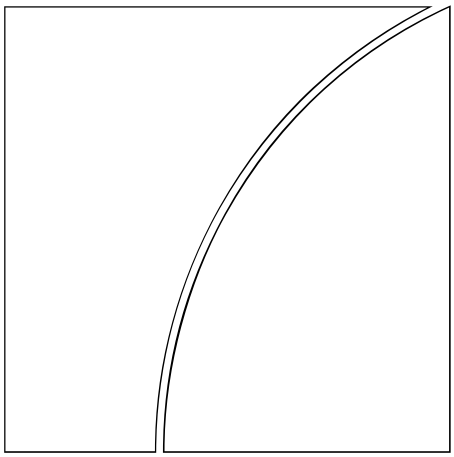
Committee on Payment and Settlement Systems



Survey of electronic money developments

Prepared by the Committee on Payment and Settlement Systems of the central banks of the Group of Ten countries

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Fax: (+41 61) 280 9100 and (+41 61) 280 8100

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Foreword

Electronic money projected to take over from physical cash for most if not all small-value payments continues to evoke considerable interest both among the public and the various authorities concerned, including central banks. The electronic money developments raise policy issues for central banks as regards the possible implications for central banks' revenues, their implementation of monetary policy and their payment system oversight role. In view of these potential policy concerns, in 1996 the G10 central bank Governors announced their intention to closely monitor the evolution of electronic money schemes and products and, while respecting competition and innovation, to take any appropriate action if necessary. The Governors asked the BIS to monitor the developments of these new products on a regular and, as far as possible, global basis.

Since 1996, the BIS in cooperation with the Committee on Payment and Settlement Systems (CPSS) and with the support of the CPSS Secretariat, has been regularly surveying electronic money developments around the globe with the help of central banks worldwide. The surveys were initially conducted twice a year and were confidential, with information being shared only with the participating central banks. However, in view of the widespread public interest in this innovative means of payment the CPSS decided to make the contents of the survey publicly available after obtaining the consent of the participating central banks. The first such *Survey on electronic money developments* was published by the BIS in May 2000. This year's report too is being made available to the public.

For this year's survey, the number of participating central banks was expanded. In all, 82 countries from around the world responded. The information in the survey relates to late 2000 or early 2001. An Introductory chapter has been included in this year's report which provides the readers with information on the policy stance adopted by the various authorities concerned, including central banks.

Electronic money products are defined here 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 called digital cash). These products differ from so-called access products that allow consumers to use electronic means of communication to access otherwise conventional payment services (for example, use of the internet to make a credit card payment or for general "online banking").

The CPSS Secretariat would like to thank all the institutions that have participated in the survey and agreed to make information available for this report. The Secretariat welcomes comments on the content or the format of the survey (e-mail: cpss@bis.org, subject line: "e-money", fax:+41 61 280 9100).

A number of publications relating to electronic money have already been published under the auspices of the BIS. These include *Security of Electronic Money* (a joint publication by the CPSS and the Group of Computer Experts, August 1996), *Implications for Central Banks of the Development of Electronic Money* (BIS, October 1996) and *Risk Management for Electronic Banking and Electronic Money Activities* (Basel Committee on Banking Supervision, March 1998). We hope that this survey of electronic money developments will provide a useful addition to this list. The survey is available on the BIS website (www.bis.org).

Gregor Heinrich
Head of Secretariat
and
Gynedi Srinivas
Member of Secretariat
Committee on Payment and Settlement Systems

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* West African Economic and Monetary Union countries (Benin, Burkina Faso, Côte d'Ivoire, Guinea Bissau, Mali, Niger, Senegal and Togo).

Introduction

1. Overview

1.1 Developments in electronic money schemes have evoked considerable interest over the last several years. Electronic money or e-money, as a potential substitute for cash for making small-value payments, raises policy issues for central banks as regards the possible implications for central banks' revenues, their implementation of monetary policy and their payment system oversight role. In view of these potential policy concerns, in 1996 the G10 central bank Governors announced their intention to closely monitor the evolution of electronic money schemes and products and, while respecting competition and innovation to take any appropriate action if necessary. The Governors asked the BIS to monitor the developments of these new products on a regular and, as far as possible, global basis.

1.2 Since 1996, the BIS in cooperation with the Committee on Payment and Settlement Systems and with the support of the CPSS Secretariat, has been regularly surveying electronic money developments around the globe with the help of the central banks worldwide. The surveys were initially conducted twice a year[1] and were confidential, with information being shared only with the participating central banks.

1.3 In view of the widespread public interest in this innovative means of payment the CPSS decided to make the contents of the survey publicly available after obtaining the consent of the participating central banks. The first such *Survey on electronic money developments*[2] was published by the BIS in May 2000. This year's report too is being made available to the public.

1.4 For this year's survey, the number of participating central banks was expanded. In all, 82 countries from around the world responded. As in the past, participating central banks were requested to furnish information on card-based schemes, network-based/software-based schemes, policy responses and statistical data on the use of e-money in their respective countries.

1.5 This introduction reviews e-money developments and policy responses on the basis of the latest survey conducted in June 2001. It is followed by the individual survey responses and comparative tables on the use of e-money products and system design features, based on the information provided by selected survey respondents.

2. Definition of e-money

2.1 Electronic money products are intended to be used as a general, multipurpose means of payment in contrast to the many existing single-purpose prepaid card schemes. E-money products also need to be distinguished from so-called access products which typically allow consumers to use electronic means of communication to access conventional payment services (for example, use of the internet to make a credit card payment or for general "online banking").

2.2 Card-based products, also known as multipurpose prepaid cards or electronic purses, are designed to facilitate small-value face-to-face retail payments by offering a substitute for banknotes and coins. They are intended to complement rather than substitute for traditional instruments such as cheques and credit and debit cards. Similarly, network-based or software-based products are designed to facilitate small-value payments over the internet (remote payments), as a substitute for making payments using credit cards on open networks.

2.3 As in the past, in this year's survey, electronic money continues to be defined[3] as a stored-value or prepaid product that allows consumers to make small-value transactions using a chip or smart

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[1] From 2000, annually.

[2] Available on the BIS website (http://www.bis.org/publ/cpss38.htm).

[3] A legal definition of electronic money has recently been provided in Article 1 of the European Parliament and Council Directive 2000/46/EC. The definition states that "electronic money shall mean monetary value as represented by a claim on the issuer which is: (i) stored on an electronic device; (ii) issued on receipt of funds of an amount not less in value than the monetary value issued; (iii) accepted as means of payment by undertakings other than the issuer" *Issues arising from the emergence of electronic money,* Page 49, ECB Monthly Bulletin, November 2000.

card (card-based product or electronic purse) or over computer networks such as the Internet (network-based or software-based schemes). A record of the funds or value available to the consumer for multipurpose use is stored on an electronic device in the consumer's possession. In the case of card-based products, the prepaid value is typically stored in a microprocessor chip embedded in a plastic card - "smart card". On the other hand, network-based products use specialised software installed on a standard personal computer for storing the "value". The loading of value into the device is akin to withdrawal of cash from an ATM and it is used for purchases through a transfer of value to the merchant's electronic device.

3. Development of e-money products

3.1 Card-based schemes

3.1.1 In a sizeable number of the countries surveyed, card-based e-money schemes have been launched and are operating relatively successfully: Austria, Belgium, Brazil, Denmark, Finland, Germany, Hong Kong, India, Italy, Lithuania, the Netherlands, Nigeria, Portugal, Singapore, Spain, Sweden and Switzerland. In some countries the products are available on a nationwide basis and in others only within specific regions or cities. Card-based products are gradually gaining acceptance. In some countries the e-money facility has been combined with other functionalities such as access control, holder identification or local transportation ticketing. Card-based e-money products have been piloted in another 16 countries,[4] and are under consideration in a further six. A common feature though is the involvement of the major international payment card companies such as Visa and MasterCard in most card-based e-money schemes.

3.1.2 In contrast, a large number of the central banks which responded to the survey questionnaire stated that, given the current economic growth and development in their respective countries, they do not have any plans to introduce any e-money schemes in the near future.

3.2 Network-based schemes

3.2.1 Compared to card-based schemes, the developments of network-based or software-based e-money schemes has been much less rapid. Network-based schemes are operational or are under trial in a few countries (Australia, Austria, Colombia, Italy, the United Kingdom and the United States), but remain limited in their usage, scope and application. In some countries card-based schemes are adopting features that would enable the card to be used over the internet.[5] In other countries, for example as in Japan and Norway, pilot projects have been conducted with no further plans for wider distribution. A vast majority of the participating central banks have indicated that there are no plans to introduce network based e-money products.

3.3 Statistical data

3.3.1 Statistical data on e-money schemes is relatively limited. Table A provides data on the use of e-money products. In a number of card-based schemes, the number of cards issued and the number of merchant terminals available for e-money transactions is considerable. The volume of transactions, however, continues to remain small in most cases. Similarly, the value of daily transactions is low on account of the low levels of usage but also because the average value of the transactions is very small, typically a few US dollars. The same is true in respect of network-based e-money schemes. The limited data available on outstanding e-money balances (float) also suggests that these are very low.

3.3.2 Table B provides an overview of the system design features of e-money schemes. These differ considerably from country to country and from product to product. Most schemes operate with reloadable cards, enabling periodic replenishment of balances from bank branches, ATMs or in some

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[4] Pilot projects are underway in Australia, Bolivia, Canada, Colombia, France, Japan, Korea, Malaysia, Mexico, Norway, South Africa, Taiwan, Thailand, the United Kingdom, the United States and Venezuela.

[5] Paysafe card in Austria, Omnipay prepagato and Moneta on line in Italy, use a "scratch" card with a pin that can be used for buying products from "web" shops over the Internet. In Korea the card product K-Cash is planned to be utilised over the internet through a special card reader.

cases through the telephone or internet.[6] Relatively low limits, (typically a few hundred US dollars) have been placed in all cases on the maximum value that can be stored on the cards. Transferability of value via purse-to-purse without the involvement of the issuer is not available in virtually all schemes.[7] In several countries the card-based schemes have been adapted for network payment.[8]

4. Policy issues

4.1 The survey questionnaire also asked the central banks to comment on several policy issues concerning e-money, such as: the impact of e-money on monetary policy and seigniorage revenues; the general legal framework; security aspects; issuer details; oversight of the payment system and e-money schemes; supervision of e-money schemes, law enforcement; and cross-border aspects of e-money. The following briefly reviews the major policy responses formulated by the central banks participating in the survey.

4.2 ***Monetary policy and seigniorage.*** A number of central banks including those of Austria, Belgium, Finland, Germany, Hong Kong, Italy, Lithuania, the Netherlands, Singapore, Spain, Sweden and the United Kingdom are collecting data on the e-money issued by banks. Nigeria and Switzerland have reported that the inclusion of e-money data in monetary statistics is under review, whereas in Denmark there is no such requirement. In the United States the Federal Reserve currently has no statutory authority requiring non-depository institutions to report on the e-money balances issued, while in the United Kingdom the Bank of England will at a future date arrange to collect data on issuance of e-money by non-banks if and when the amounts are significant.

4.2.1 So far no central bank has indicated an adverse impact on the size of its balance sheet due to a possible decline in the value of the banknotes in circulation as a consequence of widespread adoption of e-money. The European Central Bank (ECB) is of the view that the central banks can maintain the size of their balance sheet if necessary by imposing minimum reserves on e-money issuers or by issuing e-money themselves. As reported elsewhere in this chapter, given the low average value of e-money transactions and the relatively small cap on the amounts that can be stored on stored value cards, the value of e-money float is still very low. Losses on account of decline in seigniorage revenues are also perceived to be negligible by the central banks and have so far evoked no specific policy responses from them.

4.3 ***General legal issues.*** Within the Eurosystem, a comprehensive and harmonised regulatory framework for the issuance of e-money by traditional credit institutions and a new class of credit institutions called electronic money institutions (ELMIs) is provided by two EU Directives: the European Parliament and Council Directive 2000/46/EC on the taking-up, pursuit of and prudential supervision of the business of electronic money institutions and the European Parliament and Council Directive 2000/28/EC amending Directive 2000/12/EC relating to the taking-up and pursuit of the business of credit institutions. Most EU national central banks accordingly envisage making suitable changes to existing legislation or new statutes in line with the two EU Directives. Elsewhere, for example in France, Hong Kong, Korea and Malaysia, it is felt that the existing legal framework is adequate to deal with issues related to e-money. In some countries specific legislation is being contemplated for regulating the issuance of e-money.[9]

4.4 ***Relevant security issues.*** Several measures are commonly taken to address security issues. These include tamper-resistant chips on cards and the use of sophisticated encryption techniques. Further, limits on the amount of value that can be stored on consumers' and merchants'

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[6] Special terminals are provided in some cases for replenishment of balances. In the Netherlands and Singapore a handheld terminal allows for loading via the telephone line. In Sweden the loading is done through special terminals and phone, as in Lithuania, where PC-based terminals are used for the same purpose

[7] The Mondex system operational in Canada, Hong Kong and the United Kingdom is the only scheme which allows purse-to-purse transactions.

[8] Avant in Finland, CashCard in Singapore, Chipknip and Clipper in the Netherlands, GeldKarte in Germany, MINIPAY in Italy, Mondex in Canada, Hong Kong and the United Kingdom, Monedero 4B and Visa Cash in Spain, and Quick in Austria. eLitocard in Lithuania, K-Cash in Korea and Visa Cash in Brazil are planning adaptation for network payment. Network payment has also been piloted for the third Spanish scheme (Euro 6.000).

[9] For example in Korea, Thailand and Venezuela.

electronic devices, limits on the value for individual transactions, and the use of a PIN (personal identification number) for authorising loading and/or transfer instructions are also widely adopted to limit potential losses on account of a breach in security. In Germany the central bank has developed a questionnaire which is used as a checklist to analyse the security of e-money products. A similar approach is followed in Singapore, where the monetary authority assesses whether the issuing bank has put in place a robust security system to prevent counterfeiting and fraud. In France the central bank uses a tool called "protection profile" to assess the security profile of the scheme. In other countries, such as Austria, the assessment of security features is entrusted to a relevant technical organisation, while in Mexico a special task force has been constituted. In Hong Kong the central bank intends to engage outside experts to assess the security features as necessary.

4.5 ***Issuer details.*** Most EU member countries are in the process of transposing the two relevant Directives (see Section 4.3 above) into their national banking laws.[10] In Hong Kong, special-purpose vehicles whose principal business is to issue multipurpose stored value cards (MPCs) may be authorised as deposit-taking companies under the Banking Ordinance for the purpose of issuing MPCs along with traditional credit institutions.

4.5.1 In India, Lithuania, Mexico, Singapore and Taiwan e-money can be issued only by banks, whereas in Canada, Malaysia and the United States there are no restrictions on issuance of e-money by a particular type of institution. In several other countries, such as Bolivia, Thailand and Venezuela, policy guidelines on the subject are either under review or are being framed.

4.6 ***Oversight issues.*** Most central banks[11] performing an oversight function of the payment system also monitor and analyse developments with regard to e-money. This includes collection of data and periodic meetings with the issuers. In other instances a wider range of activities are undertaken to study the organisational, legal, administrative, technical and security features of the product and the operator. The Eurosystem, as part of its oversight role with regard to e-money schemes, is working towards establishing a harmonised approach in the areas of standard setting and assessment methodology relating to the technical security of the e-money schemes.[12] The Bundesbank cooperates with the Federal Office for Security in Information Technology to draw on the latter's expertise to assess the potential risk of counterfeiting in e-money.

4.7 ***Supervisory issues.*** The two EU Directives referred to above provide a comprehensive and regulatory framework for the prudential supervision of the business of electronic money institutions within the Eurosystem. In Hong Kong, India, Lithuania, Nigeria and Singapore guidelines have been framed or vested in the central bank through legislation for the issue of e-money by banks. Federal banking authorities in the United States are updating bank examination procedures to include e-money developments and their associated risks. In Thailand an amendment to the existing legislation is being proposed by the central bank to vest it with explicit capabilities of supervision. In other countries the supervisory role is executed by other bodies.[13] In still other countries such as Korea, Mexico and Switzerland, specific regulations on the issuance of e-money have not been issued.

