseer and a catalyst of the payment system has been overtaken by the banking market trends, both domestically and internationally. Domestically, commercial banks have been in the forefront, introducing new network and card-based banking products in the country. Internationally, the surge in electronic banking worldwide and the push for paperless banking phenomenon make their way to most countries of the world.

The trends in electronic banking both domestically and internationally challenge the BPNG to be more proactive in functioning as a catalyst for the development of new banking product and as a supervisor to oversee and make the payment system in the country more efficient. The advancement by the commercial banks in electronic banking and the lackluster performance of the central bank in this regard can lead to ambiguous situations when the functions of the central bank and the commercial banks in the payment system are not demarcated.

E-payment schemes are yet to be introduced in the country, while e-payment instruments are already available in the country. The likelihood of e-payment schemes being incepted in the near future is almost impossible due to constraints in ICT development and accessibility in the country. Access e-payment products, on the other hand, are gradually making in-roads into the banking industry. However, without a switching system interconnecting ATM and EFTPOS machines of all commercial banks, inter-operability is not possible. When this major shortcoming is rectified, the payment and settlement systems would become more efficient as customers of one bank can draw from another bank's ATM or EFTPOS machine.

The Bills of Exchange Act (1976) is outdated. The legislation does not cover electronic banking. In consequence, the interests of customers using the existing electronic banking products are exposed. This may result in substantial loss of savings by access product customers because there is no clear definition as to who should be liable.

5.1 Recommendations

To facilitate the development of an efficient payment system, the BPNG has to accelerate the development of the RTGS system. Commercial banks have taken the lead in digitally encoding cheques and in setting up satellite systems to upgrade their branch networks outside the major towns and cities. With commercial banks setting the pace, the BPNG can actively facilitate as a catalyst in the development of the RTGS system in order to enhance the efficiency of the payment system. It is better to source knowledge from fellow SEACEN member countries that have developed RTGS systems rather than seeking assistance elsewhere.

There is an urgent need to revise the outdated Bills and Exchanges Act (1977) to provide for the development of electronic banking products. The BPNG has to incorporate another act, “Electronic Financial Transactions Act (EFTA)”. This legislation should cover all electronic transactions, either it be e-scheme related transactions or access products. The existing act does not provide particular cover for access product (electronic banking) customers. Furthermore, enacting of the EFTA would be in one sense proactive, as e-payment schemes have yet to make their appearance in the country. Future developers of e-payment schemes would automatically be covered under this act.

As a supplementary to the EFTA, another act should be enacted to protect electronic banking customers’ personal information, i.e. “Personal Information Protection Act” (PIPA). The experiences of other countries that have incepted electronic banking products have shown that numerous cases of fraud emanate from the disclosure of personal information by individuals or corporations involved in the electronic banking products market. People have used the personal information of someone to defraud them of large sums of money without their knowledge. With cyber banking, it is difficult to establish the identity of the perpetrators as a result such transactions are prone to fraud by knowledge of personal information. Such a law if enacted should protect the individual banking clients.

To extend the availability of, and the market for, electronic banking products, a switching system is needed. Without a switching system, commercial banks will operate electronic banking products in isolation and at a high cost. With a switching system, all banks can improve their capacity in serving their clients through different banks ATM's or EFTPOS machines.

References

1. Bank of International Settlements (BIS), (1996), Implications for Central Banks of the Development of Electronic Money', October 1996.
2. Bank of Papua New Guinea Quarterly Economic Bulletin, Various Issues.
3. Minutes from Various Meetings of the Payment Committee at the Bank of PNG
4. T.J.T. Balino, O.E.G. Johnson and V. Sundararajan, (1996), "Payment System Reforms and Monetary Policy", *Finance & Development*, March.

Chapter 8

THE DEVELOPMENT OF E-PAYMENTS AND CHALLENGES IN THE PHILIPPINES

by

Agnes S. Pantola¹

1. Development of E-payment in the Philippines

1.1 E-Payment Technologies and Products in the Philippines

Over hundreds of years, the way Filipinos pay for goods and services has evolved dramatically – from barter, gold bits and gold rings in the pre-Hispanic era, to coins and paper currency, and to data transmitted over an electronic channel.

1.1.1 Automated Teller Machines (ATMs)

There are three (3) ATM networks in the Philippines: *BancNet*, *MegaLink* and *ExpressNet*. Customers maintaining deposit accounts with member banks can make cross-bank/cross-branch remittances via the ATM of the three networks. The cross-branch remittances within the same bank via ATMs are finally paid by individual bank's internal computer systems. All cross-bank remittances via ATMs are transmitted to the Treasury Bank (the payment intermediary bank of member banks). The Treasury Bank verifies and sends cross-bank remittances to the Philippine Clearing House Corporation (PCHC) for clearing. The PCHC computes and transmits to Bangko Sentral ng Pilipinas (BSP) the net cash balances of these remittances for individual banks. The ATM is a common channel for Overseas Filipino Workers' (OFWs) remittances which have become a major source of foreign exchange.

On June 20, 2000, *Expressnet* and *Bancnet* ATM networks formalised their interconnection, completing the final leg of a three-way linkage. The *MegaLink*

1. Author is Bank Officer III of the Information Systems Support and Development Department of Bangko Sentral ng Pilipinas.

network had been connected to *ExpressNet* and *BancNet* for several years now. The BSP and the banking sector have been working closely to enhance services to the public including the lowering of Overseas Filipino Workers' (OFWs) remittance fees, penalising abusive credit collection practices, and setting clear standards for consumer protection through the Service Code for Consumer Banking which was signed in time for the observance of Consumer Month last year.

1.1.2 Credit Cards

The main issuers of credit cards in the Philippines are banks. Presently, banks issue international credit cards both for domestic and overseas use as these items have become increasingly popular in the country, such as *Visa* and *MasterCard*, *JCB* and *Diners Club*. Some local banks also issue their credit cards (e.g. *Unicard & Bankard*.) Most of the credit cards enable the cardholder to make purchases or draw cash up to a pre-arranged ceiling (cash advance). However, because of the establishment of a (financial) credit bureau, the mere submission of financial documents, i.e. income tax returns and proof of billing, totally eliminated the previous requirement of banks that customers maintain a bank account prior to the issuance of credit cards.

1.1.3 Debit Cards

The use of debit cards allows access to funds already in the customer's bank account. In the Philippines, all commercial banks and a few thrift banks are issuers of debit cards that can also be used in Automated Teller Machines (ATMs). The existing ATM networks (*BancNet*, *Megalink*, *ExpressNet*) developed their own Point-of-Sale (POS) System to allow their cardholders pay their purchase electronically through their ATMs for credit to the retailer's account.

1.1.4 Stored Value Cards / E-cash

Normally for single purpose use, these cards exist for the transportation and telecommunication sector which have also introduced their respective stored value cards for convenience of payments at toll plazas (e-pass), Light Rail Transit Authority (LRT) and Metro Rail Transit Authority (MRT) and telephone booths, mobile phones and Internet cards.

1.1.5 E-money / Mobile Phone Payment

If the product is available in small-value denomination, funds can be transferred through this medium. Most popular technologies are the services offered by *Globe G-Cash* and *Smart Padala*. *Globe G-Cash* turns a cell phone into an electronic wallet. Subscribers can easily and conveniently send G-Cash both in the Philippines and worldwide, receive G-Cash and exchange it for cash or make payments, all these just by texting. *Smart Padala* is the world's first international cash remittance service linked to the mobile phone, providing convenient and affordable services.

1.1.6 Internet Banking

Some banking institutions offer services through their Internet banking facilities, such as account balance summary, request for account statements, fund transfers between own accounts or third-party accounts, payment facilities and cheque-book request services. High usage of Internet services is evident in the country.

1.1.7 Direct Debit and Credit Transfers

Banks and non-banks performing quasi-banking functions with Demand Deposit Accounts with the BSP can participate in inter-bank transactions for direct debit and credit transfers by executing the Participation Agreement for PhilPaSS access. The direct debit and credit transfers are used mainly for the settlement of large-value payments for small volume transactions, such as PHP/USD transactions, Inter-bank Call Loan (IBCL) and Government Securities transactions.

1.1.8 Electronic Bills Payment

Most users of the electronic bill payment system which facilitates customers to pay their various utility bills (e.g. electricity, telephone and water bills, etc.) electronically are coursed through the various ATM network facilities of banks. However, credit card and direct debit are still the preferred methods of payment.

1.1.9 Money Orders

The Philippine Postal Corporation is authorised to issue money orders which are instruments used to facilitate transfer of money from one person to another via a local Post Office.

1.1.10 Philippine Domestic-Dollar Transfer System (PDDTS)

This system allows online, real-time gross settlement of domestic inter-bank US Dollar transfer and third-party account-to-account US Dollar transfers. It provides a facility for online inquiry and settlement of foreign exchange transactions, where the PDDTS participants enter inter-bank US Dollar and Peso transfer instruction in a single screen. The US Dollar leg is settled via PDDTS while the Peso leg is transmitted to the Philippine Payments and Settlements System (PhilPASS) for settlement by the Bangko Sentral ng Pilipinas. The system is operated by the Bankers Association of the Philippines (BAP), Philippine Clearing House Corporation (PCHC) and Citibank, Manila.

1.1.11 Electronic Peso Clearing and Settlement System (EPCS)

The Electronic Peso Clearing and Settlement System is an inter-bank account-to-account fund transfer system that supports bulk, recurring, non-time sensitive payment and collection transactions. This is considered an efficient and cost-efficient means of transacting payments and collections and considered as a robust alternative to cheque payments.

EPCS banks/branches electronically transmit transactions by batches anytime within a pre-defined transmission time. Following the prescribed cut-off time for electronic transmissions, the Philippine Clearing House Corporation (PCHC) performs a netting process. Net clearing positions are forwarded by PCHC to the Bangko Sentral ng Pilipinas for posting to the participant banks' respective Demand Deposit accounts. The system is designed as an enhanced version and eventually a replacement to the existing Peso module of the PDDTS.

1.1.12 Philippine Payments and Settlements System (PhilPASS)

The PhilPASS is the system name where both processing and final settlement of funds transfer instructions can take place continuously (i.e. in real time). As it is a gross settlement system, transfers are settled individually, that is, without netting debits against credit. As it is a real time settlement system, the system effects final settlement continuously rather than periodically at pre-specified

time provided that a sending bank has sufficient balances or credit. The settlement process is based on real-time transfer of central bank money.

In the Philippines, cash is still the most common mode of payment on account of security concerns and anonymity. However, based on data collected from eight key Asia Pacific markets, next to India, Philippines has emerged as the second fastest growing country for domestic spending on *Visa* cards in the region.

1.2 Developments in Wholesale Payment Systems

During the initial stages of the December 2002 implementation of the Philippines' PhilPaSS, RTGS-based wholesale funds payment system was widely used for – (1) Inter-bank loan transactions (call and term) among banks and non-bank financial intermediaries performing quasi-banking functions (NBQBS), (2) Purchase and sale of government securities under outright and repurchase agreements between and among banks and NBQBs and the BSP in connection with the latter's Open Market Operations, and (3) Customer fund transfer transactions. In 2003, BSP developed a system called Third Party Option that interfaces system providers with PhilPaSS' Central Accounting System (CAS) for the settlement of transactions sent by entities such as *Megalink* for their ATM transactions and Philippine Central Depository (PCD) for the Peso leg of dollar transactions or Payment versus Payment (PvP) transactions. In August 30, 2004, the Delivery versus Payment (D v P) System was implemented.

1.2.1 Payment vs. Payment System (P v P) - April 2003

- Payment mechanism of settling inter-bank sale and purchase of foreign exchange through peso-denominated deposits maintained by banks with the Bangko Sentral ng Pilipinas.
- Ensures the delivery of foreign currency (US\$) only if the peso fund settlement in the Peso-denominated deposit account in BSP takes place.
- Aims to reduce systemic risk by providing a more secure and efficient settlement of USD/PESO Inter-bank Spot and Forward Exchange transactions.
- Involves the linkage of the Philippine Domestic Dollar Transfer System (PDDTS) (where the US\$ leg of foreign exchange transaction is currently settled through the Philippine Dealing System or PDS) and PhilPaSS (where the Peso leg of foreign exchange transaction is currently settled). The role of the Philippine Central Depository or PCD, which was initially incorporated on March 31, 1995 is to improve operations in settling

securities transactions and perform clearing services of FX transactions in coordination with Citibank, Manila as the settlement bank of US\$ foreign exchange transactions; and, Bangko Sentral ng Pilipinas for the settlement of the Peso leg.

1.2.2 Real Time Settlement of (ATM) Network Funds (Megalink) – September 2003

Presently, settlement of ATM network funds is through charge slips which are cleared together with cheques according to timelines set by the Philippine Clearing House. Automated Teller Machine (ATM) member banks found it necessary to achieve real time, final and irrevocable gross settlement of inter-bank funds and fees that are coursed through their network provider, *Megalink*, in order to reduce systemic and settlement risks. The online settlement of network funds and fees settlement aimed to improve efficiency and security of the existing payments and settlements system by allowing *Megalink* to send an electronic file containing inter-bank fund transfer instructions on behalf of its participating banks, directly to the BSP's own computer and accounting systems by utilising the Philippine Payments and Settlements System (PhilPaSS) for the actual payment and settlement of inter-bank electronic fund transfers.

1.2.3 Electronic Fund Transfer Instruction System (EFTIS) Interface with PhilPaSS - April 2004

EFTIS is a front-end system provided by the BSP to all PhilPaSS participants. This system was initially developed in 1997 to enable banks to transmit electronically fund transfer instructions to debit their account and credit the account of the Bureau of the Treasury for tax and customs duties collections in their capacity as Authorised Agent Banks of the Bureau of Internal Revenue and the Bureau of Customs. To maximise the system functionalities, other fund transfer instructions covering intra-bank accounts for reserve compliance e.g. Common Trust Fund (CTF) and Trust and Other Fiduciary Accounts (TOFA) are also coursed through EFTIS. In April 2004, BSP developed an interface for the real time gross settlement of EFTIS transactions in PhilPaSS. The daily timeline of EFTIS instructions is between 8:00am to 5:30pm. Also, as part of BSP's Continuity of Business (COB) Plan, EFTIS is also defined as the back-up system for the front-end system of PhilPaSS.

1.2.4 Delivery vs. Payment System (D v P) - August 30, 2004

In securities settlements, the improvement of market infrastructures for government securities has made progress with the “scripless” issuance of government securities to Government Securities Eligible Dealers (GSEDs). Moreover, the implementation of the securities settlement system for government securities through a delivery-versus-payment (DvP) through the system’s interface with PhilPaSS eliminated the inherent risks for both securities and funds settlement. DvP ensures that the transfer of government securities ownership in the Bureau of Treasury’s Securities Registry will only take place if there is fund settlement in the deposit accounts maintained by both the securities buyer and seller. Likewise, the implementation of DvP System complies with the Bank for International Settlements’ recommendations for securities clearing systems in relation to the elimination of various risks involved in securities settlements.

Under study for implementation in 2005 is another DvP-type of settlement system; only that transactions to be involved are listed equities traded in the Philippine Stock Exchange and are currently cleared through the Financial Transaction Recording System (FINTRACS) - the clearing and settlement system operated by Philippine Depository & Trust Corporation (PDTC). Brokers participate in the Stock (Makati City) Trading System (MAKTRADE). On T+3, FINTRACS generates the net settlement position that is provided to the settlement commercial banks.

Also, part of the payments settlement are BSP’s internal transactions such as withdrawals and deposits of the Cash Dept; loan grants and repayments of the Dept of Loans and Credit, etc. interfaced with PhilPaSS-RTGS system.

1.3 Developments in Retail Payment Systems

1.3.1 Check Clearing Systems Interface Linkage with PhilPaSS – February 2003

The Philippine Clearing House Corporation (PCHC) provides two payment clearing and settlement systems for its member banks. These are the Electronic Cheque Clearing System (ECCS) and Electronic Peso Clearing System (EPCS). PCHC is the operator of the ECCS. The PCHC is responsible for clearing cheques drawn on Metro Manila and nearby provinces and has expanded its area of coverage, e.g. to include cheques drawn on areas outside the PCHC coverage. Cheque clearing operations still require the delivery of the physical

cheques to the PCHC premises. To facilitate the physical processing of cheques at PCHC, the magnetic ink character recognition technology was introduced in 1997 and encoded in all cheques for clearing presentation. In 1999, data on cheques for clearing are electronically captured at the site of the presenting bank such that the netting process can be completed even without the physical cheques reaching the PCHC for the calculation of the net settlement position. In February 2003, barely two (2) months after the implementation of PhilPaSS-RTGS (2002), an interface was developed by BSP to directly route the net clearing positions of banks electronically transmitted by PCHC to the PhilPaSS-RTGS System for real time settlement in the deposit accounts maintained with the BSP.

1.3.2 Electronic Peso Clearing and Settlement System (EPCS) - January 2003

EPCS is a system used for the payment of small amount domestic cross-bank Peso account transfers upon the over-the-counter request of customers that are recurring, non-time sensitive payment and collection transactions. This system is also operated by PCHC and has replaced the former Peso Netting System which is an electronic payment system but is not equipped with the fund collection (reverse remittance) functions of the EPCS system. The system enables payees to withdraw funds on the next business day while withdrawals of transferred funds from the payees accounts in the Peso Netting requires at least 48 hours following the remittance date. It is an online-based processing system where EPCS banks/branches participants are permitted to gain access to the EPCS Host Computer located at PCHC via data communication lines. Using this connectivity to the EPCS Host Computer, participant banks can electronically transmit transactions to PCHC anytime within a pre-defined transmission time. Net clearing positions are forwarded by PCHC to Bangko Sentral ng Pilipinas for posting to the participant bank's respective DDA account. The bank's clearing results and inward data files and reports are generated by PCHC and made available to the participants for downloading.

1.3.3 Electronic Rediscounting (ERediscounting) – December 2006

Guided by the liberalised re-discounting policy under the BSP Circular 515 and the E-Commerce Act, *eRediscounting* is an Internet-based facility that allows banks to conduct real-time rediscounting transactions with BSP at the convenience of their offices. A bank extends loans to borrowers who, in turn,

execute promissory notes (PNs). The bank submits these PNs as collateral when applying for a loan from BSP's Department of Loans and Credit (DLC). DLC can lend up to 80 percent of the value of loans granted by the bank to clients. The bank can then extend more loans to needy borrowers using the fresh funds from DLC. Loans proceeds will be credited to, while payments debited from, the bank's demand deposit account with BSP. Services include online loan application, electronic crediting of loan proceeds, online loan payment, provision of rediscounting data online and online responses to re-discounting queries.

1.4 Government Agencies with Electronic Payment Systems

1.4.1 Bureau of Internal Revenue E-Filing and Payment System (E-FPS)

Taxpayers can avail of a paperless tax filing experience and can also pay their taxes online through the convenience of Internet-banking service via debit from their enrolled bank account.

1.4.2 Security and Exchange Commission Register

An online/web-based Company Registration System, the e-payment facility of the system accepts the name reservation fee, corporate/partnership registration fee and allows acceptance of the paid-up capital stock deposit online for those who have an account at selected banks.

1.4.3 Philippine Health Insurance Corporation E-payment

The e-payment system provides electronic messaging facility for efficient transmission and processing of *PhilHealth* contributions wherein employers can pay their *PhilHealth* premiums online through the e-payment system of the Union Bank.

1.4.4 National Statistics Office E-census

The system allows the public to apply/request for civil registry documents online. Payments for the requests made can be done online via credit card or through the Union Bank/correspondent foreign bank.

1.5 Costs and Benefits of E-payments

1.5.1 Costs

- a. **Investments to acquire technology**
 - Equipment, software, network components and architecture, consultant or professional service provider, maintenance, systems performance and monitoring tools, database management
 - Requires knowledge management on ICTs, high cost of educating the merchants and customers
- b. **Risks and controls on hardware platforms, network infrastructure and system software and utilities**

Risk is real-time. Because the system highly depends on machines/ computers, communication lines and other devices, systemic risk is expected to surface. Downtime caused by system failures can have serious economic impact both on the customer and service provider.
- c. **Potential use of e-payment (e-money in particular) for money laundering**

E-money systems can be attractive to money launderers, which in effect reduces government tax revenue. Transactions may become untraceable and very transportable. Alteration of payment data is possible. The anonymity of e-money can make 'knowing the customer' more difficult. Account access relies more on the information provided by the end-user (i.e. PIN, passwords, account number, card number, etc.) and not on the traditional handwritten name (or some other identifying mark/s) on documents which serve as proof of identity.

Appropriate legal mechanisms should be in place to protect both the clients and service providers such as clear policies, procedures and controls to deter money laundering.

1.5.2 Benefits

- a. **Reduction of cash handling costs and lowers transaction costs**

E-Payment schemes promote faster, more efficient transactions and reduces costs of remittances.

- b. **Increases productivity of service-providers and clients**
Access to e-commerce, easier collection of marketing information on customers and promotion of free banking.
- c. **Convenience of making payments and less opportunity for fraudulent or criminal activity**
Payment can be made swiftly and remotely using various devices. Financial anonymity and security from theft are possible. Computerised financial record-keeping is available.
- d. **Banks can take advantage of increase in customer reach and added cash float**

1.6 Factors that Contribute to the Promotion of E-Payments and Obstacles that may Hamper Further Progress of E-payment Innovations

1.6.1 Cost of Technology / Profitability for Operators and Customers

The cost of using the system should be kept lower than the cost of using the technology. Technology - computers, the World Wide Web, mobile phones, electronic transfers - has become a means of economic growth and has basically changed the ways of learning and doing business. In the Philippines, the mobile phone industry serves majority of the income groups due to some industry characteristics – the calling party pays, prepaid services sensitive to cash flow and purchasing power of low-income market, text messaging at low cost (Php 0.50 to 1.00) and market for low-cost used handsets (Php 500). The remarkable growth of mobile phone access provides an opportunity to reach people currently outside the banking system.

1.6.2 Public Demand and Acceptance / Public Behavior Constraints

Fear of risk, contentment with the existing payment methods and resistance to new payment mechanisms, public behavior, acceptance, awareness and understanding are some key obstacles that must be considered before any e-payment product gets attention. The risk of stolen or lost cards could threaten some consumers. Technological literacy is also an issue.

1.6.3 Geographic Location and Population Density

While ATMs are concentrated in urban centers, mobile phone technology expands outreach to rural areas and has the potential to reach the poor.

1.6.4 Technical Infrastructure

Availability of reliable telecommunication systems; expansion of ICT infrastructure.

1.6.5 Inter-operability

Inter-operability is made possible by the implementation of standards. Sharing of networks reduces the cost and complexity of developing new services by making component services available for reuse.

1.6.6 Legal Framework / Legislative and Regulatory Issues

To ensure security, privacy and customer trust, are there clear policies, procedures and controls? Are regulatory requirements and compliance to local or international laws achieved?

2. Impact of E-payments on Central Banking Functions

2.1 Overview of Functions and Operations of the Bangko Sentral ng Pilipinas

2.1.1 Objectives

The BSP's primary objective is to maintain price stability conducive to a balanced and sustainable economic growth. The BSP also aims to promote and preserve monetary stability and the convertibility of the national currency.

2.1.2 Responsibilities

The BSP provides policy directions in the areas of money, banking and credit. It supervises operations of banks and exercises regulatory powers over non-bank financial institutions with quasi-banking functions.

Under the New Central Bank Act, the BSP performs the following functions, all of which relate to its status as the Republic's central monetary authority.

- **Liquidity management.** The BSP formulates and implements monetary policy aimed at influencing money supply consistent with its primary objective to maintain price stability.
- **Currency issue.** The BSP has the exclusive power to issue the national currency. All notes and coins issued by the BSP are fully guaranteed by the government and are considered legal tender for all private and public debts.
- **Lender of last resort.** The BSP extends discounts, loans and advances to banking institutions for liquidity purposes.
- **Financial supervision.** The BSP supervises banks and exercises regulatory powers over non-bank institutions performing quasi-banking functions.
- **Management of foreign currency reserves.** The BSP seeks to maintain sufficient international reserves to meet any foreseeable net demands for foreign currencies in order to preserve the international stability and convertibility of the Philippine Peso.
- **Determination of exchange rate policy.** The BSP determines the exchange rate policy of the Philippines. Currently, the BSP adheres to a market-oriented foreign exchange rate policy such that the role of Bangko Sentral is principally to ensure orderly conditions in the market.
- **Other activities.** The BSP functions as the banker, financial advisor and official depository of the Government, its political subdivisions and instrumentalities and GOCCs.

2.2 BSP Report on Economic and Financial Developments First Quarter 2007

2.2.1 Payments and Settlement System

The Philippine Payments and Settlements System (PhilPASS) continued to play a significant role in improving the country's financial infrastructure. Large-value transactions that passed through the system during the first quarter totalled 119,830 valued at P47.6 trillion, posting an increase in value of 154.4 percent and 26.7 percent, respectively, from last year's first quarter and the previous quarter. The rise in the volume of transactions during the quarter was attributed largely to the increase coming from the Treasury, Payment versus Payment, Electronic Funds Transfer and inter-bank transactions.

Transaction fees collected amounted to P12.4 million during the same period. Year-on-year, the first quarter's fees were higher by 3.5 percent, but decline by 0.9 percent compared to the previous quarter.

Table 1

PhilPASS Transactions					
	2006		2007	Growth Rates	
	Q1	Q4	Q1	Quarter Growth	Annual Growth
Volume	110,427	107,972	119,830	11.0	8.5
Value (In trillion pesos)	18.73	37.6	47.64	26.7	154.4
Transaction Fees (In million pesos)	11.97	12.5	12.39	-0.9	3.5

Table 2
Basic Indicators

	2002	2003	2004	2005	2006	1Q2007	2Q2007
Population (in million persons)	80.16	81.88	83.56	85.26	86.97	88.27	
Gross National Product (at current prices, in billion pesos)	3,963.9	4,316.4	4,871.6	5,437.9	6,032.6	2,841.2	3,126.1
Currency outside monetary authorities / (Currency issue in million pesos)	271,695	294,782	322,466	336,558	384,492	347,178	348,175

Table 3
Financial Institutions Under BSP Supervision/Regulation

	As of June 2007
Banks and branches	
Universal and Commercial Banks	4,297
Thrift Banks	1,333
Rural and Cooperative Banks	2,108
Non-Banks and branches	
With Quasi-Banking Functions	31
Without Quasi-Banking Functions	13,231
Offshore Banking Units	7

Table 4
ATMs and Electronic Banking

	2002	2003	2004	2005	2006	1Q2007	2Q2007
No. of ATMs	4,328	4573	5469	6212	6867	6888	6967
No. of banks with electronic banking	35	39	44	44	80	87	87

2.2.2 Payment Risks

Various risks in payment systems are as follows:

- a. Credit risk – the risk that counter-party will not meet an obligation for full value, either when due, or at any time thereafter, and generally includes both the risk of loss of unrealised gains on unsettled contracts with the defaulting party and, more importantly, the risk of loss of the whole value of the transaction.
- b. Liquidity Risk – the risk that the counter-party will not settle an obligation for full value. This could adversely affect the expected liquidity position of the payee and may force the payee to cover its cash-flow shortage by funding from other sources to meet its obligations to others.
- c. Settlement Risk – the risk that the completion or settlement of individual transactions or, more specifically, settlement of the inter-bank funds transfer system as a whole, will not take place as expected. Settlement risk comprise both credit and liquidity risks.
- d. Operational Risk – the risk that hardware or software problems, or human error or malicious attack will cause a system to breakdown or malfunction giving rise to financial exposures and possible losses.
- e. Legal Risk – the risk that unexpected interpretation of the law or legal uncertainty will leave the payment system or members with unforeseen financial exposures and possible losses. (PhilPASS prime).

3. Policy Responses to E-payments

The Bangko Sentral ng Pilipinas is responsive to new developments and technological innovations. Likewise, it continues to ensure that the attendant risks are properly managed. It has set in place the necessary regulations and procedures that cover electronic banking risk management, security procedures, internal controls, anti- money laundering regulations, know your client requirements, as well as consumer protection.

Within the Supervision and Examination Sector, a Core Information Technology Supervisory Unit (CITSU) was created to keep abreast with the latest developments in electronic banking.

3.1 Speeches Excerpts from BSP Governor (Source: www.bsp.gov.ph Speech Archives)

Gov. Rafael Buenaventura, December 15, 2003 Induction of Officers, Clearing Officers Club, Inc. Payment Systems Reforms and Anti-Money Laundering Initiatives:

"In line with the innovations in payments systems, our legal framework will need to be upgraded particularly in terms of how we handle issues of enforceability of transactions, finality, bankruptcy, and security arrangements. This should form part of the priority legislative agenda of the next congress".

Gov. Amando Tetangco, Jr, June 20, 2006 Launching of Bancnet-Expressnet Interconnection:

"We, at the Bangko Sentral, welcome these developments and strongly support banks' endeavors that aim to harness new technologies and upgrade the delivery of banking services to international standards. But while we would want you to seize the opportunities, we also want industry participants to be mindful of the inherent risks. Accordingly, we shall be crafting relevant regulations that would ensure that risks inherent in electronic banking are adequately managed and depositors protected at all times."

Gov. Amando Tetangco, Jr. June 13, 2007 - Celebration of the Rural Banking Industry's 10 Years of Success in Microfinance under the RBAP's MABS Program:

"In fact, as of end March 2007, there were already 43 rural and cooperative rural banks offering electronic banking services particularly mobile phone banking. This lowers transaction costs, increases productivity, minimises cash-on-hand risk, and increases overall accessibility of financial services. In a country like ours where mobile phone usage is one of the highest in the world relative to population, the potential for revolutionising electronic banking in the countryside could be dramatically significant."

3.2 New Central Bank Act (Republic Act 7653, June 14, 1993)

Section 102 Inter-bank Settlement states that the BSP as the central institution shall establish facilities for payment services, such as inter-bank clearing under such rules and regulations as prescribed by the Monetary Board.

3.3 E-commerce Law (Republic Act 8792, June 14, 2000)

The law defines Philippines policy on electronic transactions to enable the country's players and consumers to actively participate in electronic trade. The law provides:

- Legal recognition of electronic documents, electronic data messages, and electronic signatures - guidelines for authentication and retention of electronic data messages and electronic documents; admissibility and evidential weight of electronic data message and electronic documents.
- Guidelines on communication of electronic data messages and electronic documents - formation and validity of electronic contracts; recognition by parties of electronic data message or electronic document; attribution of electronic data message; error on electronic data message or electronic document; agreement on acknowledgment receipt of electronic data message or electronic documents; choice of security methods (subject to applicable laws and/or rules and guidelines promulgated by the Department of Trade and Industry (DTI) with other appropriate government agencies).
- Guidelines on electronic transactions in government – government use of electronic data messages, electronic documents and electronic signatures; promotion of the use of electronic documents and electronic data messages in government and to the general public; authority of the Department of Trade and Industry and participating entities (shall direct and supervise the promotion and development of electronic commerce in the country with relevant government agencies).
- Guidelines on extent of liability of a service provider; lawful access; obligation of confidentiality; penalties (hacking, cracking and piracy offenses).
- Implementing Rules and Regulations and Oversight Committee – the DTI, Department of Budget and Management and the Bangko Sentral ng Pilipinas (BSP) are empowered to enforce the provisions of the Act and issue the necessary implementing rules and regulations, in coordination with the Department of Transportation and Communications, National Telecommunications Commission, National Computer Center, National Information Technology Council, Commission on Audit, other concerned agencies, and the private sector.

3.4 Manual of Regulations for Banks (MORB) – Subsection X169.2 Outsourcing of Information Technology Systems/Processes

- **Certain functions affecting the ability of the bank to ensure the fit of technology services deployed** to meet its strategic and business objectives and to comply with all pertinent banking laws and regulations, such as, but not limited to, strategic planning for the use of information technology; determination of system functionalities; change management inclusive of quality assurance and testing; service level and contract management; and security policy and administration, may not be outsourced.
- **Documentary requirements.** A bank intending to outsource information technology systems and processes shall submit documents to BSP which shall treat the same as strictly confidential:
 - Proposed contract between the bank and the service provider.
 - Minutes of meetings of the board of directors of the bank concerned documenting discussions on the benefits and advantages of outsourcing; the careful and diligent evaluation; the creation, organisation and membership of a senior management oversight committee to handle and oversee the efficient implementation and monitoring of the applications/operations of the service provider; the creation/organisation and membership of help desk; the systems and user acceptance tests.
 - Profile of the selected service provider or the non-bank partner - Most recent and complete financial and operational information; Track record; List of clientele; For service provider or non-bank partner, other documents demonstrative of its competence and reputation in the field of information technology, as applied to banking operations.