4.8 ***Law enforcement issues.*** Many of the security features of e-money schemes, including the limits on value that can be stored on the cards, make them less attractive for the purposes of money laundering and other criminal abuses. Laws combating money laundering are applicable to e-money schemes, as they are to credit institutions, which in many countries are the sole issuers of e-money. As part of the oversight function emphasis is laid on studying the features of the e-money schemes to ensure that they do not broaden the scope for possible criminal abuse. Some measures insisted upon are the maintenance of an audit trail, ascertaining the identity of the customer and restricting the issue of cards to account holders at the relevant credit institutions.

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[10] Both Directives should be implemented by member states by 27 April 2002 at the latest.

[11] Central banks in Belgium, Finland, France, Germany, Italy, Lithuania, the Netherlands, Singapore, Spain, Sweden and Thailand include e-money schemes in the exercise of their oversight functions.

[12] In order to ensure that e-money schemes are safe and efficient and that issuers are sound, the Eurosystem has defined seven minimum requirements for e-money schemes. Please see “Report on electronic money" ECB, August 1998 pp 23-27.

[13] Australia (Australian Prudential Regulation Authority), Austria (the Federal Minister of Finance), Finland (Financial Supervision Authority), Sweden (Swedish Financial Supervisory Authority, Finansinspektionen) and the United Kingdom (Financial Services Authority).

4.9 ***Cross-border issues.*** The introduction of the euro and the creation of the EU passport under the EU Directive on the prudential supervision of the business of electronic money institutions will in the future increase the relevance of cross-border issues within the Eurosystem. As part of the current initiatives for cross-border interoperability of e-money in the euro area, two projects have been launched: "PACE"[14] and "Ducato".[15]

4.10 ***Other issues.*** Some central banks are urging the market participants in their respective countries to adopt common standards on a nation wide basis to achieve the goal of standardisation and building up a common technical infrastructure such as card readers and terminals, in order to increase availability and reduce operational costs.[16] Consumer protection issues are being addressed by some central banks (eg in Spain). In other countries the issue is addressed by an appropriate institutional authority different from the central bank. The emphasis in both cases remains the protection of consumer interest.

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[14] The PACE (Purse Application for Cross-border Use in euro) project, was introduced on 5 July 2000 by CETREL (Centre de Transferts Electroniques) using miniCASH in Luxembourg, by ZKA (Zentraler Kreditausschuss) using Geldkarte in Germany, and by Groupement des Cartes Bancaires and SEME (Societe Europeenne de Monnaie Electronique) using Moneo in France. The electronic purses are interoperable and can be used to make euro-denominated payments in Luxembourg, Germany and France. The three organisations are committed to adopting the Common Electronic Purse Specifications (CEPS).

[15] The Ducato project was announced on 12 September 2000 by Banksys, Europay International, Interpay, Proton World, Sermepa, Sistema 4B, Visa International and Cartes Bancaires (joined in January 2001). This is a pilot project covering schemes in Belgium, France, the Netherlands and Spain.

[16] The central banks of Thailand, Korea and India are active in this area. Bank of England considers that these issues are best determined by market forces, but as part of its monitoring role looks for evidence of market failure in these areas.

ALBANIA

1. Card-based products

In Albania at present, there are no e-money schemes in operation. Only single-purpose cards are offered by telecommunications service providers.

2. Network/software-based products

Network-based e-money has not yet been developed.

Some banks offer home banking services to their customers, giving them the possibility to order their transactions.

3. Policy responses

The Bank of Albania is closely monitoring developments in electronic means of payment. It has recently issued a regulation on electronic payments in which it is established that only banks can issue e-money. For the moment, there are no specific provisions regarding e-money, since the level of development of e-money does not necessitate it.

ARUBA

In Aruba the development of e-money, as defined by the CPSS, is still at a very early stage in comparison to many other countries. The interest in issuing this type of payment instrument in the near future is, however, increasing. Particularly in the government sector, eg the Tax Department and the Civil Registry Department, there is a growing need for the introduction of smartcards and multipurpose prepaid cards, which will require the special attention of the Bank.

As regards more traditional payments instruments, it should be mentioned that three of the six commercial banks already have, in addition to international credit cards such as Visa and AMEX, debit cards for their clients. Because of the lack of one (local) clearing house for these transactions, the cost per transaction is still relatively high. ATM services have been available since the 1990s, while home banking services are provided on a limited scale. The local telecommunications company has issued a single-purpose prepaid card to be used in public telephones.

In order to keep abreast of e-money developments and to collect relevant statistical data, the Bank will soon conduct a survey among the commercial banks and other institutions. This will also enable it to provide data for the e-money survey, as well as to address monetary and prudential policy and general legal issues related to e-money.

AUSTRALIA

1. Card-based products

Usage of card-based e-money has yet to go beyond limited trials in Australia. Nevertheless, Australia is developing a smartcard industry, especially in electronic ticketing, which is internationally focused. A study by the National Office for the Information Economy and Asia-Pacific Smartcard Forum found that in 1999 Australia's smartcard industry generated AUD 450 million, of which AUD 390 million was in exports.

ACTSMART project. Cable and Wireless Optus and Siemens Ltd have won the contract to develop the Australian Capital Territory (ACT) government's ACTSMART project. The project will supply the ACT community with smartcards that provide a range of electronic services such as transport ticketing, library, parking, identification and electronic purse. The ACT government hopes to begin issuing multiple-application smartcards by late 2001/early 2002.

Other states have similar smartcard-based integrated transport ticketing projects planned. OneLink Transit Systems, an ERG subsidiary, intends to extend Melbourne's current integrated transportation ticketing to a smartcard-based system in the near future. Tenders are still being evaluated for multi-application smartcard projects in Sydney and southeast Queensland.

ECard. ECard is the result of an alliance between transit smartcard developer ERG, the ANZ bank and Telstra to act as a service bureau for an open smartcard network based on a Proton platform.

In early 2001, approximately 450,000 ECards were issued to Technical and Further Education (TAFE) students at 102 campuses in New South Wales. Previously, TAFE students had received Telstra-issued smartcards on a Chipper platform. Telstra's alliance with ERG and ANZ prompted a switch to the Proton-based ECard. The cards include functions for identification, access to restricted areas, and electronic purse facilities for canteens, payphones, bookshops and library photocopying.

In early 2000, ERG group began issuing ECards to staff and students at Victoria's La Trobe University. Around 27,000 ECards are currently held across four campuses. The cards also contain a magnetic stripe and bar code and can be used for transactions such as photocopying and printing, vending machines and retail purchases at 33 on-campus merchants and 18 off-campus merchants.

The Hospital Benefit Fund of Western Australia (HBF) in conjunction with ERG Group has issued 450,000 membership cards. These multifunction ECards contain an electronic purse that can be used at 1,500 retail outlets. The purse can be used to purchase goods and services and reloaded through EFTPOS terminals belonging to BankWest, a regional bank. In addition it can be reloaded at 360 special terminals. Usage of the purse has been modest.

Two major banks, Westpac and ANZ Bank, have announced that they intend to upgrade their EFTPOS/retail terminals to support ERG Group's smartcard technology.

Telstra. Telstra, Australia's largest telecommunications company started issuing disposable smart phonecards in August 1997 on the Chipper card system. The company has also conducted several trials of multifunction reloadable cards. The company now supports the open Proton-based ECard due to its membership of the Global Chipcard Alliance and its alliance with ERG group and ANZ (discussed above). Consequently, except for its disposable phonecards, the company has abandoned the Chipper platform.

Visa Cash. The South Australian Cricket Association in conjunction with St George Bank and ***Visa*** International has issued 17,000 multifunction smartcards to its members. The card can be used as a ***Visa*** credit card, an ATM/EFTPOS card and an electronic purse at retail outlets at the Adelaide Oval.

Despite acquiring the sole rights for its smartcards to be used in the Olympic village for the Sydney 2000 Olympic Games, ***Visa*** did not undertake any publicised trials during the Olympics.

Transcard. Trials of Transcard, a multi-application contactless smartcard, are still limited to western and northern Sydney and the Gold Coast corridor services of Queensland Rail. The technology is owned by Catuity Inc, and cards are available from certain newsagents or the St George Bank. The cards are reloadable up to AUD 500 and also have a loyalty programme.

Mondex. The Australian Mondex franchise, owed by the four major Australian banks, has not initiated any new developments in the last 12 months. Three of the banks are conducting in-house trials, of which two have been expanded to incorporate about 30 external merchants. However, the cards are still only issued to staff of the banks.

2. Network/software-based products

Technocash. Technocash, a stored value payment mechanism that allows a consumer to make purchases over the internet, began operations on 1 September 2000. Customers purchase an amount (varying between AUD 20 and AUD 1,000) of Technocash along with a unique 16 digit alphanumeric code. The code, along with the expiry details, are then required to access the Technocash for an online purchase. A password can also be applied to the Technocash as an additional security feature.

Customers can purchase Technocash either online through their bank's internet banking facilities, or from an Australia Post outlet. Technocash is non-refundable, but is transferable to other persons and can be combined and split; it has a valid lifespan of three years. Currently, there are 28 merchants that accept Technocash.

eCash (formerly DigiCash). eCash, St George Bank's digital cash product, continues to be used on a small scale. Initially, both consumers and merchants had to hold an account with St George Bank to use eCash. However, it is now possible for customers of other banks to purchase eCash via the BPAY scheme. BPAY is a bank-owned third-party bill payment service. It allows customers of participating financial institutions to arrange for the transfer of funds from their bank account using phone or internet banking services.

3. Policy responses

In June 2000, changes were made under the Banking Act 1959 to bring all holders of stored value (ie entities backing stored value) in relation to purchased payment facilities, such as smartcards and electronic cash, under the regulation of either the Reserve Bank of Australia (RBA) or the Australian Prudential Regulation Authority (APRA).

The change brings holders of stored value under APRA's supervision where the holder of stored value is deemed to be carrying out banking business. This is considered to be the case where the facility is available for purchase and use on a wide basis, and where all or part of the facility's unused value is repayable on demand in Australian currency. Stored value schemes outside this scope remain the regulatory responsibility of the RBA under the Payment Systems (Regulation) Act 1998.

Most other policy issues arising from the development of e-money are being dealt with by existing regulation. Issues of competition are monitored by the Australian Competition and Consumer Commission (ACCC). Consumer protection is handled under the consumer protection legislation overseen by the Australian Securities and Investments Commission (ASIC). Issues relating to law enforcement, and money laundering in particular, are being addressed by the existing agencies, including the Australian Transaction Reports and Analysis Centre (AUSTRAC).

ASIC released a revised Electronic Funds Transfer (EFT) Code of Conduct (a voluntary code) in April 2001. The code now includes rules for consumer stored value facilities and stored value transactions. The provisions of the revised EFT Code will generally bind institutions that subscribe to it from 1 April 2002.

AUSTRIA

1. Card-based products

Today there is only one multipurpose prepaid card scheme in Austria, called Quick. So far, the infrastructure provided (loading devices, terminals) does not take into account the design of any foreign systems (eg Visa Cash, Mondex). Together with a migration to an EMV-compatible chip and terminal infrastructure for debit and credit cards in 2004, a CEPS-based e-purse named "Clip" will be introduced. In a first step, the chip will handle both purse schemes, Clip and Quick, in parallel.

***Issuer*.** The Quick purse is issued by Europay Austria Zahlungsverkehrssysteme GmbH. Europay has been given bank status and is thus subject to banking supervision and other relevant regulations.

***Distribution and operation*.** The Quick purse can be loaded up to an amount of ATS 1,999 at 2,593 ATM terminals, 1,358 teller terminals and 1,166 self-service terminals. At the end of April 2001, 5,117 Quick loading terminals had been installed. Quick is distributed to customers via commercial banks as a chip contained on combined Eurocheque cards (around 2.3 million), Maestro cards (1.7 million), bank customer cards (0.3 million), or as pure electronic purse cards without relation to a bank account (about 1.3 million). Only value in ATS can be loaded; to date, the system has no multicurrency features and thus does not enable cross-border transactions. All cards have chips equipped with a euro conversion function which will allow online currency exchange from ATS to euros during the first usage of the card in 2002. The maximum balance in euros will be EUR 400. All

necessary security features are provided (safe authentication, encryption, tamper-resistance, control of payment flows).

***Payments*.** Payments can be made at several retailer terminals, most of them in supermarkets, petrol stations, drugstores, grocers, etc. The installation of Quick terminals in vending and ticket-selling machines had successfully started in 1997. Purse-to-purse transactions are not provided for. The value stored on the cards is posted on (collective) sight deposits. At the end of April 2001, 45,860 Quick POS terminals had been installed; there were 1.49 million Quick card POS transactions between January and April 2001 for an amount of ATS 85.2 million.

***Costs and fees*.** A pure Quick card ("Wertkarte", expected to be sold mainly to tourists) costs ATS 120. If the Quick purse is contained on other multifunctional chipcards, there are no extra charges for the e-purse function. Apart from the fees for operating the giro account involved, there are no further costs for the customers using the card. For retailers there is a 0.5 to 2% turnover fee and a collection charge of ATS 2 to 6 (charged when accumulated electronic values are posted on the retailer's bank account). The level of charge depends on the business involved (two categories: lower for retailers with desktop or mobile terminals, higher for vending machine operators) and on the retailer's method of transferring accrued electronic values to the bank account (lower for electronic/modem transmission, and higher if handed in on a special card - "Einreichkarte" - at the bank branch).

***Suppliers*.** While the chips embedded in cards are provided by Philips and Infineon, the card manufacturer is Austria Card Plastikkarten und Ausweissysteme Gesellschaft mbH, wholly owned by the Austrian National Bank (ANB) since 1994. Various terminals (eg ATM, POS, Teller and self-service terminals) are supplied by Bull, Diebold, Inform, Krone, NCR, PDTS, Intellect-Prodata and Siemens.

2. Network/software-based products

Today there is no software-based e-money product (ie where the monetary value is stored on the customer's software device) in the Austrian market. However, some other solutions for payments over the internet have already been developed by Austrian banks:

Bezahlen.at is an electronic bill presentment and payment system launched by PSK, the Austrian postal savings bank, which allows online payments for customers. Preauthorised payments to participating businesses are debited directly from the customer's account on the due date. The payments are settled via PSK.

Paysafecard is an internet payment solution launched by BAWAG/PSK together with paysafecard.com Wertkarten Vertriebs GmbH. The paysafecard technology is similar to that of a prepaid telephone value card. The card, which can be obtained in branches of BAWAG, post offices and a number of retail outlets, holds a hidden 16 digit PIN code that can be made visible by rubbing off the non-transparent film. Instead of submitting bank account or credit card details, when buying something in a web shop the customer keys in the PIN code and an optional password. The payment is processed - without delays for the customer - automatically in the background by means of a check routine and data exchange session between the web shop and paysafecard.com. A shadow account maintained in the system allows the customer to view his current card balance at any time on the homepage of paysafecard.com. Paysafecards are currently available at nominal values of ATS 300, 500 and 1,000. By June 2001 paysafecard will also be introduced to the German market.

3. Policy responses

Payment system oversight is according to the Maastricht Treaty and the Statutes of the ESCB a responsibility of the ESCB. The ANB's policy in the area of electronic money is therefore based on the ECB's policy stance, set out in its 1998 *Report on electronic money*.

To date, payment system oversight has been carried out on the basis of moral suasion. However, the establishment of a legal framework for the ANB's role as payment system overseer is under way.

***Monetary policy issues*.** Statistics on electronic money instruments are collected and aggregated on a monthly basis and the developments are closely followed by the ANB. As mentioned above, electronic value stored on customers' Quick cards is posted on sight deposits and, as such, is subject to minimum reserve requirements and counted in the monetary aggregates.