3.5 BSP Circular No. 240 – Guidelines Concerning Electronic Banking Activities December 21, 2000

- Banks wishing to provide and/or enhance existing electronic banking services shall submit to the BSP an application describing the services to be offered/enhanced and how it fits the bank's overall strategy, accompanied by a certification signed by its President or any officer of equivalent rank and function to the effect that the bank has complied with the following minimum pre-conditions:
 - An adequate risk management process is in place;
 - A manual on corporate security policy and procedures exists that shall address all security issues affecting its electronic banking system

(Authentication, Non-repudiation, Authorisation , Integrity and Confidentiality);

- The system had been tested prior to its implementation and that the test results are satisfactory; and
 - A business continuity planning process and manual have been adopted which should include a section on electronic banking channels and systems.
- The BSP, through the Technical Working Group on Electronic Banking, shall pre-screen the overall financial condition as well as the applicant bank's compliance with the BSP rules and regulations based on the latest available Bank Performance Rating (BPR) and Report of Examination (ROE), including CAMELS.
 - Based on the recommendation of the Technical Working Group on Electronic Banking, the Deputy Governor, SES, shall approve in principle the application so that banks may immediately launch and/or enhance their existing electronic banking services.
 - Banks shall be informed of the conditional approval of the DG, SES and they shall in turn notify the BSP on the actual date of its launching/enhancement.
 - Within thirty (30) calendar days from such launching/enhancement, banks shall submit to the BSP through the Supervisory Reports and Studies Office (SRSO) for evaluation, the following documentary requirements:
 - A discussion on the banking services to be offered/enhanced, the business objectives for such services and the corresponding procedures, both automated and manual, offered through the electronic banking channels;
 - A description or diagram of the configuration of the bank's electronic banking system and its capabilities;
 - A list of software and hardware components indicating the purpose of the software and hardware in the electronic banking infrastructure;
 - A description of the security policies and procedures manual;
 - A brief description of the contingency and disaster recovery plans for electronic banking facilities and event scenario/problem management plan/programme to resolve or address problems;
 - Copy of contract with the communications carrier; arrangements for any liability arising from breaches in the security of the system or from unauthorised/fraudulent transactions;

- Copy of the maintenance agreements with the software/hardware provider/s; and
 - Latest report on the periodic review of the system, if applicable.
- If after the evaluation of the submitted documents, the Working Group has still some unresolved issues and grey areas, the bank may be required to make a presentation of its electronic banking transactions to the BSP.
 - Upon completion of evaluation, the appropriate recommendation shall be made to the Monetary Board. The following shall be the standard conditions for approval:
 - Existence at all times of appropriate top-level risk management oversight;
 - Operation of electronic banking system outsourced to a third-party service provider taking into consideration the existence of adequate security controls and the observance of confidentiality [as required in Republic Act. No. 1405 (Bank Secrecy Law)] of customer information;
 - Adoption of measures to properly educate customers on safeguarding of user ID, PIN and/or password, use of bank's products/services, actual fees/bank charges thereon and problem/error resolution procedures;
 - Clear communication with its customers in connection with the terms and condition which would highlight how any losses from security breaches, systems failure or human error will be settled between the bank and its customers;
 - Customer's acknowledgement in writing that they have understood the terms and conditions and the corresponding risks that entail in availing electronic banking services;
 - The bank's oversight process shall ensure that business expansion shall not put undue strains on its systems and risk management capability;
 - The establishment of procedures for the regular review of the bank's security arrangements to ensure that such arrangements remains appropriate having regard to the continuing developments in security technology;
 - Strict adherence to Bangko Sentral regulations on fund transfers in cases where clients use the electronic banking services to transfer funds;
 - The electronic banking service shall not be used for money laundering or other illegal activities that will undermine the confidence of the public; and
 - The BSP shall be notified in writing thirty (30) days in advance of any enhancements that may be made to the online electronic banking service.

- The same procedure and requirements stated in the foregoing shall apply to all banks with pending applications with the BSP, except on the submission of the documents enumerated in Item 5, i.e. banks which have already submitted all the required information/documents need not comply with this requirement.
- Banks with existing electronic banking services but do not qualify as a result of the pre-screening process mentioned in Item 2 hereof, shall be given three (3) months within which to show proof of improved overall financial condition and/or substantial compliance with BSP's prudential requirements, otherwise, their electronic banking activities will be temporarily suspended until such time that the same have been complied with.
- Sanctions, in the form of monetary penalties and/or suspension of electronic banking activities, or both, shall be imposed on erring banks and/or its officers for failure to: (a) seek BSP approval before launching/enhancing/implementing electronic banking services, and/or (b) submit within the prescribed deadline the required information/documents.

Monetary penalties proposed to be imposed, in accordance with Sections 36 and 37 of R.A. No. 7653 (The New Central Bank Act) are as follows:

- For the officer/s and/or director/s responsible for failure to seek prior BSP approval and/or for non-submission/delayed submission of required information/documents, a one-time penalty of P200,000; and
- For the banking institution for failure to seek prior BSP approval and/or for non-submission/delayed submission of required information/documents, a penalty of P30,000 per day starting from the day the offense was committed up to the time the same was corrected.

3.6 BSP Circular No. 495 – Electronic Monitoring Systems for Money Laundering

September 20, 2005 – All universal and commercial banks are required to adopt an electronic money laundering transaction monitoring system which at the minimum shall detect and raise to the bank's attention, transactions and/or accounts that qualify other as "covered transactions" or "suspicious transactions".

3.7 BSP Circular No. 511 Series of 2006 – Guidelines on Technology Risk Management

February 3, 2006 – Adoption of the guidelines on technology risk management to ensure that banks have the knowledge and skills necessary to understand and effectively manage their technology-related risks.

- The use of technology-related products, services, delivery channels and processes exposes a bank to various risks, particularly Operational, Reputation, Compliance and Strategic risk.
- Banks are expected to have an integrated approach to risk management to identify, measure, monitor, and control risks. Technology-related risks should be reviewed together with other bank risks to determine the bank's overall risk profile.
- In using technology, bank management should engage a rigorous analytic process to identify and quantify risks, to the extent possible, and to establish risk controls to manage risk exposures.
- Technology-related risk management process involves three essential elements:
 1. Planning
 2. Implementing
 3. Measuring and Monitoring Performance

3.8 BSP Circular No. 542 Series of 2006 - Consumer Protection for Electronic Banking

September 1, 2006 - Rules and regulations concerning consumer protection for electronic banking (e-banking) products and services, for purposes of compliance with the requirements to safeguard customer information; prevention of money laundering and terrorist financing; reduction of fraud and theft of sensitive customer information; and promotion of legal enforceability of banks' electronic agreements and transactions:

- **E-banking Oversight Function** - Bank's board of directors and a senior management committee are responsible for developing the bank's e-banking business strategy and establishing an effective management oversight over e-banking services. Bank's Compliance Officer should ensure that proper

controls are incorporated into the system so that all relevant compliance issues are fully addressed.

- **E-banking Risk Management and Internal Control**

- a) Information Security Program**

- Banks should establish and maintain comprehensive information security programme and ensure that they are properly implemented and strictly enforced.

- b) Information Security Measures**

- Banks should ensure that their information security measures and internal control related to electronic banking are installed, regularly updated, monitored and is appropriate with the risks associated with their products and services.

- Automated Teller Machine (ATM) Safety Measures**

- To minimise/prevent ATM frauds and crimes, banks should, at a minimum, implement security measures with respect to their automated teller machine facilities such as ATM's proper location; sufficient lighting; installation of surveillance cameras; programming enhancements like masking/non-printing of card numbers; periodic security inspection; posting of banks "hotline numbers" for emergency cases near ATM facility; educating customers on the risks associated with the use of ATM and how to avoid the risks; and educating bank personnel to be responsive and sensitive to customer concerns and to communicate them immediately to the responsible bank officer
 - Banks must study and assess ATM crimes to determine the primary problem areas. Procedures for reporting ATM crime should also be established. Banks are encouraged to share information involving ATM fraud cases to deter and prevent proliferation of the crime.

- Internet and Wireless Banking Security Measures**

- 1. Network controls - Implement adequate security measures; properly design and configure the servers and firewalls used for the e-banking services either Internet-based or delivered through wireless communication networks; deploy strong and stringent authentication and controls; implement anti-virus software, network scanners and analysers, intrusion detectors and security alert; conduct regular system and data integrity checks; maintain access security logs and audit trails;

develop built-in redundancies for single points of failure which can bring down the entire network.

2. Operating Systems Controls - Harden operating systems by configuring system software and firewall to the highest security settings consistent with the level of protection required, keeping abreast of enhancements, updates and patches recommended by system vendors; change all default passwords for new systems immediately upon installation.
3. Encryption - Implement encryption technologies that are appropriate to the sensitivity and importance of data to protect confidentiality of information
4. Website and Mobile Banking Authentication - Authenticate official website to protect bank customers from spoofed or faked websites; for wireless applications, adopt authentication protocols that are separate and distinct from those provided by the wireless network operator.
5. Physical Security - House all critical or sensitive computers and network equipment in physically secure locations (e.g., away from environmental hazards, unauthorised entry and public disclosure, etc.); implement physical security measures such as security barriers and physical protection facilities/devices to prevent unauthorised physical access, damage to and interference with the e-banking services.
6. Development and Acquisition - Separate physical/logical environments for systems development, testing and production.
7. IT Personnel Training - Provide appropriate and updated training to IT personnel on network, application and security risks and controls so that they understand and can respond to potential security threats.
8. Service Providers - Perform due diligence regularly to evaluate the ability of the service providers to maintain an adequate level of security and to keep abreast of changing technology; Ensure that the contractual agreements with the service providers have clearly defined security responsibilities.

9. Independent Audit, Vulnerability Test and Penetration Testing -

Conduct regular audit to assess the adequacy and effectiveness of the risk management process and the attendant controls and security measures; perform vulnerability test or assessment to evaluate the information security policies, internal controls and procedures, as well as system and network security of the bank.

10. Incident Response - Establish an incident management and response plan and test the predetermined action plan relating to security incidents.

Banks should also take into account other relevant industry security standards and sound practices as appropriate, and keep up with the most current information security issues (e.g., security weaknesses of the wireless environment), by sourcing relevant information from well-known security resources and organisations.

c) Authentication

To authenticate the identity of e-banking customers, banks should employ techniques appropriate to the risks associated with their products and services. The implementation of appropriate authentication methodologies should start with a risk assessment process – the type of customer; the customer transactional capabilities (e.g., bill payment, fund transfer, inquiry); the sensitivity of customer information and transaction being communicated to both the bank and the customer; the ease of using the communication method; and the volume of transactions.

d) Account Origination and Customer Verification

With the growth in e-banking and e-commerce, banks should use reliable methods of originating new customer accounts. Thus, in an electronic banking environment, banks need to ensure that in originating new accounts, the KYC (“know your clients”) requirement which involves a “face-to-face” process is strictly adhered to.

e) Monitoring and Reporting of E-banking Transactions

Monitoring systems can determine if unauthorised access to computer systems and customer accounts has occurred. A sound monitoring system should include audit features that can assist in the detection of fraud, money laundering, compromised passwords, or other unauthorised activities. This control process also facilitates banks in the submission

of suspicious activities reports as required by the Anti-Money Laundering Council (AMLC) and other regulatory bodies.

- **Consumer Awareness Program**

Consumer awareness is a key defense against fraud and identity theft and security breach. Banks should convey to their customers the *Consumer Awareness Programme*.

- **Disclosure and Business Availability**

a) Banks are required to provide their customers with a level of comfort regarding information disclosures or transparencies, protection of customer data and business availability

b) Banks should apply to e-banking financial transactions and disclosures the record retention provisions required in paper-based transactions. A written policy or procedure needs to define vital records relating to e-banking financial transactions and disclosures and the corresponding retention period of these records.

- **Complaint Resolution**

Banks may receive customer complaint either through an electronic medium or otherwise, concerning an unauthorised transaction, loss, or theft in its electronic banking account.

- **Applicability**

This circular is intended for all electronic banking services and products offered by the banks to their customers. Although these are focused on the risks and risk management techniques associated with an electronic delivery channel to protect customers and the general public, it should be understood, however, that not all of the consumer protection issues that have arisen in connection with new technologies are specifically addressed in this circular. Additional issuances may be issued in the future to address other aspects of consumer protection as the financial service environment through electronic banking evolves.

3.9 BSP Circular No. 564 Series of 2007 -Valid Identification (ID) Cards for Financial Transactions

(Pursuant to Monetary Board Resolution No. 310 dated 15 March 2007,) the guidelines governing the acceptance of valid identification cards are issued for all types of financial transactions by banks and non-bank financial institutions,

including financial transactions involving overseas Filipino workers (OFWs), in order to promote access of Filipinos to services offered by formal financial institutions, particularly those residing in the remote areas, as well as to encourage and facilitate remittances of OFWs through the banking system:

- a) Clients who engage in a financial transaction with the covered institutions for the first time shall be required to present the original and submit a copy of at least two valid photo-bearing identification documents issued and signed by an official authority.
- b) Students who are beneficiaries of an OFW and who are not yet of voting age shall also be required to present two IDs - photo-bearing school ID signed by the principal or head of school, birth certificate, library ID, and membership IDs duly issued by any association or organisation within the college or university and signed by the pertinent authority issuing the ID.
- c) Banks and non-bank financial institutions shall require their clients to submit clear copies of the two valid IDs on a one-time basis only, or at the commencement of a business relationship. They shall require their clients to submit an updated photo and other relevant information whenever the need for it arises.

Financial transactions may include remittances, among others, as falling under the definition of transaction. Under the Anti-Money Laundering Act of 2001, as amended, a financial transaction is “any act establishing any right or obligation or giving rise to any contractual or legal relationship between the parties thereto. It also includes any movement of funds by any means with a covered institution.”

3.10Memorandum No. M-2007-010 - ATM Interconnection Services May 7, 2007

The “sponsoring bank arrangement” is considered an extension of the sponsored banks information technology processes and is an outsourcing activity that needs prior Bangko Sentral ng Pilipinas approval under Sub-section X169.2 of the Manual of Regulations for Banks. (A “sponsoring bank arrangement” is one where a bank, which is not a member of any ATM network consortium but wishes to provide ATM services and terminals, is “sponsored” by a member bank of any of the existing ATM consortium.)

3.11 Developments in the Oversight of Payment Systems

- 1. Memorandum of Agreement for the Philippines Payments System via Real Time Gross Settlement otherwise known as PhilPaSS** (between BSP, BAP identified the Bangko Sentral ng Pilipinas as the exclusive service provider for PhilPaSS for all banks/financial institution participating in the System and as the settlement bank or central institution for the settlement of transactions processed through the System (PhilPaSS).
- 2. The PhilPaSS Rules and Regulations** define the roles of both system operators and bank participants as well as the standards set to achieve a real time settlement of transactions. The settlement status of transactions is monitored through PhilPaSS monitoring mechanisms, e.g. erroneous settlement instructions, queued, warehoused, rejected and/or canceled transactions.
- 3. Memorandum of Agreement for the Intra-day Liquidity Facility or ILF (between BSP, Bureau of Treasury and the availing bank)** was established to address the liquidity concerns on RTGS-based inter-bank transactions. Banks can use this system to replenish temporary fund shortages arising from payments of inter-bank transactions. BSP supplies liquidity to banks through repurchase agreement facility. Government securities eligible as collaterals for ILF shall be free, unencumbered and limited to: (a) Peso-denominated securities, issued by the national government, with a remaining maturity life of at least 11 days to 10 years, including Special Series Treasury Bills for reserve requirements; and (b) USD - denominated securities issued by the national government, with remaining life of at least 11 days.
- 4. Memorandum of Agreement on the Payment Versus Payment (P v P) for USD-Peso Foreign Exchange Transactions of Government Securities (between BSP, Bankers Association of the Philippines, Citibank (Manila) and Philippine Central Depository)** for the mechanism to facilitate a foreign exchange settlement system that ensures a final transfer in one currency, if and only if, a final transfer in the other currency or currencies takes place. The system was established to reduce systemic risk by providing for a more secure and more efficient settlement of United States Dollar (“USD”) / Philippine Peso (“Peso”) Inter-bank Spot and Forward Foreign Exchange transactions (the “FX Transactions”).

5. **Memorandum of Agreement for Real Time Gross Settlement via Delivery Versus Payment of Secondary Trading of Government Securities (between BSP, Bureau of Treasury and Money Market Association of the Philippines or MART)** for the linkage/connectivity of the electronic trading platforms of all Government Securities Eligible Dealers (GSED) member banks of MART with the facilities of the Bureau of Treasury's Registry of Scripless Securities (RoSS) to ensure efficient recording of the ownership of the securities sold/bought in the primary and secondary markets, Government Securities Eligible Dealers (GSED) members of MART to, in lieu of the physical delivery of GS certificates after fund settlement in the demand deposit accounts with BSP of the securities buyers and sellers.
6. **Memorandum of Agreement for the Electronic Settlement with BSP Using the Philippine Payments and Settlements System (PhilPaSS)** for the improvement in the efficiency and security of the existing payment and settlement system involving (*MegaLink*) Network funds by allowing the network (*MegaLink*) to send an electronic file, containing inter-bank electronic fund transfer instructions on behalf of its participating banks, directly to the BSP's own computer and accounting systems. The objective is to achieve real time, final and irrevocable gross settlement of inter-bank funds and fees that are coursed through *MegaLink*; thereby reducing systemic and settlement risks.
7. **Business Continuity Plan.**

In consultation with participant banks and other financial institutions to continue normal business operations during crisis situations, where practicable, and for the benefit of their customers, a Business Continuity Plan was drawn for BSP's PhilPaSS operations as well as among its participants. On January 16, 2003, by virtue Office Order No. 45, an Ad-Hoc Committee on Crisis Management was created to ensure that BSP's critical services/functions remain workable and adequate. Payments/settlements of both domestic and foreign transactions during crisis situations will be done at the off-site back-up facility. The BSP, as the system operator of PhilPaSS, has made available two back-up facilities; on-site and off-site with online mirroring capabilities. At any one time, should the primary system fail, processing can be routed either to the on-site or off-site back-up facility.
8. **Risk Management** - Under the PhilPaSS - RTGS System, the related settlement and systemic risks that are inherent to the financial transactions

are eliminated, due to the continuous real time final transfer capability of the system, and availability of funds to the customers at the time the inter-bank/fund transfer instructions of banks are processed and approved in the System. Settlement risk refers to the risk that the completion or settlement of individual transactions or settlement of the inter-bank funds transfer system as a whole will not take place as expected. Settlement risk comprise both credit and liquidity risks. Systemic risk refers to the risk that failure of one participant to meet its required obligations when they fall due may cause other participants to fail to meet their obligations on time. It is important to identify the points of failure as these could trigger broader financial difficulties that could threaten the stability of payment systems and even the economy.

4. Future Direction of E-payments

4.1 BSP Contributions Towards the Advancement of E-payment Systems

The BSP as the owner and operator of PhilPaSS shall provide, maintain and upgrade the system, including the system server and software (Logica, Clearing & Settlement System/Central Accounting System – LCSS/CAS); endeavor to provide uninterrupted operations between the System (CAS) and Society for Worldwide Inter-bank Financial Telecommunication (S.W.I.F.T – the network provider) and that adequate Continuity of Business (COB) plans are in place; endeavor to provide back up files for the continuous and efficient operation of the system.

The BSP supports innovation in the banking industry. In the speech on the Celebration of the Rural Banking Industry's 10 years of success in Microfinance under the RBAP's MABS program on June 13, 2007, BSP Governor Amando M. Tetangco Jr. congratulated the rural banks, the United States Agency for International Development (USAID), and other enabling institutions for their success in providing microfinance services under the Micro-enterprise Access to Banking Services (MABS) Program.

Advances in technology are providing new vehicles for the delivery of microfinance services. The use of mobile phones in select microfinance transactions is a specific example. The rural banks are at the forefront of developing a revolutionary solution for low-value payments that characterise microfinance loans, through linkage with electronic cash platforms of telecommunication companies. Electronic banking services particularly mobile phone banking lowers transaction costs, increases productivity, minimises cash-

on-hand risk, and increases overall accessibility of financial services. Mobile phone usage in the Philippines is one of the highest in the world relative to population. The potential for revolutionising electronic banking in the countryside could be dramatically significant.

As of end March 2007, there were already 43 rural and co-operative rural banks offering electronic banking services particularly mobile phone banking. A concept paper of the MABS and Globe Telecom outlining the expansion and rollout of mobile banking applications to microfinance clients of MABS participating banks has been selected for support under the Consultative Group to Assist the Poor Technology Program. The President of the Global Development Program at the Bill and Melinda Gates Foundation said that by "... supporting pilots with new technologies that have the power to dramatically change the business model of delivering financial services, we can help expand access to financial services for hundreds of millions of poor people." As proposed, the mobile phone banking applications will convert mobile phones into "virtual wallets" for receiving and paying loans, depositing and withdrawing money, sending and receiving remittances, purchasing and selling goods and services and making bills payments. The MABS-Globe Telecom proposal was one of nine selected from more than 70 projects submitted from 38 countries.

The Governor also cited that the BSP will continue to look at ways in which banks can have a wider scope of their microfinance operations, will remain responsive to the changing demands of the industry by maintaining a positive enabling policy and regulatory environment for microfinance, will continue with major reforms towards a more robust financial system and in fostering greater competition aligned with international standards within the banking sector and regulations will continue to focus on critical areas of strengthening board and institutional governance, improving bank's balance sheets and upgrading risk management systems. As the BSP is responsive to new developments and technological innovations, it continues to ensure that attendant risks are properly managed.

The BSP Supervision and Examination Sector Core Information Technology Supervisory Group (CITSU) was created to keep abreast with the latest developments in electronic banking. The move to form this unit is in response to the accelerated adoption of information technology-based products and services and e-commerce in the Philippines by banks and non-bank institutions. The unit will provide a baseline of minimum standards through the issuance of IT risk policies that include the management of IT risk which is an operational risk under Basel-II. Its aim is to align IT policies with the

international best practices. The CITSU will also be responsible for conducting IT supervision and examination of these financial institutions and other payment entities. The unit will examine the institution's technology-related risk management process, including the plan for the use of technology, how the technology will be implemented and the measurement and monitoring of the risk-taking activities of the financial institutions. Likewise, the CITSU will review requests from financial institutions to offer products and services that involve the use of electronic channels via the Internet. These include activities like overseas or domestic wire transfers of funds, payment of bills and other on-line transactions offered to retail and wholesale customers. The unit will assess the adequacy of controls adopted relative to these activities to forestall operational problems, such as collapse of the computer system resulting in the disruption of banking services and fraud in internal and external transactions.

The BSP as a member of the Government Electronic Payment and Collection System Evaluation Team (GEPCSET). The Joint Department Administrative Order (JDAO) 02, Series of 2006 prescribing the "Guidelines Implementing RA 8792 on Electronic Payment and Collection System (EPCS) in Government" will allow electronic payments through credit cards, automated teller machines (ATMs), debit cards, stored-value cards, mobile wallet payments and kiosks, among others.

The principles of implementation are technology neutrality, inter-operability, operational efficiency (elimination of red tape), information availability, security, privacy and integrity and auditability. The project will bring about more efficient and effective payment and collection services for the transacting clients and amongst the government offices through any authorised electronic payment and collection system and will allow the government to better manage financial resources, thereby improving its revenue generation capability.

The GEPCSET is an inter-agency team mandated to evaluate, accredit and recommend the adoption of an Electronic Payment and Collection System (EPCS) by a government entity composed of representatives from the Department of Finance, Dept of Trade and Industry, Bureau of Treasury, National Computer Center and the Bangko Sentral ng Pilipinas. The team shall maintain a list of accredited EPCS providers and shall convene on a specified date, time and place to conduct the appropriate evaluation, accreditation and recommend the approval of applications to adopt EPCS or components. The BSP shall designate a permanent representative to the GEPCSET in an advisory capacity.

5. **Globe Telecom GCash**

(Source: *Globe Telecom website - www1.globe.com.ph*)

Globe Telecom is one of the largest telecommunication companies in the Philippines. It is a full service telecommunications provider offering digital wireless communication, wireline voice, data transmission, domestic and international long distance communication and mobile-commerce services.

In 2004, *Globe Telecom* invested in G-XChange, Inc. (GXI), a wholly-owned subsidiary, which handles the mobile payment and remittance service using *Globe Telecom*'s network as transport channel under the *GCash* brand. During the fourth quarter of 2004, *Globe* launched *GCash*, the first cashless and cardless integrated payments service in the world. *GCash*, *Globe*'s flagship mobile commerce service, was born from a simple goal of transforming a mobile phone into a wallet enabling *Globe* and Touch Mobile (TM) subscribers access to a cashless and cardless method of making money-transfers by simply sending a text message.

On 28 July 2006, *Globe*, by virtue of an agreement with Hypercash Payment Systems, Inc., launched *G-PASS*, another *GCash* innovation which allows Metro-Rail Transit (MRT) riders to breeze in and out of the MRT station by simply tapping a *G-PASS* chip on the reader located on the designated turnstile. Value reloads can be made anytime and anywhere through *GCash*, or through direct cash payments at designated *G-PASS* reloading booths located in MRT stations.

***GCash* is most commonly used for:**

- Sending and receiving money locally or internationally since *GCash* is a much faster, cheaper, and more secure alternative to traditional money transfer services- at the Speed of Text, No Membership, Maintenance, Remittance, or Bank Fees.
- Prepaid Reloading due to the convenience of being able to load anytime and anywhere and the 10 percent REBATE for every transaction.

GCash allows subscribers to pay or transact for the following using their mobile phone:

- Domestic and international remittances
- Utility bills
- Interest and amortisation of loans
- Insurance premiums

- Donations to various institutions and organisations
- Sales commissions and payroll disbursements
- School tuition fees
- Micro tax payments and business registration
- Electronic loads and PINs
- Online purchases
- Ferry and airline tickets
- Train tickets using the *G-PASS* chip

GCash is also used as a wholesale payment facility. As of 30 September 2007, *GCash* handled an average monthly transaction value of around P5.9 billion.

Globe is regulated by the National Telecommunications Commission (NTC) for its telecommunications business and by the Securities and Exchange Commission (SEC) and the Bangko Sentral ng Pilipinas (BSP) for other aspects of its business.

5.1 Limits to the Amount of Transactions

In compliance with Bangko Sentral ng Pilipinas Policies and the Anti-Money Laundering Act (AMLA), a *GCash* account can hold a maximum of P40,000 (800 USD) at any given point in time with a P40,000 incoming and P40,000 outgoing maximum transactional daily limit and a P100,000 (2000 USD) incoming and outgoing maximum monthly transactional limit.

Minimum amount for person-to-person transfer is P1.00. However, minimum cash-out or cash-in transaction will depend on the *GCash* partner outlet where you are cashing-in or cashing-out.

For Globe Business Centers, Globelines Payments & Services Centers, and various other participating partners there are no minimum cash-in and cash-out amount. Cash-in is free and cash-out is one percent of the amount to be withdrawn (minimum P10.00).

5.2 How to Start Using *GCash*?

a. Register to *GCash* via text

Text: **REG**<space>any 4-digit PIN/Mother's Maiden Name/First Name/Last Name/Address and send to 2882

* All information must be true and the subscriber's name is as reflected on the subscriber's ID.

b. Convert Cash into *GCash* (Cash-in)

- Via any *GCash* partner outlet (Globe Business Centers, Globelines Payments and Services Centers, SM Department Stores, selected pawnshops, partner rural banks, etc.).
- Via any partner *Bancnet* ATM (Indicate cellphone number of recipient and amount to be sent).

c. *GCash* can be Used for the Following:

- Send *GCash* to other Globe/TM subscribers by texting the amount and PIN to a designated number + the number of the recipient. The recipient can then convert *GCash* into cash (or cash-out) with the *GCash* partner outlets.
- Buy Globe/TM prepaid load by texting the amount and PIN.
- Pay bills by texting the amount, PIN, institution code and account reference number.
- Payments for *GCash* partner outlets (SM Department store, selected drug stores, restaurants, supermarkets, etc.).
- Sending donations to selected charitable institutions, tuition fee payments, buying prepaid internet credits and online gaming credits, etc.

As a safety measure, the *GCash* has a PIN requirement for any transaction, thus nobody can access the *GCash* account other than the owner in case of lost phone. The subscriber can also request to have the *GCash* account blocked. If the *GCash* is sent to an expired or inactive number, the *GCash* can be transferred to an active Globe/TM cell phone or can be converted into cash (cash-out). In any case, valid ID and responses to security questions related to the account have to be presented to the Globe Business Center or Globelines Payment and Service Center.

GCash has partners in the top countries with the highest concentration of Filipino Migrant Workers – America, Singapore, Malaysia, Australia, Canada, Taiwan and Norway.

Table 5

Globe Press Release / Annual Report	2006	Q3 2007
No. of wireless subscribers (in millions)	15.7	19.2
No. of cell sites	5,884	
Subscribers' SMS usage, daily average	17 SMS	
GCash value transaction size, monthly average (in million PhP)	5.67 (w/ net registered user base of 500,813)	

Wireless subscriber growth in the Philippines has been driven by the unique topography and demographics of the country. It is comprised of more than 7,100 islands and over 50 percent of its population is below the age of 25. This young and technologically-adept population coupled with the wide geographic expanse of the country has favored wireless, rather than wireline communication systems.

With mass market appeal, the increasing affordability of wireless handsets and services, and the wide coverage of wireless networks have substantially driven the growth of wireless subscribers in the Philippines. The popularity of wireless voice and data services have also been driven in part by the continued growth of the prepaid service which permits customers who do not meet the credit standards for postpaid service or who have different needs from that of postpaid subscribers, to avail of wireless service.

The mobile phone industry in the Philippines serves all income groups, including low income groups due to significantly low cost of short message service (SMS). Forty-three percent of Filipinos are mobile phone users (37 million).

References

1. Bangko Sentral ng Pilipinas Website – www.bsp.gov.ph.
2. BSP Report on Economic and Financial Developments - First Quarter 2007.
3. The Central Banker, February 2007.
4. BSP-Payments and Settlement Office - Overview of the Philippine Payment System.
5. Report on National Government Agencies with Online Payment Systems (Stage 4). As of March 2005 - CICT-National Computer Center- Plans Review and Monitoring Office.
6. Regulating Mobile Banking: The Philippines Perspective Presentation by Mr. Rogelio A. Encinas, Manager II/Head, Microfinance Examination Group, Bangko Sentral ng Pilipinas
7. Department of Trade and Industry Website – www.dti.gov.ph.
8. Digital Filipino - www.DigitalFilipino.com
9. Globe Telecom website - www1.globe.com.ph
10. Electronic Money Laundering: An Environmental Scan Dept. of Justice Canada, October 1998 - ww2.ps-sp.gc.ca/publications/crim_jus/money_laundering_e.asp

Chapter 9

THE DEVELOPMENT OF E-PAYMENTS AND CHALLENGES IN THE REPUBLIC OF CHINA (TAIWAN)

by

Kuo Hsing Chang¹

Introduction

A safe and efficient e-payment vehicle is critical to the success of e-commerce. Towards an e-commerce era, one of the most important mandates for the central bank is to create a streamline banking and payment environment, secure and reliable enough to support the development of on-line transactions. It needs to solve the problems of identification, authorisation, authentication and non-repudiation when payments are made in electronic networks, especially the Internet, through which on-line transactions are protected by security arrangements such as Secure Electronic Transaction (SET) or Secure Socket Layer (SSL). Besides, many government authorities have devoted themselves to construct the Public Key Infrastructure (PKI) and to set up certificate authorities in charge of the certificate-based key management. The keys and certificates are used to encrypt/decrypt messages interchanged between trading partners to ensure the confidentiality, integrity and non-duplication of messages.

In this report, we follow a system development approach to describe the evolutionary process of e-payments in Republic of China (Taiwan) [hereafter referred to as ROC (Taiwan)] including the strategies, roles, policy responses of the Central Bank of the Republic of China in Taiwan (hereafter the Bank) in facing with the challenges from the Information and Communication Technology (ICT) revolution. Some factors that contribute or impede the e-payment development are analysed, the impact of e-payment innovation on the seigniorage and the effectiveness of monetary policy conducted by the Bank are explored, and the expected challenges and the future plans for the Bank are presented for public understanding. Finally, we give a briefing on the anti-fraud programme and the migration of ATM card from magnetic strip to microchip as case studies.

1. Author is Senior Specialist at the Department of Banking of Central Bank of the Republic of China (Taiwan).

1. The Development of E-payment Systems

1.1 The Cost and Benefit of E-payments

The scope of e-payments in this report covers stored value products and access products on the whole. Each type of payment product provides a distinct set of costs and benefits to consumers, merchants and payment service providers (see Figure 1).