***Seigniorage*.** In the medium term, circulation of notes and coins is not expected to be substantially reduced by electronic stored value devices. This judgment is based on a projection of the actual figures, household surveys on usage of and attitudes towards such instruments as well as experience with former "cash innovations". However, the ANB is aware of studies conducted in the framework of the ESCB, which include scenarios with seigniorage decreases of up to 15%.

***Legal issues*.** To date, pursuant to the Austrian Banking Act, the task of effecting non-cash payment transactions on a commercial basis has been entrusted to banks exclusively, which for this purpose require a licence issued by the Federal Minister of Finance. Neither prepaid card money nor network money has up to now been addressed by specific provisions within the Austrian legal framework, and the various legal aspects of electronic money have not been dealt with by the courts or by jurisprudence. However, the European Directive on the taking up, pursuit of and prudential supervision of the business of electronic money institutions, as well as the respective amendment of Directive 77/780/EEC, are currently being transposed into Austrian law.

***Security issues*.** The assessment of e-money related security features has been entrusted by ANB to the Austrian Secure Information Technology Center (A-SIT), which is a joint effort of the Ministry of Finance (representing the Republic of Austria), the ANB and Graz University of Technology. Its prime goal is to function as an independent technology assessment and evaluation management centre in the field of IT security. It is designed to fulfil tasks comparable to the BSI in Germany in the field of electronic signature, cryptography and electronic commerce. This is done in close cooperation with international bodies. A-SIT has also contributed to the Austrian electronic signature legislation as well as to the European signature guidelines.

***Provider issues*.** As stated above, only banks and - in future - electronic money institutions are/will be allowed to issue electronic money.

***Supervisory issues*.** At present all e-money issuers are supervised by the Federal Minister of Finance.

***Law enforcement and cross-border issues*.** As the amount which can be loaded onto prepaid cards is limited and such cards are used mainly for small-value transactions, apart from security features to prevent any counterfeiting activities no specific measures to prevent money laundering through such instruments have been implemented so far. Nevertheless, all developments with respect to increasing possibilities for money laundering through electronic retail payment schemes, especially network money, are closely monitored and any necessary steps will be taken in an internationally coordinated manner.

BAHAMAS

The central bank has not yet formulated a policy approach to this matter, as there are at present no significant developments in the Bahamas.

BCEAO[17]

In order to reduce the amount of cash in circulation and increase the effectiveness and efficiency of payments, the central bank together with the banking community is considering schemes for the creation of a regional interbank and interoperable banking card system for the West African Monetary Union (WAMU) through a structure dedicated to the achievement of this objective.

[17] Western African Monetary Union countries: Benin, Burkina Faso, Côte d'Ivoire, Guinea Bissau, Mali, Niger, Senegal and Togo.

The importance of central bank involvement in e-money development is recognised, but the BCEAO has yet to design a policy, as the use of e-money is not very widespread. The BCEAO is thinking of developing such a policy in the near future. The policy will take into account the recommendations of the European Central Bank and the experience of developed countries in this field.

BELGIUM

1. Card-based products

A multipurpose prepaid card scheme, called Proton, was launched in February 1995 by Banksys, a bank-owned company already running the national debit card scheme. Nationwide expansion was achieved at the beginning of 1998.

Proton is a microprocessor card which stores monetary value as opposed to tokens or units of service (as a phonecard does). It is designed to be a replacement for cash (and small-value cheques) and is targeted at payments below BEF 500 (EUR 12.39) at neighbourhood shops, vending machines, car parks, ticket machines, payphones and on public transport. It can be loaded with amounts ranging from EUR 5 to EUR 125. Card-to-card payments are not possible. Proton is a monocurrency system, the payments being made in either BEF or EUR since July 1999. From mid-2001, cards in BEF are automatically converted into EUR as they are presented at a loading terminal.

The loading transaction is processed with verification of a PIN code and of the funds available on the bank account. The cards are reloadable at cash dispensers (ATMs) or at public telephone booths. A "smartphone" which makes it possible to reload a card at home and to use the card to make payments to a service provider over the telephone has also been available since the end of 1997. Furthermore, a pilot related to card-based payments made on the internet through a plug-in terminal for personal computers is under way.

During a transaction, money is transferred from the Proton card to the retailer's terminal (offline terminals or vending machines). As only small amounts are involved, and for the sake of speed and convenience, these payments are made without using a PIN code. The retailer can transfer the money into his/her bank account through a simple telephone call from his/her terminal (using the modem). The cardholder can consult the balance on his/her Proton card at a cash dispenser, public telephone booth, service provider's terminal or using a small personal pocket device.

The electronic purses are issued only by credit institutions. It is up to each institution to set the fees (if any) that it charges cardholders. The annual fees charged to the cardholders range from BEF 0 to BEF 200 (from EUR 0 to EUR 5). Using or downloading the cards must remain free. Banksys is responsible for the tariff policy towards the retailers. The retailers have to pay a percentage of the amount stored in their terminals plus a fixed fee (depending on the contract) per collect.

At the end of February 2001, more than 8,500,000 cards were issued with the e-money facility (in Belgium, almost all debit cards are issued with such a facility); the total amount outstanding was around BEF 2.07 billion (EUR 51.31 million). A daily average of 156,357 purchase transactions were made in February 2001 for an average amount of BEF 151 (EUR 3.74).

The Proton technology has already been adopted by a large number of countries, making it a de facto international standard. Visa, Amexco and ERG, an Australian smart card group, decided in July 1998 to set up a venture with Banksys. Interpay, a Dutch smartcard group, joined this venture in October 1998. The venture, Proton World, aims to establish a global standard and infrastructure for electronic purses.

2. Network/software-based products

No such products exist at present in Belgium.

3. Policy responses

The requirements set out in the *Report on electronic money* published in August 1998 by the European Central Bank serve as guidelines for the public authorities in the conduct of their policies in this area.

***Monetary policy and seigniorage*.** A separate section has been introduced in the monthly reporting by banks in order to collect data on the float owned by the credit institutions involved in the issuing of e-money.

According to the ECB report, the possibility would exist for NCBs to impose reserve requirements for monetary policy reasons on all issuers of e-money. In the same way, the redeemability requirement for electronic money contained in the report is intended to guarantee that central banks continue to issue the final settlement medium in the interbank market. The details of this requirement have been specified by the ECB. The redeemability requirement will be part of the forthcoming EU Directives on e-money (see below).

***General legal issues*.** From a macroeconomic viewpoint, the issuance of e-money raises questions about the supervision of issuers, on the one hand, and the oversight of payment systems, on the other hand. From the microeconomic viewpoint, the effect of the issuance of e-money on consumer and data protection as well as law enforcement issues have to be taken into account by the authorities.

(a) *Supervision of issuers*: the only e-money system in operation in Belgium is managed by the banking sector, the issuers of the e-value on the cards being exclusively credit institutions under the prudential control of the Banking and Finance Commission. The de facto restriction of this type of activity to credit institutions is in line with the recommendation of the ECB stipulating that the issuers must be subject to prudential supervision. In the same context, two Directives relating to the taking up, pursuit of and prudential supervision of the business of electronic money institutions were adopted in September 2000 by the EU's Council of Ministers and the European Parliament. Both Directives will be transposed into the Belgian banking law.

(b) *Oversight of payment systems*: the NBB's organic law entrusts it explicitly with the task of overseeing clearing and payment systems. The NBB has conducted two evaluations of the reliability of the Proton scheme from the technical, operational and legal viewpoints: the first in 1996, the second in 1999-2000. The last exercise evaluated the conformity of the system with the minimum requirements contained in the ECB *Report on electronic money*.

(c) *Consumer protection*: the electronic units stored on prepaid cards are now considered equivalent to deposits as regards the enforcement of the legal scheme for the protection of the holder's interests. That has made them eligible for protection under deposit insurance since February 1999. This eligibility is not extended to the funds incorporated into the merchant's terminal that are not yet credited to the merchant's account.

A bill is currently being drawn up with a view to transposing the European Commission Recommendation concerning transactions effected by means of an electronic payment instrument, in particular the relationship between issuer and holder, into national legislation. The bill is to cover the minimum information to be addressed to the consumer as well as the respective rights and obligations of the parties involved. Another bill concerning the use of electronic signatures has been adopted.

Even though Belgium does not yet have specific legislation on computer crime, a new provision (Law of 19 December 1997) has been adopted relating to the security of communication networks, and more specifically to the free usage of cryptography.

The Belgian law on data protection is applicable to personal data collected through the working of e-money schemes. The money laundering legislation is also applicable to such schemes, because the law covers all transactions with this form of criminal intention, regardless of the techniques used.

Relevant security issues*.** The BIS report on security issues remains the main basis for discussion of technical security matters. The last evaluation conducted by the NBB (see above under ***Policy responses) also covered the security features of the Proton scheme.

Issuer details*.** See above under ***General legal issues.

***Payment system issues*.** There are no particular problems concerning the clearing and settlement arrangements for e-money schemes. The NBB has not taken any specific steps to influence the

design and operation of e-money schemes. The only thing to mention here is that all the transactions relating to the Proton scheme flow into the CEC, the domestic retail payment system.

Oversight issues*.** Banksys, the operator of the Proton scheme, is overseen by the NBB (see above under ***General legal issues).

Supervisory issues. At present, only credit institutions issue electronic money. No specific policy responses have been made by the Banking and Finance Commission. Article 20 of the law of 22 March 1993 on the legal status and supervision of credit institutions is applicable to the current issuers: "A credit institution shall have a management structure, administrative and accounting procedures and internal control systems which are appropriate to the activities proposed". Regarding the issuance of e-money by specialised non-bank institutions, Belgian legislation would need to be adapted according to the new Directives in order to cover, amongst other things, the response to the supervisory concerns.

***Law enforcement issues*.** E-money products could theoretically be attractive for money laundering if they could be used to process large-value payments without the possibility of tracing the transactions. The Proton product in use in Belgium is typically used for small-value payments and the scheme is designed to be fully auditable. Laws combating money laundering are applicable to credit institutions, which are, to date, the only issuers of e-money.

***Cross-border issues*.** These issues are particularly relevant for e-money used on-network to make remote payments. For issuers established within the European Union, the legal system applicable to the provision of e-money services in Belgium will be identical to the one regulating the same activity on Belgian national territory. The issuers will have the opportunity to operate in the single market on the basis of the agreement delivered by the home country. For issuers established outside the European Union, the above-mentioned Law of 22 March 1993 makes the conduct of banking activity in Belgium subject to the existence of a local branch or subsidiary. It can, however, be difficult to determine where the issuer of e-money used on-network is located. No cross-border scheme is currently operational in, or from, Belgium.

BERMUDA

While Bermuda is continuing to see increasing use of both card-based and electronic value payments mechanisms, there have been no initiatives locally involving the retail use of stored value cards.

BOLIVIA

1. Card-based products

The only significant development in the field of e-money is the pioneering use of smartcards with a chip that stores the balances held by individuals in a financial institution, and allows the management of funds via ATMs that are not connected to any network. These smartcards were introduced for pilot tests during the last quarter of 2000 by PRODEM, and have been fully operational since April 2001. PRODEM is a non-banking institution known in Bolivia as a Private Financial Fund that operates in the micro-credit sector and mainly in rural areas.

PRODEM customers can withdraw cash from its ATMs using their smartcards. Likewise, they can charge their cards easily at any of the ATMs or agencies of PRODEM. The ATMs are specifically designed to read the value of the notes deposited in the machine for the loading of cards, and they use digital fingerprinting for client authentication.

The advantage of this mechanism is that it allows people from rural areas to maintain their funds in a secured way, and to have quick access to them via ATMs, but without the need of a large and expensive network.

There are no laws that regulate this kind of activity or other electronic operations in Bolivia. The legal framework for the use of smartcards exists only in the form of bilateral private contracts between the participants.

At present, these smartcards cannot be used for any other purposes. However, PRODEM is preparing their use for buying products in selected stores that will have some kind of POS device that will likewise not be connected to any network. Through these devices, the buyer's card will be debited and the seller's card credited. This service will be offered only in rural areas, and will be implemented in the last quarter of 2001.

2. Network/software-based products

No developments.

3. Policy responses

The central bank has not yet formulated a policy approach to e-money, as there are at present no major developments in this area, but will take into account the experience of developed countries as these schemes start to grow.

BRAZIL

1. Card-based products

The development of card-based e-money schemes in Brazil started in 1996 with SIBS and Visa Cash.

The SIBS system was adopted by only one issuing bank, which acquired the licensing rights for using it. At the end of 2000 this pilot project ended.

Nowadays the only scheme in use is Visa Cash (see below).

Visa Cash. Visa Cash is an electronic purse based on the TIBC (Tarjeta Inteligente y Cajas) operating system developed by Visa Spain. The system has been licensed to Visa Latin America and Caribbean, whose representative in Brazil is Visa do Brasil Empreendimentos Ltda.

Loading is done online, using attended load terminals at the banks. Payment transactions, on the other hand, are performed offline. Since purse-to-purse transfers are not permitted, auditing is possible at any time. Moreover, the system has multi-application capability. These applications can be dynamically loaded.

Visanet, whose controllers are the member banks of Visa do Brasil, has acquired the Visa franchise in Brazil. Visanet controls USA transactions and is responsible for relations with the merchants that accept Visa cards (registration of affiliates, installation and maintenance of POS terminals, payments to merchants, charging of fees and capture of transactions).

Visa owns the trademark and the licensing rights for using of Visa Cash system. It is responsible for interoperability, clearing, integrity of information and certification and ratification of applications, terminals and cards used by the system.

Visa conducts the clearance of payments using the same procedures adopted for its credit cards. There are currently 13 institutions issuing Visa Cash cards. The software and hardware infrastructures are provided by Visa, Visanet or vendors certified by Visa. The security mechanism employs 3-DES cryptography and RSA public keys, with a different security key for each card.

Besides the loading process carried out through terminals at banks, Visa do Brasil has developed new products to allow the loading of e-money via the internet, ATMs or special loading devices.

Visa Cash products offer features such as the possibility for each issuer to set a different load ceiling. Currently, cards are assigned maximum load values from USD 44 to USD 131.

As far as costs are concerned, Visanet charges affiliate merchants from 1% to 3% of the transaction value, while the member banks pay Visa a fixed amount of USD 0.0075 per transaction.

The Visa Cash card loads only national currency. Visa intends to start issuing credit and debit cards with Visa Cash and other applications by this year.

2. Network/software-based products

No products have been adopted to date.

3. Policy responses

In Brazil, e-money is not yet in widespread use. The volume and value of e-money transactions are negligible compared to those of other retail payment instruments. Consequently, it will not result in a sharp decline in central bank balance sheets in the short term. Moreover, given the way e-money has been developing in Brazil to date, it is almost certain that it will replace only currency held for small-value transactions, which involves a (less critical) loss of revenue from seigniorage.

The Central Bank of Brazil has studied policy approaches concerning e-money but has not yet decided on any particular approach.

BULGARIA

1. Card-based products

Currently there are no card-based e-money schemes implemented in Bulgaria. Following a decision by the managing board of the central bank, the national card operator BORICA was permitted to obtain a licence for a card-based scheme based on Proton technology. The scheme is now in process of testing, but has not yet been implemented.

2. Network/software-based products

There are no network/software-based schemes under consideration.

3. Policy responses

The Law on electronic commerce and electronic signature has been passed by Parliament and will come into force in October.

CANADA

1. Card-based products

There are two major e-money card schemes which are currently running pilot projects; Visa Cash and Mondex Canada, although the latter will be winding down operations in 2001.