The e-money (or value-based token) herein is defined as a re-loadable multi-purpose prepaid card with value stored electronically in a device such as a chip card or a hard drive in a PC terminal; they can be used for micro-payments in place of bank notes and coins. Likewise, access products are defined as payment instruments that allow customers to access their deposit accounts and to transfer the deposits therein. Examples mainly include electronic fund transfers at Automated Teller Machines and e-banking facilities. The money value is posted by means of direct credit or direct debit between payer and payee's deposits accounts for settlement. In addition, e-credit cards are developed to make payments from credit accounts instead of deposit accounts, so cardholders can consume first and pay later.

Figure 1
The Cost and Benefit of E-Payments

Payment Instruments	Benefits	Costs
(Stored Value Products) E-moneys: (Card-based) (Network-based)	<ul style="list-style-type: none"> • Repeat use without worrying about damage; • Suitable for user without bank accounts; • Suitable for on-line micro-payments; and • Not easily tracked. 	<ul style="list-style-type: none"> • Not suitable for large value transactions; • Bear opportunity cost; • Exist residual value loss when lost/stolen; and • Misuse as a tool of money laundry.
(Access Products) E-Payments: (EFT/ATM/POS/ACH) E-Banks: (Internet Banking) (Mobile Banking)	<ul style="list-style-type: none"> • Banks provide accounts management services such like book-keeping, recording, reconciliation; • Consumers: pay anyway, at any time, and anywhere; • Merchants: save costs for handling cash and get more sales from bonus feedback; • Service providers: make earnings from charges of accounts management, fees of interchange services; and interest revenues of liquidity accommodation. 	<ul style="list-style-type: none"> • Share costs for ICT system establishment and operation; • Consumers: bear opportunity cost and service charges; • Merchants: install POS and bear interchange fees; • Service Providers: maintain information security and make sure business continuity when facing internal and external threats.

1.2 Current Development of E-payment Products and Technologies

An e-payment system is de facto a computer network. From the viewpoints of ICT application, an e-payment system mainly involves the following development of software and hardware components:

- Computer servers or IC chips: embedded CPUs or microprocessors with functions of logic and arithmetic algorithm.
- Cryptography: aims to robust on-line transactions in security and protect personal data and payment orders with confidentiality and integrity.
- Tele-communication networks and peripheral devices: bridges an environment for information and message exchange.
- Rules, standards, laws and regulations: stipulated to operate the system in streamline operation and to ensure the payment and settlement with finality.

In ROC (Taiwan), many e-payment systems and products have been developed and reshaped to keep up with the rapid advance in ICT revolution during last one or two decades. They are:

1.2.1 CBC-CIFS System

The CIFS is an inter-bank electronic fund transfer system, launched and operated by the Bank since May 1995, for the purpose of large value and critical payment services. Since September 2002, it has been reshaped into an overall RTGS system with a view to minimise settlement risks and to streamline the system performance. In line with the RTGS reform, the Bank introduced the following auxiliary facilities into the CIFS, specifically:

- Central queue mechanism with a by-Pass FIFO basis;
- Automated collateralised intra-day liquidity accommodation; and
- Time-schedule guidelines controlling the throughput of payment flows with time-based transaction pricing to encourage settlement as early as possible.

Participants of the CIFS include banks, investment and trust companies, and bills finance companies. For those who maintain transaction accounts with the Bank, they may directly use the CIFS to transfer funds. Payment instructions are also sent over the CIFS for settling obligations on cheque clearing, adjusting reserve account balances, or making payments associated with inter-bank call loans, short-term bill transactions, and government bond transactions.

All payment orders and messages in CIFS are delivered through a proprietary line to guarantee on-line fund transfers in security. As of year-end 2006, total 104 financial institutions participated in this system. Total year-round transaction value in 2006 registered NT\$ 244,683 billion, and transaction volume 817,008 with an average value per transaction around NT\$ 300 million.

1.2.2 FISC-NIRS System

Nationwide Inter-bank Remittance System (NIRS) was launched in August 1987 and currently operated by the Financial Information Service Co., Ltd. (FISC). The goal of the FISC-NIRS is to integrate all local remittance systems into a national remittance system so that people can access the system to make remittance at any bank's branch throughout ROC (Taiwan). The business scope of fund transfers includes direct credit to personal accounts, to government accounts, to inter-bank settlement accounts, and to relevant accounts with respect to securities transactions.

In practice, the FISC plays as a switch center for financial information exchanges; its NIRS is designed to share the market of inter-bank funds transfer services to all its member banks. The messages and funds transfers are protected by access security controls and information security arrangements.

As of year-end 2006, a total of 378 financial institutions with 6,213 branches were involved in this system. Total year-round transaction value in 2006 registered NT\$ 103,979 billion, and transaction volume 82,378,188, with an average value per transaction of NT\$ 1.2 million.

1.2.3 Shared CD/ATM System and ATM Cards

The first CD (Cash Dispenser) was introduced into ROC (Taiwan) in July 1977 and the first ATM in February 1984. The shared CD/ATM system was launched in January 1987 with a view to prevent domestic banks from double investing in these self-service facilities. Since 1991, ATM started to provide round-the-clock service, seven days a week, making financial services available anytime and anywhere. Customers can use an ATM card at any ATM machine with FISC mark to make inter-bank withdrawals, fund transfers, bill payments, tax payments, and balances inquiries. Since 1994, ATM furthermore provides global financial services, and card holders can use *VISA* or *MasterCard* debit cards at any ATM with the Plus or Cirrus marks to make cross-border cash withdrawals in denomination of local currency.

Although this system applied the Message Authentication Code (MAC) and the Personal Identification Number (PIN) to enhance the security of funds transfer and protect the users' confidentiality, ATM cards used to be made of magnetic strips and could be easily duplicated by forger groups. Besides, hackers using keyboard logger or screen logger as wiretap often grab the users' Personal Identification Number (PIN). To fight against the criminal groups using ATM facilities as trick tools, the financial authority pushed domestic banks to upgrade the ATM card from Magnetic Strip to IC chip. The migration of chip-based ATM cards has been carried on since October 2003. Moreover, existing old ATM cards shall be in force for inter-bank fund transferring until March 1, 2006. With the multi-function of IC chips, ATM cards can be used to pay shopping directly since July 6, 2007.

As of year-end 2006, the number of ATM cards issued registered 136 million, and the number of active cards was 72 million, of which 43.5 million were chip-based cards. Likewise, the number of ATM machines available registered

24,781 sets, of which 24,346 sets were enabled to read chip-based cards. As of June 30, 2007, 2136 shops accepted people holding IC chip ATM cards for shopping. An e-payment system is de facto a computer network. From the viewpoints of ICT application, an e-payment system mainly involves the following development of software and hardware components:

In 2006, total year-round transaction value through the shared CD/ATM system reached NT\$ 8,759 billion, and transaction volume 727 million, with an average value per transaction nearby NT\$ 12,000.

1.2.4 EFT/POS System and Credit/Debit Cards

Card-based payments are mainly divided into three types: pay after credit cards; pay now debit cards and pre-paid smart cards.

The credit card market in ROC (Taiwan) currently composes of 46 issuers, 20 acquirers, 2 local processing centres (NCCC and FISC) and several credit card companies, each one with its own trademark. NCCC (National Credit Card Center) commenced its credit card business in June 1984 and FISC much later in August 1993. Either NCCC or FISC plays the role as a switch center to process clearance and settlement between issuer banks and acquirer banks for local and international credit card organisations in trademark of *Visa*, *Master*, *JCB*, *Dinner*, *AE* and local *U Card*.

As of year-end 2006, a total of 46 financial institutions competed to share local issuer market, among which 28 banks accessed to NCCC, 9 banks to FISC, and 9 banks operated on their own. The total credit cards in force registered 38.3 million, of which 20.4 million were active. As for local acquirer market, a total of 20 financial institutions competed to share this market and at least 185,376 contracted shops were available to accept credit card consumption.

Local debit card system was launched by FISC in May 1998. Debit-card holders no longer need to worry about the problem of over consumption due to credit expansion, which has happened to a lot of credit-card holders, especially the young generation. Besides, debit cards allow the bank to extend its payment services from ATMs to POSs so that money value is directly posted from the cardholder's accounts to the merchant's accounts.

In 2006, total year-round transaction value of credit cards reached NT\$ 1,380 billion and transaction volume 534 million, with an average value per

transaction around NT\$ 2,600. Meanwhile, total year-round transaction value of debit cards was NT\$ 8.7 billion and transaction volume 3.9 million with an average value per transaction nearby NT\$ 2200.

All consumption information and payment message of credit/debit card transactions flow through the system of Electronic Fund Transfer at Point of Sale (EFT/POS) that enables the cardholder to withdraw cash and make purchases at the contracted shops by credit/debit fund transfers. Meanwhile, this system offers the credit card holder the services, including authorisation, cash advance, lost card service and customer emergency service. Likewise, to prevent from counterfeiting and altering, the magnetic strip credit/debit cards in outstanding shall be totally upgraded into IC cards, however, the function of magnetic strip remains in force in order to allow cardholders to shop abroad during the transition of EMV migration. Accompanying with the migration of IC card (adopting computer chip and EMV format), all card readers of POSs shall be upgraded at the same time. Whatever it may be now, the EFT/POS system mainly applies Secure Electronic Transaction (SET) to identify the authorisation and to verify the transaction authenticity. It is acknowledged that SET is developed by Visa and Master Organizations to protect the transaction security between the cardholder and the merchant.

1.2.5 E-money Products

The E-money herein will be defined as Multi-purpose Stored Value Card (MSVC) for general micro-payment, which can be divided into card-based and network-based products. In Taiwan, three pilot e-money schemes are in process. They are:

Smart Pay System (card-based): This e-money system just rolled out on December 21, 2007. It is designed to combine the function of pre-paid card, ATM card and credit card together into an IC-chip card naming *Smart Pay* in place of the e-money product naming *FISCash*, issued by FISC since August 1998. The *FISCash* product had run into an end in December 2006 because of lacking an inter-operable platform for more cardholders, merchants and banks to share together. This *Smart Pay* card is designed to make Mobile Micro Payments (MMP), either online or offline, with new generation computer chip embedded thereon for services diversification and multi-channel controls to access the FeSnet system, an inter-operable platform launched and operated by the Financial eSolution Co., Ltd.

Mondex-Taiwan System (card-based): This card system is developed by Mondex Taiwan, a subsidiary of MasterCard Corp, and a joint venture company with Taiwan's ACER Group. The pilot scheme began in September 1999 and was put into operation in June 2002. The *Mondex* card adopts EMV standard format with a microchip embedded thereon. It enables cardholders to pay taxi fares, buy lotto tickets, and make purchases at convenience stores. There are now 9 local banks participating in this system for funds management, cards issuance and merchants' acquisition. Its multiple functions allow this card to store cash value for consumption in the real world or over the virtual space.

E.SUN e-Coin System (network-based): This e-Coin system is a pure network-based SVC, which is designed and operated by local E-Sun Bank. It was launched in February 2003 to provide customers with an online payment instrument, enabling customers to make micro payments for on-line shopping purpose and for those without having a real account with E-SUN Bank. The money value is stored at the E-SUN Bank's payment server instead of the microchip. Customers may use e-Coin to purchase digital content products, play games, shop at e-markets, or participate in e-auctions.

The development of e-money in ROC (Taiwan) is in the embryonic stage. Current transaction value and volume of e-money are still far from widespread. For all that, a variety of single-purpose-stored-value cards issued by private sectors are far and widely used in Taipei Metro and Omnibus ticket system in name of "*Go-Easy*" card, and 7-11 convenient chain stores in name of "*iCash*". As of year-end of 2006, *Go-Easy* cards in force recorded 8 million and *iCash* cards 4.5million.

1.2.6 FEDI & FXML for E-banking

Financial Electronic Data Interchange (FEDI) services were launched in January 1997. The FEDI facility employs computer-to-computer transmission of financial data such as bills or invoices in a standard format using UN/EDIFACT. This system extends its services directly to customers and thus helps banks to maintain their customer base. Both enterprises and individuals can access this system via a communications network from their own offices to establish online connections with their bankers and quickly make payments or allocate funds via computer in a completely safe environment, using standardised forms. As of year-end 2006, 29 financial institutions, 23 value-added networks, and around 8,000 enterprises used FEDI services. In 2006, total transaction value was approximately NT\$ 2,460 billion and total volume was over 2.8 million, with an average amount per transaction around NT\$ 0.9million.

Financial eXtensible Markup Language (FXML) system was brought on line in May 2003. This system supports XML over Internet (XOI) that enables customers to use XML-based services provided by financial institutions to initiate transactions via the Internet from a personal computer or other such devices. This XML-based message format is drawn up by the Bankers' Association to standardise the e-banking services and is designed to associate security certificate controls with W3C Signature Syntax and Process. It is quite a safe and convenient way to allocate or transfer funds, to effect payments, to make account inquiries, and to process finances through e-banking channel with 24 hours a day and all year round business hours. As of year-end 2006, there were 15 FXML service providers and 12 Internet Content Provider (ICP) participants. The accumulated transaction value in 2006 was nearly NT\$ 19.4 billion and total volume was over 60,000, with an average amount per transaction nearby NT\$ 0.3 million.

1.2.7 Internet Banking

Since 1997, the financial authorities in ROC (Taiwan) started to plan and deploy an Internet electronic payment gateway. In February 1999 the Ministry of Finance (MOF) Taxation Agency began offering an online tax payment service. Since 2000, financial institutions gradually implement Internet banking, providing customers with online fund transfers, balance inquiries and financial information services.

The Shared Internet Banking System, launched by FISC in February 2000, is an electronic payment system using the SET standards for e-commerce purpose. The Taiwan authority has constructed the Public Key Infrastructure (PKI) and opened the setup of Certificate Authority to charge itself with the management of the master key. As a matter of fact, the Internet is an open network. Security arrangements such as Secure Socket layer (SSL) or Secure Electronic Transaction (SET) is often used to protect on-line transactions through the Internet channel. SSL is an encrypted communication protocol between the end-user and the Web server to protect the information or message flows from eaves dropping, tampering, and forgery, while SET is a security protocol developed to offer a standard TCP/IP for Internet transactions. SET can be used with digital signature and certificate identification to protect data privacy and message authentication. As a whole, SSL is less secure than SET, but it is cheaper in installation and more convenient in utilisation. It is thus well suited for small-value payments in Internet transactions.

In the past few years, financial institutions also issued microchip ATM cards to their clients and added the Web ATM function into the Internet Banking. A

customer needs only to connect a card reader to a personal computer; he or she can make transactions such as inter-bank account transfer, bill payment, tax payments, and balance inquiries. Web ATM has all the functions of ATM machine except for cash withdrawals.

As of year-end 2006, a total of 34 financial institutions provided on-line tax payment services, 32 offered on-line fund transferring services, and 38 afforded Web ATM service with around 1.5 million cards readers distributing to the market. A total of transaction value registered NT\$ 13.4 billion and volume 0.24 million in 2006.

1.2.8 Mobile Banking

Mobile banking service was launched in June 2001. The Mobile Banking Sharing Center provides convenient mobile banking services by linking multiple telecom providers with multiple financial institutions. A customer needs only apply to a telecom provider for SIM cards with mobile banking functions and contact a financial institution to get set up for mobile banking. With the development of 3G technology, mobile banking transactions can be handled more quickly and safely. More and more people use 3G mobile devices today, so it is said that 3G technology is leading M-commerce to a new age. Furthermore, in the near future, the mobile handset is going to provide card reader's functions, therefore a customer can use microchip cards at any mobile handset with card reader's functions, and make transfers and other financial services at any time and anywhere. It will be like carrying a mobile ATM with you at all times!

As of year-end 2006, approximately 6 million SIM cards with mobile banking services had been issued, and there were 11 financial institutions, 8 security companies, 3 contracted telecommunication system providers and around 300 thousand subscribers used mobile banking services. Total transaction value in 2006 was approximated NT\$ 6.4 billion and total volume over 0.12 million.

1.2.9 The Bill Payment System

To implement the Executive Yuan's plan for a common payment platform to improve the Bill Payment Service, the Bankers' Association invited FISC and banks to roll out the Bill Payment System in 2004. The new Bill Payment

System integrates all kinds of payment systems, including ATMs, Internet payments, and mobile payments. Customers can use a savings account or financial chip card to execute online payments, with real-time account debiting, to pay phone bills, credit card bills, fines, taxes, utility bills, medical bills, insurance premiums, school tuition and fees, charity donations, building management fees, membership fees, cable TV bills, and more. The new system simplifies the processing of payments between government agencies, financial institutions, and corporations, providing consumers quick and convenient bill payment services. As of year-end 2006, there were 343 financial institutions and over 600 business firms using the new Bill Payment System. Total transaction value in 2006 was NT\$ 27.9 billion, and total volume was over 78.7 million.

1.2.10 Direct Credit and Direct Debit (ACH and On Batch)

On-batch payment system aims at developing the media transfer, e.g. tape, for mass routine payments. In the wake of Internet revolution, e-mail has been used in the FISC system since December 1998 to replace the old magnetic tape for faster and better commission payments. As requested by the Tax Bureau and other public/private business units, FISC offers tape media batch transfer services for tax, payrolls and dividend bonus payments and accounts management. The system started operation in September 1990. As of year-end 2006, a total of 363 financial institutions were participating in this system. The total year-round transaction was NT\$ 516 billion (by value) and 9.6 million (by volume).

The TCH has extended its service to the Automated Clearing House (ACH) since June 2002. The ACH network is based on the TCH's nationwide check clearing system through which public and private companies or organizations (originators) may authorise banks (Originating Financial Deposit Institution, OFDI) to collect funds or pay bills for their clients in regular routine payments, such as public utilities bills, cable access charges, credit cards bills, school tuitions for direct debit payments and payrolls, stock dividends, insurance premiums, pensions for direct credit payments. The balances resulting from the direct debit and direct credit will be transferred to the TCH for inter-bank exchange and clearance, after which, the net balances will be sent to the Bank for final settlement. In 2006, the total of collected funds was NT\$ 138 billion (by value) and 14 million (by volume), and total bill payments was NT\$ 469 billion (by value) and 14.6 million (by volume).

Figure 2-1
The Penetration Rates of Non-cash
Payments in ROC (Taiwan) – By Volume

Unit: Percent

	2002	2003	2004	2005	2006	1Q2007	2Q2007
Paper-based							
Cheques	11.762	9.992	8.065	6.257	6.181	6.044	5.833
Card-based	2.863	2.897	2.950	2.742	2.627	2.932	2.762
1. ATM cards	2.541	2.542	2.568	2.370	2.268	2.556	2.379
2. Credit cards	0.321	0.354	0.380	0.371	0.357	0.373	0.380
3. Debit Cards	0.001	0.001	0.001	0.002	0.002	0.003	0.003
4. E-Purse(MPSVC)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Electronic-based	0.356	0.593	0.836	0.836	0.938	1.002	1.095
1. FEDI	0.293	0.482	0.671	0.643	0.630	0.724	0.705
2. FXML	0.000	0.000	0.000	0.004	0.005	0.007	0.009
3. Internet Banking	0.002	0.003	0.003	0.004	0.003	0.100	0.109
4. Mobile banking	0.001	0.002	0.002	0.002	0.002	0.002	0.001
5. Bill Payment	0.000	0.000	0.001	0.003	0.007	0.003	0.018
6. On-Batch Media	0.059	0.079	0.094	0.076	0.134	0.007	0.010
7. ACH	0.001	0.027	0.064	0.105	0.157	0.160	0.243
Large Value EFT	85.019	86.518	88.149	90.164	90.253	90.022	90.310
1. CIFS	56.434	56.894	58.726	64.314	63.338	61.885	62.126
2. NIRS	28.585	29.624	29.423	25.850	26.915	28.137	28.184
Total	100	100	100	100	100	100	100

1.3 Current Structure and Outlook of E-payment Products

Figures 2-1 and 2-2 show the penetration rates of non-cash transactions in ROC (Taiwan).

Once upon a time, cash and cheques were widely used by people in ROC (Taiwan) in their daily transactions. However, handling cash and cheque transactions is costly, especially compared to the newly emerging e-payment instruments. In the course of payment innovation, payment in ROC (Taiwan) has transferred from paper-based to card-based and electronic-based instrument. During the period from 2002 to 2007, the penetration of cheque transactions decreased from 14.61 percent to 8.64 percent (by volume) and 11.76 percent to 5.83 percent (by value); while card payments increased from 78.98 percent to 81.33 percent (by volume), 2.86 percent to 2.76 percent (by value), and electronic payments increased from 6.41 percent to 10.03 percent (by volume), 85.02 percent to 90.31 percent (by value).

Figure 2-2
The Penetration Rates of Non-cash
Payments in ROC (Taiwan) - By Value

Unit: Percent

	2002	2003	2004	2005	2006	1Q2007	2Q2007
Paper-based							
Cheques	11.762	9.992	8.065	6.257	6.181	6.044	5.833
Card-based	2.863	2.897	2.950	2.742	2.627	2.932	2.762
1. ATM cards	2.541	2.542	2.568	2.370	2.268	2.556	2.379
2. Credit cards	0.321	0.354	0.380	0.371	0.357	0.373	0.380
3. Debit Cards	0.001	0.001	0.001	0.002	0.002	0.003	0.003
4. E-Purse(MPSVC)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Electronic-based	0.356	0.593	0.836	0.836	0.938	1.002	1.095
1. FEDI	0.293	0.482	0.671	0.643	0.630	0.724	0.705
2. FXML	0.000	0.000	0.000	0.004	0.005	0.007	0.009
3. Internet Banking	0.002	0.003	0.003	0.004	0.003	0.100	0.109
4. Mobile banking	0.001	0.002	0.002	0.002	0.002	0.002	0.001
5. Bill Payment	0.000	0.000	0.001	0.003	0.007	0.003	0.018
6. On-Batch Media	0.059	0.079	0.094	0.076	0.134	0.007	0.010
7. ACH	0.001	0.027	0.064	0.105	0.157	0.160	0.243
Large Value EFT	85.019	86.518	88.149	90.164	90.253	90.022	90.310
1. CIFS	56.434	56.894	58.726	64.314	63.338	61.885	62.126
2. NIRS	28.585	29.624	29.423	25.850	26.915	28.137	28.184
Total	100	100	100	100	100	100	100

Figure 3
The Life Cycle of Non-Cash Instruments in ROC (Taiwan)

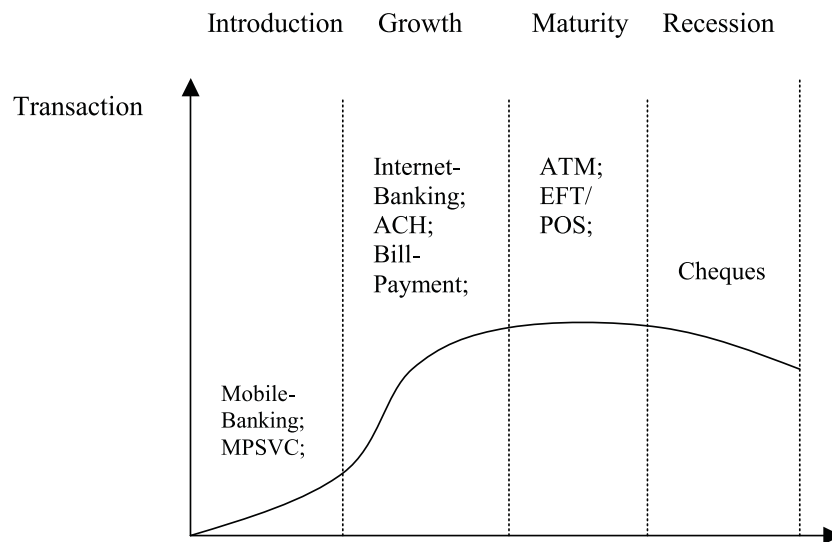


Figure 3 applies the S curve to illustrate the current life-cycle stage of payment products, as proposed by Porter (1980) and applied to bank payment services in Norway. The S curve shows the link between transaction growth for a given payment product over time. The location of different payment products on the S curve varies across countries due to many factors. We will explain these factors in the next section. We find that the S curve of Taiwan's e-payment products is quite a similar to that of Norway's. On the whole, today, the most widespread payment tools in Taiwan are ATM cards and credit cards. The number of paper cheques is declining year by year, both Internet banking and ACH services has increased, even faster than e-money products which are still in the embryonic stage stage.

Figure 4
The Framework of E-Payment Systems in ROC (Taiwan)

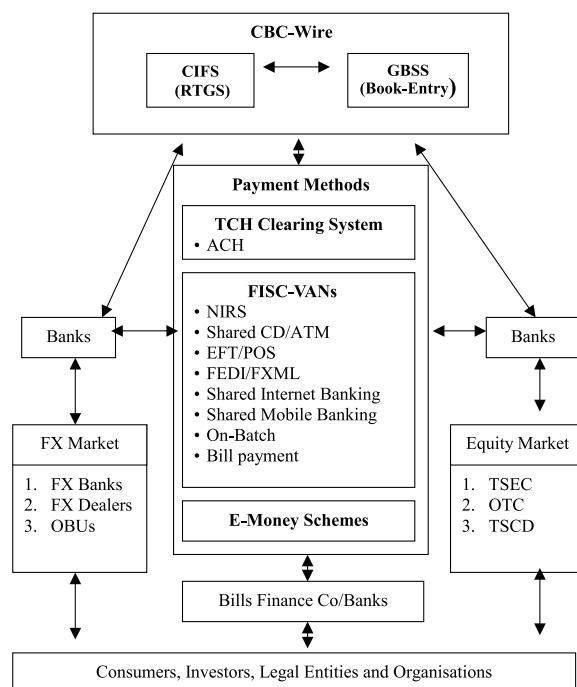


Figure 4 shows the framework of payment systems in ROC (Taiwan). With the extension of branches throughout the island country, most domestic commercial banks deployed their electronic intra-bank remittance system in the early 1980s; however, all payments involving inter-bank fund transfers must be processed through the following systems:

- **CBC-Wire:** operated by the Central Bank of ROC (Taiwan);
- **TCH Clearing System:** operated by Taiwan Clearing House;
- **FISC-VAN:** operated by Financial Information Service Co. Ltd;

In this sense, CBC-Wire, TCH Clearing system and FISC Value Added Network (VAN) together constitute the backbone of all inter-bank funds transfer systems. Based on these backbone systems, other e-payment systems stated above are developed one after another in order to fit in well with various payment behaviors. The driving force for the e-payment development is policy orientation for backbone systems, but market orientation and ICT advance for other retail e-payment systems.

For the purpose of system inter-operability, the competent authority once urged the Bankers' Association to compile a unified bank code/clearing code and encouraged system operators to develop a common message format for inter-bank fund transferring as well as to upgrade their information security systems to fit in well with on-line transactions. For example:

1.3.1 Common Message Format

- Develop the Multiple Payment related messages such as PAYMUL, DEBMJL;
- Develop the Direct Debit related messages such as DIRDEB, CREMUL;
- Develop the Amendment of Documentary Credit related Message, such as DOCAMR, DOCAMI, DOCAMA, DOCARE and related messages;
- Develop a common guideline for XML interchange at the beginning of year 2001;
- Convert message from UN/EDIFACT to SWIFT (MT100/103) format for EDI users.

1.3.2 Information Security System

- Upgrade RSA algorithm of digital signature's key length from 512 bits to 1024 bits;
- Use SHA-1 hash function instead of MD5;
- Add on the data encryption for the transmission of FEDI messages on Internet;
- Continue to leverage the existing infrastructure while adding higher level secure module or financial related system to provide more diversified services.

1.4 Key Factors Affecting the E-payment Development

What affects the e-payment development may vary across countries due to the maturity of the banking system and the level of economic development. In ROC (Taiwan), the following factors are supposed to be critical to the success or the failure of the e-payment development.

1.4.1 Positive Factors

- The readiness of ICT infrastructure: According to the Global Information Technology Report 2006-2007, published by the World Economic Forum (WEF), ROC (Taiwan) is ranked 13th in the Networked Readiness Index

(NRI) in which the readiness of individuals, businesses and government to use and benefit from ICT infrastructure ranks 7th out of 122 economies; the general environment for ICT (17th) and the actual usage of the latest ICT (13th). The well-developed ICT infrastructure provides a pillar to the development of e-commerce. Today, the Taiwan society has been developing into a ubiquitous network that integrates computers, mobile phones, Internet servers and other ICT devices into an information exchange connected network. Through this cybernetic infrastructure, the government, entrepreneurs and end-users in ROC (Taiwan) are able to get needed information by any device, at anytime and anywhere.

- The penetration and diffusion of e-commerce: To enhance the e-business capability of Taiwan's export-oriented supply chain, so that orders are received in Taiwan and production can take place anywhere in the world, the government authority has initiated a push on a series of projects, naming Projects ABCDE, since June 1999. Projects A and B aim to establish an e-business supply chain covering every stage from design to procurement and further to manufacturing. The aim of Project C, D, E is to ensure the provision of e-business services covering payment, accounts receivable management, on-line financing, global inventory management, delivery tracking and collaborative design services. The overall aim is to strengthen the global logistics management capability of Taiwanese industry and its competitiveness in international markets.
- The legal foundation for e-commerce: Taiwan financial authority promulgated "The Security Criteria to Handle Electronic Banking for Financial Institutions" in 1997, and "Electronic Signature Law for E-Commerce" in 2001. The former aimed to set up the minimum criteria regarding the security control and risk management for e-banking and to ensure on-line transactions to meet requirements of confidentiality, integrity, identification, authentication, non-duplication and non-repudiation. The latter aimed to give legal validity to electronic documents, and endows electronic media the equal legal status with those of paper-based media.

1.4.2 Negative Factors

- Rigid payment habit: Consumers who are familiar with the traditional payment media, like paper cash or cheque, might not easily change their habits into the e-payment instruments; likewise, merchants who prefer cash revenue might not be willing to accept e-money for service charges. In general, it takes a long time to change payment habits.

- Insufficient system inter-operability: The e-payment is made in the way of non-face-to-face transactions or in cyber space; its application is subject to the availability of terminal facilities and the inter-operability among different payment systems. For the moment, there is a lack of such an integrated system and platform for various e-payments to share.
- Frequent Internet frauds: The e-payment is transferred through Internet or cyber space, which may face a variety of challenges coming from internal and external threats, such as counterfeiting, tampering, hacker attacking, virus invading, personal data disclosing, and so on. Therefore, many consumers lack faith in many e-payment products.

2. The Impact of E-payments on Central Banking Functions

As mentioned in the previous section, e-payments mainly involve stored value product (value-based e-money) and access product (account-based EFT); both have their own ways to influence the functional performance of the central bank, especially on the seigniorage revenue and the effectiveness of monetary policies. Besides, e-payment development also brings business innovation as well as system integration to both payment and banking services.

2.1 The Seigniorage

E-money issued by the private sector may curtail the seigniorage revenues, and thereby erode the aggregates of both assets and liabilities in the balance sheet as well as lessen the capability of the central bank to implement large-scale daily open market operations for monetary stabilisation.

The central bank is supposed to be a unique supplier of banknotes and coins from which seigniorage revenues are secured to cover its operation expenses and coinage costs, and to pay the surplus into the treasury. Seigniorage can be estimated by multiplying notes and coin outstanding by the long-term rate of interest on government securities (a proxy for the return on central bank assets). The scale of seigniorage revenues varies across countries.

In ROC (Taiwan), only banks are allowed to issue multi-purpose stored value cards, the floating balances of e-money shall be required to deposit a fixed reserve at the central bank in accordance with the legal reserves ratio of passbook deposits, which is 9.775 percent for the moment. Currently, the issuance of e-money in outstanding amounts to NT\$ 40 million of which about NT\$ 4

million is involved in the base money, compared to existing required reserves balances NT\$ 1145 billion, it is obvious that e-money development in Taiwan is still far away from influencing the scale of Bank's open market operation and far from a menacing monster to the effectiveness of monetary policy.

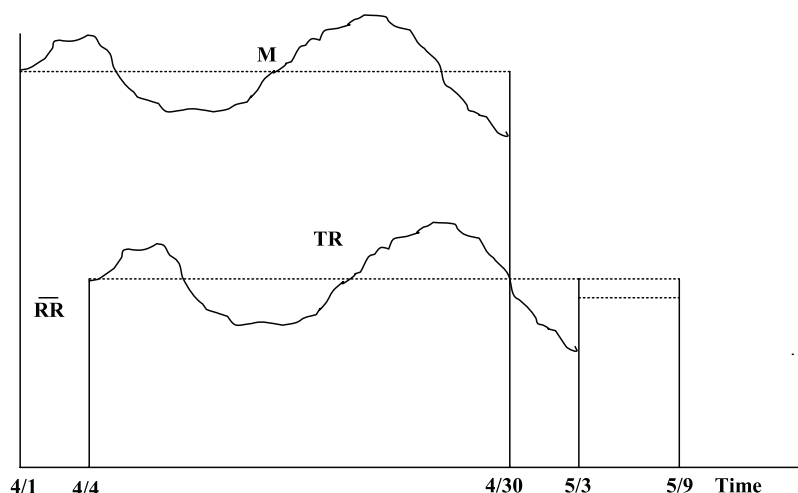
2.2 The Effectiveness of Monetary Policy

The monetary policy theoretically is based on the quantity theory of money, which assumes that the payment behavior is fixed or determined by market convention, so the relation between the demand for money aggregates and its determinants is a fundamental building block in most theories of macroeconomic behavior and is a critical component in the formulation of monetary policy. The central bank has the obligation of controlling money supply to meet the demand for money. Under this policy framework, a monetary target approach mainly focuses on the control of base money first, then monetary aggregates, finally the output and inflation. Another inflation target approach focuses on the determination of short-term interest rates and directly targets inflation stabilisation only.

In ROC (Taiwan), the Bank adopts monetary targeting approach to achieve its macroeconomic goals. The broad monetary aggregate, M2, is chosen as the intermediate target variable. The principle reason for the Bank to adopt monetary targeting lies in the fact that the demand for M2 remains stable and predictable so that it can be used to indicate whether the expected policy results will be realised and whether the ultimate goals will eventually be attained. In addition, under the regulation of legal reserve ratios, the Bank is able to leverage commercial banks' reserves-holding positions through its open market operation, to push or pull market interest rates up or down and to signal its policy stance being active, neutral or passive with the aim of stabilising the aggregate demand and containing the inflation expectation.

Figure 5 presents an average accounting strategy that the Bank regularly implements reserve requirement adjustment in the way of semi-lagged 3 days, meaning that the maintenance period partly overlaps with the calculation period but has 3 days of time lag and additional 6 days for practical reserves adjustment. In Figure 5, M, TR, respectively, represent the distribution patterns of monetary aggregates and total reserves positions in calculation vs. in maintenance periods, while M, RR and with bar line above represent the period averages level of monetary aggregates or reserve requirement balances, respectively.

Figure 5
Average Operation of Reserve Requirement Adjustment in ROC (Taiwan)



Commercial banks are allowed to deposit their required reserves with the Bank in an average accounting. That is, during the maintenance period, each commercial bank's total reserve balances (the period sum of daily positions) must equal to the product that multiplies an average balances of required reserve by the number of days in maintenance period. In ROC (Taiwan), every reserve accounts held by the commercial bank with the central bank is divided into A and B sub-accounts with a proportion of 45 to 55, where account A serves as a current account for the purpose of settlement, and account B act as a reserve account for reserve requirement adjustment. The Bank pays a fixed interest to the balance of account B, but none to account A. Under this mechanism design, it is the reserve account, instead of current account, that triggers the Bank's monetary policy. The main function of current account is designed to support the daily demand for liquidities needed to maintain the core backbone of national payment systems (including CIFS, NIRS and Cheque Clearing Houses TCH) in smooth operation.

One of the most desirable features in the conduct of the Bank's monetary policy would be the accessed product of e-payments rather than the stored-value e-money, if the e-payment indeed speeds up the monetary transmission mechanism and becomes more sensitive to systemic contagion effect in the payment system as a whole. According to William Pool's analysis with a stochastic augmented IS/LM model, if e-payment innovation brings about unexpected shocks to the monetary sector instead of real sector, then the central

bank would rather target interest rates than to control monetary base, otherwise, and vice versa.

For all that, a well-functioning and reliable payment system is a prerequisite for the effectiveness of monetary policy and for the efficient operation of financial markets. The market efficiency in the monetary economy is largely determined by the efficiency of the payment system. In another word, monetary policy cannot be implemented in the absence of payment systems, nor can it be implemented effectively without an effective payment system. Likewise, the monetary policy framework may itself affect the efficiency of national payment systems. On the other hand, payment systems are also linked to financial stability because financial instability can be transmitted through the payment system at a speed of the payment system used. When a participant fails to settle the payment obligation, financial instability may impinge on the payment system because a spark may cause a conflagration; the spread of contagion is in proportion to the scale of participation and transactions as well as the procedure of the risk control management. In the sense mentioned above, the monetary policy and the financial stability together provide further grounds for central bank to oversee national payment systems.

2.3 The Overall Integrity of Payment Systems

In ROC (Taiwan), an overall integrity of payment systems can be characterised as the evolution of automated banking and payment services, which falls into three phases as below:

- E-Giros: Each bank consolidates its branches' business lines from deposits, loans, and foreign exchanges, and integrates its accounting systems so the bank can offer its services with all kinds of banking functions via any business desktop.
- E-Payments: These e-giros pave the way to the "Shared ATM System" and the "Nationwide Inter-bank Remittance System" launched in 1987. The aims were to construct a nationwide financial service network for inter-bank electronic fund transfers and financial data exchange so that banks could share common resources, exchange payment instruments and forge overall automation of financial services.
- E-Finances: Since 1999, a series of projects naming A, B, C, D and E has been undertaken to facilitate the development of B2B electronic commerce,

including global logistics and banking finances. Global logistics mean global outsourcing and marketing to establish Supply Chain Management (SCM) for Enterprise Resource Programming (ERP) and Customer Relationship Management (CRM). Banking finances imply product and channel innovation in accessing banking and payment services, such as e-shopping, e-ordering, e-factoring, e-billing and e-invoicing services through channels of Internet banking and mobile banking.

The construction of e-payment systems is driven by an array of initiatives and reforms put forward by the public and the private sectors in a manner of collaboration.

- Establish a government task force to steer the direction of development, to programme the required infrastructure, and to support fundamental research;
- All beneficiary participants are encouraged to develop jointly the infrastructure for common use;
- The specification of system, both in hardware and software, is formulated to comply with an uniform standard, especially to upgrade international standard;
- Many users are able to access and share the common resource, such as ICT infrastructure and information, as open as possible;
- Encourage fair competition and consumer protection with respect to market mechanism.

The Bank used to play a leading role in the early development of large value electronic funds transferring systems. To advocate the development of retail payment systems, such as the shared ATM system, the shared Internet Banking system, and the shared Mobile Banking system, the financial authorities devoted themselves to the design and management so as to make sure these systems would be state sponsored, together developed, standard unified and resource shared. Since the early 1990s, the government has shifted towards fair competition and consumer protection with respect to market orientation. Technology neutrality with non-discriminate and functional equivalent principles applied to the payment innovation so that industry self-discipline and administration neutrality characterise the recent modernisation of banking and payment systems.

2.4 The Risk Identification and Analysis of E-payments

The business of payment services per se is credit and risk. Participants in e-payment systems are confronted with a variety of risks that must be identified and understood if they are to be controlled effectively. Several risks are identified in relation to e-payments; their determination or measurement is described in the following:

Credit Risk: Participants will not settle obligations either when due or at any time thereafter due to default or insolvency. Credit risk can be divided into the pre-settlement risk and the settlement risk. The former is also called replacement cost risk, that is, the risk of loss of unrealised gains on unsettled contracts with the defaulting participant. The replacement cost depends on the volatility of the transaction price and the amount of time that elapses between the trade date and the settlement date. The latter is sometimes termed principal risk, the risk of the loss of payments made to the defaulting participant prior to detection of the default.

Liquidity Risk: Participants will settle obligations late rather than at due date. The costs associated with liquidity risk depend on the liquidity of the markets in which the affected party must make its adjustments; the more liquid the markets, the less costly the adjustment.

Operational Risk: The risk arises from unexpected losses as a result of deficiencies in information systems or internal controls, for example, it may impair the system's ability to complete settlement, create liquidity pressures for system as a whole, curtail the system's ability to monitor and manage its credit exposures and result in errors, delays, or frauds in system operation.

Legal Risk: A risk arises from the failure of the legal system to support the rules and procedures of the settlement system. It entails the uncertainty of transaction enforcement and thus exacerbates other risks, such as credit or liquidity risk, relating to the integrity of transactions.

Systemic Risk: The failure of one participant renders other participants unable to meet their obligations when due. Such a failure may cause significant liquidity or credit problems and, as a result, might threaten the stability of financial markets and payment systems by transmission from one financial institution to another.

Different participants have their own manners to face settlement risks mentioned above. For example, consumers take a cautious look at the probability of frauds or counterfeits when do shopping. Merchants concern very much about credit defaults or deferred payments due to liquidity shortage. Banks and relevant payment service providers, such as some ISPs and ASPs, pay attention to maintain system in normal operation and do their best to resume business continuity as soon as possible when systems break-off. As far as the central bank is concerned, playing a triple role as a system operator, a regulator and a supervisor of the national payment systems, the Bank is obliged to watch all potential settlement risks of which the systemic risk is often placed as the first priority to overcome.

3. Policy Responses to E-payments

3.1 The Central Bank's Viewpoints on E-payments

As we mentioned previously, an e-payment system is de facto a cyber network consisting of IT servers, IC chips, fire-walls, tele-communication lines, TCP/IP, standards, rules, laws and regulations. However, from the viewpoint of banking industry, an e-payment system is a set of instruments, banking procedures and, typically, inter-bank fund transfer systems that ensure the circulation of money.

The development of e-payment systems includes a country's entire matrix of institutional and infrastructure arrangements and processes for initiating and transferring monetary claim in the form of commercial bank and central bank liabilities. Moreover, the development of e-payments help banks to combine the ICT with various payment services innovations. Many banks consolidate and integrate their front-end business lines and middle wares with back-office accounting systems for straight-through process purpose. Another help is to extend banking service channels from branch facilities to cybernetic visual realities so that clients may access banking service at anytime, anywhere and with any devices. These e-payment developments aim at enhancing payment and settlement efficiency, improving payment security and system performance. In this sense, an efficient and sound payment environment may also reflect the competitiveness power of a country's economy.

In ROC (Taiwan), cash and cheques are still widely used by people in daily transactions, but they cost banks much higher than e-payments in general. According to an estimate measured by domestic China Trust Bank, the service

costs of Internet banking are much cheaper than branch's desktop services. On average, it costs about one fortieth of the operation costs of a branch. Moreover, payment services revenues for some banks currently account for one-fourth to one-third total business revenues. This fact reflects that payment services now are as equal importance as other banking services. The Bank thus plays an active role to encourage domestic banks to move towards an overall development of e-payments so as to reduce the use of cash and cheques, to abate the operation costs and to increase the payment service revenues.

In line with the national project to forge ROC (Taiwan) towards an electronic, mobile and ubiquitous network society, relevant policies and objectives toward a cashless economy were made out to deepen the ICT infrastructures and their applications. The Bank's policy towards a cashless economy aims at developing an overall e-payment environment with security, efficiency and practice. An overall e-payment environment will cover all kinds of inter-bank transactions among customers, firms, government agencies and banks (including central bank). However, the first priority to the Bank will be put emphasis on large value and critical payment systems.

3.2 Policies on E-payments Development

To create a sound legal environment for electronic commerce, the financial authorities in ROC (Taiwan) have promulgated relevant regulations to pave the way for e-payment and e-money development, including:

- “The Central Bank of the Republic of China (Taiwan) Act” currently is revised and submitted to Legislation Yuan for approval. This new Act introduces an additional mandate to the Bank, that is, to assume a sound and streamline operation of national payment systems. Since the central bank acts as the lender of last resort and offers risk-free settlement assets for payment system, the Bank is thereby empowered to conduct payment systems oversight, whereby the Bank may require related institutions, legal entities and individuals to offer data or business reports regularly for examination. The Bank may also take prompt corrective action or impose a range of sanctions, when necessary.
- “Computer-Processed Personal Data Protection Law” put into effect on August 11, 1995, and later, on May 1, 1996, the “Enforcement Rules of Computer-Processed Personal Data Protection Law” was promulgated under the auspices of the Ministry of Justice. Both Law and Rules have wide-

ranging implications with regard to the collection, computer processing and usage of personal data in ROC (Taiwan). They are enacted to regulate the computerised processing of personal data so as to avoid any infringement of the rights pertaining to an individual's personality and to facilitate reasonable use of personal data. The legislation behind this Law mainly took reference to the "Eight Principles of OECD Guidelines" released in September 1980, the "Convention for the Protection of Individuals with Regard to Automatic Processing of Personal Data" drawn up and completed by the Council of Europe in 1981, as well as "Germany's Federal Data Protection Law".

- "The Security Criteria to Handle Electronic Banking for Financial Institutions" issued in May 1998. These criteria aim at setting up the minimum requirements for e-banking security controls, i.e. symmetric and asymmetric cryptographic algorithms that are commonly known as DES and RSA mechanisms, respectively. They serve to manage such security risks as alteration or duplication of information, repudiation of transaction, and fraudulent attack of information. When conducting electronic banking activities, banks are required to adopt appropriate prevention measures to safeguard critical data and processes through PC-based, network-based, or Internet-based channels. These operations must be done to meet the requirements for confidentiality, integrity, authentication, non-duplication and non-repudiation.
- "Standard Service Agreement of PC and Internet Banking" issued in May 1999, basically provides a sample copy of contract for banks wishing to engage in electronic banking with customers.
- "The Electronic Signatures in Electronic Commerce Law" issued on November 14, 2001 and put into effect on April 1, 2002. This electronic signature law is based on three principles: non-discriminate, function equivalent and technology neutrality, so as to give legal validity of electronic documents, and endow electronic media the equal legal status with those of paper-based media. These law is also applied to prevent possible illegal actions, but not against creative intentions. In another word, these laws shall not preset any regulation that imposes unnecessary burdens on the technology innovation.
- "Guideline on Consumer Protection in Electronic Commerce" issued in November 2001, reinforces the "Consumer Protection Law" to protect Internet consumers.

- “Regulations Governing Approval of the Issuance of Stored Value Cards by Banks” issued on 8 October 2001, permit banks only to issue SVC with multiple purpose functions. A prudential approach with minimum criteria requirements is adopted to regulate the issuance and governance of e-money suppliers under the existing framework of financial stability so that prevents the existing monetary institution and banking system from any potential negative impact, as well as avoids too early an interference with the development of e-money innovation.

According to these Regulations, non-banks are not allowed to issue multiple purpose SVC, but they can cooperate with banks for business promotion or system development and maintenance. However, they shall not touch the funds received from the SVC issuance.

3.3 Policies to Deal with Problems Arising from E-payments

Increasing Internet/Mobile network frauds challenge the capability of banking industry and financial authorities to fight against on-line criminals, for example, on-line bandits obtain pecuniary advantages with blind entry, dummy accounts, counterfeited cards, falsified ID code, and so on. Such activity is similar to taking one’s property away without breaking into one’s home.

Since many fraud events exposed the fact that magnetic stripped ATM cards and PIN passwords are easily counterfeited and sidelong recorded by criminal groups, the financial authority encouraged domestic banks to renew ATM cards by replacing magnetic strips with IC chips, which may use a onetime password to enhance the security of transactions (see Box 1).

Coping with these network frauds, the government authorities jointly establish an Anti-Fraud Consultation Center that set up “165 Anti-Fraud Hot Line” for emergency calls and consultation when people have suffered from or found out financial fraud activities in order to detect and contain the criminal behavior in time (see Box 2).

4. Future Directions and Plans for E-payment Development

The Bank devoted itself to reshape the payment system into a modern and well-integrated system with the capacity of inter-operability and straight through process. Playing a triple role as an operator of CIFS, a regulator of inter-bank payment systems and a catalyst to develop national payment systems, the Bank has made many efforts to strengthen the legal foundation, to reduce the settlement

risks and to improve the security, efficiency and accessibility of payment systems. To maintain a sound and streamline payment system, the Bank is going to assess the payment system starting from its CIFS to other Systematically Important Payment Systems (SIPSs).

4.1 The Central Bank's Efforts to Advance E-payments

- **Reshaping CIFS into an Overall RTGS for Improving System Performance:** Starting from September 16, 2002, the Bank has reshaped the settlement mode of its CIFS system from a mix of DNS and RTGS into a pure RTGS since 2002, with a view to shorten the payment float. In fact, the existence of payment floats exposes one party to an open position. Under the settlement mode of RTGS, payment orders are processed in manner of real time and on the basis of transaction-by-transaction. Payment float disappears, which implies more efficiency and less risk. The Bank also provides banks an intra-day liquidity, queue mechanism and throughput guidelines, together aims to streamline the payment flows in its CIFS system, and thereby improves system performance. Full collaterals are required for intra-day overdraft, which must be refunded no later than 5:40 p.m. at each business day. If banks carry the overdrafts over night, additional penalty will be charged besides the accrued interest rates payable.
- **Developing Nationwide Cheque-Clearing Network and Providing ACH Services:** To promote cheque-clearing efficiency and save floating time between cheque collection and exchange, the Bank urged the Taiwan Clearing House (TCH) to combine all local cheque-clearing houses into one whole. Starting from July 2002, TCH has developed a nationwide check-clearing network, which is mainly built on an end-to-end connection with Taipei, Taichung and Kaohsiung offices as regional hubs. It is designed to speed up the process of cheque clearance in manners of local exchange and national clearance and settlement. One salient feature of this network is one common system and three processing centers, which support the system and backup each other, and provide new services of Automatic Clearing House (ACH).
- **Establishing a Short-term Bill Clearing System and Linking with CIFS for D-V-P Settlement:** To promote short-term bills clearing efficiency, the Bank partnered with other financial authorities to set up a Task Force for developing the Short-term Bills Central Depository and Clearing System (BCDC) in March 1999. Later in August 2003, this task force organised the Taiwan Debt Instruments Depository and Clearing Co., Ltd DIDC to

establish and assume the system operation of BCDC, launched on 2 April 2004. Through linking BCDC with CIFS, the settlement of bills transactions is processed by means of Delivery versus Payment (D-V-P). This D-V-P adopts central bank money as a settlement asset to minimise the settlement risks in funds leg and adopts book-entry processing to improve the settlement efficiency in bills leg.

- **Urging Domestic Banks and Clearing Institutions to Report and Test Their Business Continuity Plans Regularly:** Since early 2000s, the Executive Yuan in ROC (Taiwan) has established a national information security system. The American (9/11) event exposed the vulnerability of financial infrastructure and the insufficiency of traditional information security. The Bank learned lessons from American (9/11) experiences and introduced the Business Continuity Planning (BCP), a set of Standard Operating Procedure (SOP) for emergency treatments and crisis controls, into ROC (Taiwan) in the middle of 2004. Coping with increasing internal and external threats and a deepening financial inter-dependency, the Bank now urges domestic banks and clearing institutions (including the Bank itself) to draw up and test their BCPs, and regularly submit their BCP documents and testing results to the Bank for examination.
- **Encouraging DIDC and TSCD to Merge into TDCC for Further Integration of Financial Markets:** Effective on March 27, 2006, DIDC (Debt Instruments Depository and Clearing) officially merged into TSCD (Taiwan Securities Central Depository Co., Ltd.) and is now recognised as Taiwan Depository & Clearing Corporation (TDCC). Until the time of merger, TSCD engaged itself in providing central custody, book entry as well as clearing and settlement services for equity and fixed income securities traded on Taiwan Stock Exchange Corporation (TSEC) and GreTai Securities Market (GTSM) in capital market, while DIDC undertook the same business functions for short-term bills exchange in money market. Besides, the Bank itself conducted another book-entry operation for the issuance and transaction of government bonds. In all, there had been three central depository and clearing systems that supported the smooth and sound operation of whole financial markets in ROC (Taiwan). With a movement towards cross-industry operations in Taiwan's financial sector, the business delimitation between securities firms and bills dealers has faded out little by little. There has been a steady increase of cross-selling in equity, bond and bill products in order to ensure a higher level of convenience for market participants, to expand service scope, and to keep up with the trend towards back-office integration among the world's leading capital markets. The financial

authorities in ROC (Taiwan) thereby decided that DIDC should be merged into TSCD. It was anticipated that the integration of settlement, clearing and central depository platforms would help to avoid duplication of investment, enhance business complementarities through the creation of synergy, and improve operational performance.

- **Considering to Provide Third Trust Parties to Access CIFS:** To promote settlement efficiency and reduce settlement risks in capital markets, the Bank commenced on 23 July 2007 to authorise TSEC and GTSM settlement accounts to access the Bank's RTGS system for clearing the stock swap between securities firms. Until the date, the cash leg of stock market was settled by Cathay United Bank, a commercial bank, with which the TSEC have a settlement account. Because the settlement asset is not central bank money, there exists potential systemic risk in this security settlement system. With a view to improve the efficiency of security settlement system and reduce the potential settlement risks, the Bank drew up the "Plan to Improve the Cash Leg of Security Settlement System" in 2005, and joined with the Financial Supervisory Commission to set up an Ad Hoc team implementing this Plan. After two-years of programming and implementing, this new arrangement has been launched on-line and CIFS has run smoothly since then.
- **Implementing Payment System Assessment to Comply with CPSS's Core Principles:** To carry out payment system oversight, the Bank has followed the CPSS's Core Principles to self-assess the compliance of CIFS. It plans to require other system operators to make the same self-assessment and to give reports to the Bank for scrutiny. Regarding those clearing institutions operating e-money systems, the Bank focuses on the robustness and soundness of the system's framework, including executive organisation, IT system technology, security controls, counterfeit-resistance, business operation guidelines, internal audit, inner controls, risk management, accounting procedures and contracted merchants management.

4.2 The Expected Challenges and Problems

Major challenges for the development of stored-value products are:

- **Payment habits:** e-money cannot be widely used by the public. The main reason is that e-money is still at the promotion stage in the payment market; its spread is subject to the consumers' habit, merchants' acceptance,

originators' reputation, and facilities' security. In general, there exists a chicken-egg dilemma in the marketing promotion of e-money. The consumer may suspend to apply for e-money until more merchants are accessible; the merchant may hold applications to participate in the e-money's business circle until more consumers participate.

- System inter-operability: the access of e-money is subject to the availability of terminal facilities and the inter-operability among different systems. There is a lack of an integrated system and platform for various e-money systems to share together.
- Information security: e-moneys are transferred through a cybernetic system, which may face a variety of challenges coming from internal and external threats, such as counterfeiting, tampering, hacker attacking, virus invading, personal data leaked or stolen. Most consumers thereby lack of faith in using e-payments.

Major challenges for access products (e-payments) development are:

- Banking accounts management: there exists many surrogate banking accounts that illegal organizations buy from weak-power people, such like homeless or unemployed men. In some cases, they apply for banking accounts in name of other people. Banks often compete to expand their clients but fail to adequately screen their clients' qualification. With the surrogate banking accounts, criminal groups may easily cheat money out of gullible people.
- Open system security: The e-payment is a de facto network system. Most inter-bank fund transfers are processed in a close system with a proprietor line; system security could be controlled by access criteria. However, for some retail payments, funds are transferred through an open system, like Internet or private owned value-added networks that may adopt certain security standards, such as SSL, SET or PKI, but the general public might have little idea about them. So, even though many people in ROC (Taiwan) have applied for their Internet banking accounts, their usage rate now is no more than 30 percent.
- Personal data protection: To provide universal banking under a framework of financial holding company, personal data are often exchanged among

affiliates for the purpose of cross-selling and strategic alliance. Sometimes business outsourcing might also disclose personal data information. In addition, many criminal syndicates hire hackers to plant Trojan into Internet banks to steal personal data, especially bank accounts number and PIN, so they can plunder one's pecuniary properties without breaking into one's door.

4.3 The Medium and Long Term Development Plans

In Respect of Robusting Legal Foundation:

- Revising the Central Bank Act and submitting to Legislation Yuan for approval

The CBC once amended the Central Bank Act that will entrust the Bank with an additional mandate to maintain national payment systems in sound operation and empower the Bank with more clear legal foundation for the oversight of payment systems. The revised Act will be put into effect when it has the approval of the Legislative Yuan.

In Respect of Reducing Settlement Risks:

- Linking CIFS with CGSS and moving toward a DVP system

The Bank's CIFS system had been reshaped into a RTGS system and is connected with the central deposits custody and clearing system for large value short-term bills in the settlement mode of delivery versus payment (DVP). The next step is to apply the DVP settlement mode to the Bank's Central Government Securities Settlement system (CGSS) by bridging the CIFS and the CGSS.

- Consolidating All Domestic Large-Value Fund Transfer Systems with the CIFS for Centralised Processing

To reduce credit risk and promote liquidity efficiency, other domestic large-value fund transfer systems will be further integrated into the CIFS system so that all large-value and critical payments shall be attributed to the Bank for centralised processing.

- Assessing the Cost and Benefit to Access the CLS System:

For improving cross-border payments and settlement, the Bank has set up an ad hoc team to assess the feasibility and the optimal timing to access the CLS system with NT dollar as one of the qualified settlement currencies.

In Respect of Promoting System Security:

- Reinforcing the Business Continuity Plan for Local SIPSs

The Bank has built and regularly tests its business continuity plan and is going to supervise and urge local SIPSs to reinforce their resilience for emergency and contingency controls;

- Enhancing Internal Control and Information Security

To combat fraud resulting from the lost of personal data disclosure, such as bank account numbers and PIN, financial authorities shall supervise and urge local clearing institutions to maintain robust internal controls and information securities.

In Respect of Improving Payment Efficiency:

- Promoting the ACH Service Market

To promote the efficiency and safety of micro-payments, the Bank now encourages Taiwan Clearing House to actively promote its ACH products.

5. Case Studies

Box 1: The Migration of ATM Cards from Magnetic Strip to Microchip

On 1 March 2006, the Bankers' Association in ROC (Taiwan) announced to effect an abatement using magnetic ATM cards to make inter-bank fund transfers as well as cash withdrawals, except keeping intra-bank functions. The aim of this announcement is to upgrade the security and functionality of card-based payments with microchips in place of magnetic strips.

In the past, many criminal organisations have often acquired the magnetic strip and PIN data on ATM cards to cheat victims of their money. Since magnetic strip card is relatively easy to skim and counterfeit, the Association set up a Task Force on 5 February 2001 to assume the conversion of ATM cards from magnetic strip to microchip and to work out inter-bank chip-card standards for all member banks' compliance. On 15 September 2003, financial institutions began bringing chip cards online. As of year-end 2006, a total of 43,506,717 chip-based ATM cards were in circulation, 24,346 ATM machines in function and 355 financial institutions participated in this service.

Furthermore, starting in 2007, the chip-based ATM card will be able to make purchase transactions online, and a customer needs only to enter a password, while no signature is required. So the whole purchasing process is handled quickly and safely. Today, more and more POS terminals are distributed into the contract merchants; the microchip ATM card is expected to be the most critical payment instrument in the forthcoming ubiquitous-network Taiwan societies.

One salient feature of the chip-based ATM card is the card-holder can access banking services via multiple devices such as ATMs, EFT/POS, Internet, cell phone, TV-MOD and personal computers, because the embedded IC chip can be used as a certificate of identity and can generate a one-time password to protect the security of every on-line transaction.

With the circulation of the chip-based ATM card, it brings Taiwan society one-step ahead of a cashless economy. For example, banks can offer their clients banking and payment services through multiple channels day and night all the year round. The cardholders can bring with them one card for all purposes, they need not carry too much cash or too many cards.

Box 2: 165 Anti-Fraud Hotline

To fight against increasing financial fraud and swindles, the financial authorities in ROC (Taiwan) joined forces with local police stations, Criminal Investigation Bureau (CIB), National Communications Commission (NCC), and National Police Agency (NPA) to draw up and carry out an anti-fraud programme, naming “165 Anti-Fraud Hotline”, which was launched in April 2004 to handle fraud cases. If people encounter any suspicious fraud activity, he/she can phone this hotline for assistance.

For the time being, CIB has 50 full-time operators to handle 40 service lines day and night and on average they receive 4500 phone calls per day requesting assistance. According to CIB statistics, the most common financial and telecom scams include: false notification of taxes refunds and undelivered mails; credit card and ATM card fraud; fake prize winning; false online sales and online payment traps, and cash withdrawal and advance from ATM with forged cards, etc.

These fraud cases exposed at least three loopholes in existing financial and telecommunication systems. They are: (1) Banks lack strict control and management in screening the public application for bank accounts; (2) Communication system providers can not detect the sources of fraud phone call due to the issuance of mobile SIM cards which allow their clients to call each other without showing the phone numbers; (3) Criminal syndicates often have cross-border collaborative teams who take advantage of every means to collect personal data information regarding bank account number and PIN, for example, theft, burglary, phishing, Trojan programme, and so on.

Coping with the above loopholes, NPA plans to enhance the functions of 165 Anti-Fraud Hotline and suggests the following reforms:

- Draft new rules penalising those who engage in the purchase and sale of bank accounts.
- Revise the Banking Act to authorise financial institutions to freeze accounts that display abnormal transaction records, so as to forestall criminals from swindling money from local residents.
- Closer cooperation between the police force across the Taiwan Strait to combat financial and telecom fraud perpetrators who set up operation sites in mainland China to execute scams in ROC (Taiwan).

Chapter 10

THE DEVELOPMENT OF E-PAYMENTS AND CHALLENGES IN THAILAND¹

by

Rungsun Hataiseree²

Introduction

The use of electronic payments (e-payments) has expanded rapidly in recent years, thanks to technological innovation and falling costs in computing and telecommunications. The spread of e-payment usage vary unevenly between countries partly due to differences in factors such as quality of regulatory framework and readiness of telecommunication infrastructure. New payment services based on the Internet and mobile phones proliferate in the advanced economies. The use of e-payments in the marketplace for retail payments, including the Electronic Fund Transfer at Point-of-Sale (EFTPOS), E-banking, telephone banking, Internet banking, E-debit, and E-money, has become a common and well accepted practice in the advanced countries that have extensive and well developed telecommunication network and infrastructure. In the some of the emerging economies, on the other hand, the pace and development of e-payments appear to be less clear.

It has been widely argued that Thailand's financial and infrastructure development has reached a point where e-commerce and e-payment systems are both technologically feasible, and are required for the country to remain globally

-
1. Country paper prepared for the SEACEN research project on "*Development of E-Payment and Challenge for Central Bank in SEACEN Countries*". An earlier version of the paper was presented in the workshop organized by SEACEN Centre during 13-14 December 2007. The author wishes to thank workshop participants, especially A. G. Karunasena, the Executive Director of The SEACEN Centre, and Vincent Lim, Project Leader, for their helpful comments. The author is grateful for comments received from senior staffs of the BOT and TDRI, in particular, Chim Tantiyaswasdikul, Sayan Pariwat, Somchai Jitsuchon, Jarinya Kaewmanee, Amporn Sangmanee, Roong Mallikamas, and seminar participants at the BOT seminar on 29 February 2008. Special thanks are also given to Raknaree Hlajuntug and Jittra Boonsiri for providing research assistance. The views expressed herewith are those of the author, and do not necessarily reflect those of the Bank of Thailand, with which the author is associated. The usual disclaimers apply.
 2. The author is a Payment Systems Senior Specialist, Payment Systems Department, The Bank of Thailand.

competitive (Payment Systems Roadmap 2004, 2010). The emerging consensus is that it is increasingly necessary for Thailand to respond to a rapidly changing economic landscape by using the newly developed technologies to enable e-commerce in general, and e-payments in particular. The establishment of the new e-payment gateway in July 2005, called the Thailand National Inter-bank Transaction Management and Exchange (ITMX), is a promising start. The ITMX is viewed as a milestone in the development towards electronic-based payments in this country, reflecting a full recognition of the need to put in place a common infrastructure capable of attracting a critical mass of business to use the newly created platform to a high standard (Rungsun and Sayan, 2006).

The implementation of a new fee structure for payment services/products on March 6, 2006, is another good example of an attempt in using pricing policy to stimulate a greater use of e-payment instruments in place of the traditional forms of paper-based payment instruments, such as cheques and cash. To be discussed in fuller detail, the fees levied on certain types of e-payment instruments/services have been adjusted downward significantly as compared with paper-based payment instruments.

At the institutional level, the Bank of Thailand (BOT) has fostered changes in the legal and regulatory framework to promote reliance on e-payments by consumers and businesses for retail payments. The enactment of the Electronic Transactions Act, 2001 and the recent proposal of the “Royal Decree Regulating E-payment Business” can be seen as a reflection of this fact.

While the use of e-payments may raise the efficiency of electronic media as a means of making payments, leading to an overall improvement in the country’s economic efficiency, the potential benefits need to be weighed against the threats posed by the increasing use of e-payments on the performance of the core central banking functions. The threats, as claimed in many circles, such as those reported in Banque De France (2001) and Arnone and Bandiera (2004), are the effects of e-payment innovations on seigniorage, monetary policy and overall integrity of the payment systems. The framework of monetary policy management, as can be argued, appears to be affected by the recent surge in the use of e-money products. The challenges confronting central banks, therefore, are not only directed at the attainment of “efficiency” in the payment system, but also the attainment of “stability” in the payment and financial systems. In view of this, central banks have the responsibility to ensure the fulfillment of both “efficiency” and “stability” of the payment system.