***Mondex Canada*.** Mondex e-money value is issued by Mondex Originator, which is a joint venture comprised of Mondex member financial institutions that issue Mondex value. The current pilot project was initiated in Sherbrooke, Quebec on 26 August 1999. The cards, issued by the Royal Bank and Le Mouvement des caisses Desjardins, combine the traditional debit card function, via a magnetic stripe, with an e-money application offered on a MULTOS platform. This is an open platform capable of separately operating multiple applications. More than 600 merchants are participating in the project

in addition to various self-service devices such as parking meters and laundromats. The card can be loaded through automated teller machines, specialised loading machines, Mondex-compatible phones and the internet, with value transferable between Mondex cards. The load limit on cards is determined by the individual financial institution but an informal survey indicates a CAD 500 load limit is the norm across institutions.

This project will begin winding down in 2001. Mondex Originator will stop issuing value on 31 May 2001 and customers will be able to redeem value left on the chip until approximately the end of October 2001. At that time, Originator will be closed and Mondex operations will cease in Canada pending the establishment of a broader smartcard infrastructure that will allow for a national rollout of smartcard applications such as Mondex electronic cash.

***Visa Cash*.** The Barrie, Ontario project, launched in 1997, involves reloadable cards with multiple payment features that are issued by the Bank of Nova Scotia. The card's chip is equipped with a variety of features; stored e-money value, customer loyalty plans and an automated transit fare collection function for Barrie Transit. The cards also include a traditional debit function via a magnetic stripe.

Stored value on the cards is loaded in one of two ways, through specialised units that transfer value from the user's bank account to the card through a network operated by the Interac Association, and through the internet via the Bank of Nova Scotia computer banking site. As of 31 December 2000, 61,503 cards had been issued. The activation rate for the stored value function is between 60 and 65%. However, the rate at which a least one function is activated, the transit function for example, is between 80 and 90%. The chips are capable of storing up to CAD 1,000. Currently, however, the load limit is set at CAD 500. Increasingly, payment services offered through loyalty plans and automated fare collection, as opposed to the stored value function, are gaining importance and facilitating the growth of chip payments.

2. Network/software-based products

No specific developments at the moment.

3. Policy responses

An interdepartmental working group consisting of representatives from the Department of Finance, the Bank of Canada, the Office of the Superintendent of Financial Institutions and the Canadian Deposit Insurance Corporation has studied many of the public policy aspects of e-money. At this time there is no specific regulatory regime surrounding stored value schemes, although the issues are reviewed and assessed periodically.

***Monetary policy and seigniorage*.** Stored value and e-money schemes are not seen to pose difficulties for monetary policy or seigniorage at present or for the foreseeable future. If such schemes reach a significant size, outstanding balances in such products could be included in the monetary aggregates.

***Provider issues*.** There is currently no prohibition on the issuance of electronic money by non-financial institutions. Approval may be required for a regulated financial institution to establish a subsidiary which will be an issuer of e-money. So far, only regulated deposit-taking financial institutions have issued e-money. The Bank of Canada has no plan to be an issuer at present.

***Law enforcement issues*.** Existing measures apply if an issuer is a regulated financial institution.

***Supervisory issues*.** There is no direct supervision of stored value or e-money schemes, although the pilot projects in Canada thus far have been undertaken by financial deposit-taking institutions which are regulated.

***Consumer protection issues*.** With regard to fraud, loss, theft and disputes, civil codes and rules for credit institutions are generally applicable. Deposit insurance is not applicable to stored value or e-money deposits.

COLOMBIA

1. Card-based products

There are various electronic money pilots in Colombia involving card-based products. One has been developed by the local Bank Conavi and the Red Multicolor network, and the others by world franchises Visa and MasterCard.

Red Multicolor. The first project was developed by Bank Conavi and later handed over to Red Multicolor (the country's major ATM and POS network) for administration. This is a stored value smartcard project, whose MPCOS system was mapped by Conavi in a Gemplus chip with triple-DES encryption. It can hold multiple applications but currently is only used as an e-purse. The pilot has targeted the major universities in the country for payment of photocopies, meals and bookstore purchases, etc.

Although the e-money issuer is Conavi, the university charges the cost of the smartcard to the students. The students do not need to hold an account with Conavi and can load the card by paying cash to the bank up to a maximum of USD 172. When a purchase is performed, the merchant transfers the payment value from the card into a Red Multicolor POS terminal. To close the cycle, at the end of the day the merchant transmits all the transactions to the issuer bank, which credits the merchant's account at that same bank. Since there is only one banking institution involved, there is no actual clearing process.

To date, 75,000 cards have been issued, and 3,000 transactions are performed monthly.

***Visa*.** The second project is a stored value smartcard project sponsored by Visa and based on a chip with the TIBC operating system. The TIBC system (Tarjeta Inteligente de Bancos y Cajas) was developed by the Sociedad Española de Pagos (Spanish Payments Company). It works with a DES data encryption algorithm. It is a multipurpose card and its target is a mid-size university in Bogotá and a health insurance provider called Colsanitas.

The University's pilot will have Banco de Bogotá as issuer. The cost of the smartcard will be assumed by Visa. The smartcard is loaded at devices in Banco de Bogotá branches. The students can debit a current or savings account or pay cash if they don't hold an account at that bank. Spread throughout the university campus there will be POS terminals at which the students can purchase photocopies, meals and books and pay for university services. Visa will be the processor of the transactions, and will clear them at the end of the day in the same way as for the credit cards.

It is estimated that 8,000 cards will be issued by the second semester of the year 2001.

The experiment with Colsanitas will work in almost the same way. Here, the Doctors will have POS devices in their offices so that they can debit the cost of the appointments from the patient's stored value card. This project is at the design stage.

***MasterCard*.** MasterCard has delayed the introduction of Mondex in the country. However, it is working on replacing all credit and debit card terminals with smartcard readers. They expect that by the first quarter of 2002, there will be more than 1,000 new smartcard readers and the number will continue to grow. In the first phase, the new cards will be equipped with a new magnetic stripe and a smartcard chip. MasterCard expects that after this replacement it will be able to start new card-based e-money projects.

2. Network/software-based products

Currently, there are two e-money products based on network access. The first, e-prepago, is provided by Bancolombia, one of the largest banks in the country. The product is a virtual card which can be loaded from current or savings accounts to pay for internet purchases. It works on the MasterCard network and can be used in any virtual store where MasterCard payment is allowed.

As soon as the user registers for the service, Bancolombia provides a number, which can be changed three times a day. This number complies with the MasterCard credit card standard numbering and includes the security code CVC2. The virtual card is protected with SSL security and the debit card PIN and ID combination to access the system.

Additional features of the system include no plastic and blocking of the card whenever the user is not making internet purchases. There is no fee for the customer.

The second project has been developed by Banco Colpatria. This is also a virtual card that can be requested by Banco Colpatria account holders. It can be loaded from a credit card account or from current/savings accounts. In the first case, the purchases can be deferred for up to 12 months. The customer can choose in which franchise, Visa or MasterCard, the card will work.

The card has a limit of USD 858 and can be reloaded as required by the user. If there is money remaining on the card, this can be transferred back to the current/savings account whenever the customer instructs the bank to do so. There is an administration fee of USD 2 every three months.

3. Policy responses

Due to the fact that the total value of e-money transactions is still minimal, the authorities have not yet included e-money statistics in the monetary aggregates. By the same token, the impact on seigniorage is negligible.

As yet, there are no specific regulations on e-money systems. Since all the projects work on credit and debit card networks, the clearing and settlement of these systems are performed in the same way. The central bank does not currently oversee any of these systems.

The Banking Supervisory Authority has issued regulations on the security features of magnetic cards and smartcards on the same basis as those for networks and terminals.

CROATIA

Electronic money schemes are yet to be introduced by the Croatian banking industry.

CYPRUS

1. Card-based products

There are no card-based e-money schemes currently in operation in Cyprus. Most of the payment cards used are magnetic stripe debit and credit cards (usually combined with an ATM function) or single-purpose stored value cards.

2. Network/software-based products

There are no such schemes currently in operation in Cyprus in the strict sense of the terms. However, in August 2001, one local bank will be launching a virtual credit card. This will be used exclusively for purchases from the internet and will not have POS functionality.

3. Policy responses

The Central Bank of Cyprus is following international developments in e-money. As yet it has not deemed it necessary to formulate a policy on this issue as there have been no significant developments in this area in Cyprus.

DENMARK

1. Card-based products

Danmønt is both the issuer of value and the operator of the scheme. The ownership structure of Danmønt was changed in 1997. From being an independent company, owned jointly by PBS (a clearing and payment systems company co-owned by the Danish private banks) and the Danish telecoms operator, Danmønt became a fully owned subsidiary of PBS. Today Danmønt is an integrated part of PBS's structure, but is still a separate legal entity. As before the integration, PBS processes the clearing in the sense that it performs clearing on the basis of input from Danmønt, which is legally in charge. Danmønt has outsourced the "physical" part of the clearing to PBS. With the structures being integrated, it will be two parts of the same company together performing the clearing. The clearing is performed on standard IBM hardware and on proprietary software. The terminals come from various suppliers.

The encryption techniques used are the so-called triple-DES, a security application module (SAM) in all card accepting devices (CADs) and proprietary masks.

There are no fees as far as consumers and participating banks are concerned. On the merchant side, the following fees apply: (a) DKK 0.18 per transaction; (b) DKK 10 per batch delivery from CADs; (c) DKK 5 per posting on the account statement (if the merchant wants a posting per CAD per period, it will be more expensive than if the merchant can accept just a total per period); and (d) DKK 1,250 as an annual fee per SAM (ie not necessarily per CAD, as one SAM may cover several terminals, which then cannot accept payments simultaneously).

The scheme does not have any multicurrency or cross-border features and, for now, is not part of a multifunctional instrument. This may change in the foreseeable future. Three data centres in Denmark can now support the recharging of Danmønt cards, which until now have been "disposable". The rechargeable cards and systems have been tested and piloted and are now ready for national production and introduction. Recharging will be carried out at ATMs but is expected to be integrated in the banks' home banking systems as well.

In the longer term, given the more advanced chip, which will allow identification of various individual issuers, these might want to claim all or part of the float, but this is presumed to be a project for the more distant future. In the nearer future, banks have an interest in issuing multifunctional chipcards, including the Danmønt chip that will secure a widespread deployment of Danmønt.

Danmønt is a pioneer in the field and is not being promoted by an international company or group. On the contrary, Danmønt obtains an important share of its income from selling know-how to international companies.

As mentioned, there is only one issuer, Danmønt, which to date has issued about 3.5 million cards. The value of e-money outstanding as at 31 December 2000 was DKK 22 million. In 2000, the total number of transactions was 7.91 million, for an average value of about DKK 8.88, bringing the total value of transactions close to DKK 70 million. Growth from 1999 was 0.7%.

PBS has committed itself to follow the international new standard for e-purses, CEPS (Common Electronic Purse Specification), in Europe. However, this specification, to be used for cross-border purchases with e-purses, is not considered ready for deployment before 2002-03.

The cross-border issue will naturally be taken up in this forum.

2. Network/software-based products

No such systems are in operation in Denmark.

3. Policy responses

As the amount of e-money outstanding has not yet reached 0.1% of notes and coins in circulation, not to mention M3, the National Bank of Denmark has not found it relevant to include e-money in

monetary statistics so far. Moreover, even in the long term, the Bank regards the risk of e-money replacing coins as rather remote and not something that will significantly effect seigniorage.

A new regulatory framework for electronic money will soon be introduced in Denmark. The Act on issuers of electronic money, which was submitted to Parliament in February 2001, is an implementation of European Parliament and Council Directive 2000/46/EC on the taking up, pursuit of and prudential supervision of the business of electronic money institutions. At present Danmønt is the only company regulated by this act.

Recently an analysis of potential money laundering implications for anonymous payment technologies was conducted by relevant parties in the Danish financial sector, eg the National Bank of Denmark and the Danish Financial Supervisory Authority. The analysis concludes that the specific security features of Danmønt make the product very unattractive for money laundering purposes.

EGYPT

1. Card-based schemes

The Central Bank of Egypt (CBE) is preparing a strategic plan for modernisation of the national payment system and its subsystems associated with payment instruments, with a view to introducing measures to increase cashless payments, including the use of magnetic stripe debit and credit cards. As there are no electronic purse schemes currently operating in Egypt except single-purpose stored-value cards, ie telephone cards, few banks are preparing preliminary studies to introduce card-based products.

2. Network/software-based schemes

For the time being, there are no projects regarding network-based products. Use of the internet is growing among individuals and may stimulate the development of such projects. The growth in using the internet may lead banks in the near future to offer services such as making small-value transactions via computer. Special attention will be given to ensuring the highest security for these kinds of transactions.

3. Policy responses

The CBE is monitoring the development in e-money schemes internationally and their potential impact on policy issues, with a view to establishing a framework and guidelines for the introduction of a new scheme in Egypt, taking into consideration the international norms. Issues that might arise as a result of the development of e-money and the CBE's view are:

(a) The issuance of e-money liabilities by the banks will not reduce the value of notes and coin in circulation. Monthly statistical information on e-money products will be collected and included in the monetary statistics. The situation will need to be monitored if the amount of e-money balances increases. The statistical information will include the number of cards in circulation, the value loaded, the value of payments made and the outstanding value available.

(b) A framework and guidelines for e-money have been under discussion in the CBE, including:

- The authorised banks should be subject to specific requirements.
- Security and disclosure measures to be taken by authorised banks issuing e-money to ensure that they have put in place adequate safeguards to protect cardholders' rights.

(c) The CBE will perform oversight activity vis-à-vis the e-money schemes.

(d) The e-money products seem to have no significant features that might make them particularly attractive for money laundering as the amount of the loaded money for each card will be limited.

(e) Certification will be done by a trusted third party.

(f) No problems are expected to arise in respect of the clearing and settlement arrangements for e-money schemes.

ESTONIA

1. Card-based products

There are no schemes at the moment but Estonian credit institutions are keeping track of Visa and MasterCard projects and considering the possibility of issuing Visa or MasterCard products in the future.

2. Network/software-based products

No projects are under way at the moment.

3. Policy responses

The Bank of Estonia's policy approach is in accordance with Directive 2000/46/EC of the European Parliament and the Council of 18 September 2000 on the taking up, pursuit of and prudential supervision of the business of electronic money institutions.

EUROPEAN CENTRAL BANK

1. Introduction

Electronic money schemes are currently relatively small in most euro area Member States. However, e-money has the potential to grow significantly in the future. As is the case with many innovations, the development of e-money could follow an "S-curve", ie a period of slow growth can be followed by rather expansive growth.

The potential for rapid growth has led the Eurosystem[18] to analyse the implications for its tasks in the future, should a period of rapid growth in e-money take place. This analysis concluded that e-money may have significant implications for those central bank tasks related to the conduct of monetary policy, the promotion of the sound and efficient operation of payment systems and confidence in payment instruments, the stability of financial markets, the protection of customers and merchants, the prevention of criminal abuse and ensuring a level playing field.

Against this background, the Eurosystem believes that it is crucial that the development of e-money should take place within a regulatory framework which takes into account the public interest pursued by central banks. In fact, the Eurosystem's view is that a clear and prudent regulatory framework for e-money will actually promote its acceptance by the general public and its development.

Section 2 of this article deals with the diffusion of e-money, providing some statistical evidence. It goes on to examine current initiatives for cross-border interoperability of e-money, broadening national card-based schemes to a euro area level. Section 2 also explains why software-based schemes remain at a national level, and thus why an examination from a euro area perspective is still premature. The

[18] The Eurosystem comprises the national central banks (NCBs) of the Member States of the euro area and the European Central Bank (ECB).

Eurosystem's interest in e-money is discussed in Section 3. This section also explains the Eurosystem's policy and the regulatory framework, before some general conclusions are drawn in Section 4.

2. Diffusion of e-money

The use of e-money is not yet widespread in the European Union. In most EU Member States, e-money is still at an early stage compared with cash or traditional non-cash payment instruments. For the moment, only card-based e-money has any significance, whereas the use of software-based e-money is marginal. Most developments are still taking place in a national context, as explained in the individual country reports. Hence, this chapter will only focus on general patterns for the euro area, and should be seen as a complement to the more detailed descriptions provided by Eurosystem NCBs.