This paper deals with the experience of Thailand in moving towards the greater use of e-payment products/services and the challenges of the BOT in striking a balance between “efficiency” and “safety” of the nation’s payment system. In particular, we would like to share the experience of the BOT with respect to the implications of e-payments on the core functions of the central bank as well as the use of diverse initiatives or strategies regarding e-payments. Although the main emphasis of the paper is on Thailand, some references to the case of certain SEACEN member countries will be made, where appropriate.³

Essentially, the paper will address the following issues:

- (1) The extent of the development of e-payments in Thailand;
- (2) The relative importance and penetration of e-payments in selected countries;
- (3) Factors responsible for the promotion and/or hindrance of e-payment usage;
- (4) The BOT’s strategy for supporting e-payment development;
- (5) Implications of e-payment development on the central banking functions;
- (6) Challenge of the central bank in striking a balance between “efficiency” and “safety” in its management of the payment system.

Section 1 presents an overview of the e-payment developments in Thailand⁴, with particular reference to the e-payment systems operated by the BOT and a successful case of an e-payment product in the form of ORFT (Online Retail Funds Transfer). It also highlights a few aspects of e-payment development in some SEACEN member countries. *Section 2* analyses the implications of e-payment developments on the performance of the core functions of the central bank, especially issues related to the operation of monetary policy, the integrity of payment systems, and the stability of the financial system. It also discusses the strategies adopted by the BOT to help improve the effectiveness of risk management for e-payment products/services. *Section 3* provides a detailed analysis of the diverse initiatives or strategies regarding e-payment, particularly

-
3. The central banks participating in the SEACEN research project are (i) The National Bank of Cambodia, (ii) Bank Indonesia, (iii) The Bank of Korea, (iv) Bank Negara Malaysia, (v) Nepal Rastra Bank, (vi) Bangko Sentral ng Pilipinas, (vii) Bank of Papua New Guinea, (viii) Central Bank of Republic of China (Taiwan) (ix) Bank of Thailand, and (x) State Bank of Vietnam.
 4. Conceptually speaking, the term “e-payments” refers to “large-value payments” and “small-value payments” or retail payments. However, following the agreement reached during the first workshop in August 2007 in Kuala Lumpur, the emphasis of this paper is therefore given to “retail payments”. Loosely speaking, “retail payments” refer to most of the non-cash payments made by consumers and businesses, including cheques, credit/debit cards, direct credit/debit, Internet bill payment, and new types of e-payment mechanisms, such as e-money (e-purse). It follows that, in the Thai context, this excludes large-value payments such as those made through BAHTNET.

with regard to the use of pricing initiatives, the setting up of a new payment-gateway service of ITMX, and the recent efforts to put in place new laws and regulations governing the e-payment business service. It also addresses the factors that contribute to the promotion of e-payments as well as the obstacles that tend to hamper future progress of e-payment innovations. We conclude, in *Section 4*, with a brief discussion of the expected challenges and problems, as well as the medium- and long-term plans regarding e-payments.

1. Overview of E-Payment Developments in Thailand

This section will first provide an overview of the current status of E-payment penetration in Thailand. At the risk of over-simplification, the term “e-payments” used here is defined to include (1) e-money, (2) other innovative payment procedures, and (3) electronic access to traditional payment instruments. It is worth noting in this connection that cross-country comparisons should be interpreted with great care, as the definition of e-money tends to vary greatly from country to country.⁵ For more details of this, see, for example, Fullenkamp and Nsouli (2004).

1.1 Existing E-payment Services Operated by the BOT

Like in many other countries, payment systems in Thailand have undergone significant changes over the last two decades. The changes include the move towards an increasing reliance on the use of newly developed technologies to enable both e-commerce and e-payments. The BOT has over the past decade introduced e-payment systems as the basis for financial transactions and financial settlements.

As one can see from Figure 1, the current e-payment systems in Thailand can be broadly grouped into two main categories: (i) core e-payment systems and (ii) other e-payment products. Basically, the core e-payment systems refer to the systems operated by the BOT. This is a reflection that the BOT has a major role to play as a service provider. The systems include, for instance, BAHTNET (**B**ank of Thailand **A**utomated **H**igh-value **T**ransfer **N**etwork), SMART (**S**ystem for **M**anaging Automated **R**etail Funds **T**ransfer), and ECS

5. In Indonesia, for instance, ATM cards which are used for the purpose of cash withdrawals, not for payments for the purchase of goods and services, are often viewed as a type of e-payments. Likewise, the transaction volumes and values associated with this sort of ATM cards are incorporated into the definition of e-payment usage for Indonesia's case. Such a practice does not seem to be the case for some SEACEN member countries, such as Malaysia and Thailand.

(Electronic Cheque Clearing System). For other e-payment products, they refer to the systems operating by the private sector, including credit/debit cards, direct credit/debit, ORFT (Online Retail Funds Transfer), Internet banking, telephone banking, and mobile banking.

As is commonly called, the BAHTNET is an electronic fund-transfer system that is designed primarily for handling large-value payments (inter-bank, third party) on real-time gross settlement (RTGS) basis. The nature and main features of this system are in large part similar to those systems of RENTAS, MEPS, BI-RTGS, and CBC-CIFS currently operated in Malaysia, Singapore, Indonesia, and Taiwan, to name but a few. For more detailed description and analysis related to the BAHTNET system, interested readers are to refer to the following documents: (i) Sayan Pariwat and Rungsun Hataiseree (2004), (ii) Sayan Pariwat and Rungsun Hataiseree (2003) and (iii) Sayan Pariwat and Rungsun Hataiseree (2002).

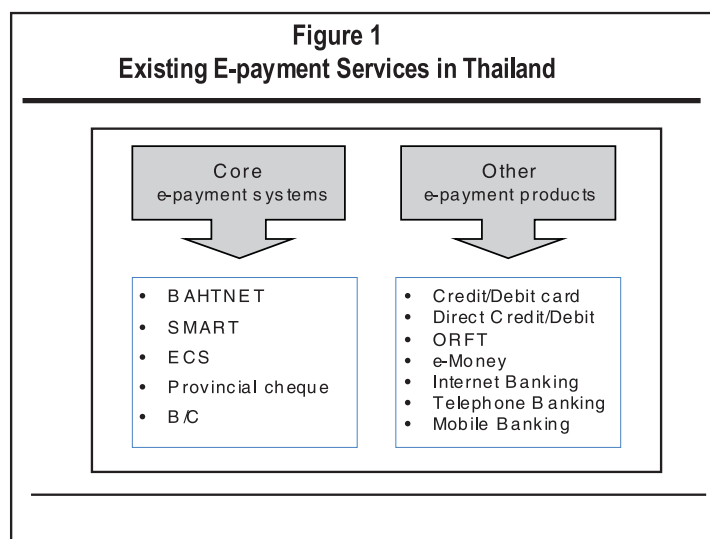


Figure 2 provides more detailed information with respect to the nature of e-payment system operated by the BOT as well as the year the respective system has been put into operation. As one can see from the figure, in the years 1995, 1996 and 1997, the BOT launched three major types of payment systems, namely, the BAHTNET, ECS and SMART systems. The primary objective is to accommodate the country's economic expansion with more convenient, quick and safe payment systems. In particular, the BAHTNET system has been

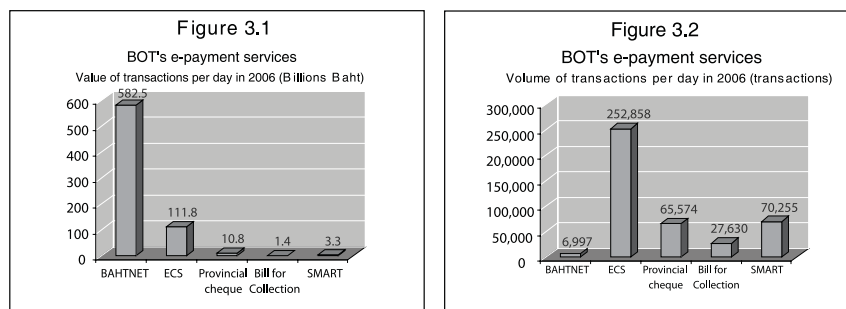
specifically designed for handling large-value financial transactions on the RTGS (real-time gross settlement) basis. It should be noted that, effective 15 October 2007, the SMART system is no longer under the BOT's operation. It has been transferred to operate under the National ITMX.

Figure 2 Payment Systems Operated by the BOT		
Type of services	Major features	Period in operation
<ul style="list-style-type: none"> • BAHTNET (Bank of Thailand Automated High-value Transfer Network) 	A large-value electronic funds transfer system (Inter-bank, Third Party) with RTGS transactions	May 24, 1995
<ul style="list-style-type: none"> • ECS (Electronic Cheque Clearing System) 	The system for electronic data presentment and clearing of inter-bank cheques in Bangkok and the metropolitan areas	July 16, 1996
<ul style="list-style-type: none"> • SMART (System for Managing Automated Retail funds Transfer) 	A small-value inter-bank funds transfer system	January 16, 1997
<ul style="list-style-type: none"> • Provincial Cheque Clearing 	The system for collecting inter-bank cheques within the province	September 15, 1997
<ul style="list-style-type: none"> • B/C (Bill for Collection) 	The system for collecting inter-bank cheques across the provinces	February 14, 2003

Source: Compiled from database of BOT's Payment Systems Department.

It should be noted in this connection that e-payment transactions through the BAHTNET system recorded the highest share, followed by ECS. As can be seen from Figure 3.1, the transaction value per day via BAHTNET and ECS accounted for around 431.2 billion and 102.3 billion baht in 2005, respectively. However, on the basis of transaction volume per day, financial transactions through the ECS, as shown in Figure 3.2, recorded the highest share when compared with other channels.

Figure 3
BOT's E-Payment Services



Source: Calculated from the data base of the BOT's Payment Systems Department

For a longer perspective, financial transactions via the BAHTNET system have, over the past decade or so, recorded the highest share when compared with some other types of the BOT's payment services. As shown in Figure 4, the daily average value of transactions via the BAHTNET system accounted for around 78.7 percent of the total value of transactions through payment services channels operated by the BOT. Second in importance in this regard is the payment channel through ECS, accounting for about 18.7 percent.

1.2 Current Developments of Other E-payment Products

1.2.1 Distribution of Cashless Payment Instruments

Apart from the e-payment channels provided by the BOT, there have been significant increases in the use of other e-payment channels offered by commercial banks and non-banks. As one can see, the latter type of e-payment channels is often used for the purpose of small-value fund transfers or micro payments. Chief among these include (i) credit cards, (ii) debit cards, (iii) e-money, and (iv) payment channels related to the Internet and mobile phones. For Thailand's case, as shown in Figure 5, the debit card (with the ATM withdrawer) has a leading share by payment instrument. It accounted for almost 39 percent of the total transactions of the cashless payments in 2006. Second in importance in this regard is the credit card, representing around 30 percent of the total. For example, in the case of Taiwan, the experience is similar. Judging from the penetration rates of non-cash payments in Taiwan, ATM cards recorded the highest share of around 46.5 percent in 2006, followed by credit cards of about 34.5 percent.

Figure 4
Financial transactions via payment service operated by the BOT

Value of Transactions per day (in Billion Baht)							
Payment systems	2000	2001	2002	2003	2004	2005	2006
BAHTNET	260.39	288.21	273.86	316.36	302.00	431.16	582.53
	70.39 %	80.69 %	77.87 %	77.68 %	74.43 %	78.73 %	82.07 %
ECS	102.56	61.71	69.33	81.00	92.00	102.30	111.83
	27.73 %	17.28 %	19.71 %	19.89 %	22.68 %	18.68 %	15.76 %
Provincial cheque	6.47	6.52	7.40	7.80	8.30	9.68	10.77
	1.75 %	1.83 %	2.10 %	1.92 %	2.05 %	1.77 %	1.52 %
B/C (Bill for Collection)	-	-	-	0.50	1.10	1.24	1.35
	-	-	-	0.12 %	0.27 %	0.23 %	0.19 %
SMART	0.49	0.75	1.12	1.60	2.30	3.29	3.30
	0.13 %	0.21 %	0.32 %	0.39 %	0.57 %	0.60 %	0.46 %
TOTAL	369.91	357.20	351.70	407.26	405.70	547.66	709.78
	100 %	100 %	100 %	100 %	100 %	100 %	100 %

Source: Calculated from the data base of BOT 's Payment System Department

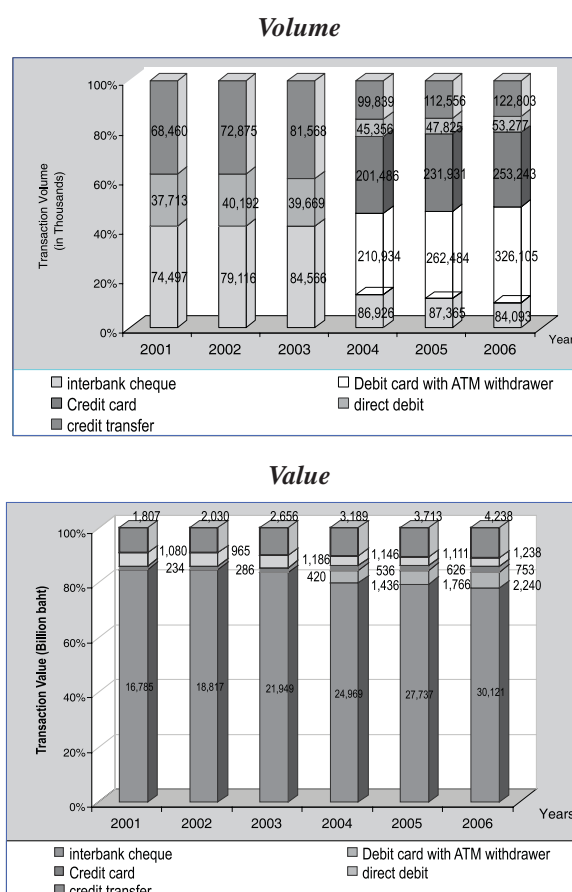
Noticeably, the share of debit card in terms of transaction volume of total cashless payments increased from around 32.7 percent in 2004 to nearly 39 percent in 2006. This rise in the debit card share appeared to be at the expense of certain types of payment instruments, especially paper cheques (reducing from 13.5 percent to 10 percent) and credit transfers (reducing from 15.5 percent to 14.6 percent). As will be discussed in greater detail in the subsequent sections, some of these new types of payment services, in particular ORFT, have experienced reasonably high growth rates over the past several years. This has, to some certain extent, contributed to a greater presence of e-payment in Thailand, when compared with some countries in the SEACEN region.

As the information in Figure 5 reveals, the usage of debit card (with ATM withdrawer) accounted for the largest share in terms of transaction volume. On the other hand, paper-based payment instruments, particularly cheques, have continued to take up the lion's share in terms of transaction value in retail payments. The share of cheques accounted for around 80 percent in the total value of non-cash transactions over the years 2004-2006, while debit card gained around only 5 percent during the same period.⁶

6. This may in part reflect the fact that debit cards are often used for conducting transactions for small- value payments. Cheques, by contrast, are normally used by businesses for making larger-value payments. Personal cheques with quite small-value payments remain in very limited use in Thailand.

Looking at the aggregate data reported in Figure 5, one can make at least two interesting observations. While e-payments have continued to grow over the past several years, paper-based payment instruments, notably cheques, continue to dominate, taking up the largest share of nearly 80 percent of the total value of non-cash transactions over the period of 2004-2006. Most of the e-payment instruments were used for the purpose of making small-value fund transfers and/or micro payments.

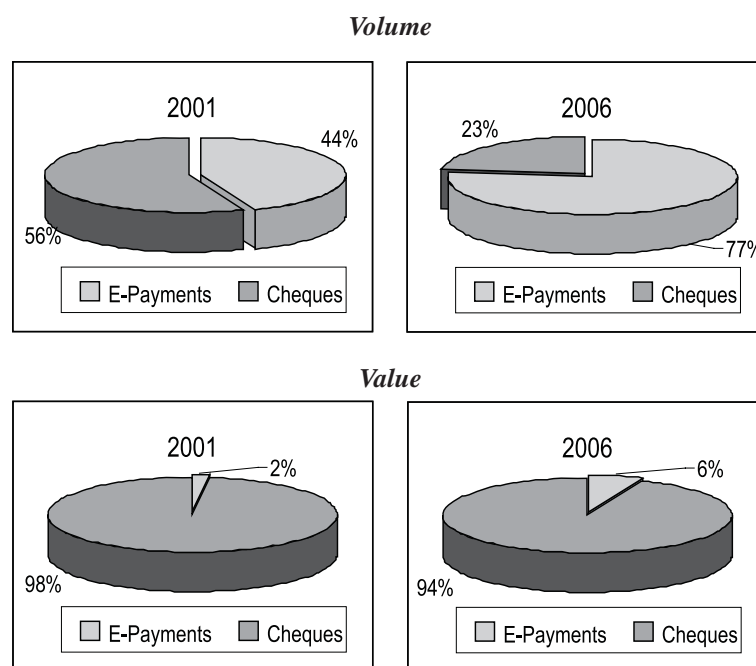
Figure 5
Distribution of Cashless Payment in Thailand



Source: Calculated from the data base of BOT's Payment System Department

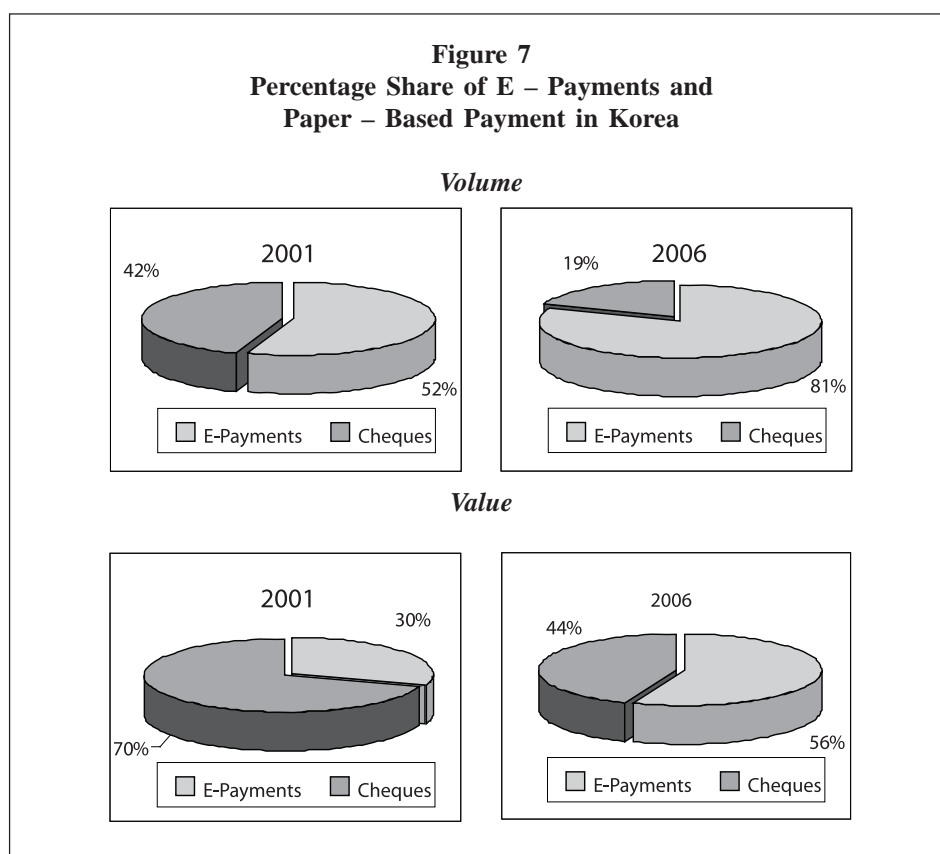
It is useful at this point to provide some reference to the experiences of some countries in the SEACEN region. In the case of Malaysia, although e-payment usage is on the increase over the past few years, the mode of payment by cheque is still significant in non-cash retail payments. According to the information in Figure 6, e-payments in terms of transaction volume have jumped from around 44 percent of the total non-cash transactions in 2001 to about 77 percent in 2006. The increasing usage of e-payments was at the expense of cheques which recorded a sharp decline from around 56 percent to 23 percent over the corresponding period. However, the development is less clear when looking at the figures in terms of transaction value. The share of e-payments of the total non-cash transactions recorded a marginal increase from around two percent in 2001 to six percent in 2006. Accordingly, it is evident that cheque use still dominates the retail payments in Malaysia when judging in terms of the value of the transactions.

Figure 6
Share of Non-cash Retail Payments in Malaysia



Source: Bank Negara Malaysia

Looking at statistics in Figure 7, Korea is probably the only country in the SEACEN region with the prevalent use of e-payments. As figures show, e-payments have currently surpassed the use of cheques as the preferred means of making non-cash payments.⁷ In volume terms, the share of e-payment amounted to 80 percent, while that of paper-based instruments accounted for only 20 percent in 2006. Similar observations can be made when considering in value terms, although the pace of growth tended to be relatively less pronounced, when compared with the former case. At the risk of oversimplification, the degree of e-payment penetration in Korea is much higher than in other SEACEN member banks.



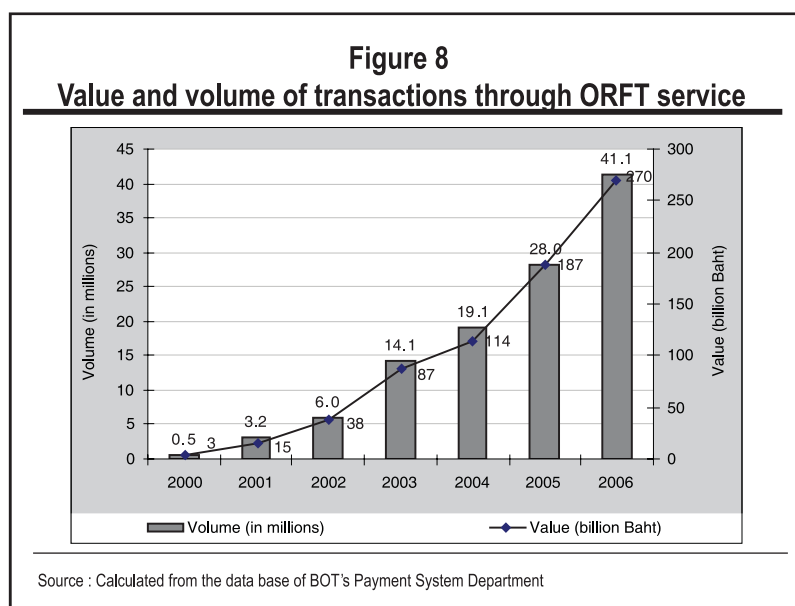
Source: The Bank of Korea

7. A similar experience is encountered in the case of the United States. According to the Federal Reserve Study, it was found that, for the first time ever, the number of e-payments, including credit card, debit card, and automated clearing house (ACH) payments, has exceeded cheque payments since the year 2003 onwards. See, for example, Kohn (2006) for more detail on this.

1.2.2 Sharp Rise in Online Retail Fund Transfer (ORFT) Service

It is perhaps useful in this connection to shed some light on Thailand's experience in the use of ORFT service via ATM networks. Basically, ORFT is a further development of the ATM system in which inter-bank retail funds transfer can be performed through an inter-bank network using the ATM platform. It is developed by the Thai Bankers' Association (TBA) on advice of the BOT. ORFT, as a kind of e-banking activity, enables a customer of one commercial bank to make retail-level funds transfer to a transferee at another bank on an online basis.

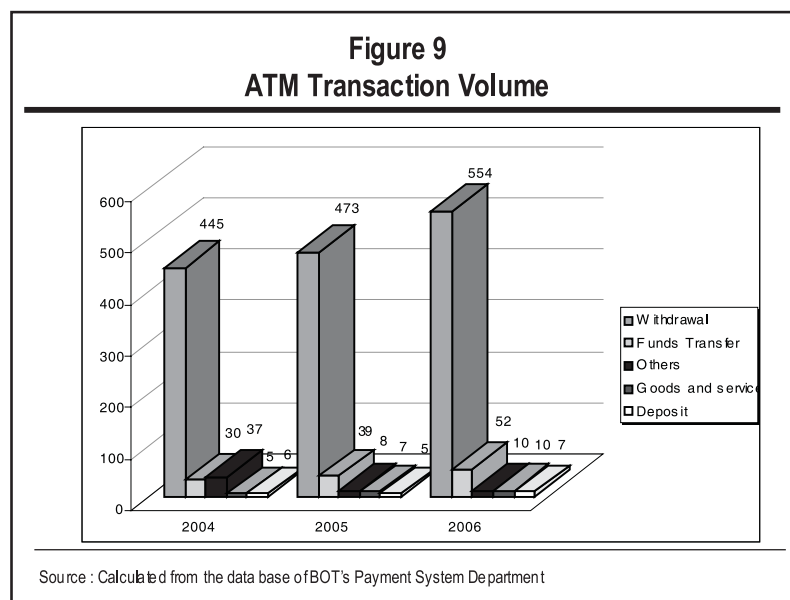
Since the inception in 2000, ORFT has grown remarkably both in terms of volume and value. As one can see from Figure 8, the ORFT transaction volume in 2005 was 28 million transactions, increasing from the year 2004 by 46.8 percent. Total value was 187 billion baht in 2005, increasing from last year by 64.0 percent.



More importantly, since December 2005, ORFT service has been enhanced to cover inter-bank funds transfer service via commercial banks' counters. The customers can use this service at any branches of the participating banks all over the country. The maximum amount of funds transfer is capped at 50,000 baht per transaction. This service is easy, quick and safe because the transactions will be confirmed by sending banks, which will provide immediate effects on the funds- receiving accounts through the online real-time system.

Interestingly, the volume of ORFT transactions via commercial banks' counters has grown more than ten-fold between December 2005 and May 2006. Specifically, the volume showed an increase from an approximate amount of 18,638 transactions in December 2005 to 202,908 transactions in May 2006. The new services seem to suit customers' needs, as reflected in the substantial increase in the volume of transactions. From December 2006 onwards, the maximum amount per transaction has been extended from 50,000 baht to 100,000 baht.

A closer look at the data of ATM transactions also provides very interesting observations in relation to the ORFT service. As one can see from Figure 9, although more than 85 percent of ATM transactions were in the form of cash withdrawals, the ratio of retail-fund transfer via ATM machines has been on a



consistently upward trend, rising from around two percent in 2001 to nine percent in 2005. Such an increase in the ratio seems to suggest a possibility of higher electronic-fund transfer via ATM cards. It is important to point out in this connection that inter-bank fund transfer (Online Retail Fund Transfer-ORFT) has been viewed as the most important component of retail fund transfers via ATM networks. The remaining components are internal fund transfers and fund transfers for goods and service payment via ATM machines, including bill payments and filling of funds for prepaid cell phone systems.

There is a similar experience in the surge of the retail fund transfers in some other countries in the SEACEN region. In Malaysia, for instance, the volume of fund transfers through the Interbank Giro (IBG)⁸, operated by the Malaysian Electronic Payment System (MEPs), has shown signs of rapid increase over the past several years. According to the Malaysia Country Report, the value per capita increased significantly from around RM 192.7 in 2000 to around RM 1,700.2 in 2006, reflecting a ten-fold increase during the mentioned period. Noticeably, the value of fund transfers via the IBG system was the second most important type of non-cash transaction, after cheques.

1.2.3 Nature Of E-money Usage in Thailand and in Selected SEACEN Countries

Like in many other countries, banks are not the sole service providers of e-payment. In the case of Thailand, some non-banking institutions have recently been able to develop new methods of e-payment. As shown in Figure 10, there are six non-banks offering e-payment services to their clients. They are (i) True Money Co. Ltd, (ii) PaySbay Co. Ltd, (iii) Payment Solution Co. Ltd., (iv) Advance Mpay Co. Ltd., (v) Advance Magic Card Co. Ltd., and (vi) Thai Smartcard Co. Ltd. Four of them are network-based, while the remaining firms are card-based. It does not include the card payment services provided by certain types of non-banks, particularly VISA card, Master card, and the like.⁹

8. There are three parties to the IBG system: remitting financial institutions, system operators of MEPs, and receiving financial institutions.

9. The term used here refers to certain type of private firms which are involved in the provision of payment services related to e-money business. Apart from the mentioned six non-bank firms, Siam Commercial Bank also takes part in providing e-money related services to its customers.

A number of products were gradually launched in the market by the above-mentioned companies in the past few years. One is “*Smart Purse*” by Thai Smart Card, which can be used for purchases and bill payments at 7-11 Convenience Stores and merchant stores participating as members. “*OK Cash*” card is another product launched by Payment Solution. It can be used for purchases and bill payments at merchant stores and food shops participating as members, and for fund transfer among smart cards issued by the company. Then there is e-money introduced by PaySbuy. It is a digital cash facility for storing cash on the computer of PaySbuy for fund transfers and bill payments via the Internet, such as payments for auctions, utility expenses, and downloads of ring-tones for cell phones, etc. For digital cash, customers can transfer funds from digital cash in the computer to bank accounts. Besides, there is also storage of money in the accounts of cell phone subscribers, such as “*m-Pay service*” by Advanced Info Service (AIS) Plc. “*Money Service*” by TRUE Money can be used for payment of utilities, as well as for bill payments at participating member stores, general stores, and some Internet shops.

Figure 10
Some Features of Six Non-bank Corporations

Company name	Card Based	Network Based	Date for license applications
Thai smart card Co.,Ltd.	✓		May 2005
Advance magic card Co.,Ltd.	✓		June 2005
Payment Solution Co.,Ltd.		✓	June 2005
Advance mPay Co.,Ltd.		✓	June 2005
PaySbuy Co.,Ltd.		✓	July 2005
True money Co.,Ltd.	✓	✓	August 2005

As of December 2006, the total value of e-money transactions by these six firms accounted for nearly 57,000 million baht. Around 90 percent of the transactions were in the form of filling funds for use in prepaid mobile phone systems, while transactions for purchase of goods and services are still negligible. This seems to suggest that the day of e-money usage as a substitute for cash has not yet arrived. Indeed, the outlook for e-money-related businesses appears highly uncertain. As reported elsewhere, e-money transactions in both volume and value terms experienced substantially negative growth rates in the range of 26 to 34 percent in the year 2007, when compared with those in 2006.

However, it should be noted that in some SEACEN member countries the issuers of e-money are solely commercial banks. In Malaysia, for example, the issuance of e-money was traditionally the exclusive preserve of banks. Apparently this is no longer the case since 2006, with a change in policy towards the new types of e-money. As one can see, non-banking institutions in Malaysia are now permitted to conduct the e-money-related business. In particular, Bank Negara Malaysia gave its approval for the launching of four e-payment facilities by non-bank firms in 2006. As mentioned elsewhere, these newly introduced e-money services provide consumers with additional payment methods for purchases on the Internet and the convenience of using mobile phones for payments.

At this stage, two of the most widely used e-money (e-purse) products in Malaysia are (1) "*Touch 'n Go*" and (2) "*MEPS Cash*". The first type of e-purse is in the form of card-based e-money, and can be used to make payments for toll fare, parking, and transport fare in Malaysia. The latter is a national card-based e-Purse/e-Money application, available in both Bankcard and MyKad (a government multi-purpose card issued by the National Registration Department). *MEPS Cash* was launched in 2002. The transactions of these two types of e-purse have recorded significant increase (rapid growth) over the past five years. Judging from the volume of transactions per capita, it can be clearly seen that E-purse came first among certain types of payment instruments, including, in particular, cheques, credit card, charge card, debit card, interbank GIRO, internet banking, mobile banking. The figure for E-purse in 2006 was about 16.0 units, followed by credit card and cheques of 7.8 and 7 units, respectively.

Like Thailand, e-money in ROC (Taiwan) can be issued by both commercial banks and non-bank private firms. The e-money in this country is loosely defined as "Multipurpose Stored Value Card" (MSVC) for making general micro-payments, which can be divided into card-based and network-based products.

Up to now, there have been three pilot e-money schemes offering e-money-related businesses. The first among these is “*FISCash System*” (card-based). The IC Card enables cardholders to purchase at contracted stores, make phone calls, and pay gas bills, to name but a few. The second scheme is “*Mondex-Taiwan System*” (card-based). The card system enables cardholders to pay taxi fares, buy lotto tickets, and make purchases at convenience stores. The last one is “*E-SUN e-Coin System*” (network-based). This *e-Coin system* was launched in February 2003 to provide customers with an online payment instrument, enabling customers to make micro-payments for on-line shopping purpose and for customers without having a real account with E-SUN Bank.

In a similar vein, the issuance of e-money in Indonesia is carried out by both commercial banks and non-banking institutions. Currently, there are four e-money operators authorised by Bank Indonesia. Two of them are commercial banks, while the remaining are non-bank private firms. At present, the non-banking institutions, as issuers of e-money, are dominated by telecommunication companies. This development is consistent with the situation in many other countries, such as ROC (Taiwan) and Korea. In part the well-established infrastructure and technology readiness in these countries have been widely accepted as critical factors contributing to the successful development of e-money-related activities. Broadly speaking, the type of e-money issued by the telecommunication companies is server-based e-money product, with using cellular telephone as a means for making payments. According to the statistics of Bank Indonesia, the number of prepaid cards amounted to around 126,211 cards, with the value of transactions being recorded at about IDR 591,356,572 as of September.

1.2.4 The Life Cycle of Non-cash E-payment Products

It is perhaps useful at this point to share some preliminary observations from a comparative study of the life cycle of non-cash e-payment instruments in Thailand, Taiwan, and Norway. The study was carried out by applying the “S-Curve” which was previously applied in the context of bank payment services in Norway.¹⁰ Figure 11 shows how the life cycle of each type of retail payment instruments and services has developed over the course of the years. Conceptually speaking, the products and services proceed through the life cycle phase from their introduction through the subsequent phases of public acceptance, growth, and, eventually, maturity.

10. For more detailed account on this, see, for example, Gresvik and Owre (2003).

As displayed in Figure 11, ATM cards and EFTPOS tend to be the most widespread e-payment tools in ROC (Taiwan), while Internet banking, ACH (Automated Clearing House) and mobile banking, relatively new types of e-payment mechanisms, have shown sign of continual increase. The latter types of payment products grew at a relatively higher rate, compared to other e-payment mechanisms, such as e-money and E-bill, which appear to be at the early stage of development. Noticeably, in Taiwan's context, paper-based products, such as cheques, have experienced a declining trend over the past several years.

In Thailand, certain types of e-banking activities encountered explosive growth. This is particularly evident in the case of ORFT. The exceptionally high growth of ORFT tends to suggest that the major characteristics of this sort of e-payment product are able to satisfy the common need of users. As alluded to in Figure 8, the value of retail-fund transfers through the ORFT system tended to be negligible, around 3.2 billion baht in 2002. However, the value of the transactions surged to about 41.1 billion baht in 2006, increasing around fourteen-fold when compared with the figure in 2002. Additionally, certain types of payment cards, in particular credit and debit cards, have experienced remarkably high growth rates in the recent years. On average, as can be seen from Figure 12, a card user made about 13 transactions per year using payment cards in 2006, a slight increase when compared with the card usage in 2004 and 2005.

Nonetheless, unlike in ROC (Taiwan) and Norway, the traditional paper-based payment instrument, the cheque, remains deeply embedded in the Thai payment system. As shown in Figures 5, 11, and 12, cheque usage accounted for nearly 80 percent of the total value of non-cash payments in Thailand. But, while cheque usage remains at an extremely high level in terms of value, its share is trending downward in terms of volume. As one can see, the share of cheques in volume terms has recorded a continuous decline over the past years, dropping dramatically from around 41.2 percent in 2001 to 13.5 percent in 2004, and to 10.0 percent in 2006.

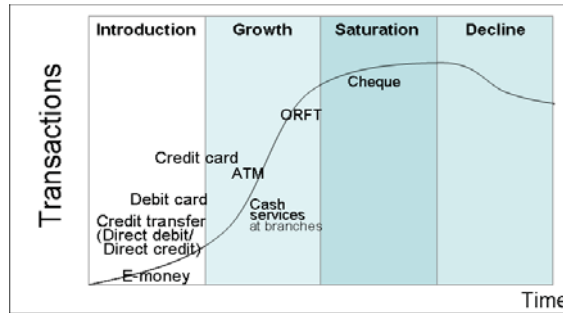
A closer look at Figure 11 suggests that the degree of e-money usage has not yet shown any prominent development when compared with some certain types of e-payment products. As one can see, the growth rate of the value of transactions for e-money products tended to be relatively lower than those of credit card, debit card, and Internet banking. Nonetheless, at the risk of oversimplification, the development of e-payments in ROC (Taiwan) and Thailand appear to be more progressive as compared to most of the SEACEN member countries participating in this research project, especially Indonesia, Vietnam, the Philippines, to name but a few.

In Norway, in contrast to Thailand and ROC (Taiwan), most of the e-payments instruments or products are widely used in retail payments and for a longer period of time. As one can see from the Figure 11, PC/Internet Giros and EFTPOS are the e-payments instruments that are in widespread use in retail payments in Norway. The EFTPOS, for example, has passed from the “growth phase” to the “saturation phase”. The use of cheques, on the other hand, is on the “declining phase”. Unlike in Thailand and Taiwan, there has been a sharp drop in use of cheques in Norway over the past few years, reflecting the growing substitution of cheques by e-payments.

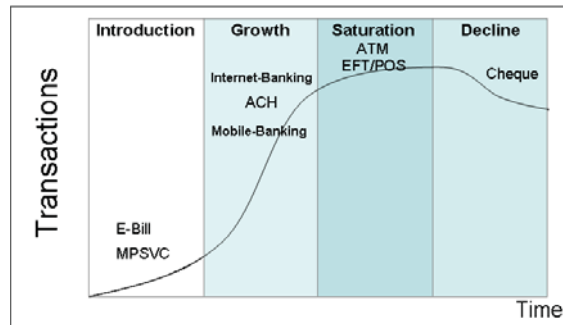
It should be noted that the most popular payment services tend to be found in the “saturation phase”. In this phase, as has been argued by Gresvik and Owre (2003), the services are used by “everyone”. In this stage, the users are familiar with the use of the services, and the technology is no longer a cause for concern. The quality of the services is stable and satisfactory, and some of the services may have surplus capacity. The service providers tend to rely less on the use of marketing incentives, and depend increasingly on price competition. At the same time, they tend to focus on the costs of providing such services. Most of the popular payment services may have remained in this phase for some time.

Figure 11
Location of Payment Service in the Life Cycle:
The Case of Thailand, ROC (Taiwan) and Norway

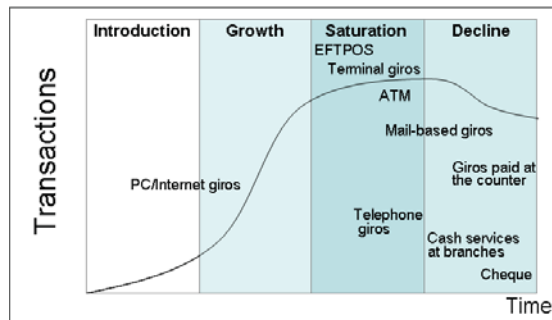
a) Thailand's case



b) ROC (Taiwan's) case



c) Norway's case



Note: Figures for Norway and ROC (Taiwan) are respectively based on Gresvik and Owre (2003) and Change (2007), while those of Thailand are the author's estimates.

Figure 12
Penetration of Cashless Transaction in Thailand

	Volume per capita					Value per capita (in thousand baht)				
	2002	2003	2004	2005	2006	2002	2003	2004	2005	2006
I. Paper based										
Cheques	1.26	1.34	1.40	1.40	1.34	299.6	348.0	402.9	444.4	479.4
	[6.2]	[6.9]	[2.8]	[0.5]	[-3.7]	[12.1]	[16.6]	[13.8]	[11.1]	[8.6]
II. Card-based										
Debit Card	-	-	3.39	4.21	5.23	-	-	23.1	28.4	36.0
	-	-	-	[24.4]	[24.4]	-	-	-	[23.0]	[26.8]
Credit Card	-	-	3.23	3.72	4.06	4.6	6.7	8.6	10.0	12.1
	-	-	-	[15.1]	[9.2]	[22.2]	[46.9]	[27.6]	[16.8]	[20.3]
E-money	-	-	-	-	3.80	-	-	-	-	0.09
	-	-	-	-	-	-	-	-	-	-
III. Automated										
ORFT	0.096	0.226	0.306	0.449	0.659	0.6	1.4	1.8	3.0	4.3
	[87.3]	[135.6]	[35.2]	[46.8]	[46.7]	[153.3]	[128.9]	[31.0]	[64.0]	[44.4]
Direct Credit	1.17	1.31	1.60	1.81	1.97	32.6	42.6	51.2	59.6	68.0
	[6.4]	[11.9]	[22.4]	[12.7]	[9.1]	[12.3]	[30.8]	[20.1]	[16.4]	[14.1]
Direct Debit	0.65	0.64	0.73	0.77	0.86	17.3	19.0	18.4	17.8	19.9
	[6.6]	[-1.3]	[14.3]	[5.4]	[11.4]	[11.9]	[9.8]	[-3.4]	[-3.1]	[11.4]
IV. Others										
Internet Banking	0.16	0.17	0.08	0.18	0.25	11.7	10.2	18.3	43.7	57.5
	[60.0]	[3.5]	[-52.9]	[127.8]	[39.5]	[8394]	[-12.7]	[78.6]	[139.0]	[31.6]
Mobile Banking	-	-	0.0004	0.005	0.006	-	-	0.012	0.010	0.006
	-	-	-	[1352]	[7.7]	-	-	-	[-16.5]	[-37.0]

Notes: (1) Figures in parentheses refer to year-on-year growth rates.

(2) Debit Card refers to debit card with ATM withdrawal.

(3) Data on SMART are included in Direct Credit.

Source: Calculated from the data base of the BOT's Payment System Department

1.3 International Comparison of E-payment Penetration

It can be seen From Figure 13 that Thailand is ahead of Malaysia and Indonesia in its peer-group category on e-payment usage. Using e-payment per person as a benchmark for cross-country comparison, the average e-payment usage per person for Thailand is approximately 11 transactions per person per year. This usage figure is relatively higher than the corresponding figures in some of the ASEAN countries.¹¹

11. In the recent study of international comparison of e-payment penetration, the authors have resorted to a variety of indicators in the measurement of the degree of e-payment usage among 13 countries in the sample groups. These include, for instance, (i) the ratio of card payments relative to GDP, (ii) mobile penetration (iii) degree of Internet usage, to name but a few. For a more detailed account on the subject of e-payment penetration, please see the recent paper by Rungsun Hataiseree and Jittra Boonsiri (2006).

Figure 13
E-payment Usage across Countries

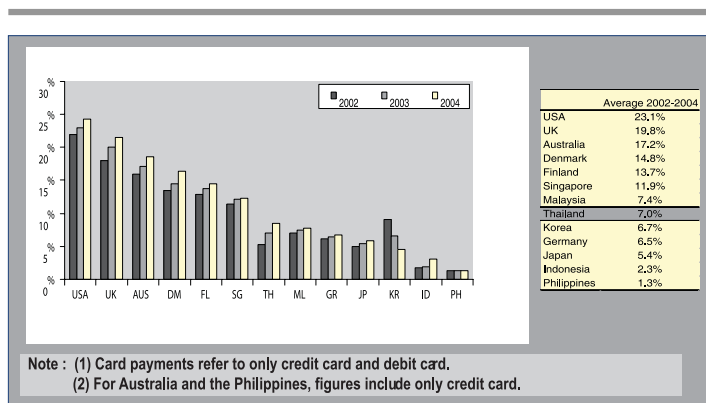
Countries	Cash & Coin / GDP	Checks per Person	E-Payments per person*
Finland	8.9 %	0.2	349.7 (1)
Australia	3.7 %	26.5	228.2 (2)
Germany	6.2 %	1.4	204.0 (3)
Denmark	3.6 %	5.6	194.6 (4)
USA	6.4 %	118.5	179.3 (5)
UK	3.4 %	35.1	178.3 (6)
Korea	3.2 %	26.7	118.9 (7)
Singapore	8.4 %	20.5	85.9 (8)
Japan	16.3%	1.2	29.7 (9)
Thailand	11.3%	1.4	10.9 (10)
Malaysia	6.4 %	6.9	6.4 (11)
Indonesia	5.5 %	0.3	0.4 (12)

Note: * Includes credit/debit cards, credit transfer/direct debits and EFTPOS.
No EFTPOS data for other countries, except Finland, Australia, Germany, Korea and Singapore.
No credit card data for Singapore, no direct debit data for Japan and Malaysia.
Data for Indonesia are 2003.

Source: Calculated based on Payment System Department database
(BIS, ECB Blue book, Central Bank's reports)

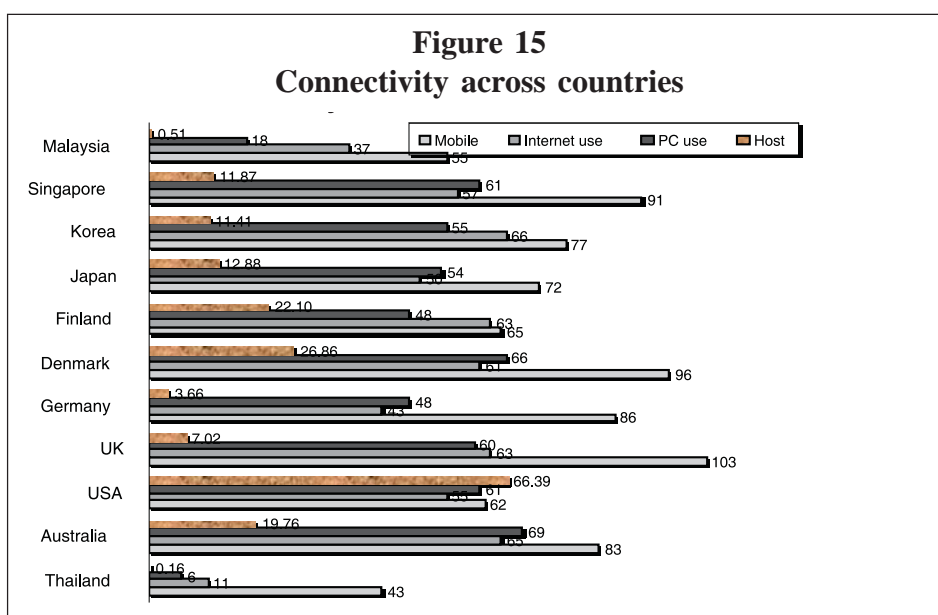
It is perhaps interesting to point out that similar conclusions can be made when certain types of benchmarks are used for making such cross-country comparison. From Figure 14, using “value of card payments relative to GDP,” the figure was about seven percent for Thailand, which is relatively higher than certain countries in the ASEAN region.

Figure 14
Value of card payment relative to GDP



Source : Calculated from Payment System Department database (BIS ECB Blue book, Central Bank's reports)

Using some indicators of e-payment penetration at the micro-level for cross-country comparison, we can conclude with a similar finding, as with the use of macro-level indicators. Applying “mobile phone penetration” and “Internet usage” as benchmarks, Thailand still performed reasonably well when compared with some of the ASEAN countries, except Malaysia and Singapore (Figure 15).



Note : Connectivity refers to the spread of new e-payment related services

Source : Calculated from Payment System Department database (BIS, ECB Blue book, Central Bank's reports)

2. Some Reflections on the Impact of E-payment on Central Banking Functions

2.1 Impact of E-payments on the Operation of Monetary Policy

In this section, we investigate the effect of the development of e-payments on monetary policy management and financial system stability. As has been reported elsewhere (see for example, Banque De France [2001] and Arnone and Bandiera [2004]), some forms of e-payments may create some impact on the demand for central banks' reserves and reserve requirements, thus causing the ability of central banks to influence short-term interest rate to be in doubt.

Apart from this, closer attention needs to be directed at the growing use of credit and debit cards in making retail payments. Such types of e-payment instruments, it can be argued, tend to be close substitutes for bank notes. It appears that the widespread use of certain types of e-payment instruments would speed up the velocity of narrow money, substituting the use of physical cash and, thus, influencing the central bank's monetary policy decision-making in the short term.

In view of this, the monetary authorities have to keep closer tabs on the development of the accessed products of e-payments, such as those related to e-money, like EFTPOS, E-banking, E-cheques, and on the development of card-based e-payment products, such as credit and debit cards. Care needs to be taken to determine whether the increased use of these types of e-payment products would speed up the monetary transmission mechanism through the prospective increase in the velocity of money and money multiplier. Additional attention is required to gauge whether the increased usage of such e-payment products would cause the local financial system to become more sensitive to systematic contagion during the period of an out-break of a financial crisis.

In Thailand's case, the preliminary evidence tends to suggest that the impact of e-payments on the operation of monetary policy has *not* yet created any serious concern on the part of the Thai monetary authority. This is partly because of the relative insignificance of e-money transactions in the money supply. As one can see from Figure 15, the percentage of e-money of the total supply of money (M1) accounted for less than one percent in 2006. It is important to note that the share of e-money appears to be much lower when the definition of e-money used refers only to the type of e-money activities that are exclusively used for "multi-purpose transactions". As revealed in the Payment Systems Report (2006), the value of e-payments using the latter type of e-money definition, which excludes figures on top-up cards, is reported to be in the approximate value of 5,530 million baht in 2006.

<p align="center">Figure 16 Likely Impact of E-payment on Central Bank Functions: Thailand's Preliminary Evidence</p>		
	Likely Impact	Some Supporting Evidences
<ul style="list-style-type: none"> • The Effectiveness of Monetary Policy 	<ul style="list-style-type: none"> • No significant impact • The current level of e-money use does not seem to pose a threat to the stability of the financial system. 	<ul style="list-style-type: none"> • <u>On Macro Level:</u> • Less than 1 percent of e-money in relation to M1. • No real evidence indicating a shift of the velocity of money • <u>On Micro Level:</u> • More than 90 percent of e-money was used in the form of topping up funds for mobile phone usage. • Negligible proportion has been used for transaction purpose to pay for the purchase of goods and services. • Lack of extensive use of some forms of cash substitution products, such as debit cards, e-purse
<ul style="list-style-type: none"> • Overall Integrity of the Payment System 	<ul style="list-style-type: none"> • No real concern 	<ul style="list-style-type: none"> • Continue monitoring the impact of e-money on safety and efficiency of the payment system; • Putting in place the requirement for the maintenance of the 100 percent float for e-money issuers at commercial banks.

As with many countries in the SEACEN region, the progress of the development of e-money in Thailand is slow. As pointed out in Section 1, e-money-related businesses are at their initial stage in most SEACEN member countries, particularly when compared with their development in the advanced economies. Indeed, some of the service providers of e-money find it increasingly difficult to cope with the relatively high fixed-cost of investment in light of the relatively slow growth in the demand for this sort of product/service.

As mentioned elsewhere, there appears to be *no* strong evidence to indicate that e-money would displace bank notes or the settlement services that are offered by central banks in the foreseeable future. In the Thai context, the pace of e-money businesses appears to be far from reaching critical mass. As pointed out in Section 1, there are currently six non-banks offering the e-money services.

Most of them started their operations either in 2005 or 2006, and their actual operation has shown that some of these firms are far from being successful. Indeed, some of them are expected to withdraw from the market place. A more detailed account of this can be read from the recent Annual Report of the Payment System Department.

More interestingly, as will be discussed in further detail in Section 3.1, consumers and businesses in Thailand have not yet perceived that e-money in the form of e-purse or stored value cards (SVCs) can compete perfectly with traditional currency for making payments for small transactions. From the users' standpoint, e-money is just only a *partial substitute* for currency. In their view, there are still substantial differences between bank notes and coins and e-cash. As often claimed, e-cash can be used for very small payments, does not grant anonymity to the parties involved, and bears a higher risk for the holder than central bank notes, since the issuers are not risk-free.

Under these circumstances, the threat of e-money usage on the conduct and implementation of monetary policy tends to pose *no* real concern for the Thai monetary authorities, especially with respect to the control of the targeted policy rates, e.g. the 1-day repurchase rate¹². The experience is similar in those countries where the e-payment penetration is relatively advanced. As pointed out in Freeman (2000), central banks would continue to influence the very short-term rate of interest, even in the situation where bank notes or the settlement services that are offered by the central banks have been fully replaced by e-money.¹³

Similar arguments are encountered in a recent paper by Arnone and Bandiera (2004). In their view, central banks can still retain control over short-term interest rates, as long as settlement takes places on the books of the central bank. Settlement of this kind, as it can be argued, would give rise to a positive demand for central bank money. Under these circumstances, the central bank can exert influence on the whole structure of interest rates by varying the interest rate on these overnight balances. By doing so, the central bank can exert influence on aggregate spending, the level of prices, and real variables. Additionally, as is claimed, financial institutions will have to consider the risks inherent in their liquidity positions and their ability to minimise settlement balances by buying

12. The rate was adjusted downward from 3.50 percent to 3.25 percent since 18 July 2007 onwards.

13. Apart from this, Freeman (2000) notes that e-money is unlikely to reach critical-mass usage and hence would have limited impact on the ability of central banks to influence interest rates. Also, many central banks have already placed less emphasis on monetary aggregates as indicators in the conduct of monetary policy.

or selling funds in the interbank market, given the rewards and punishment structure set by the central bank.

In light of the discussion, it appears there is no evidence to indicate the real impact of the stored-value e-money on the conduct of monetary policy at this stage. However, the situation may be significantly different with the issuance of e-money by non-bank private firms. In this case, the pace of e-money development may have adverse implications on the conduct and implementation of monetary policy, especially in the situation where the floating fund is not maintained at the commercial banks. This is partly because the e-money usage may potentially cause a reduction in the bank's deposit, thus affecting the total supply of money. In view of this, the monetary authorities may have to take into account the development of e-money products in the management of monetary policy in the period ahead.

2.2 Impact of E-payment on the Overall Integrity of Payment System

As alluded to above, the evidence so far shows that e-payments, in the forms of the accessed products of e-payments and the card-based e-payments, appear to have *no* significant impact on the conduct of monetary policy in Thailand. Given the growing volume of e-payment transactions over the past several years, as shown in Section 1, there is growing recognition among the Thai authorities about the *potential risks* of e-payment on financial system stability. Certain e-payment systems/services may carry potential risks due to the nature of their business model. Examples in this regard include the operational risks reflected in the failures of some non-bank institutions. The risks involved in the growth e-payment transactions may have an adverse impact on the entire financial system. This seems to be particularly so in the cases where the necessary regulatory measures and/or framework are not properly put in place.

As mentioned in Section 1, non-bank firms are allowed to offer new payment methods/instruments in the form of e-money. On one hand, this practice can be seen as a positive sign from the vantage point of encouraging competition and innovation. On the other hand, it may raise potential risks to the payment system. In view of this, the BOT, as a regulator, needs to put in place a regulatory regime that can address the potential risks. As is widely agreed, commercial banks and non-bank firms, as operators of these new types of e-payment products, face risks engaging in e-payment business. Among these risks are credit risk (credit default), liquidity risk (liquidity shortage), legal risk (legal uncertainty), and operational risk (system breakdown). The nature of these risks, as it can

be argued, tends to be somewhat different when compared with the risks faced by market participants in the large-value e-payment system such as BAHTNET.¹⁴

In response to the potential risks associated with e-payments, legislation was enacted to provide a legal framework to govern the conduct of the players in the e-payment business. Chief among these is the “Electronic Transactions Act of 2001” and the recent proposal of the “Royal Decree Regulating E-payment Business”. At the same time, the BOT has attempted to put in place a regulatory framework to support e-payment usage and foster “public trust”, especially with regard to the introduction of e-transaction law and e-documented law.

The BOT is well placed to monitor the development of e-payment activities. This is mainly due to its ability to collect data and compile statistics on e-payment transactions. Since the 2006, data on numerous kinds of e-payments have been publicly reported. It is now possible to have data on bill payments at bank counter, the use of e-money, the use of mobile banking, the use of internet banking, to name but a few.¹⁵

From a regulatory perspective, the BOT is in a position to put in place the regulatory measures aimed at containing the adverse effects from a growing use of e-payments. If the situation warrants, the BOT would consider introducing some of the following measures. These include, for instance, (1) enlarging the coverage of reserve requirement to include e-money, (2) introducing 100 percent float; and (3) setting ceiling on certain types of e-payment transactions.

The present framework for compliance with the legal reserve requirement has *not* yet included non-bank issuers of e-money in the calculation of legal reserve requirement. In case where the overall framework of monetary policy

14. As pointed out in the paper by Rungsun and Sayan (2002), the risk involved in the payments system can be broadly classified into 6 major categories: (i) credit risk, (ii) liquidity risk, (iii) systemic risk, (iv) FX settlement risk, (v) legal risk, and (vi) operational risk. The BOT, with the aim to support the smooth functioning of high-value fund transfers via BAHTNET, has initiated several policy measures to help reduce various types of risks involved, in particular, credit risk and/or systemic risk from the payment and settlement process. Of particular importance are: (i) the pricing incentive scheme to encourage an early transfer of funds, (ii) the so-called 30:70 percent measure, (iii) the high-value cheque migration, (iv) the use of credit balance from cheque clearing.

15. For more detailed account of this, see, for instance, (i) Rungsun Hataiseree and Jittra Boonsiri (2006), (ii) Rungsun Hataiseree, Don Nakornthab, and Jittra Boonsiri (2007), and (iii) Payment Systems Annual Report of the BOT.

management is affected by the recent surge in the use of e-money products, the monetary authorities have many options to mitigate the potential risks associated with such e-money activities. Among the options include the enlargement of the coverage for the ongoing components of the legal reserve requirements. Similar policy decision can be made for the case of the accessed products of e-payments, such as EFTPOS, E-banking.¹⁶

The evidence so far has shown that e-money and other forms of e-payment services/products do not appear to pose any real threat to financial system stability. Nevertheless, like many other central banks in the SEACEN region, the BOT finds it necessary to formulate a regulatory framework on e-money. The basic aim is to minimise the risks associated with e-money-related business to safeguard users' interest and instill confidence in its use. Example of the measures include: (i) management of float balance, (ii) management of fee charge, (iii) management of dispute resolution, (iv) management of data confidentiality, (v) introduction of IT security and control, and (vi) establishment of adequate governance and operational arrangements to ensure the integrity of the e-money facility.

As a regulatory requirement, a "float", defined as the value stored in advance by prospective customers of service providers for e-money-related businesses, is required to be kept as deposits at the commercial bank's account in full amount. It is also stipulated that this amount of funds has to be kept separately from other accounts. As part of the measures to safeguard the system from the associated risks, the BOT has stipulated that the "float" has to be reserved for the exclusive use of customers only.

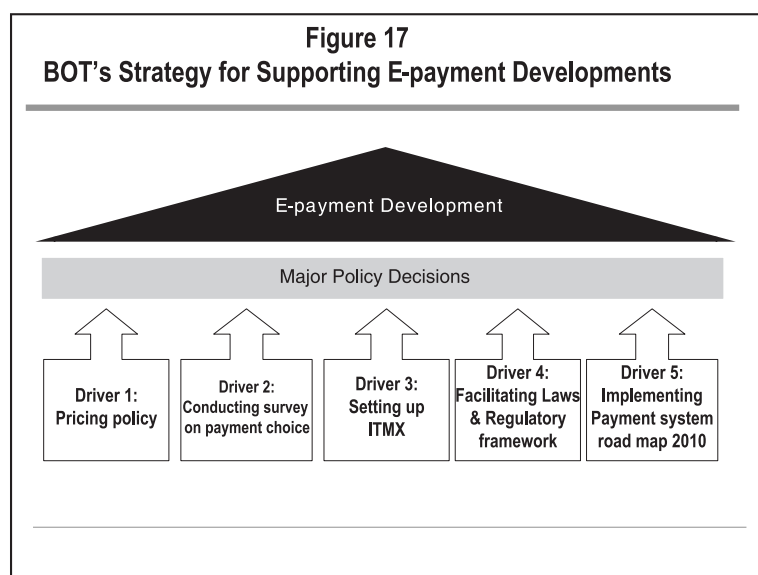
It is not surprising that no evidence has turned up indicating any adverse impact of e-payment development on the core functions of the BOT, especially with regard to the operation of monetary policy and financial system stability. Though the development and effect of e-payments may vary differ from country to country, the conclusions drawn by the Bank of Thailand, based on the available evidence, is consistent with the experience of the other central banks in the SEACEN region. This can clearly be seen from the Country Reports of the central banks participating in this SEACEN project.

16. It should be noted that some of these measures have been applied to some countries in the SEACEN region. As pointed out elsewhere, the Bank of Indonesia, for instance, has put in place the ceiling on certain types of e-payment transactions. For more detail, see Country Paper of Bank Indonesia.

3. Responding to New Payment Challenges Regarding E-Payments

The BOT has initiated numerous policy responses in relation to e-payment development over the past several years. The primary aim of these initiatives is to encourage greater use of e-payment by the market participants. The measures taken include:

- Growing reliance on the use of pricing policy to encourage greater use of e-payment;
- Conducting survey on payment choice by consumers and businesses;
- Setting up the New Payment Gateway Services of ITMX;
- Facilitating and fostering changes in legal and regulatory framework.



3.1 Growing Reliance on the Use of Pricing Policy

Like the central banks in many other countries, the BOT has over the past several years resorted to the use of pricing policy to stimulate increased use of e-payment products in place of paper-based payment instruments in the retail markets. A good example of this is the introduction of a new fee structure for different types of payment products, effective on March 6, 2006. Apart from using it as a means to promote greater use of electronic payment systems, the setting up of this new fee payment structure is also intended to reflect the actual costs of providing the payment services by commercial banks.¹⁷

Figure 18

New structure fees on payment service/product

Payment service	Old structure fees	New structure fees
Effective date from March 6, 2006		
Cheque	5 baht per cheque (inclusive of 3 baht stamp duty, service charge 2 baht)	15 baht per cheque (inclusive of 3 baht stamp duty, service charge 12 baht)
Provincial cheque (B/C)	20 baht per cheque (for each 10,000 baht, minimum fee is 10 baht)	10 baht per cheque (for each 10,000 baht, minimum fee is 10 baht)
ATM (On-line Retail Funds Transfer)	35 baht per transaction (for ≤30,000 baht)	25 baht per transaction (for ≤10,000 baht)
		35 baht per transaction (for > 10,000 to 30,000 baht)
Effective date from April 3, 2006		
SMART credit (Inter bank credit transfer)	10 baht per transaction (for ≤ 500,000 baht)	12 baht per transaction (for ≤100,000 baht)
		40 baht per transaction (for > 100,000 to 500,000 baht)
		100 baht per transaction (for > 500,000 to 2,000,000 baht)

As one can see from Figure 18, the fees on paper-based payment instruments have been adjusted upward to induce a shift towards a greater use of substitution payment instruments, such as e-payment products. For instance, fees levied on cheques were raised from 5 baht to 15 baht, reflecting an increase of around 200 percent, while fees on e-payment products, such as ORFT, were adjusted downward from 35 baht to 25 baht for transactions worth less than 10,000 baht.¹⁸

17. The BOT has approved a guideline for payment fees setting among commercial banks to reflect actual costs of services, and promote greater use of electronic media, with reduction in use of cheque and cash usage. The new payment fee structure among commercial banks has been in place since March 2006. The use of fee structure has, in fact, been successful in many countries, moving the whole economy to increasingly rely on electronic payment systems.

18. It should be noted that these new fees are the ceiling rates to be charged from the customers by commercial banks. In practice, each bank still retains the right to accordingly set out its rates deemed to be appropriated.

Although it is too early to conclude the impact of price changes, the preliminary data obtained thus far point to a favorable response by businesses and individuals to the price changes.

It is worth pointing out that price is only one of several factors determining consumer choice in using different types of payment instruments. According to a recent survey by the Payment Systems Department of the BOT, it is found that more than 85 percent of respondents from the business sector still prefer cheque as a payment instrument of choice. This is mainly because businesses perceive the cheque as the most convenient method of making payment to their trading partners. Apart from this, they also view that a cheque can provide documentary evidence in the event something goes wrong in the payment process.

The experience is similar to a large extent in the U.S. According to the recent survey by CHIPS (the Clearing House Interbank Payments System) and Fedwire, more than 80 percent of the volume of all corporate payments is still made with cheques in spite of the fact that most companies use both cheques and wire transfers.¹⁹ This finding points to the need to be more cautious in the use of pricing policy alone in the changing of consumer choice.

Like in many other countries, the structuring of service fees is part of an overall package in marketing the use of different types of payment instruments. For Thailand's case, the implementation of the new fee structure was seen as a means of promoting reliance on the use of e-payment instruments. However, the surveyed results seem to provide little support for this claim.