2.1 Statistics on e-money diffusion

The ECB's money and banking statistics capture the e-money that is issued by monetary financial institutions (MFIs) located within the euro area, which is classified as deposit liabilities within the MFI balance sheet statistics and indistinguishably included within the item "overnight deposits".

In addition, almost all euro area NCBs and the NCBs of the non-participating EU Member States collect separate data on the outstanding amounts of e-money issued by MFIs, although this is not currently a legal requirement of the ECB. From April 2002, all e-money institutions will fall under the revised definition of credit institutions (see subsection 3.3). Thus, the existing statistical requirements for credit institutions under the Eurosystem's legal framework shall then also apply to e-money institutions.

The ECB receives data from the NCBs on amounts outstanding of e-money issued by MFIs, broken down into hardware-based and software-based electronic money, and also by currency, with a split between balances in euros (including the legacy currencies) and other currencies. However, MFIs located in the euro area have only issued euro-denominated e-money so far. Data are compiled by NCBs at the available frequency, monthly in many cases, and submitted to the ECB at least twice a year. The ECB intends to publish these data regularly on the ECB's website as from autumn 2001.

Starting from a negligible level in 1994, the total amount outstanding of e-money in circulation has increased over recent years, to reach a level of EUR 140 million at the end of June 2000 (see Table 1). The largest contributions to this amount came from Germany, the Netherlands and Belgium. In this respect, it could be noted that the statistics only include hardware-based e-money as the use of software-based e-money remained negligible. As at the end of June 2000, e-money still represented a very small fraction of total money (0.04% of banknotes and coins in circulation and 0.003% of the monetary aggregate M3). Hence, the practical relevance of e-money for current economic analysis remains limited.

Table 1

Euro-denominated electronic money in circulation in the euro area

(amount outstanding, end-of-period data, EUR millions)

	1994	1995	1996	1997	1998	1999	June 2000
Hardware-based	0	2	9	75	116	135	140
Software-based	0	0	0	0	0	0	0

Source: ECB.

According to the most recent Blue Book[19] statistics, which refer to 1999, in the euro area there are 454 cards with an e-money function per 1,000 inhabitants, initiating 77 million transactions during the year. However, this represented only 0.30% of all cashless payment transactions.[20] The still marginal use is also exemplified by the low volume of transactions per inhabitant (0.36), corresponding to 3.7 payments a year per card with an e-money function. The average value per transaction was EUR 3.1.

2.2 Card-based schemes and current initiatives for cross-border interoperability of e-money in the euro area

So far, two projects exist to enable the cross-border use of e-money schemes in euros. The first of these, the PACE project (Purse Application for Cross-border use in Euro), was introduced on 5 July 2000 by CETREL (Centre de Transferts Electroniques) using miniCASH in Luxembourg, by ZKA (Zentraler Kreditausschuss) using Geldkarte in Germany, and by Groupement des Cartes Bancaires and SEME (Société Européenne de Monnaie Electronique) using Moneo in France. The electronic purses are interoperable and can be used to make euro-denominated payments in Luxembourg, Germany and France. The three organisations have committed themselves to adopting gradually the Common Electronic Purse Specifications (CEPS).

The second project for an interoperable electronic purse, Ducato, was announced on 12 September 2000 by a number of organisations[21] and is based on CEPS. This is a pilot project including schemes in Belgium, the Netherlands, Spain and France. In addition to the existing domestic e-purse brands, the cards are also branded either Clip (Europay International's e-purse brand) or Visa Cash (Visa's international e-purse brand). Domestic transactions are cleared through the existing clearing networks, and international transactions are cleared through either the VisaNet network (for Visa Cash-branded cards) or the EPS-Net[22] (for Clip-branded cards). The pilot project is scheduled to end in the fourth quarter of 2001.

A number of national e-money and prepaid card schemes are preparing or currently testing the adaptation of their cards for use in internet transactions, either through an online verification procedure or through a plug-in terminal for personal computers. This extension of functionality might stimulate the use of card-based e-money.

2.3 Software-based schemes

At present, there are no real euro area software-based e-money schemes to be presented. Furthermore, at the national level, there is very little statistical evidence, as this kind of payment infrastructure currently only exists in relatively unimportant projects. Moreover, software-based e-money schemes often struggle to survive beyond the initial phase, further limiting the potential for future cross-border establishment.

3. Electronic money policy issues and regulatory framework

3.1 The Eurosystem's interest in e-money

As the outstanding amounts of e-money in circulation are still very low, they do not have a material impact on monetary policy at present. However, given the potential for rapid growth in e-money use, the ECB regarded it as important to design a regulatory framework for the issuance of e-money with a view to ensuring that the needs of monetary policy are taken into account as appropriate.

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19 *Payment and securities settlement systems in the European Union*, June 2001.

20 Other cashless payment instruments are: credit transfers (44.7%), direct debits (32.7%), debit/credit cards (14.5%) and cheques (7.8%).

21 Banksys, Europay International, Interpay, Proton World, Sermepa, Sistema 4B, Visa International and, as from January 2001, Cartes Bancaires.

22 A telecommunications network of European payment systems services owned jointly by Europay and MasterCard.

The importance of e-money for monetary policy[23] stems from the fact that it may become a very close substitute for banknotes and coins. If e-money were to be remunerated, it might also become an attractive alternative to holding short-term bank deposits. Over the long run, developments in consumer prices are closely related to developments in money. The primary objective of monetary policy as assigned to the ECB is to maintain price stability. With regard to this objective, the development of e-money raises three different issues:

First, there is a need to safeguard the role of money as the unit of account for economic transactions, irrespective of the issuer or the form in which money is issued. Imposing an obligatory redeemability requirement on issuers of e-money could create a close link between e-money and central bank money. Thus, privately issued e-money always has to be redeemed at par value with central bank money.

Second, the effectiveness of monetary policy instruments might be affected by a widespread adoption of e-money. This relates mainly to effects on central bank balance sheets and central banks' ability to steer short-term interest rates. Central banks can take broad measures to maintain the size of their balance sheets by imposing minimum reserves on e-money issuers or by issuing e-money themselves. However, as long as some form of ultimate market recourse to central banks remains, the ability of central banks to influence money market interest rates will be preserved. Thus, the potential implications of rapid growth in e-money for the control of money market conditions should not be overstated.

Third, the emergence of e-money might have repercussions for the information content of monetary indicator variables with regard to the primary objective of price stability. In this connection, as explained above, the ECB is equipped to take into account any potential increase in e-money in circulation. E-money is part of monetary aggregates, which are the focus of analysis under the first pillar[24] of the ECB's monetary policy strategy.

The Eurosystem's interest in e-money not only stems from the monetary policy concerns mentioned above. It also relates to the Eurosystem's basic task of promoting the smooth functioning of payment systems, as well as to its role in contributing to the smooth conduct of policies pursued by the competent authorities on the prudential supervision of credit institutions and the stability of the financial system.

Although e-money creates opportunities for efficiency gains in retail payments, it is important that its development should not jeopardise either the smooth functioning of payment systems or the stability of the financial system. Furthermore, efficiency gains can only be realised if sufficient safeguards are put in place to ensure that the general public has confidence in e-money, ie that it is seen to be a reliable way of making payments. A number of risks can be identified. In particular, the intrusion of counterfeit value, major technical failures, float mismanagement and, ultimately, failure on the part of issuers of e-money could have a negative impact on the credibility of various e-money products and possibly even on other electronic payment products. Public confidence in the currency could be undermined if e-money issuers engage in risky investment activities, which could lead to e-money instruments being traded at variable exchange rates. This would undermine the role of money in providing a single unit of account as a common denominator for the whole economy.

Hence a framework is needed to ensure that e-money schemes are safe and efficient and that e-money issuers are sound. The regulatory framework also needs to ensure that there is a level playing-field across the different types of e-money providers. In addition, in view of the possible expansion of e-money schemes, such a framework should help to protect the stability of the financial system. The Eurosystem's policy on e-money is outlined in more detail below.

3.2 The Eurosystem's policy on e-money

Based on the concerns outlined above, clear rules on the conditions under which e-money can be issued must be established. The Eurosystem's policy is explained in the *Report on e-money* published

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[23] For a more detailed discussion on this subject, see the article "Issues arising from the emergence of electronic money" in the November 2000 issue of the *ECB Monthly Bulletin*.

[24] The first pillar assigns a prominent role to money in explaining the future evolution of price developments.

by the ECB (August 1998) and further elaborated in the Opinion of the ECB[25] on draft Community legislation on e-money.[26] In the report, the Eurosystem places particular importance on the following seven minimum requirements for the framework for the issuance of e-money:

1. Issuers of e-money must be subject to prudential supervision.
2. E-money schemes must be covered by solid and transparent legal arrangements.
3. E-money schemes must maintain adequate technical security against threats, such as counterfeits.
4. E-money schemes must offer protection against criminal abuse, such as money laundering.
5. E-money schemes must supply the central bank with relevant statistics for the purpose of monetary policy.
6. Issuers of e-money must be legally obliged to redeem it at the request of the holder of e-money.
7. The ECB must have the possibility to impose reserve requirements on all issuers of e-money.

These requirements serve, inter alia, as the basis for a common policy line for the Eurosystem central banks when they oversee e-money schemes. In particular, the oversight of payment systems pursues the objectives of soundness, efficiency and ensuring confidence in the currency.

New developments in e-money schemes, internet payments and the emergence of market initiatives in the field of technical security of e-money schemes might require further review of oversight standards. As part of its oversight duties regarding e-money schemes, the Eurosystem is investigating how to ensure a harmonised oversight approach in the field of standard-setting and assessment methodology related to the technical security of e-money schemes. The technical security of e-money schemes is important for the reliable functioning of systems and for protection against criminal abuse. Adequate security would also contribute to the achievement of interoperability, thus promoting efficiency. As a first step, the Eurosystem is currently studying technical security approaches adopted by e-money schemes and market initiatives in this area.

The objective of maintaining efficient payment systems has traditionally involved balancing economies of scale against competition. This is also pertinent with regard to e-money schemes. The normal remedies are cooperation between service providers - in order to avoid any unnecessary duplication of investments - and interoperability, in particular through the use of common standards. The degree of interoperability should be sufficient to widen the choice for customers, avoid unnecessary costs for merchants and enhance overall efficiency. The compatibility of standards and the resulting interoperability could provide greater freedom for customers and merchants to switch from one service provider to another, thus enhancing competition and promoting product innovation. Therefore, the Eurosystem supports the current market initiatives for developing cross-border interoperability of e-money (see subsection 2.2).

3.3 The new regulatory framework for e-money institutions

The recently adopted Community legislation on e-money provides a comprehensive and harmonised regulatory framework for the issuance of e-money which is confined to traditional credit institutions and to a new type of credit institution: the e-money institution (ELMI).

The new framework is defined in two Directives: European Parliament and Council Directive 2000/46/EC on the taking up, pursuit of and prudential supervision of the business of electronic money

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[25] The Opinion of the European Central Bank of 18 January 1999 at the request of the Council of the European Union under Article 105 (4) of the Treaty establishing the European Community and Article 4(a) of the Statute of the European System of Central Banks and of the European Central Bank on (1) a Commission proposal for a European Parliament and Council Directive on the taking up, pursuit of and prudential supervision of the business of electronic money institutions, and (2) a European Commission proposal for a European Parliament and Council Directive amending Directive 77/780/EEC on the co-ordination of laws, regulations and administrative provisions relating to the taking up and pursuit of the business of credit institutions (ECB/1999/1, published in the *Official Journal of the European Communities*, OJC 189, 6 July 1999, pp 7-10).

[26] Both the Report and the ECB Opinion are available on the ECB's website at www.ecb.int.

institutions and European Parliament and Council Directive 2000/28/EC amending Directive 2000/12/EC relating to the taking up and pursuit of the business of credit institutions. Both Directives should be implemented in the Member States by 27 April 2002 at the latest.

Directive 2000/46/EC on the taking up, pursuit of and prudential supervision of the business of e-money institutions

The new regulatory framework allows the ELMIs to benefit from a European passport, which will enable them to carry out their activities throughout the European Union. The main elements of the framework include:

(i) limitation of activities. Article 1 limits the business activities of ELMIs to the issuance of electronic money, the provision of closely related financial and non-financial services and the issuance and administration of other means of payment, excluding the granting of any form of credit. The ELMIs' business activities also include the storage of data on electronic devices on behalf of other undertakings or public institutions;

(ii) scope of application of banking directives. Article 2 stipulates that only two EU Directives, if not otherwise expressly provided for, will apply to ELMIs, namely a number of provisions of Directive 2000/12/EC relating to the taking up and pursuit of the business of credit institutions and Directive 91/308/EEC on money laundering;

(iii) redeemability. Article 3 stipulates that the bearer of electronic money may, during the period of validity, ask the issuer to redeem it at par value in coins and banknotes or by a transfer to an account free of charges other than those strictly necessary to carry out that operation. The contract between the issuer and the bearer must clearly state the conditions of redemption and may stipulate a minimum threshold. This threshold may not exceed EUR 10;

(iv) initial capital and ongoing own funds requirements. The initial capital and minimum ongoing capital requirement for ELMIs is EUR 1,000,000, while capital requirements are also set on an ongoing basis (Article 4);

(v) limitation of investments. Article 5 requires that ELMIs invest an amount not less than their outstanding financial liabilities related to electronic money in highly liquid assets which attract a 0% or, subject to quantitative limitations, a 20% credit risk weighting. Limitations also apply to ELMIs' activities in derivatives. These activities can only be undertaken for the purpose of hedging market risks. The imposition of appropriate limitations on market risks inherent in electronic money activities is left to the Member States;

(vi) verification of the specific prudential requirements for initial and ongoing capital, limitations on investments and market risks by the competent authorities not less than twice per year (Article 6);

(vii) sound and prudent operation in respect of management, administrative and accounting procedures and adequate internal control mechanisms (Article 7);

(viii) application of a waiver of the provisions of the e-money Directives 2000/46/EC and 2000/28/EC (Article 8). National authorities may grant a waiver if the storage device cannot hold more than EUR 150 and one of the following conditions is fulfilled: (a) the total amount of financial liabilities related to outstanding e-money does not normally exceed EUR 5 million and never exceeds EUR 6 million; (b) the exchange of e-money takes place solely within the group to which the ELMI belongs; or (c) the e-money business is limited to local areas or it is accepted only by undertakings that have a close financial or business relationship with the ELMI, such as a common marketing or distribution scheme. The ELMIs eligible for the waiver will not benefit from the EU passport provisions.

The Directive recognises that there may be a need for a revision of the waiver. Other envisaged revisions concern, for example, measures to protect the bearers of e-money, such as the introduction of a guarantee scheme. The Directive stipulates that the Commission should present a report on these issues to the European Parliament and the European Council, together with a proposal for any necessary revisions, not later than 27 April 2005.

Directive 2000/28/EC amending Directive 2000/12/EC relating to the taking up and pursuit of the business of credit institutions

This provision:

(i) amends the definition of a credit institution by including the ELMIs (this provision implies, in conjunction with Article 19.1 of the Statute of the ESCB and the ECB, which entitles the ECB to require "credit institutions" established in Member States to hold minimum reserves, and with the restriction of issuance of electronic money to credit institutions as stipulated by Article 1 of the above-mentioned Directive 2000/46/EC, that the ECB can impose minimum reserves on all issuers of electronic money);

(ii) stipulates that the redeemability requirement will also apply to traditional credit institutions issuing electronic money.

The new regulatory framework meets the concerns of the ECB to a very large extent. However, the e-money Directives specify that, under certain conditions and within certain limits, national authorities may grant a waiver for some of the obligations imposed on issuers of e-money. The ECB regards it as important for there to be a prudent implementation of the waiver in national legislation and a restrictive granting of waivers to e-money schemes. Furthermore, the ECB would welcome a minimum level of harmonisation pertaining to the imposition of limitations on market risks.

4. Conclusions

In the euro area, e-money is still in an early stage of development. For the moment, software-based e-money has no statistical relevance. Card-based e-money has marginal relevance (representing 0.04% of banknotes and coins in circulation or 0.3% of all cashless payment transactions). However, e-money has the potential to grow in importance. The development of e-money raises issues relating to monetary policy, payment systems oversight and the prudential supervision of financial intermediaries. In general, the recently adopted Community legislation on e-money issuers together with the Eurosystem's policy stance provide adequate safeguards in these three areas.

Whereas the e-money Directives focus on the soundness of e-money *issuers*, payment systems oversight by the Eurosystem focuses on the sound and efficient functioning of e-money *schemes*. The Eurosystem has established a clear and prudent oversight framework for e-money, facilitating its development and its acceptance by the general public. In order to ensure that e-money schemes are safe and efficient and that issuers are sound, the Eurosystem has defined seven minimum requirements for e-money schemes. A common oversight approach to technical security is becoming more important, owing to new developments in e-money schemes and technical security. The Eurosystem is currently further investigating possible initiatives in this area.

The cross-border interoperability of e-money schemes is also a desirable objective for the Eurosystem, enhancing the overall efficiency of payment systems. Despite the fact that most developments are still taking place in a national context, two projects exist to enable cross-border interoperability in the euro area. The Eurosystem welcomes this kind of initiative, which could offer customers a wider range of service providers to choose from, enhancing competition and product development.

FIJI

Telephone banking is the most recent software-based product that has been launched in Fiji, in addition to debit card- and credit card-based systems, which are loaded by automated teller machines and electronic funds transfer terminals launched about six years ago. Consolidated data on the use of e-money products are not available.

FINLAND

1. Card-based products

Avant. The present, multipurpose Avant e-money scheme was launched in March 1997. The three biggest Finnish banks, Nordea, OKO Bank and Sampo Bank, issue reloadable cards and the value on them, and Automatia Electronic Purse Ltd is the system operator. Avant electronic cash can be loaded into the banks' chipcards at "Otto" ATMs or over the internet using a card reader and suitable software. Avant electronic cash is used as payment for some services, eg payphones, parking, public transport, kiosks and shops. At the end of 2000, the total amount of cards in circulation was around 530,000 and the number of terminals accepting Avant e-purses totalled 6,000. All Avant cards are now reloadable since disposable cards were withdrawn from circulation at the end of 2000. The total number of payment transactions during 2000 was around 600,000.

Matkahuolto. This is a nationwide prepaid card ticketing scheme for public transportation operated by Matkahuolto Ltd. It includes ticket products in electronic form and general value cards. It should be noted that Matkahuolto Ltd also provides its system and operating services for the Rovaniemi and Seinäjoki Citycard schemes mentioned below.

Citycards. Three local multipurpose prepaid card schemes, called Citycard schemes, have been implemented in Vaasa, Rovaniemi and Seinäjoki. Citycards can be used for paying, eg bus fares and some communal fees. During 2000, four new Citycard schemes were launched in Espoo, Vantaa, Oulu and Pori.

UniCard. In 1998 the student union of the University of Helsinki launched a chip-based student card, UniCard, which also incorporates an e-purse. E-money on UniCard can be used to make purchases from service providers owned by the University of Helsinki student union, eg student cafeterias and restaurants, book shops and computer stores. E-money can be loaded onto UniCard chipcards at service providers' terminals.

2. Network/software-based products

Currently, there are no software-based e-money schemes in Finland. Eunet e-cash, which started operations in March 1996, was closed down in autumn 1998.

3. Policy responses

Monetary policy and seigniorage. According to the current Finnish legislation, the issuance of electronic money cannot be considered a monopoly of the central bank. Balances representing amounts outstanding on prepaid cards or software-based e-money schemes are not at present defined to be included in the monetary aggregates. However, reporting requirements covering eg issued, outstanding and redeemed e-money have been imposed on the Avant e-money scheme, and Automatia started reporting relevant figures monthly at the beginning of 1998. At the moment, however, e-money schemes in Finland are not regarded as systems which should be included in the monetary statistics.

Estimates for the asset base of the Bank of Finland do not seem to indicate that e-money is replacing coins and notes to any large extent. In addition, it is very unlikely that cash will be totally replaced by e-money, at least in the foreseeable future.

General legal issues. Directive 2000/46/EC of the European Parliament and of the Council on the taking up, pursuit of and prudential supervision of the business of electronic money institutions will be translated into Finnish legislation by 27 April 2002. At the moment, however, there is no special legislation governing e-money.

The legislative power as regards e-money is divided: the Ministry of Justice handles the general legal framework such as the penal code and consumer protection issues and the Ministry of Finance handles some specific legal issues, ie the banking laws. The central bank and the Financial Supervision Authority are most often represented in the working groups considering banking regulations but they do not possess legislative power themselves.

Relevant security issues. The authorities have not laid down special criteria for evaluating the security features of e-money schemes. The problem at the moment is that if the issuers of e-money are not banks, the central bank and the Financial Supervision Authority have limited legal authority over the issuing entities. On the other hand, security features of the Finnish payment systems have also been developed by participating banks, not set by the authorities.

Provider issues. In Finland the issuance of e-money is not yet restricted, as indicated in "General legal issues" above. The issuance of e-money will be limited to supervised institutions by incorporating the e-money Directive into Finnish legislation by 27 April 2002.

Payment system issues. There have been no serious problems concerning clearing and settlement arrangements for e-money schemes.

Oversight issues. The Bank of Finland is responsible for the oversight of the Finnish payment systems. Automatia reports monthly some relevant figures concerning the Avant e-money scheme and oversight meetings are annually arranged at the Bank of Finland. Automatia would also inform the Bank of Finland immediately if there were any malfunctions related to the Avant e-money scheme.

Supervisory issues. According to Finnish legislation, the Financial Supervision Authority has authority to supervise financial institutions operating in Finland. It thus has authority over the banks that own Automatia and also issue Avant e-money. So the Financial Supervision Authority also has an indirect influence on Automatia. If the e-money issuer is a non-bank financial institution, the Financial Supervision Authority has authority to supervise it. If the issuer is a non-financial institution, the authorities have no direct power over it before the implementation of the e-money Directive.

Law enforcement issues. Pursuant to the Credit Institutions Act (1607/1993), a credit institution or a financial institution belonging to its consolidation group must ascertain the identity of its regular customers. If it is probable that a customer is acting on behalf of another person, the identification should also be extended to that person. The Credit Institutions Act further provides that a credit or financial institution must, in some cases, ascertain the intended use of its services.

The Finnish Penal Code contains provisions on fraud involving payment media and money laundering (769/1990 chapters 32 and 37). In addition, there are two separate legal acts on money laundering alone (583/1994 and 68/1998).

Cross-border issues. There has not been any official decision on how to deal with foreign e-money schemes. If the schemes are located in the EU area, the principle of free movement of services would naturally apply. At present, however, no foreign e-money schemes are used in Finland and no Finnish e-money schemes are used abroad.

Other issues. The Supreme Administrative Court has decided that the selling of disposable prepaid cards and the loading of reloadable cards are not subject to value added tax (VAT). The Court decided that this kind of activity constitutes payment transmission and therefore can be exempted from VAT.

FRANCE

1. Card-based products

Three electronic purse systems (Modeus, Monéo and Mondex) using different technologies and a different market approach are being tested in France.

Monéo and Modeus. Société Européenne de Monnaie Electronique (SEME), which promoted the electronic purse Monéo, and Modeus announced in July 2000 the merger of their organisations. The convergence of these two projects is a watershed in French electronic purse development. This new company, BMS (Billétique Monétique Services), which brings together the main credit institution, transport companies and some technological firms, has an ambitious schedule.

The first project conducted by BMS, the electronic purse Monéo, was launched with success in Tours in 1999 and in the Finistère in November 2000. In March 2001, 60,000 electronic purses were in use, and two transactions per purse per month were performed for an average amount of EUR 3.5. Monéo is based on the Geldkarte technology as a result of the ongoing partnership of GCB (Groupement des

Cartes Bancaires, the association of the main French banks which manages the domestic debit card system) and its German counterpart ZKA (Zentraler Kredit Ausschuss) in the field of interoperable electronic purses. However, Monéo has some specific features, including an offline loading facility at the POS terminal which ensures that the cardholder never runs out of electronic cash. Monéo is typically a mixed card containing the traditional chip-based French debit card application along with the electronic purse; both payment instruments are used in their respective domains. The customers targeted by BMS are mainly bank cardholders. A loyalty system could also be included in the card so as to achieve wider merchant support. Monéo promotion in major provincial cities is forecast for spring 2001 and the rollout is planned for 2002-03. 300,000 electronic purses by the end of 2001. BMS is concentrating its equipment effort on merchants who use small change, as well as parking meters, vending machines and ticket machines.

In a parallel way, the second project, named Modeus, couples a contactless transport ticketing application with an electronic purse. This brings both better ergonomy and strong constraints in terms of transaction times and security. The pilot has been launched in a major railway and metro station in Paris. The targeted customers are mass transportation users, of which only 50% are bank cardholders.

Mondex France. The Crédit Mutuel group has created a special purpose company called Mondéx France to buy and operate the licence of the Mondéx International (controlled by MasterCard) technology for the French territory and the euro. A pilot scheme has been launched in Strasbourg. Between September 1999 and April 2001, 109,000 purses were created and an electronic value of EUR 225,000 is currently in circulation. Around 1,500 electronic purses per month are active, with one transaction per electronic purse per month.

The Mondéx system replicates the structure and organisation of cash systems: a single issuer called the "originator" provides electronic value to members, which distribute and receive it; purse-to-purse electronic value transfers could be technically feasible between all participants regardless of their status (customers, merchants, banks), if they were not restricted by the operational rules of the system. In the French scheme, a fraud detection module based on the activity of individual purses will be added to the basic risk management system of MXI and purse-to-purse transfers will be limited to customers within the same family. The main goal of Crédit Mutuel in this project is to offer a wide range of applications to its cardholders through the MULTOS open operating system.

All 11 banks participating in those two consortia are committed to the convergence or the interoperability of the schemes after the trials and have agreed upon a single electronic money issuer, a special purpose company called "Société Financière du Porte-monnaie Electronique Interbancaire" (SFPMEI); the role of SFPMEI is to issue electronic money and collect as well as manage the funds received as a counterpart of the issuing process. SFPMEI also defines security regulations (technical and organisational) for the schemes and makes sure that they comply with these regulations on an ongoing basis. It will then be able to guarantee to all e-money holders the redemption of their electronic value.

With this single issuance structure, the banks are reducing clearing and supervision costs and also sharing the necessary security expertise, while competing on fare structures and service packages.

SFPMEI successfully applied for credit institution status in September 1999.

2. Network/software based products.

This kind of payment infrastructure exists only in pilot projects of minor importance.

3. Policy responses

Monetary policy. At present, the development of e-money is not expected to have strong implications on monetary policy implementation. Indeed, it will need to be closely monitored if e-money schemes expand to such an extent that it would imply a significant shrinking of the central bank's balance sheet, with a simultaneous reduction of the money base and the size of liquidity-providing operations. However, central banks have at their disposal means to accommodate such a situation and to keep their ability to steer short-term rates, through the issuance of debt certificates (or collection of deposits) in the interbank market or by increasing reserve requirements. Furthermore, the redeemability of

e-money will ensure that a demand for central bank money as a medium for interbank final settlements continues to exist.

Against this background, and in order to maintain a level playing field, the Bank of France maintains the view that there is a case for restricting the issuance of e-money to credit institutions, in line with the recommendations presented by the ECB in its 1998 "Report on electronic money". This seems to be the most appropriate solution since only credit institutions are subject to reserve requirements and, as eligible counterpart of the central bank, have direct access to marginal lending facilities in central bank money. The European Directive 2000/46/EC on the issuance of e-money accommodates most of Bank of France's concerns, creating a specific category of credit institutions with a dedicated activity and a specific prudential framework.

General legal issues. No specific law or regulations have been adopted to deal in particular with electronic money as it is considered that the existing legal framework fully covers these new developments.

Provider issues. According to the French Banking Act, the receipt of deposits from the public and the management as well as delivery of means of payment (including e-money issuing and distributing) are banking operations, restricted to credit institutions. This approach is considered in France to be essential for the protection of the public and, more generally, for the security of payment systems, the oversight of which is the responsibility of the Bank of France.

For these reasons, the Bank of France requested, in October 1996, the credit institutions involved in such schemes to submit all projects of this type prior to any operational implementation, in order for them to be assessed for compliance with existing banking regulations. In particular, if transport or telecommunications companies are involved in the delivery or management of the means of payment, their responsibilities should be clearly stated and any additional risk that they might cause to the system evaluated.

Relevant security issues. Strong competition between banks in the field of electronic purses, where security could be at stake, led the Bank of France to push the market players to write down formally the minimum functional security requirements for these products. This exercise involved IT security experts from the banking and smartcard industries.

In this process, the policy of the Bank of France was to ensure a level playing field between the various projects, to achieve international recognition of the evaluation process and to require that skilled and independent evaluation laboratories carry out the evaluation. To match those constraints, the requirements were written in the language of the ISO 15408 standard,[27] usually referred to as "Common criteria". The Bank of France used a tool called "protection profile", meant for IT users to express their security requirements for families of products; the evaluation was to be done as part of the national scheme for IT security evaluation and certification of security, placed under the responsibility of a governmental certification authority. Finally, the Bank of France made sure that the protection profile was known and considered as a reachable goal by all parties involved.

All electronic purse providers in France have ordered evaluations using the protection profile for the trial as well as the rollout phase.

Supervisory issues. As only credit institutions are allowed to issue e-money, the issuers will be subject to the same kind of requirements as other credit institutions, with a specific emphasis on technical and fraud risk.

Law enforcement issues. The issue of anonymous purses and their money laundering implications has been raised with the competent authorities. No need for regulation has been felt so far, given the features of the projects and the risks involved: for instance, the maximum amount to be loaded on the

[27] This ISO standard is the convergence of North American and European approaches to IT security; it ensures a mutual recognition for evaluation methods and centres between most countries. It provides users with a powerful tool called "protection profiles" in order to express their security expectations. Protection profiles are generic security requirements for families of IT products (such as firewalls, e-mail software, ATMs or e-purses).

anonymous purses of the various schemes does not exceed EUR 100 and their holders will be identified during the loading process.[28]

GERMANY

1. Card-based products

In Germany a number of products using prepaid multifunction cards, also know as electronic purses, are currently under development. The major prepaid card projects, GeldKarte, and PayCard, are described below.

GeldKarte. In a joint initiative, the German banking industry has developed a prepaid rechargeable electronic purse called GeldKarte, usable for a variety of payment operations, in particular for small amounts. The operator of the scheme is the Central Credit Committee (Zentraler Kreditausschuss), although the issuers (of both the cards themselves and the value on them) are exclusively banks and savings banks. A GeldKarte can be loaded with up to DEM 400 (USD 240) per card. As a rule, this will be either from the cardholder's account by means of online authorisation using a PIN, or against cash for customers without an account. The value loaded is credited to an electronic purse clearing account. The function of an EC or bank customer card can be embedded in the same card. Payment by GeldKarte takes place offline and without the use of a PIN. The value of the transaction is transferred from the customer card to the retailer card within the transaction terminal. The value received is then generally transferred once a day by the retailer to the relevant recording centre (Evidenzzentrale) for settlement.

With regard to fee structures, the price of cards for consumers varies from bank to bank, but is commonly DEM 10 for one year. The charge for loading is roughly DEM 0.15-0.60 with the consumer's bank (otherwise, DEM 2). For retailers, the unloading fee is 0.3% of turnover (at least DEM 0.02 per transaction).