Against the increasing trend in the use of e-payments, the usage of paper-based payment instruments has shown signs of declining. This is particularly so for cheques, which recorded a reduction of around three percent in the first ten months of this year as compared with the same period of last year. The increase in the cheque processing fees from 5 to 15 baht in early March this year has been viewed as a major factor contributing to the decline in the use of cheques. Such a reduction in cheque usage is in line with our "National E-Payment Strategy," which aims to reduce paper-based payment instruments in Thailand's payment system.

19. For more detail, see New York and Clearing House Survey (2007).

3.2 Conducting Survey on Payment Choice by Consumers and Businesses

It is useful from the policy makers' point of view to identify the main trends in the payment choices of consumers and businesses. At least, it would reveal valuable information on the factors influencing the use of different payment instruments (cash and non-cash) in the retail payment sector at a micro-level. The BOT made its first attempt in 2006 to carry out a survey on the payment methods and transaction value among groups of businesses. The survey was conducted during the fourth quarter of 2006. It comprised direct interviews with the senior staff and/or executives of the companies taking part in the project. The survey covers seven groups of businesses: (i) Insurance, (ii) Media, (iii) Retail, (iv) Public Transportation, (v) Education, (vi) Financial Market Transaction, and (vii) Government. This survey is probably the first of its kind in which Thai businesses were asked to indicate the views on the pro-and-cons of paying in cash, by debit card, e-purse and credit card in specific POS (Point-of-Sale) situations.²⁰

The results of the survey, as summarised in Figure 19, provide some useful findings on the behavior of businesses in making payments. *First, is the prevalent use of paper cheques and cash by most of the business groups in making payments.* In the insurance industry, for example, paper-based payment instruments are dominant, both in terms of incoming and outgoing payments. More than 90 percent of incoming payments were paper-based payment instruments. Of this amount, around 80 percent was in the form of cash, while the remaining 18 percent was by cheque. The same finding could be observed for the outgoing expenses of the industry. A closer look at the figures of the other business groups yields similar conclusions as in the insurance industry, though the pattern between cash and cheque between may vary.

20. The second survey is planned to be carried out in 2008. The coverage of the second survey includes the following six sectors: (i) Leasing, (ii) Public Utilities, (iii) Health Care, (iv) Manufacturing, (v) Agriculture, and (vi) Cash Management.

<p style="text-align: center;">Figure 19 Some Reflections on Payment Choice by Businesses in Thailand</p>						
Business type	Incoming payments			Outgoing expenses		
	<i>Cheque</i>	<i>e-payment</i>	<i>cash</i>	<i>Cheque</i>	<i>e-payment</i>	<i>cash</i>
•Insurance	18%	2-3%	80%	80%		
•Media	90%	9%	1%	Almost 100%		
•Retail		30%	70%	30%	70%	
•Public Transportation	15%	5%	80%	Around 50%	Around 50%	
•Education			Mainly cash	Mainly cheque		

Source: BOT survey on payment choices by businesses in Thailand.

Note: Figures provided here should be viewed as an indicative.

The finding that the mode of payment by cash is most preferred in the retail sector is not totally surprising. As pointed out in many circles (see, for example, Sayan and Rungsun [2003], Taylor [2006]), the persistent reliance on cash as a means of payment can be explained by its unique qualities which, in combination, need to be surpassed by other types of payment instruments. These include, (i) convenience, (ii) liquidity, (iii) protection of privacy, (iv) legal tender, (v) payment finality, (vi) confidence and acceptance. It is a common practice in the restaurant business in Thailand for most entrepreneurs to deal in cash. As is widely practiced, payment on cash terms is subject to a relatively higher discount of 10 percent, whereas the discount is five percent for payments by credit cards. Such a business practice tends to highlight the importance of “liquidity” as perceived by business sector.

Second, there is some evidence to indicate that some forms of e-payment products/services, particularly Pre-authorised Direct Credit, are used extensively in certain sectors (e.g. retail sector). From the surveyed data, there is increasing evidence to show that a variety of companies’ expenses are made via SMART. Although salary payments continue to be the prime item for payments through SMART, other expense items, like rents and reimbursement for hospital claims, are increasingly paid out through this channel. It is important to point out that most of businesses under review tended to show that credit transfer via the SMART system is increasingly a popular payment mode by far for salary payments.

Third, as claimed by most of the surveyed businesses, both the price and non-price factors have been cited as attributing to the low degree of substitution of paper-based payments by e-payment instruments. The most cited non-price factors are (i) lack of acceptance in the use of e-receipts or e-documents as legal evidence by the relevant government agencies, such as the Revenue Department, (ii) low degree of inter-operability, especially it cannot be cross-used among the service providers, (iii) low degree of common standards on technology and security, (iv) relatively well-established legal framework for the use of cheques, (v) security concern, especially those related to the frauds problem, (vi) network instability.

The above-mentioned factors are often cited as hindrances to the usage of e-payments. The relatively lower cost of using cash and cheques has often been cited as one of the major factors attributing to a higher use of paper-based payments instruments. The relatively cheaper processing fees for cheques in relation to e-fees are viewed as the price factor contributing to the lower use of e-payments. This is the rationale for the upward adjustment in the processing fees for cheques, as indicated in Figure 16. As has been claimed in many circles, the recent introduction of new fee payment structure may have provided an unclear signal for certain groups of people, for example, as in the upward adjustment of the fees for using the SMART system from 10 baht to 12 baht for transaction amount less than 100,000 baht.

Fourth, cash usage is prominent in some certain sectors, such as public transportation and education. Although cash is the most traditional means of discharging an obligation, the surveyed results show that the businesses offer their customers the option of paying by other means other than by cash. Indeed, the finding that payment by cash is still predominant in retail payments by consumers seems to be consistent with the overall macro-picture of the country. As one can see, the cash usage in relation to GDP in Thailand was in the range of 8.16 to 9.22 percent in the years 2000-2006²¹, compared with three to four percent for the advanced economies. As pointed out in Rungsun and Sayan (2005), the extent of cash usage in Thailand is relatively high, compared particularly with certain countries in the advanced economies. The relatively high cash-to-GDP ratio and extensive withdrawals from ATMs can be seen as

21. The ratio of cash-to-GDP dropped significantly to 8.35 percent in 2006, compared with 9.00 percent to 9.22 percent during the years 2002-2004. While such a decline may suggest a positive outlook with regard to the strategic move towards the reduction of cash usage, as advocated in the Payment Systems Roadmap 2010, it may be premature to draw any clear conclusion of any change of preference in the choice of payment methods by consumers and businesses.

the evidence of high usage of cash. This suggests that, like many other countries, cash remains an important payment instrument in Thailand.

However, one should be very careful when comparing the extent of cash usage among countries participating in the SEACEN research project. Cambodia, for instance, is widely recognised as a cash-based economy, yet the cash-to-GDP ratio of Cambodia was reported to be only around three to four percent. This tended to be much lower when compared with the figures of other SEACEN member countries, including Thailand, Korea, and ROC (Taiwan), to name but a few. Nonetheless, a closer look at the figure of Cambodia's cash-to-GDP ratio reveals that the statistics of cash usage does not include payments by US dollar. The US dollar is in widespread use in making daily payments in Cambodia. According to the estimates of the National Bank of Cambodia, the use of US dollar in making daily payments comprise more than 85 percent of the total cash in circulation.

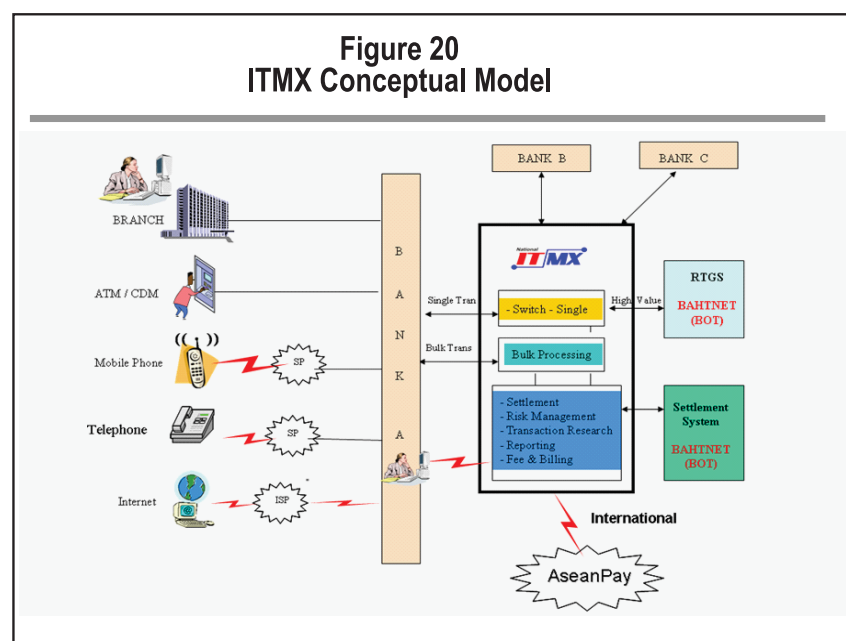
Fifth, there appears to be no symmetry in the payment pattern with regard to incoming payments and outgoing expenditure among the business sectors under review. One can see this clearly in Figure 19. The public transportation sector, for instance, receives more than 80 percent of its revenue in cash, while, for payments, about 50 percent its outgoing expenditure are paid by cheques and another 50 percent by e-payments. This reflects in part that the public transportation sector manages their fund to fit to the overall framework of the fund management.²²

3.3 Setting up the New Payment Gateway Services (Thailand National ITMX)

It has been widely accepted that the establishment of an efficient payment infrastructure would contribute significantly towards a more efficient payment system. This would, in turn, benefit the country's economic development and improve its economic performance. The idea of setting up of an e-payment gateway has received increasing attention from the BOT's policy makers, who are responsible for the implementation and conduct of payment-system policy, as well as from the leading players in Thailand's payment industries.

22. The view along this line has been shared by Dr. A. G. Karunasena, Executive Director of The SEACEN Centre, during the Workshop conducted by the SEACEN Centre in Kuala Lumpur on December 13-14, 2007. As pointed out by Dr. Karunasena, similar observations made about the public transportation in Thailand can be made in the case of the "Octopus Card" in Hong Kong.

Although the e-payment systems developed by the BOT, covered in Section 2, have been viewed as important gateways in inter-bank transactions, the Payment Systems Committee (PSC) has found it necessary to further develop the e-payment platforms to fully serve all the activities relating to e-commerce, making sure that the payment system complies with the BIS Core Principles.²³ The establishment of the Inter-bank Transaction Management and Exchange (ITMX) is viewed as a promising starting point. Indeed, the establishment of the ITMX can be viewed as an attempt on the part of the Thai authorities to move away from taking a “direct operational role” to performing a newly designated role as regulators of the country’s payment systems. It is rather clear that some forms of payment services will no longer be under the direct operation by the BOT in the foreseeable future. This is particularly so for the SMART system which has been transferred and operated by the ITMX since October 2007.



23. The PSC was established in 2001 to coordinate on policy matters concerning the payment system and deliberate issues bearing on national monetary policy. The PSC also required the local financial institutions to nominate experts to serve as representatives in the committee, which, in turn, signaled the start of concerted effort to engineer uniform payment systems to enhance efficiency and effectiveness of the payment system.

As presented in Figure 20, the ITMX would provide e-payment services to businesses, individuals, and local and international banks using IT infrastructure, so that they could transact business using e-payment systems and mobile phones. The services to be available in the ITMX system would include ATM, SMART Credit, SMART Debit, Direct Credit, Direct Debit, ORFT via ATM, inter-bank counter funds transfer service via ATM, and services via e-channels, such as the Internet and mobile phones.²⁴

Specifically, the setting up of national ITMX is intended to serve *multiple purposes*. For one thing, it is intended to facilitate the conduct of business and electronic payment transactions in accordance with the framework and policies of the BOT and the supervision of the Bank's Payment System Committee. For another, it will serve as a switching centre for business and payment transactions, both business-to-business and business-to-customers. Apart from these, the ITMX will allow easy electronic transfer of funds by business. It will instill confidence among companies in the private sector wanting to conduct business over the network. It is expected that Thailand will be in a better position to provide consumers and businesses with high quality services when the ITMX commences full operation in the period around late 2008.

More importantly, the setting up of the national ITMX has paved the way for the ease of regional fund transfers among the countries in the ASEAN region. Over the past several years, with the continued support from the BOT, the ITMX has been working in collaboration with the switching networks in the three member countries of Indonesia, Malaysia, and Singapore, to set up an ATM regional linkage that facilitates cross-border ATM withdrawal arrangements. As one can see from Figure 21, the ITMX has already set up the ATM link with its counterparts in Malaysia (MEPS) since 15 October last year. For the linkages with the remaining countries, it is expected to be completed soon. As envisaged, the ATM regional linkage will offer convenient services to consumers and corporations among the ASEAN member countries. The first phase of the ATM regional linkage will become more useful to consumers and corporations in the region in the near future when it enlarges its coverage to provide for inter-bank fund transfers.

24. Essentially, the payment system is required to operate with high efficiency and offer convenience, swiftness and safety. The cost of operating the system is to be maintained at an appropriate level, reducing the duplication of investments among member banks. In addition, it will promote the expansion of electronic commerce in the country, in accordance with a key policy requirement of the PSC. It will greatly facilitate consumers in using the payment services of banks all over the country, 24 hours a day, when the company is fully operational in late 2008. The National ITMX Co., Ltd. was registered in July 2005, and has presently completed the selection of the solution vendors for inter-bank fund transfers and payment services.

<p style="text-align: center;">Figure 21 Cross Border ATM Linkages with ITMX</p>			
ATM Regional Linkage	Country	No. of Banks	Date in Operation
ITMX – MEPS	Thailand	7	15 October 2006
	Malaysia	2	
ITMX – NETS	Thailand	-	Under discussion
	Singapore	-	
ITMX – Artajasa	Thailand	-	Under discussion
	Indonesia	-	

3.4 Facilitating and Fostering Changes in Legal and Regulatory Framework

Although there are laws and regulations empowering the BOT to function as a regulator and to handle the problems arising from the country's payment systems, there is no explicit legislation on payment and settlement systems in Thailand. The areas of payment and settlement systems are governed by separate pieces of legislation and regulations. The principal legislation governing the country's payment and settlement systems are summarised as follows:

- (1) *The Bank of Thailand Act of 1942*, enacts the role of the central bank in the payment system and its issuance of regulations and guidelines for the operation of payment services;
- (2) *The Commercial Banking Act of 1962*, empowers the BOT to directly supervise Thai commercial banks and local foreign bank branches;
- (3) *The Currency Act of 1958*, concerns currency operation;
- (4) *The Civil and Commercial Code*, covers other financial papers that are used as means of payments (the Law relating to legal instruments, contracts, and obligations);
- (5) *The Securities and Exchange Act of 1992*, provides for the supervision the primary and secondary markets of the country's capital market;
- (6) *The Electronic Transactions Act of 2001*, accords legal recognition to electronic data message;

- (7) *The Bankruptcy Act of 1940*, governs the entire areas of insolvency and bankruptcy;
- (8) Consumer Protection Law.

The lack of a comprehensive law relating to the payment system means that payment transactions fall under the Civil and Commercial Code. However, the BOT and other concerned government agencies are well aware of the rapid pace of development in ICT, and hence the need to ensure the adequacy of legal framework to cater the rapid advance of ICT development.

The following are the recent developments in the legal framework for payment and settlement systems in Thailand:

- (1) *Amendment to the BOT Act*, empowering the BOT to regulate and support the establishment of clearing and settlement systems across financial institutions and/or payment systems. However, this approach may take a very long time, pending approval by the parliament.
- (2) *The draft of the Financial Institution Act*, being currently under the BOT board review. The act empowers the BOT to propose a royal decree to regulate businesses that are engaged in deposit-taking from the public, credit extension, or other financial businesses. This Act will be another legislation covering the payment and settlement systems.
- (3) *The enactment of subsidiary laws, royal decree, rules and regulations derived from the Electronic Transactions Act*. This may empower the BOT to spread its authority to oversee the operations of private payment systems, particularly payment services operated by non-bank firms. The decree is still under the consideration. If the BOT proposes regulation on oversight of the payment systems, electronic money, or new means of making payments, it is required to propose a Royal Decree under Section 32 of the Electronic Transactions Act 2001.

As pointed out in the previous sections, although the pace of e-payment usage in Thailand has not been dramatic, the evidence tends to suggest a gradual upward trend in the use of e-payments in the near future. It is likely that not only commercial banks will be participating in offering a variety of services in the retail payment markets, but also non-banking institutions have shown increasing interest in providing competitive services for consumers and businesses. Under this changing retail- payment landscape, it appears that the

existing legal and regulatory framework has not kept pace with the new environment.

As a regulator and catalyst of the country's payment system, the BOT has found it increasingly difficult to handle such a changing retail-payment landscape. Enormous efforts have been taken to foster the introduction of new law governing the payment system. Reflecting this, steps have initiated to formalise the acceptance of e-receipts by market participants, along with the push towards the promulgation of the Royal Decree Regulating E-payment Service Business.²⁵ At present, the law is in the process of enactment by the Cabinet and is expected to be legislated in 2008. It is envisaged that the BOT will be in a better position to play a leading role in promoting the development and usage of e-payment with the passage of this law.

As mentioned earlier, in Thailand, e-money can be issued by either banks or non-bank firms. However, they are regulated under different laws. The regulation of e-money issued by banks falls under Section 9 of the Commercial Banking Act B.E. 2505. As for e-money issued by non-banks, the issuers are subject to compliance with the Ministry of Finance Notification, which came in force on October 4, 2004. (Ministerial Notification, Ministry of Finance: Business for which Permissions must be obtained according to Clause 5 of Announcement of the Notification Executive Council No.58 dated October 4, 2004).

The evidence appears to show that the countries in SEACEN region have diverse experience with respect to the nature and evolution of their legislation on payment and settlement systems. As one can see, certain countries in the SEACEN region have already put in place explicit legislation on payment and settlement systems. Malaysia, for instance, has enacted the Payment System Act (PSA) in 2003. This legislation empowers Bank Negara Malaysia (BNM) to establish a comprehensive regulatory oversight framework to govern the rapidly changing payment landscape. The law also recognises BNM as the sole authority responsible for the oversight of the payment system in Malaysia. This is to ensure the safety and efficiency of the payment system infrastructure and to safeguard public interest.

25. E-payment businesses covered in this law are defined to include (i) Credit Card Network service, (ii) EDC service, (iii) Transaction Switching service for payment in one system, (iv) E-money, (v) Clearing service, (vi) Settlement service, (vii) Transaction Switching service for payment in several systems (viii) Payment service via new devices (such as mobile phone, the Internet), (ix) Counter services.

4. Concluding Remarks and Future Direction of E-payments

There has been an increasing use of e-payments in Thailand over the past decade or so, as reflected in part in the substantial increase in the value and volume of financial transactions via the payment system of the BOT. As indicated, the e-payment services operated by the BOT have displayed significant upward trends over the past decade, particularly the usage of the BAHTNET and SMART systems. The volume of transactions through the BAHTNET and SMART systems have increased nearly three-fold and seven-fold, respectively, over the period 2000-2006. The usage of other e-payment channels offered by commercial banks and non-banks also saw significant increase, as can be seen in usage of ORFT, apart from the growing popularity of the more “traditional” e-payment types. In terms of transaction volume, the traditional e-payments, including debit cards, credit cards, and credit transfers, are increasingly emerging to become important components of the Thai payment systems over the past several years. The share of debit cards and credit cards alone accounted for nearly 70 percent of the total volume of non-cash payments in 2006.

Evidences so far tend to suggest that e-payment development in Thailand has shown a promising development, although the pace of the development has yet to quicken. As pointed out in the paper, the BOT has made initiatives to develop the e-payment infrastructure to promote and facilitate the smooth functioning of the entire payment and financial systems of the country. Of particular importance are the establishment of the national ITMX and the promulgation of the Electronic Transaction Act of 2001.

In concurrence to the development of e-payment system, the BOT seeks to encourage the expansion of the use of e-payment products for making retail payments. The sharp rise in the usage of ORFT, a development reflected by a more than *ten-fold* increase in its volume of transactions over the past seven years, points to the success of ORFT. The contributory factors behind its success are: convenience, service meeting consumers’ needs, and relatively low costs for providing the service.

The preliminary evidence indicates that consumers and businesses give major weights to some “non-price” factors in their selection of payment instruments. One of the findings of the business survey indicates that concern over the legal acceptance of e-receipt and e-document has resulted in the delayed acceptance of some forms of e-payments, especially those related to fund transfers via SMART service. It follows one should be careful not to place too

much emphasis in the application of “pricing factor” alone to shift the preference of consumers and businesses towards the greater use of e-payment products.

The impact of e-payment on the operation of monetary policy has *not yet* produced any issue of serious concern to the Thai monetary authority. This is partly because, in value terms, the volume of e-money transactions is relatively small when compared with the money supply. Likewise, the negative impact of growing e-payment usage on the conduct and implementation of monetary policy has yet to be felt.

It is also found that the impact of e-payment has *not yet* posed any apparent threat to the stability of the country’s financial system. However, given the potential risk involved, the Thai monetary authorities takes the approach to keep track of the developments in the application of new innovations in e-payment instruments/products, and to formulate regulatory framework to ensure the safety and efficiency of the payment system. The experience of other the central banks in the SEACEN region is similar to the case of Thailand, though the pace of policy response may differ, reflecting in part differences among the countries’ e-payment developments and extent of e-payment penetration. As documented in the Country Reports, e-payments have not yet posed any real threat in influencing short-term interest rates for the monetary authorities in these countries.

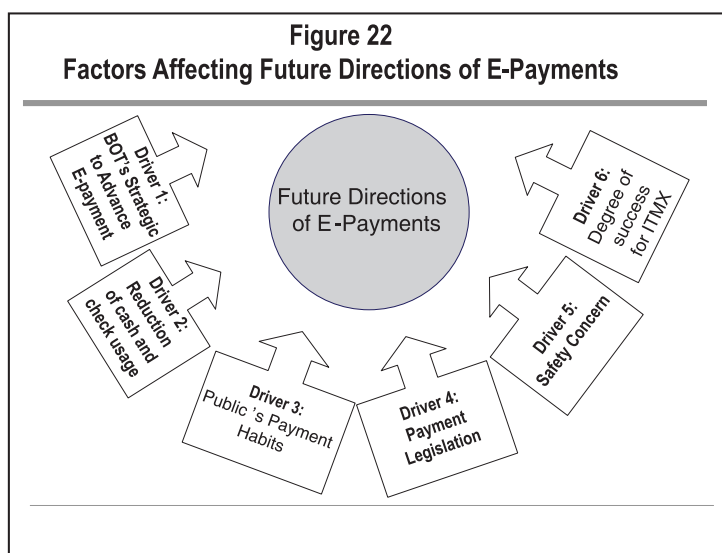
The experience has shown that the use of pricing policy alone may not be sufficient in encouraging greater adoption of e-payment products. This is mainly because consumers and businesses tend to give relatively higher weights to certain types of “non-price” factors, including, in particular, legal acceptance of e-receipt and e-document as proof of payment and the difficulties involved in the use of new e-payment products. From the standpoint of service providers, the move towards the wider use of the more cost-effective electronic payment products or services, may have become feasible, if the provision or introduction of e-payment products/services has a high potential to reach critical mass.

The results of the survey show that while the use of paper-based payment instruments, cash and cheque, have been affected by the growing use of electronic alternatives, the volume and value of cash usage have continued unabated. The survey provided insights into the payment habits and perceptions of cash and its alternatives in the various sectors businesses. The survey results showed that the decision-making in the various business sectors concerning payment choices is quite complex. Potentially, the results of the survey tend to highlight several

“non-price” factors that contribute to the unpopularity of e-payment instruments, especially factors related to uncertainty over security, standards, and compatibility.

The preliminary evidence suggests that the recent introduction of the payment gateway service of National ITMX appears to be a major driver in increasing the usage of e-payment products. Looking at the prospects the over short- and long-term horizon, it is likely that this type of gateway service would, to some degree, result in the overall reduction of the operating costs of the participating banks in offering e-payment services. This would, in turn, help increase the overall efficiency of the country’s payment system. It also suggests that the upcoming promulgation of the Royal Decree Regulating E-payment Service Business, apart from the existing of Electronic Transaction Act of 2001, would contribute in enhancing the confidence of the market participants towards a greater use of e-payment products/services.

It is perhaps useful to briefly discuss the plausible factors affecting the future direction of e-payments. As illustrated in Figure 22, the factors affecting the future direction of e-payments can be grouped under the following *six* headings.



The first concerns the BOT's strategy to advance e-payments. Like many central banks in the region, especially Bank of Korea and Bank Negara Malaysia, the BOT is involved in efforts to migrate the country to e-payments, which at present is in the fancy stage, as compared to the advanced economies. The Bank has recently initiated a number of projects to provide an environment conducive for fostering the orderly transition to e-payments. As reflected in the Payment Systems Roadmap 2010, the Bank has established plans to encourage the increased use of e-payments by the major market participants, including individual customers, businesses and government agencies. Further efforts are under way to channel and coordinate industry efforts to migrate to e-payments.

The second concerns the BOT's strategic move towards the reduction of cash and cheque usage in the near future. The BOT has approved a guideline for the imposition of payment fees by commercial banks to reflect the actual costs of providing the services, and to promote greater use of electronic media with reduction in the usage of cheque and cash. The new fee payment structure has been in place since March 2006. The use of fee structure has, in fact, been successful in many countries, moving the whole economy to increasingly rely on electronic payment systems. Whether this will be a success story for Thailand is open to debate. The evidence reported in Section 3.2 indicates that pricing factor alone may have limited influence in conditioning the public's choice unless it is bolstered, or at least supported, by the requisite non-price factors. Apart from the approved fee structure, it remains to be seen whether, and to what extent, the setting up of Thailand National ITMX would contribute to a future reduction in the usage of cash and cheques.

It is important to note, however, that one should not ignore the entrenched cultural pattern when judging the potential pace of acceptance of future payment methods or the realisation of the intended effects of new payments technologies. The experience of many countries has shown that it typically takes years to shift the public's payment preference/habits from the use of the traditional paper-based instruments to the new forms of e-payment instruments in making payments. For example, in the case of the United States, it took at least a quarter of a century for e-payment instruments/services (e.g. debit and credit payment cards) to surpass paper-based payment instruments.²⁶ This tends to suggest that

26. This happened for the first time in the year 2003. According to the Federal Reserve Board (2004), the share of paper-based payment instruments (cash, consumer cheques, commercial cheques, official cheques, traveler cheques, and money orders) declined from around 85 percent of the total non-cash payments in 1979 to 78 percent in 1995. The share further declined to 58 percent in 2000 and 45 percent in 2003. The share of e-payments, by contrast, recorded rising trends over the same period. It increased from 15 percent of the total non-cash payments in 1979 to 22 percent in 1995. It increased further to 42 percent in 2000 and 55 percent in 2003.

greater efforts need to be carried out to achieve the successful reduction of cash and cheque usage in the country.

The third is related to the public's payment habits. As indicated by the survey results, there are several *non-price* factors contributing to the unpopularity of electronic payment instruments. As discussed in Section 3, most businesses continue to prefer paper-based payment instruments to e-payments. Within many business sectors, cheques and cash are the predominant modes in incoming income and outgoing expenses. Thus, it may not be quite so easy for the authorities to change the payment habits and/or behaviour of consumers. In addition, merchants might not be willing to use e-payments for fear of increased service charges. Apart from these, there are additional concerns regarding system inter-operability, IT security, to name but a few. The application of pricing policy alone to encourage the shift towards the increased use of e-payment may not be adequate unless concerted actions are taken to overcome the reservations of users in relation to the non-price factors.

It is worth pointing out that other central banks have also encountered similar experiences as the BOT. As documented in the paper by Chang (2007), the inducement of changes in the public's payment habits towards greater use of e-payments are considered as challenging tasks in ROC (Taiwan). According to Chang, the process takes a long time for it to achieve the desired effect. For one thing, consumers who are familiar with the use of the traditional payment media, e.g. cash and cheques, may not find it easy to change their habits and switch over to e-payments. For another, merchants who prefer to transact in cash may not be willing to accept e-money for fear of the accompanying service charges. For instance, in the restaurant trade in Thailand, it is a widespread practice for restaurants to give discounts to their customers. Customers receive a higher discount rate paying by cash as compared to payment by cheque.

The fourth concerns the pack of changes in the country's legal and regulatory framework related to the payment system. A sound legal and regulatory framework is vital to support the growing use of e-payment and e-money. The lack of specific laws pertaining to e-payment and e-money has raised the implicit costs to all participants. Like many central banks, the BOT and other concerned government agencies are well aware of the rapid developments in ICT and in e-payments. The financial authorities in Thailand have over the course of the past few years strengthened the laws and regulatory framework governing e-payments. This is to ensure that the legal framework stands ready to cater for the growing proliferation of e-payment channels and instruments.

The recent proposal of the Royal Decree Regulating E-payment Business is a good reflection for this. According to this decree, any person who intends to provide e-payment services, which include e-money, will be subject to prior notification, regulation, or licence. This law is pending parliamentary approval. The enactment of the law will not only strengthen the oversight power of the authorities, but it will also promote reliance on e-payments and consumers' confidence. The lack of a law governing the use of e-receipts and e-documents has resulted in the slow adoption of e-payments by the market participants. Plans are afoot for the BOT, working with the Revenue Department,²⁷ to encourage wider acceptance of e-receipts.

It should be pointed out in this connection that the upcoming promulgation of the Bank of Thailand Act of 2008 would additionally empower the Thai authorities to exert significant influence over the pace and development of e-payments in the country. Under this new law, the traditional consultative mechanisms under the so-called "Payment System Committee" (PSC) will be legally formalised. It is expected that the BOT, through the PSC, would be in better position to lay down the necessary measures/guidelines to regulate and coordinate the development of e-payments, and ensure that certain "attractive" or "desirable" features of e-payments are embedded in the e-payment applications.

The fifth is related to the safety concern of market participants. As in the countries in the SEACEN region, the issue of safety in the usage of e-payments is a major concern among the market participants in the e-payment-related businesses. In the minds of consumers, e-money-related activities are transacted through a cybernetic system which is fraught with challenges arising from internal and external threats. The challenges include counterfeiting, tampering, hacker attacks, theft or leakage of personal data, notably, bank account number and PIN.

The sixth aspect deals with challenges of creating net benefits for the use of or introduction of prospective e-payment products. To address the barriers hindering the use of e-payments, the BOT recently initiated a series of strategic action plans to help create a conducive environment to foster the increased use of e-payments. The major aims of the BOT's three-year plan for the years 2007-2009 are to: (i) encourage a greater use of e-payments by the government and

27. For reference, see "The Electronic Signatures in Electronic Commerce Law". The law, issued on 14 November 2001, aims to confer legal validity to electronic documents, and endow electronic media equal legal status with paper-based media.

business sectors; (ii) gain wider acceptance of e-payment usage among rate-payers as the e-payment receipt is legally recognised as evidence of payment by the Revenue Department; (iii) put in place the system for inter-bank bulk payments (debit transfers); and (iv) strengthen the standard of information exchange for bulk payments. As the plan involves the active participation of the various sectors, ranging from commercial banks, industrial body, consumers, businesses, government agencies, it may take some time before the goal becomes a reality.

References

1. Allen, Howard Charles, (2007), “Moving towards the New Payment Environment in 2010: Global Trends and Local Challenges”, Speech Given to a Seminar on Payment Systems Road Map 2010, Bank of Thailand, 21 August 2007.
2. Arnone, Marco and Luca Bandiera, (2004), “Monetary Policy, Monetary Areas, and Financial Development with Electronic Money”, *IMF Working Paper*, WP/04/122
3. Bank of Thailand and Thailand Development Research Institute Foundation, (2000), “Report on Payment Systems Pricing and Usage”, a Joint Research Project.
4. Bank of Thailand, (2007), “Survey of Payment Choice by Businesses in Thailand”.
5. Banque De France, (2001), “Implementations for Monetary Policy of the Development of Electronic Money: A Review of Recent Debate”, *Bulletin Digest*, No.92, August.
6. Chang, Kuo. Hsiang, (2007), “Development of E-payments and Challenges for Central Bank: Taiwan’s Case”, Paper Prepared for the Workshop Organized by The SEACEN Centre during 13-14 December 2007.
7. Freedman, C., (2000), “Monetary Policy Implementation, Past, Present and Future-Will Electronic Money Lead to Eventually Demise of Central Banking”, *International Finance*, Vol.3, No.2.
8. Fullenkamp, Connel and Nsouli, Saleh M., (2004), “Six Puzzles in Electronic Money and Banking”, *IMF Working Paper*, WP/04/09.
9. Gresvik, Olaf and Grete Owre, (2003), “Costs and Income in the Norwegian Payment System 2001, An Application of the Activity Based Costing Framework”, *Norges Bank Working Paper*, ANO 2003/8.
10. New York and Clearing House Survey, (2007), “Chips and Fedwire Join Forces: Traditional Rivals are Working to Turn Businesses Away from Cheques”, *Speed*, Vol. 2, No. 1, pp. 10-11., 2007.