In 1996, the GeldKarte system underwent a field trial in Ravensburg and Weingarten with various retailers and service providers. The transition to nationwide operation has been taking place since autumn 1996.

Paycard. This is a prepaid rechargeable chipcard developed by German Railways (Deutsche Bahn AG), the Association of German Transport Operators (VDV) and Deutsche Telecom. The card is designed to be used to pay for telephone calls, travel tickets and, at a later date, other small-value purchases. The cards, which are available with or without a link to a customer account, can be loaded with amounts ranging from a minimum of DEM 20 (USD 12) to a maximum of DEM 400 (USD 240). The PayCard was on trial in regional pilot tests in 1996. The transition to nationwide operation took place in summer 1997; for the time being, the system is still in the process of reorganisation.

2. Network/software-based products

Starting in autumn 1996, the Deutsche Bank in partnership with DigiCash successfully tested the *e-cash* system on an internal basis. In October 1997, the Deutsche Bank started a launch with roughly 1,500 of its customers who were able to buy directly goods and services provided by 35 retailers. From mid-1999 the system gradually left the pilot stage. Operation of the system was discontinued in mid-2001.

Dresdner Bank together with Landesbank Sachsen and CyberCash started a pilot project at the end of 1997. About 10 retailers and up to 5,000 customers and employees of the Dresdner Bank and Landesbank Sachsen participated in the project. After the end of the testing phase, payment systems

[28] ID is required for loading transactions against cash and indirect identification is possible through a bank account number for loading transactions with cheques or bank cards.

on the internet for CyberCoin (system for small-value payments) and others were to be offered. Operation of the system was discontinued at the end of 2000.

3. Policy responses

Monetary policy and seigniorage. Since the beginning of 1996, the value of electronic money issued on cards has had to be reported by credit institutions as a special liability position in their monthly bank balance sheet ("stored value card loading countervalue"). Since January 1997, this countervalue has been incorporated into the money stock M1 and thus also into M3. The amounts are still very low. With the amendment of the Banking Act, the issuance of e-money on stored value cards and in computer networks has been restricted to credit institutions since the beginning of 1998. If the use and dissemination of e-money on prepaid cards is limited, relief from some legal requirements of the Banking Act is conceivable for smaller issuers. The Bundesbank's view is that the linchpin of monetary policy monopoly on central bank money is not jeopardised by innovations in payment systems at the moment. The Eurosystem will probably remain in a position to set the conditions in the money market in such a way that they correspond to its objectives. Although e-money has a relatively large potential to displace currency in circulation, this assessment is supported by the total amount of banknotes in circulation, the structure of the denominations of banknotes, and the prevailing preference of the public for currency despite previous card-based innovations.

Since January 1999, minimum reserves must be held on e-money too, as it is part of the balance sheet position "overnight deposits". Since then, these reserves have been interest bearing. In the event of a considerable shrinking of the central bank's balance sheet - a risk which seems small from the present perspective, but which cannot be ruled out - the imposition of higher minimum reserves would seem to be an adequate response.

Given average seigniorage, the expected substitution of banknotes should not threaten seigniorage revenue substantially. Up to now, no measures have been envisaged for offsetting any possible loss of revenue.

The Bundesbank believes that the option of issuing e-money itself should be kept open as a sort of "last resort". Conditions and circumstances for such a decision, which has to be taken by the Governing Council, have not been determined. A lot of questions would first need to be answered concerning costs, safety, legal tender status, risk and competition or monopoly.

Relevant security issues. Both the report published in 1996 by the BIS on the security of electronic money and that on electronic money published by the European Central Bank in August 1998 are regarded by the Bundesbank as yardsticks against which e-money systems appearing on a national scale can be assessed in terms of the extent to which they correspond to the state of the art. In order to analyse a specific system, the Bundesbank has developed a questionnaire on the evaluation of the security features of new electronic means of payment as an introduction to the security check, which is based on the above-mentioned reports of the BIS and ECB. In the field of security, the Bundesbank cooperates closely with the Federal Office for Security, in Information Technology (Bundesamt für Sicherheit in der Informationstechnik) as the technically competent public authority.

In cooperation with the Federal Banking Supervisory Office, the Bundesbank is striving to achieve the aim of exercising influence on the operators of new e-money systems in such a way that the systems being sold do not fall below the general level of security and that guarantee funds provide a base of support for unavoidable risks.

Provider issues/supervisory issues. Any enterprise wishing to issue e-money should be subject to supervision by a competent industry. They should meet minimum requirements for this business concerning licensing, solvency, liquidity, investments and exposure, risk management and control systems and technical and operational security (including high encryption standards). These standards are complied with in Germany.

In Germany, the amendment of the Banking Act came into force at the beginning of 1998. Accordingly, the catalogue of banking business was extended by adding the following activities:

– the issuance of prepaid cards for payment purposes, unless the card issuer is also the service provider and hence the recipient of the payment made using the card (prepaid card business);

– the creation and administration of units of payment in computer networks (network money business).

In line with these definitions, only the issuers of single-purpose prepaid cards (where the issuer and the supplier of goods or services are identical) are by law exempt and thus not subject to banking supervision. On the other hand, although the issuers of all other forms of prepaid cards (limited and multipurpose) as well as of network money are, in principal, subject to supervision, the Federal Banking Supervisory Office may grant exemptions in particular cases concerning cards (to the effect that an enterprise which exclusively conducts prepaid card business is not subject to the licensing requirements, to the provisions on solvency and liquidity and to some other supervisory requirements) as long as it is expected that, in view of the limited use and dissemination of prepaid cards, the enterprise's business will pose no threat to the payment system. These institutions, however, are not exempt from the requirement to submit monthly returns to the Bundesbank and annual accounts, annual reports and auditors' reports to the Federal Banking Supervisory Office and the Bundesbank. In addition, the Federal Banking Supervisory Office is empowered to request (with regard to money card business) information about all business matters and the presentation of books and records from the institution and to carry out inspections.

All other enterprises (money card issuers which are not entitled to these exemptions and all issuers of network money) are subject to banking supervisory requirements concerning, in particular, licensing, solvency, large exposures and liquidity requirements.

The decision to classify the issuance of e-money (card-based money and network money) as banking business subject to supervision was taken mainly on account of systemic considerations pertaining to the integrity of the payment systems and, to a certain extent also, the desire to protect consumers and e-money users. For example, the failure of issuers, weak technical and operational security precautions or widespread fraud or counterfeiting of the electronic units in circulation might damage confidence in e-money schemes and, moreover, potentially have spillover effects on the integrity of the retail payment system more broadly. Another motivation for making the issuance of e-money subject to supervision was the attractiveness of e-money for criminal purposes, such as money laundering or drug dealing.

Limiting e-money issuers to credit institutions and thereby subjecting them to banking supervision may reduce the risk of solvency or liquidity problems. Furthermore, credit institutions have direct access to central bank credit facilities. Supervision requires credit institutions to have adequate risk management and control systems in place, which could help to improve security. In addition, in Germany credit institutions have long experience and the necessary technical skills in operating payment systems.

The goal of restricting the issuance of e-money to supervised institutions has also been acknowledged by the European Union. In September 2000, two EC Directives on the prudential aspects of e-money were adopted. This European regulation is currently in the process of being translated into German law.

Payment system issues. No particular problems have arisen relating to the clearing and settlement arrangements for e-money schemes.

Oversight issues. As the payment system overseer, the Bundesbank has not taken any particular steps to influence the design and operation of e-money schemes. However, the Bundesbank lays emphasis on the security of e-money schemes. In this context, the assessment of e-money's counterfeit risk is a new assignment in the fulfilment of which the Bundesbank also draws on the special knowledge of third parties, such as the Federal Office for Security in Information Technology. Whenever an e-money issuer intends to start up an e-money business, the potential issuer has to complete the Bundesbank's questionnaire. The answers are evaluated by the Bundesbank and the Federal Office for Security in Information Technology. Problems and shortcomings are discussed with the companies concerned in order to arrive at satisfactory solutions. This procedure is also applied whenever existing systems are extended or refined (additional applications or functionalities).

Cross-border issues. At the moment there is no promotion of e-money products or schemes in Germany by foreign vendors about which the authorities have concerns. However, it would be difficult, if not impossible, to apply or enforce regulatory measures relating to cross-border e-money products or payments, whether in national or foreign currency, offered in Germany if the issuer or the participants in the scheme were domiciled in one or more different countries or jurisdictions. Only if the operator is using a German agent might it be possible - under certain circumstances depending on the individual case - to regard the agent conducting the banking business as being subject to supervision.

Therefore, the solution to this kind of problem is not possible at the national level but requires international cooperation among the competent authorities.

Legal issues. Information is available with regard to the GeldKarte system of the German banking associations. This system is, in principle, based on a trilateral contractual structure - although the number of intermediaries involved and the combinations to be considered lead to a much greater number of contractual relationships than suggested by the trilateral architecture. All contractual documentation concerning (a) the issuing bank/cardholder relationship, (b) the retailer/bank relationship and (c) the rights and duties between the banks involved are defined in a general agreement between the banking associations binding upon all individual banks that are members of those associations.

The standard terms and conditions to be used between issuing bank and cardholder specify that, in the event of losing the card, the holder has no protection against loss of value as any finder, thief, etc, may use the stored value. In some ways, the respective clause renders the situation legally comparable to a loss of banknotes and coins. There is a hotline allowing the cardholder to block reloading transactions in the event of loss (reloading is, of course, only possible using a PIN).

The standard terms and conditions to be used between banks and connected merchants specify that the retailer is under a legal obligation to accept the card for payment if the customer wishes to use it and that the retailer is under an obligation to indicate to the public his willingness to accept the card in a clearly visible manner by using the logo. They also specify that any "duly executed" payment transaction between a cardholder and retailer gives the retailer an independent, abstract claim to payment against the issuing bank. To encourage acceptance of the new payment instrument, the payment obligation of the issuing bank will even cover value created fraudulently. Excessive losses of one institution in this context will be pooled within the banking industry.

The interbank relationships distinguish between (and, of course, define) rights and obligations between banks (i) on account of the loading transaction which may occur through ATM facilities with banks other than the card-issuing bank and (ii) in the context of the collection of cash countervalue for electronic value which a retailer has accepted for payment.

The legal analysis may, to a certain extent, be comparable to the analysis in credit or debit card systems (in particular to the EC card system) or other systems where the payee acquires a guaranteed right to be paid against the issuing bank.

With regard to network-based/software-based schemes, no information was available.

At present, no legislation is envisaged to support the private law aspects related to the (contractual) construction of any kind of e-money. On account of the general freedom of contract, there may be little need to enact specific provisions in this field.

Concerning the regulatory treatment (eg in the context of banking supervision, minimum reserves and deposit insurance), there is a prevailing opinion that obligations under issued e-money do not constitute deposits in a legal sense, owing to the non-identifiability of the holder.

Law enforcement issues. In the context of money laundering, there have been no initiatives taken at national level. The problem does not seem too urgent at present as the GeldKarte - like other card-based systems - has only limited storage capacity, which would allow only small values to be converted into card money.

GREECE

1. Card-based products

In Greece, at present, there are no e-money schemes in operation. The previous piloted electronic purse scheme, launched by the National Bank of Greece in June 1995 and restricted to the bank's headquarters premises, ceased its operation. During the last year, an initiative has been undertaken in order to develop and implement a card-based electronic money scheme gradually on a nationwide basis, following one of the main European operational e-money schemes. The Bank of Greece is

currently in consultation with the scheme developers for the close monitoring of the various stages in its development.

2. Functional aspects of the new scheme

Role of the involved firms: Two credit institutions are planning to develop an e-purse scheme. For this purpose, they are setting up a new company which will be the operator of the scheme, but not the issuer of value. Initially, the two credit institutions will be the e-money issuers. Any other institution entitled to issue e-money will have the right to participate in the scheme, under certain terms and conditions. The operator will be responsible for the function of the scheme, the promotion of the product, the development and supply of the hardware terminal network (POS) to the participating vendors and the clearing of transactions according to the frequency chosen (daily basis, weekly basis, etc) by the merchants taking part in the scheme.

Single-currency function: The prepaid cards will have a single-currency function and the expected maximum value to be stored on the reloadable cards will be within the limit provided for in Article 8 of Directive 2000/46/EC. Transferability of electronic balances directly between consumers (purse-to-purse) will not be permitted, for reasons of protection against criminal abuse. The scheme is expected to be implemented following a model which will permit record keeping of all transactions (audit trails), as well as the interoperable use of the reloadable cards within the single European market, to the extent current common standards allow.

Single-function instrument: Initially, the cards will have only the e-purse function and will be accepted by devices dedicated exclusively to e-money, with the further possibility of becoming part of a multifunctional instrument, ie combined with credit and debit cards and other payment applications or non-payment functions, in the future.

Loading/redemption: The cards will be loaded by debiting the bank accounts of the holders through ATMs. The redemption of the outstanding value stored in the cards will be at par through crediting the bank accounts of the bearers of e-money, at their request.

Fee structure: Each credit institution interested in participating in the scheme will pay an entry fee and a fee per electronic transaction to the operator. A fee per transaction will also be paid to the operator by the participating merchants. No fees will be charged by the issuing credit institutions to end users.

Security aspects: The scheme under development will incorporate the technical, organisational and procedural safeguards against counterfeit threats and criminal abuse of the chosen operational scheme. The self-regulatory security features of the scheme will be evaluated against the security requirements that are currently under development in the context of the Eurosystem.

Legal arrangements: At domestic level, the laws, regulations and administrative provisions necessary for compliance with Directive 2000/46/EC on the taking up, pursuit of and prudential supervision of the business of electronic money institutions are in the process of adaptation and implementation. E-money products are currently regulated by the Bank of Greece Governor's Act no 2366/03.08.1995, according to which the issuance of e-money, in the form of multipurpose prepaid cards, is limited exclusively to institutions entitled to receive deposit funds or other repayable funds, in the sense of Directives 780/77/EEC and 646/89/EEC - as codified by Directive 2000/12/EC - which have been transposed into Greek legislation by Banking Law 2076/1992 (Article 4, Part 1). As the issuers of e-money are credit institutions, they are subject to prudential supervision by the Bank of Greece.

3. Policy responses

The Bank of Greece's major policy concerns are based on the prospect of the gradual growth of multipurpose prepaid cards on a nationwide basis, in the long run.

In line with the anticipated developments, the Bank of Greece is considering the possible policy issues and responses, relating mainly to monetary policy effectiveness, in the context of the Eurosystem. In this direction, the e-money scheme under development will be requested to supply the Bank of Greece with the appropriate monetary statistics on the float owned by the e-money issuing institutions. The imposition of reserve requirements on e-money issuers should be in compliance with the Eurosystem policy concerns, while the redeemability requirement has to be met. The central bank's stance as

regards the possibility of issuing e-money itself will depend upon the long-term effects of e-money on seignorage revenues.

Apart from the supervisory issues raised with regard to individual e-money institutions, e-money schemes fall under the scope of the payment systems oversight responsibilities of the Bank of Greece. The oversight function focuses on the continuous monitoring of the integrity of the scheme as a whole, through the collection of statistical information, the periodical evaluation of the operational and technical security features implemented and the unconditional application of the rights and obligations resulting from the contractual agreements among the parties involved, ie issuers, operators, merchants and consumers.

Additional policy concerns, due to the interrelation of card-based e-money with other card-based payment products and the clearing process of e-money transactions, relate to the efficient functioning and the integrity of payment systems, the stability of financial markets, the protection of consumers and merchants, the maintenance of confidence in payment instruments, and currency and cross-border considerations. Policy responses in that direction would incorporate all the necessary security, supervisory and cooperative actions, including proposals for legislative adaptations, that render e-money a reliable product accepted by all its users.

GUATEMALA

There are no developments to report in this country.

GUYANA

There are no developments as regards electronic money schemes in Guyana.