11. Payment Systems Roadmap, (2004), Payment Systems Department, Bank of Thailand
12. Payment Systems Roadmap, (2010), Payment Systems Department, Bank of Thailand
13. Rungsun Hataiseree, Don Nakornthab, Jittra Boonsiri, (2007), "Payment System Data and Economic and Financial Activities: Some Empirical Evidences from Thailand", BOT Working Papers, (Also available via the Internet: http://www.bot.or.th/bothomepage/BankAtWork/Payment/E_payment_research_papers.htm)
14. Rungsun Hataiseree and Jittra Boonsiri, (2006), "Current Status of E-Payment Penetration in Thailand: Salient Indicators and International Comparison", *Payment Systems Working Paper*, September. (Also available via the Internet: http://www.bot.or.th/bothomepage/BankAtWork/Payment/E_payment_research_papers.htm)
15. Rungsun Hataiseree and Sayan Pariwat, (2006), "Strategy and System to Facilitate E-payment Services (ITMX): Thailand's Recent Experiences and the Role of the Central Bank", *Payment Systems Working Paper*, December. (Also available via the Internet: http://www.bot.or.th/bothomepage/BankAtWork/Payment/E_payment_research_papers.htm)
16. Rungsun Hataiseree and Sayan Pariwat, (2002), "Risk Reduction in the Payment System and the Role of the Central Bank: Thailand's Recent Experience", *Bank of Thailand Quarterly Bulletin*, Vol. 42, No. 4, (December), pp.59-95. (Also available via the Internet: http://www.bot.or.th/bothomepage/BankAtWork/Payment/E_payment_research_papers.htm)
17. Sayan Pariwat, (2006), "How Cashless Payments will Reshape Asian Commerce", *Quarterly Journal*, Central Banking, August. (Also available via the Internet: http://www.bot.or.th/bothomepage/BankAtWork/Payment/E_payment_research_papers.htm)

18. Sayan Pariwat and Rungsun Hataiseree, (2004), "Challenges to the Reduction of Cash Usage: Thailand's Perspective", *Payment Systems Working Paper*, September. (Also available via the Internet: [http://www.bot.or.th/ bothomepage/BankAtWork/PaymentE_payment_research_papers.htm](http://www.bot.or.th/bothomepage/BankAtWork/PaymentE_payment_research_papers.htm))
19. Sayan Pariwat and Rungsun Hataiseree, (2004), "The Role of CLS Bank in Reducing Foreign Exchange Settlement Risk: New Challenges and Implications for the Thai Payment System Policy", *Payment Systems Working Paper*, August. (Also available via the Internet: http://www.bot.or.th/bothomepage/ BankAtWork/Payment/E_payment_research_papers.htm)
20. Sayan Pariwat and Rungsun Hataiseree, (2004), "The Evolution of Large-value Funds Transfer System in Thailand: Causes, Changes, and Challenges", *Chulalongkorn Review*, Vol. 16, No. 63, (April-June). (Also available via the Internet: http://www.bot.or.th/bothomepage/BankAtWork/Payment/ E_payment_research_papers.htm)
21. Sayan Pariwat and Rungsun Hataiseree, (2004), "Managing Payment and Settlement System Reform: a Thai perspective", *Thammasat Economic Journal*, Vol. 22, No. 11, (March), pp.69-112., (Also available via the Internet: http://www.bot.or.th/bothomepage/BankAtWork/Payment/ E_payment_research_papers.htm)
22. Sayan Pariwat and Rungsun Hataiseree, (2003), "The Use of Cash, Cheque and Electronic Payment Services in Thailand: Changes and Challenges for Efficiency Enhancement", *Chulalongkorn Review*, Vol. 16, No. 61, (Oct. - Dec.), pp.46-109. (Also available via the Internet: http://www.bot.or.th/ bothomepage/BankAtWork/Payment E_payment_research_papers.htm)
23. Thailand Development Research Institute Foundation, (2004), "Report on Cost and Fees of Commercial Banks' Payment Services", (in Thai).

Chapter 11

THE DEVELOPMENT OF E-PAYMENTS AND CHALLENGES IN VIETNAM

by

Le Anh Dung¹

1. Overview of E-payment in Vietnam

1.1. A Cash-based Society

The development of Vietnam's banking system has largely been affected by the dominance of cash. In Vietnam, cash is "king" since the bulk of personal consumption is done through the medium of cash. For corporations in particular, this has resulted in the problems of cost and delay, arising from the counting, bundling, transporting and depositing of large volumes of cash, as well as the risk and inconvenience of dealing with counterfeiting and the treatment of damaged notes.

Of a total population of 84 million, less than 10 percent are estimated to be using bank services regularly and less than 30 percent have savings with banks. The payment system is functional, but technically not very developed due to inadequate payment infrastructure and unavailability of products and services. Cash remains as the main method of payment especially among individuals despite a fall in M2/GDP from 20.3 percent in 2004 to 17.2 percent in 2006. Although the number of individual accounts jumped from 2 million to around 8 million in the last 3 years, the account users are mainly high-income earners in urban areas or in large companies.

The State Bank of Vietnam (SBV) has made efforts to reduce the volume of cash payment transactions. However, a major problem is that less than 10 percent of Vietnam's population of 84 million has personal bank accounts. One of the reasons is the lack of access to banks. While all the large banks have expanded their networks to most major cities, they have fewer branches in the provinces outside of Ho Chi Minh City and Hanoi, where most of the country's

1. Author is Staff of the Payment Department of State Bank of Vietnam.

commercial activities are based. Also, traditionally, most average citizens prefer to keep cash and gold at home, or in a form of lending to relatives or close associates, rather than use a bank account. While the number of bank accounts is growing rapidly, it is estimated that as much as US\$10bn (22 per cent of the country's GDP) is in savings outside the banking system. With the dominance of cash, cheques are not popular in Vietnam (only under one percent of total payment instruments).

1.2 E-payment Systems

1.2.1 Inter-bank Payment System (IBPS)

The system became operational in May 2002 and runs in parallel with the current semi-automated clearing system. Transactions can be sent among members within eight seconds. However, this system has not yet reached a 100 percent Straight Through Processing (STP) rate, and its coverage remains limited to only five cities/provinces (Hanoi, Hai Phong, Da Nang, Ho Chi Minh City and Can Tho).

The inter-bank electronic payment system is composed of two sub-systems: High Value Sub-system (HVTS), the RTGS for large-amount remittances on a gross basis, and Low Value Sub-system (LVTS) for small-amount remittances on a net basis. This system is based on the Korean Inter-Bank Payment System (KIPS), and was developed by Hyundai Information Technology. Remittances of 500 million dong (US\$33,000) or more are handled by HVTS, while LVTS is for remittances of less than 500 million dong.

If there are sufficient balances in the SBV settlement accounts of member banks, funds are immediately transferred via HVTS. If account balances are insufficient, the remittance instructions are stored in a system queue. They will be sequentially processed when account shortfalls are replenished.

Small-amount payment instructions sent by member banks via LVTS are balanced out on a net basis, and at the end of business hours, SBV executes net balance payments via transfers of settlement accounts.

There are provincial payment centers (PPC) in charge of intra-province payments in rural regions. Individual banks transmit inter-province payments to the National Processing and Settlement Center, through which they are re-sent to member banks.

PPCs have installed the electronic payment system in six locations, to process the remittances of five cities: Hanoi, Ho Chi Minh, Haiphong, Danang, and Can Tho.

Intra-province payments are estimated to account for 75–85 percent of all remittances. The rest are inter-province payments handled by National Payment Processing Center (NPSC). The IBPS was designed to process 4,500 transactions per day but now execute more than 25,000 transactions. In addition, the system was initially set up to link seven member banks but now the number of participants is more than 74.

1.2.2 Electronic Clearing System

The system was designed to replace the legacy paper-based clearing system and has been in operation since 2002. It looks like a semi-automated clearing where each provincial branch of SBV plays the role of regional clearing house for intra-province inter-bank transactions. There are now 58 provincial clearing houses in Vietnam. However, the introduction of the IBPS has reduced the relative importance of electronic clearing system owing to the speed, security and convenience of the IBPS.

1.2.3 Card Payment System

Card payment system was first introduced in 1993, yet remained under-developed until recently. There are now 29 card issuers and more than 40 card correspondent banks. As of October 2007, the country has approximately 4,280 ATMs, approximately 23,000 point of sale (POS). Banks have issued 8.3 million domestic and international payment cards with an average annual growth rate of more than 100 percent for the last few years. There are two stand-alone card alliances: Vietcombank and VNBC and one switching company called Banknetvn which provides switching services for card issuers.

1.3 E-payment Products

1.3.1 Credit/ Debit cards

Credit cards have been introduced in 1996 by several leading local banks. As of April 2007, around 20,000 merchants, including restaurants, retailers, hotels and supermarkets, accept credits cards. Recent years have witnessed the phenomenal growth of debit cards as local banks are seeking to attract customers via this versatile payment instrument. Although introduced after credit cards,

debit cards still dominate credit cards, accounting for more than 95 percent of total cards. However, the latter is expected to be more popular with the increased income from young population and a change to loan financed consumption.

There are currently about 4,280 ATMs in Vietnam, but there are only about 8.3 million cards because the number of retail bank accounts is still small compared to the population. These numbers show that with nearly 20,000 inhabitants per ATM machine and 8.3 million cards out of population of 84 million, Vietnam has lowest ATM penetration rate as well as huge potential for card service expansion.

Although the establishment of ATM networks in recent years has encouraged more individuals to open and use bank accounts with domestic banks, the ATM networks are all proprietary, not shared networks. This has significantly limited the users' access.

1.3.2 Credit Transfer/ Direct Debit

Bank credit transfer is the most efficient payment method in Vietnam and is preferred by most corporations. With the semi-automated clearing system of the SBV, the electronic banking systems developed by local banks and the IBPS, transfers can be effected in one or two working days - a marked improvement compared to a few years ago when it took at least two to three working days to effect an inter-provincial payment.

1.3.3 Internet Banking

The past few years have witnessed the early development of Internet banking in Vietnam. The boom of the ICT sector and the introduction of IBPS have accelerated this modern payment method in Vietnam. Foreign banks are understandably active players in this new area but their Internet banking is only offered to corporate customers. Some local banks have developed some simple operations of Internet banking, such as online account query, online bill paying, and intra-bank credit transfer. However, due to underdeveloped payment infrastructure (lack of Automated Clearing House, absence of certification authority), more advanced Internet banking operations, such as online inter-bank credit transfer, online shopping using local bank cards, are non-existent.

1.3.4 Mobile Banking

Although mobile phones are quite popular in Vietnam with more than ten millions users, mobile banking is still at the early stage of development. Seeing the huge potential of mobile banking, some active bankers have teamed up with several largest operators to explore this market segment. For example, Vietcombank's menu and SMS-based system offers customers the ease of using their mobile phone to pay for telephone bill, Internet bill or even top-up their mobile phone prepaid account.

1.3.6 Phone Banking

This type of banking is not popular in Vietnam. This is understandable given that international standard contact centers are not available at most of the local banks and Vietnamese prefers banking in person with bank officers.

1.3.6 E-Money and Prepaid Card

Up to now, e-money in Vietnam is only in the form of single purpose use card. These cards such as call cards, Internet cards and mobile phone prepaid cards are very popular in the telecommunication sector.

Compared to credit/ debit cards, prepaid cards is still a new concept in Vietnam. Banks are not very interested in the type of card due to small customer base and limited use. Only one of the biggest local banks has offered the so-called Prepaid *Visa BOPO* card targeted to tourists and travelers.

2. Costs and Benefits of E-payment

The huge benefits to the Vietnam's economy brought by e-payment are undisputable. Especially, over the past five years, the IBPS has made great contribution to the development of e-payment in Vietnam by creating the backbone for the Vietnam's payment system. Specifically:

- SBV manages in a timely manner the commercial banks' reserves via their central account at the central bank, increasing the flows of funds and reducing the amount of floating funds.
- The IBPS provides a secure and reliable clearing and settlement system for stimulation of economic development.

- The IBPS integrates with commercial banks' internal payment systems for the convenience and speed of payment services.

As in other countries, electronic payments in Vietnam promote economic growth by providing such fundamental benefits as:

- Increasing levels of security and consumer empowerment owing to secured automated payment system and a wide range of payment options.
- Greater economic transparency via channeling the large amount of floating funds in the public and state budget's financial transactions through the banking system.
- Widened participation in the banking system given that only 10 percent of population has bank accounts.

In the banking sector, electronic payments are found to benefit commercial banks by extending bank customer base; reducing operating costs; enhancing customer service and improving banks' competitive advantage. For example, some proactive banks have considered cards as the strategic products to broaden their customer base, cut down paper-work, invoices and cashier's service, and build competitive advantage over other banks without card products.

In Vietnam, the following shortcomings related to e-payment are also found:

- High investment cost of ATM, POS devices for local banks given their small capital base (on average less than US\$200 million).
- As of 2007, the majority of the local banks' ATM/ POS networks are not shared and the card alliances are not linked, resulting in inefficient use of payment infrastructure, high cost of operation for banks and inconvenience for bank clients.
- Inadequate network infrastructure given the increasing customer's transactions has some time made the ATM network overloaded, especially peak hours and holidays. Since a majority of card transactions via banks' ATM network are cash withdrawals, the cash replenishment and machine maintenance cause operational difficulties for these card issuers.
- Although the infrastructure for the ATM network has been considerably improved over the past few years, the ATM network is still unreliable due to electricity cut-off and communication failures which are beyond the control of the ATM network operators.
- The ATM network and POS network are only available at the big cities or urban areas whereas the rural area where more than 70 percent of the population resides is still uncovered.

3. The Perceived Attitude of the Public

Since Vietnam is basically a cash-society with cash making up more than 90 percent retail payments, the preference to cash over e-payment is a fact. However, the attitude of the public towards e-payment has been very encouraging over the past few years with the boom of bank cards (ATM/Debit/Credit), the expansion of ATM and POS network. The habit of card usage for payment has been established in some big cities like Hanoi or Ho Chi Minh City. For example, according to Vietcombank estimate, its card payment amount in 2005 is just one percent of the total transaction amount in contrast of 99 percent for cash withdrawals. However, as of July 2007, the number has risen to 15 percent. Although other forms of e-payment like Internet banking or mobile banking are only at primitive stages, these modern payment instruments are expected to boom in the near future given Vietnam's young population (65 percent population is in the labor force) and the increasing number of Internet and mobile phone users in the up-coming years.

However, the public is still concerned about the security and convenience of e-payments due to card frauds, unreliable and unevenly distributed ATM network and bank staff's moral hazards.

4. The Existing Structure of E-payments

E-payments in Vietnam can be construed as operating outside the general wholesale payment systems. E-payment systems, excluding the IBPS - the system for high-value inter-bank transactions, are generally working within the framework of each commercial bank's internal system and are not integrated into the IBPS. For example, as for ATM networks of banks, there are two alliances in Vietnam now, if the buyer and the seller have bank accounts at different banks or alliances, credit transfers using ATMs will not be conducted.

Currently, retail e-payment initiatives most come from individual banks, payment gateway operators and mobile phone operators. However, there are concerted efforts by the State Bank of Vietnam, commercial banks to create a unified national switch for retail payments. For the large-value payments, SBV is implementing Phase II of IBPS with a view to create a solid payment infrastructure for all commercial banks operating in Vietnam and have wider coverage.

5. Contributing Factors to the Promotion of E-payments

Some of the noticeable factors for the development of e-payments in Vietnam are the introduction of the IBPS that lays the foundation for the payment infrastructure and helps commercial banks accelerate the payment speed (from weeks to just intra-day) and improve the customer service and convenience.

The other major factor is the application of modern core banking in commercial banking activities. Eighty percent of local banks have successfully deployed core banking in their day-to-day operations. The remaining banks have also considered the deployment of modern core banking to close the gap with other banks. Based on the core-banking, local banks have offered a range of e-payment products, such as SMS banking, mobile banking, Internet banking, ATM card, credit card, etc,

6. Obstacles to E-payment Innovations

6.1 Legal Framework

Inadequate legal framework in the payment system and payment instrument has long been considered one of the main hindrances for the progress of e-payment innovations. Although some laws and regulations such as Law on Electronic Transactions (2005) and Decree on Banking Electronic Transactions (2007) related to e-payments have been promulgated recently, they are still not enough to regulate the fast-changing e-payment area. Some new areas like e-money, mobile banking and Internet banking, payment gateway are generally loosely regulated. In addition, regulations on the payment system and the standardisation of e-payment instruments, especially on e-money/prepaid cards are not complete.

6.2 Technology Infrastructure

The absence of Certification Authority (C.A) is one of the identified obstacles for the promotion of e-commerce, in general, and e-payment, in particular. However, the State Bank of Vietnam is trying to establish one C.A for the banking sector.

Up to now, ACH (Automated Clearing House) is non-existent in Vietnam. This problem causes a lot of difficulties for the electronic clearing of cheques and other small-value transactions (credit transfers, direct debits, ATM transactions, etc).

6.3 Attitude Towards Payment

As mentioned above, the rooted habits of cash usage have made it difficult for the promotion of e-payments. However, with the expansion of banking branches, ATM/ POS network and other forms of convenient e-payments such as internet banking and mobile banking, this situation will be changed for better in the up-coming years.

7. Impact of E-payment on Central Banking Functions

7.1 Effects of Modern Inter-bank Payments on Financial Policy

The introduction of the inter-bank electronic payment system has affected Vietnam's financial markets. This modern system enables banks to quickly send and receive funds, contributing to the reduction of unnecessary short-term borrowing. Some sources report that the IBPS makes a contribution to slowing the increase of short-term interest rates in Vietnam's money markets.

According to statistics, from 02/05/2002 to 30/04/2007, the IBPS has completed 14,494,240 transactions with VND 10,742,000 billion. The number of transactions average 25,000, with a total value of VND 23,000 billion per day. The peak number of transactions is 40,000 per day with a total value of approximately VND 44,000 billion. Over the past five years, on yearly basis the IBPS has witnessed phenomenal growth in volume and amount, 54 percent and 67 percent, respectively.

Figure 1
Inter-bank Payment System: Transactions and Volume

2002		2003		2004		2005		2006	
No of Trans	Amount (Billion VND)	No of Trans	Amount (Billion VND)	No of Trans	Amount (Billion VND)	No of Trans	Amount (Billion VND)	No of Trans	Amount (Billion VND)
514,950	283,100	1,788,252	898,302	2,633,713	1,607,598	3,455,670	2,171,363	4,500,000	3,653,000

7.2 The Degree of Impact of E-payment Innovations

E-payments (debit/ credit card, e-money, e-banking, internet payment) for small-value transactions make an insignificant impact on the seigniorage and monetary policy currently in Vietnam. This is because e-payment usage is still in the embryonic stage; their volume and transactional amount are miniscule compared to those of cash.

Figure 2
State of Technology of Vietnamese Banks

Modern Banking Applications	2007	2004
Banks with Core Banking System	12	8
Online Transactions/ Day (millions)	3-4.5	1.5-2
Banks equipped with ATM and POS	20	12
<i>Number of ATMs</i>	4,280	800
<i>Number of POSs</i>	22,959	16,283
Banks that issue payment cards	29	20
<i>Number of Cards (millions)</i>	8.3	1.9
Banks with Internet Banking	17	3

Source: State Bank of Vietnam

The following statistics may validate the above suggestion.

However, as e-payments make progress, the importance of cash is on the decline. Over the past three years of e-payment boom, the proportion of cash in circulation has shown marked decline.

Table 3
Cash in Circulation

Year	2003	2004	2005	2006
M2/GDP (%)	22	20.3	19.1	17.2

7.3 E-payment Risk

Malfunctioning IT systems and telecommunication failures, categorised as operational risk, are the usual source of problems affecting local banks' ATM network. This is because the local banks have not possessed their own solid IT infrastructure and the telecommunication network, which is owned and operated by Vietnam Post and Telecommunication, does not ensure 100 percent fault-free operation.

Card frauds have occurred in Vietnam for over the past few years. The most popular type of fraud is stealing a card holder's data to make counterfeit cards and withdraw money from ATMs. The risk of card frauds is bigger since the local banks are not ready for mitigation to EMV chip cards.

Security is another problem for the local banks although they have not been fully exposed to the electronic banking environment. Recent reports from a local security firm shows that 8 out of 26 Vietnam's commercial bank websites are subject to critical security threats which might allow hackers to change the banks' website content or take control over the database.

In conclusion, banking security will be the main concern for Vietnam's financial institutions in the up-coming years given that most of the banks are trying to expand electronic distribution of financial services in the context of banking security expertise shortage.

8. Policy Responses to E-payments

8.1 General View of State Bank of Vietnam Regarding the Development of E-payments

The view of the State Bank of Vietnam on development of e-payments can be implied from the wording of the *Masterplan on Banking Sector Development, Period 2006-2010 with Vision to 2020*. This document emphasises the promotion of non-cash payment for the replacement of cash, ensuring the safety, convenience and efficiency of payment systems and non-cash payment instruments. This view is also clearly demonstrated in the content of *Development of Non-cash Payment* Project approved by the Prime Minister where the State Bank of Vietnam is the main co-ordinator in cooperation with other ministries, including the Ministry of Finance, Ministry of Industry and Commerce, and Ministry of Planning and Investment. Some of the main guidelines for the

development of non-cash payment with e-payment as the main driving force are pointed out as follows:

- Non-cash payment development should be in line with the development of the economy, technology infrastructure and payment systems.
- The development should ensure the balance of mutual interest among society, payment service users and service providers.
- Measures for e-payment promotion should be incentive-based and state budget resource should be used for the strategically important systems as the main catalyst.
- Development of retail payment and settlement systems on the principle that encourages the involvement of the private sector in these systems through capital contribution and/or operational management.

The adoption of the international standards and best practices in the development of e-payments are also pursued and encouraged by the State Bank of Vietnam. For the next-generation of e-payments including mobile payment and Internet payment, the State Bank of Vietnam will play the role of improving the current legal framework and issuing new regulations for the healthy development of these instruments.

8.2 Recent Policies Regarding E-payments

The Law on Electronic Transactions (2005) lays a solid legal framework for electronic transactions in general and electronic payment activities in particular. This Law has officially recognised the legal proof of electronic messages, agreements and signatures. On this basis, a Government Decree on Banking Electronic Transactions has been promulgated in 2007 to accommodate electronic transactions in the banking sector.

New regulations² on the card-issuing business have recently been issued to meet the requirements of this fast-changing environment.

However, the most significant policy directly related to the e-payment area should be the masterplan, *Development of Non-cash Payment in Vietnam, Period 2006-2010 with vision 2020*, approved by the Prime Minister in December 2006. It set specific goals within five years in terms of number of cards issued, network

2. (i) Decision No. 20/2007/QĐ-NHNN dated 15/05/2007 on bank card's issuance, settlement, usage and third-party service for bank card business; (ii) Decision No. 38/2007/QĐ-NHNN dated 14/11/2007 on the issuance, usage and management of Bank Identification Numbers.

coverage, number of bank accounts and proportion of cash out of total payment instruments, etc. Towards these ends, the State Bank of Vietnam considers the improvement of the legal framework as well as the development and consolidation of important payment systems as the top priorities.

9. Future Direction of E-payments

9.1 SBV's Contribution to the Advancement of E-payment Systems

SBV makes contribution in the promotion of e-payments in three aspects. First, by issuing regulations on e-payments in the banking sector, SBV assures commercial banks on the soundness of the legal framework regarding e-payments and future direction of e-payment development. Second, as the reliable operator of the most important IBPS payment system, SBV lays the unified payment system infrastructure for the banking sector, encouraging commercial banks in deploying their own e-payment system based on this backbone system.

And finally, as the catalyst factor in the e-payment promotion, SBV encourages the interconnection among fragmented card alliances³ and development of modern e-payment such as mobile banking and Internet banking.

9.2 Expected Challenges and Problems

Development of modern e-payments such as mobile banking and Internet banking is expected to accelerate in the upcoming years since the potential users have reached the necessary critical mass and banks themselves are looking for innovative ways to broaden their electronic distribution channels. By mid-2007, Vietnam has around 17 million Internet users, ranked 17th in the world and nearly 20 million mobile phone users. This situation requires SBV to improve the legal framework for e-payment services, especially the rules and regulations on payment instrument security, customer protection and non-bank payment service providers. As the catalyst for e-payment development, SBV also needs to build and consolidate the payment infrastructure for retail e-payments, especially the establishment of the ACH and the consolidation of card alliances.

3. In November 2007, *Smartlink* and *Banknetvn*, two card alliances controlling 90 percent card payment's market share, have signed an agreement on card system integration on the SBV's suggestion.

9.3 Medium and Long-Term Plans Regarding E-payments

9.3.1 Improvement of IBPS – Phase II

The current IBPS - the most important RTGS payment system in Vietnam - will be upgraded and extended in line with international standards to meet the higher requirements for transactional volume, system reliability and number of participants. In Phase II, the new system will have the nation-wide coverage (64 cities and provinces) from just five cities and provinces currently. On completion by 2009, the new IBPS will be able to process up to two million transactions per day and accommodate for more than 1,000 direct and indirect members. The IBPS will have different settlement modes including RTGS, intra-day net settlement, as well as D.V.P for securities settlement.

9.3.2 The Integration of Other Systems into IBPS

In SBV's vision, the IBPS will interface with ready-to-integrate important retail payment systems, securities settlement system and foreign exchange settlement system. The securities settlement system will be prioritised for integration in 2008 since payment obligations for securities in Vietnam are currently settled without central bank's money⁴ and the requirements for securities settlement in terms of volume, rapidity and reliability will be more demanding.

9.3.3 Establishing the ACH for Retail Transactions

The National Automated Clearing House will be set up for retail payment transactions such as clearing bill of exchange/ cheques and credit transfers/ direct debits. In addition, in the initial design, this institution will operate as the Bank Giro, which processes transactions for utilities payments, insurance premium and credit cards, and interface with the IBPS. Card payment transactions and e-commerce transactions are expected to be cleared through this clearing house. In SBV's vision, private sector will be encouraged to participate in the set-up and operation of this institution through capital contribution. The ACH in Vietnam will be fully functional as early as 2010.

4. Due to legacy, BIDV, one of the big four state-owned commercial banks in Vietnam is currently designated settlement bank for securities settlement on the basis of clearing results from Vietnam Central Depository.

9.3.4 Promoting a Unified Card-payment Switch

A card-payment-switch company with unique brand will be developed, connecting all ATM machines and POS terminals from the currently fragmented card alliances. The unification of card alliances will ensure the effective usage of card payment infrastructure, bringing more convenience for card users and providing access to small banks. This unified card payment switch will be integrated to the fully functional ACH in the future.

10. Vietcombank - Success in E-payment Promotion

10.1 Corporate Profile

Established on April 1, 1963, the Bank for Foreign Trade of Vietnam (Vietcombank) is classified as one of the State's 23 special corporations. The bank has positioned itself as one of the leading banks in Vietnam's banking system with its profound strength in wholesale banking, treasury, trade finance, international settlement and application of advanced banking technology. In addition to its solid position in wholesale banking with traditional customers including big corporations and major enterprises, Vietcombank has successfully developed a diversified and widespread distribution network, thereby creating a momentum for expanding retail banking and better serving small and medium-sized enterprises with advanced and high quality products and services. The bank has also participated in other business segments, including securities, fund management, life insurance, real estate, infrastructure development, etc. via its network of subsidiaries and joint ventures.

Vietcombank's operations have been supported by the largest correspondent network among local banks with more than 1,300 correspondent financial institutions in over 90 countries and territories.

The year 2007 will witness the turning of a new page in Vietcombank's history, marked by the milestone of the bank's equitisation. Thorough changes in advanced corporate governance under international best practices, expansion of businesses, development of modern banking products and services and in-depth investment in technologies will help Vietcombank realise its objectives of becoming a leading regional universal financial holdings by 2015 – 2020.

10.1.1 Success in E-payment

Faced with increased competition during the course of integration into the global economy, Vietcombank places information technology as the strategic focus for improving competitiveness, product development and establishment of modern banking service distribution. Towards these ends, Vietcombank has expended great efforts in developing e-payment services, especially internal payment system, e-banking and card services.

10.1.2 Some Notable Achievements

In February 2002, Vietcombank completed its integrated bank-wide network and deployed core banking Vietcombank Vision 2010 at all its branches. With this deployment, Vietcombank became the first local bank equipped with online-internal system enabling the offering of retail banking services and e-payment products.

The core banking system has provided the bank with a reliable platform for the development of IT applications, enabling it to centralise and computerise all information and payment transactions. Vietcombank also offers a range of innovative products and services including VCB Online, VCB Money, VCB Connect 24, Credit Card, VCB Cyber Bill Payment, VCB Global Trade and VCB Treasure.

In April 2002, Vietcombank brought to the market the automated card system VCB *Connect 24* with added-value utilities such as bill paying and credit transfer, which is considered a breakthrough service at that time.

The bank's online payment system connected to 1300 correspondent banks can automatically process up to 95 percent American standard compliant SWIFT money transfers. For the inter-bank operation, Vietcombank has developed an in-house core product of VCB-MONEY. The bank is considered, in some way, an electronic payment processing center for the national banking system, given its transactional volume and customer base. By the end of 2006, VCB-MONEY channel is now capable of processing up to 97 percent of electronic transactions for financial institutions and corporate customers. VCB-MONEY was continuously upgraded with new applications, such as online credit advice, unlimited payroll payments, foreign exchange dealing, credit transfer and OTP authentic security system. The bank's product innovation efforts resulted in 120 financial institutions and 175 economic entities using payment service via VCB-MONEY channel, with 928,000 transactions and transaction value of

VND332,750 billion (equivalent to USD 20 billion) and USD 21.0 billion in 2006. The service is expected to be rolled out to individual customers at the appropriate time.

Vietcombank also brings more innovative services in the upcoming time including international remittance, online shopping and e-commerce.

10.1.3 Card Services in Close-up

In recent years, the bank's card issuance and card payment have seen rapid growth. By the end of 2006, Vietcombank has attracted 1.8 million individual customers. The card business has become a fundamental modern banking service, a breakthrough for the development of retail banking and creating a low-cost, efficient funding source for Vietcombank. The bank success can be demonstrated by the following facts:

- As of 2006, Vietcombank makes up 33 percent of the card issuance market, including international cards and domestic debit cards. The bank has successfully managed impressive growth in the mainstream debit card *Connect 24* at triple digits in recent years. In addition, enhancements in billing payment services were made available in alliance with insurance, electricity, telecommunication and mobile telecommunication service providers.

Figure 4
Vietcombank's Card Business Performance 2004-2006

Criteria	Units	2004	2005	2006
Outstanding valid cards				
<i>International credit cards</i>	Cards	36,275	51,600	72,448
<i>Connect 24 debit cards</i>	Cards	480,000	940,000	1,500,000
Card Payment				
<i>Int'l credit card turnover</i>	Million USD	226	315	386
<i>Connect 24 turnover</i>	Million VND	8,818,354	18,574,653	29,249,000

Source: Vietcombank 2007 Prospectus for IPO

- The bank possesses the country's largest ATM network, accounting for nearly 30 percent of the total (740/2752 ATMs) by the year 2006. In addition, the bank's payment system accounts to 5000 POS and its card alliance has 16 member banks.
- VCB is the first local bank in Vietnam that issues and provides card payment for international card brands such as *Visa*, *Master*, *JCB* and *Amex*. Further developments in card business in 2006 included Vietcombank's cooperation with other partners on service enhancement and new product launch for Vietcombank *MTV MasterCard*, Vietcombank *SG24* and *V-CBP* e-commerce service. The year 2006 marked another step forward in the bank's collaboration with local and foreign partners through a series of strategic partnership with Visa, MasterCard, American Express, Vietnam Airlines, and China Union Pay (CUP).
- The bank has recently developed value-added facilities called VCB-P on *Connect-24* bank card, such as purchase of Internet card, phone card Internet, insurance premium payment, mobile phone billing payment, and utilities billing payments.

In conclusion, as the first-mover in the development of e-payment, Vietcombank has created substantial competitive edge over other local banks, pushing forward business performance in other areas, such as retail banking and branding in the context of increased competition in the banking sector. In addition, owing to e-payment promotion, the bank can now offer a range of new products and services in short cycle times, improve service quality, enhance bank's overall performance through operation cost-saving and improved non-credit revenue.