HONDURAS

The Futura 3000 project

The Central American Bank for Economic Integration (Banco Centroamericano de Integración Económica - BCIE), as part of its commitment to financial system modernisation and sustainable development in the region, has decided to invest in the creation of a Central American "network of networks" in order to facilitate the use of modern payment media. This project, named Futura 3000, is currently in operation in Costa Rica and Guatemala.

Futura 3000 is an interoperable system which supports transactions carried out with the Futura 3000 card, allowing the various participating institutions to interact and originate transactions. Clearing of all transactions under this system would be the responsibility of the BCIE, and net positions would be sent to the Central Bank of Honduras for booking on the reserve account of the participating banks.

According to the BCIE's proposal, the legal basis for this scheme could be provided through formal agreements or authorisations via exchange of letters.

In Honduras the project has not been implemented; moreover, no date has been set for starting talks and reaching agreement with the potential participants. The same is true for the marketing of the product.

HONG KONG

1. Card-based products

Prime Visa Cash. The first general multipurpose stored value card (MPC), Prime Visa Cash, jointly developed by two banks and Visa International, was launched on a trial basis in August 1996. The Visa Cash system is similar to electronic cheques. The issue of electronic value under the Visa Cash system merely involves a change from deposit liability to stored value liability in the balance sheet of the issuing bank (in the same way as a transfer from a savings account to a cheque account), which does not affect its level of overall liability. Payments made by the Visa Cash system are cleared through the Visa Cash clearing and administration system (in the same way as the cheque clearing system). There is no cardholder-to-cardholder transfer in the Visa Cash system (which is a major difference from Mondex, mentioned below).

Currently, Visa Cash cards are issued by nine banking groups in Hong Kong. They are available in two types, disposable and reloadable. The disposable card, launched in August 1996, can store a value of HKD 200 (USD 26) while the reloadable card, introduced in April 1997, can store up to HKD 3,000 (USD 385). The holders of the reloadable cards can load and unload their cards at hundreds of designated cash dispensers (ATMs).

Up to 31 March 2001, there were approximately 340,000 cards in circulation. Currently, there are about 4,500 merchant terminals in various retail outlets, including supermarkets, fast food chains, convenience stores, department stores, gasoline stations, book stores, hair salons and so on which have signed up for the scheme.

Mondex. The Mondex system, which is more akin to banknotes, was first launched in designated shopping malls in October 1996. The first phase rollout of Mondex took place in November 1997, and expanded the availability of Mondex accepting merchants away from the two designated malls. Mondex value, like banknotes, may be freely transferred between cardholders and between cardholders and merchants without going through a clearing system. Initially, the maximum amount that can be stored on a consumer's card is HKD 3,000 (USD 385). Currently, Mondex is issued by the Hong Kong Bank and Hang Seng Bank.

Loading and reloading of Mondex value can be done by transferring monetary value from the cardholder's bank account at cash dispensers (ATMs) and bank counters. The heart of the Mondex payment scheme is the electronic purse in which monetary value is stored and which maintains a record of the last 10 transactions. Mondex electronic purses contain a four-digit "lock code". By pressing the lock key on devices such as a wallet or telephone, the cardholder's money is kept secure and his transactions private. A Mondex purse can hold up to five different currencies at any one time, and in due course Mondex will permit multicurrency payments.

Mondex value is originated by an "originator" in the same way as banknotes are issued by the note issuing bank. The issue of Mondex value creates new liabilities on the part of the originator (in the same way as the issuing of banknotes creates new liabilities on the part of the note issuing bank). Member banks participating in the Mondex scheme may "purchase" Mondex value from the originator (in the same way as they would draw cash from a note issuing bank). The average value stored on the card is around a few hundred Hong Kong dollars and the cards are mainly used for purchases of items of small value. Up to 31 March 2001, there were about 243,000 cards in circulation. So far, about 1,120 merchants with over 3,000 merchant terminals are available to accept payments by Mondex.

There is a co-branded card product, i-Life Card, jointly issued by the Hong Kong Bank and a telecommunications company in Hong Kong and launched in June 2000. It is a multifunctional card with credit, debit, e-cash and calling card features, equipped with a Mondex chip that supports e-cash as well as a number of online applications (with internet-related features). Since its launch, over 20,000 cards have been issued. The maximum Mondex value that can be stored on the card is also HKD 3,000 (USD 385).

Octopus Card. A limited-purpose stored value card issued by Creative Star Limited (CSL), a company jointly owned by transport operators, primarily for payment of transport services provided by them (the "core use"). It is a "contactless" stored value card. The card scheme was launched in the third quarter of 1997, when it was exempted from the definition of MPC under the Banking Ordinance because of its restricted range of services and because the risk of its use to the payment system and cardholders

was considered slight. Subsequently, apart from the core use, the card could also be used to pay for goods and services provided by shops and kiosks within the station premises ("non-core use"); these kinds of uses were regarded as ancillary or incidental uses and were limited to 15% of the value of all transactions carried out with the card.

In April 2000, CSL was authorised as a special purpose deposit-taking company to issue Octopus Card under the Banking Ordinance. The authorisation of CSL allows Octopus Card to be used for a wider range of uses, including some which are non-transport related, with a view to enhancing the convenience for cardholders. Accordingly, the ceiling on non-core use has been raised from 15% to 50% of the aggregate value of transactions. However, the uses of the card will continue to be mainly transport-related.

Currently, other than the transport-related uses, the card can be used at various outlets, including vending machines, ticketing machines, convenience stores, fast food chains, bakery shops, public swimming pools, public recreational centres, etc. The maximum value that can be stored on the card remains HKD 1,000 (USD 129). The card can be reloaded at designated terminals within the station premises and some other retail outlets.

The sales of the Octopus Card have been very successful. By the end of March 2001, the number of cards in circulation reached 7.4 million, and about 6 million transactions per day were recorded. Currently, there are about 16,000 merchant terminals available to accept payments by Octopus Card.

Single-purpose cards. The Hong Kong Jockey Club has issued a stored value card for use in betting services and other club facilities by its members. In addition, in April 1998 the Transport Department of the Hong Kong Government issued a disposable stored value card, E-Park Card, in denominations of HKD 100 (USD 13), HKD 200 (USD 26) and HKD 300 (USD 39) for payments at electronic parking meters and paying parking fees at a number of multi-storey car parks.

Functional aspects of the schemes. The functional aspects of individual schemes such as security, fee structure and details of the commercial agreement between the various parties involved in a card scheme are confidential and cannot be made available. The HKMA sets out in a questionnaire the information which scheme operators must provide to the HKMA (including that relating to the functional aspects of a proposed scheme) when applying for authorisation to issue MPCs.

2. Network/software-based products

A number of banks have developed online banking for corporate and high net worth customers through computer terminals installed at the premises of the customers. Several banks in Hong Kong have taken a lead in introducing a service enabling customers to execute banking transactions through the internet. However, there are no schemes of network-based e-money being implemented in Hong Kong at present.

3. Policy responses

Implications for monetary policy and seigniorage. Issuers of e-money in the form of MPCs will be required to submit periodic returns to the HKMA on the amount of electronic value issued and outstanding, the aggregate transaction values and the average value of transactions. This helps the HKMA in considering whether and how e-money should be captured in the definition of the money supply.

Of the three MPCs (Mondex, Visa Cash and Octopus) in Hong Kong, Mondex and Visa Cash have been in the market for some time but Octopus is by far the most popular, particularly as regards payment for transport-related services.

Given the present monetary arrangements in Hong Kong and the importance of the aggregate balance, rather than cash, in the operation of the currency board system, it appears unlikely that the growth of e-money in Hong Kong would undermine monetary control. Therefore, it is not desirable or necessary at this stage to grant legal tender status to electronic cash. Practical problems would in any case arise if all businesses were required to install machines to handle the various forms of e-cash now in use.

Regarding whether some form of backing requirement should be introduced for e-payment instruments that are close substitutes for cash, given the current early stage of development of e-money, such a

requirement is not necessary. It would also be premature to introduce legislation to require issuers to redeem e-money on request for conventional payment instruments, although measures of this kind might be worth considering in the future.

As for the implications of the growth of e-money on seigniorage, the potential loss of seigniorage under current conditions is not particularly large. Nor is it likely to affect the robustness of the currency board arrangements.

With regard to the question of whether the HKMA should look into the feasibility of participating in the issue of e-payment instruments, it is undesirable at present, since it might have the effect of stifling private sector initiatives. However, there might be a case for returning to this question at some time in the future, particularly if the market for e-money developed to the point at which consideration of a unified system became relevant.

General legal issues. The legal framework for regulating the issue of card-based e-money or MPCs is contained in the Banking Ordinance. Briefly, the Ordinance provides that:

(a) fully licensed banks will be deemed to be approved to issue MPCs which have the characteristics of "generally accepted purchasing power";

(b) special purpose vehicles whose principal business is to issue MPCs may be authorised as deposit-taking companies under the Banking Ordinance for the principal purpose of issuing MPCs. It is envisaged that service providers which wish to issue more limited-purpose MPCs for the main purpose of charging for the services they provide, or originators of electronic value (such as the originator of Mondex), would be authorised under this category;

(c) the HKMA may declare a stored value card not to be an MPC where the usage of the card is very limited and the risk of its use to the payment system and cardholders is slight;

(d) single-purpose cards where the goods and services are provided only by the issuer of the card do not require approval under the Ordinance.

Concurrent with the commencement of the Ordinance, the HKMA issued a guideline explaining the principles and criteria that the HKMA will use in exercising his powers for the authorisation of MPCs.

Security issues. The criteria which the HKMA requires to be satisfied in respect of security are set out in the questionnaire mentioned in the last paragraph of Section 1 above. Briefly, the main concerns are that the e-money scheme should have:

(a) adequate safeguards against counterfeiting or tampering, and effective means of detecting and measuring fraudulent value;

(b) adequate safeguards against money laundering activities;

(c) adequate control procedures to ensure accurate recording of e-money issued and outstanding;

(d) sufficient audit trails to minimise the cost and inconvenience arising from disputes and system default;

(e) appropriate and effective contingency plans to cover major system breakdowns or a significant compromise of the scheme (for example, due to a major fraud).

To assess whether the security of an e-money scheme is adequate is probably the most difficult area for central bankers. This is because there is usually a lack of the relevant expertise within the central bank in this area and it is difficult for central bankers to keep pace with the rapid development of security and encryption technology. However, the risk is mitigated by competition among card issuers to come up with schemes with adequate security features and by the issuers' own interests in preventing possible losses from breaches of security. Further, continuing developments in security technology are required to maintain the effectiveness of security measures on an ongoing basis.

It is the intention of the HKMA to appoint outside experts to assist in assessing the security of e-money schemes on a need basis.

Provider issues. See the paragraph above on general legal issues regarding who may issue MPCs. In developing the legal framework for MPCs, the HKMA has adopted the following principles:

(a) it is important to maintain the stability of the payment system (and thus of the financial system as a whole). Therefore, the HKMA needs to be careful about extending access to the payment system beyond fully licensed banks, to which it is confined at present;

(b) at the same time, it is important to provide some flexibility in the legal framework for service providers to take advantage of e-money technology to improve the efficiency of their services to the public;

(c) these two considerations would argue that there should be some scope for non-bank issuers to issue MPCs, but that these should be more limited in scope than those issued by licensed banks. Only the latter cards should have the characteristic of "generally accepted purchasing power" which would make them more direct substitutes for paper currency or current accounts;

(d) it is important to ensure that the payment obligations of card issuers can be honoured;

(e) the main concern of legislation should be with MPCs because of their analogy to cash and deposits. However, single-purpose cards also raise considerations of consumer protection which need to be addressed (though not necessarily in the Banking Ordinance).

Payment system issues. Hong Kong's payment systems are generally considered to be efficient, effective and reliable. Hong Kong's payment system providers are innovative and well tuned to market needs, and they develop and operate products which generally meet market needs in terms of service required, timeliness and response time. There is no particular problem relating to the clearing and settlement arrangements for e-money.

At present, the HKMA is conducting a comprehensive review of retail payment services in Hong Kong. The review also touches on the direction in which retail payment services relating to e-money (including smartcards) may develop in future.

Supervisory issues. The policy responses with respect to e-money developments are described under "Legal issues" and "Provider issues".

Law enforcement issues. The potential for e-money to be exploited for money laundering purposes argues for restricting the issue of MPCs to regulated entities. The advent of e-money may create a convenient vehicle for money launderers to transport money without having to carry a huge amount of physical cash. As part of the criteria for approving the issue of MPCs, the HKMA will need to be satisfied that there are adequate controls to guard against money laundering activities. These would include, for example, having an audit trail, a limit on the amount that can be transferred to and from the card, linking the card to specific bank accounts for the purpose of downloading and offloading of value and limiting the amount that can be exchanged through the linked accounts, and monitoring the behaviour of card transactions and reporting any suspicious activities. Current legislation on money laundering, counterfeiting, false accounting, etc will be applicable to e-money schemes.

Cross-border issues. As noted earlier, all card-based e-money schemes promoted or used in Hong Kong, irrespective of whether or not the scheme is a multicurrency scheme or is provided by a foreign vendor, will need to be approved by the HKMA under the Banking Ordinance. In approving such schemes, the HKMA will have the power to impose appropriate requirements, such as requiring the issuer to maintain adequate backing for all outstanding electronic value issued and adequate security for the scheme. As such, the HKMA believes that the existing legal framework for card-based e-money schemes is sufficient to regulate multicurrency schemes.

The regulation of network-based e-money schemes is more difficult as electronic value could be originated and made available to local residents by overseas operators through the internet. Regulatory enforcement by local supervisors may be difficult owing to territorial restrictions. The HKMA has not yet developed any regulatory policies in these areas as there are no network-based e-money schemes available in Hong Kong. However, it is considered that this is an area where supervisory cooperation among central banks is most important.

Other issues. Consumer protection and competition issues are outside the scope of the HKMA. However, in order to be satisfied with the soundness of an e-money scheme, the HKMA will have regard to whether the scheme documentation is clear and fair with respect to the rights and obligations of the various parties involved in the scheme (for example, those arising from lost or stolen cards or from counterfeit value). Whilst the HKMA does not consider it to be within its role to prohibit anticompetition practices among e-money schemes, it will formally bring to the attention of approved

issuers that its policy is to support healthy competition and to maintain a level playing field for market participants.

At this stage, the HKMA is not aware that e-money schemes would raise any taxation questions.

Apart from requiring e-money schemes to have adequate security and systems of control, the HKMA does not have any policy to require their standardisation.

HUNGARY

1. Card-based products

Although there are a number of single-purpose prepaid card schemes and loyalty applications, no e-money project is under way in Hungary.

2. Network/software-based products

Currently, there are no software-based e-money schemes in Hungary.

3. Policy responses

The central bank takes the minimum requirements and desirable objectives laid down in the *Report on electronic money* (August 1998) published by the European Central Bank as a guideline for its policy. It closely monitors new developments and takes action when deemed necessary.

A government decree [77/1999. (V. 28) Korm.] based on European Union Commission Recommendation 97/489/EC was issued in May 1999. It defines e-money and sets some basic rules. Current regulations restrict e-money issuance to credit institutions.

ICELAND

There have not been any major developments in the e-money situation in Iceland. The proposed pilot project by Visa and Europay has been delayed and no new schedule has been announced.

A minor initiative was launched in a local community, but it is limited to school children in several schools in the community and a few shops and services.

INDIA

1. Card-based schemes

E-Money developments in India are of recent origin. A pilot project for the use of smartcards - called the SMART Rupee System (SMARS) - launched at the Institute of Technology, Mumbai, was concluded and a report on the standards to be used in smartcard technology was submitted to the Reserve Bank of India in August 1999 by those involved in the project, which comprised the Reserve Bank of India, the Institute for Development and Research in Banking Technology, the Indian Institute of Technology, State Bank of India, Canara Bank and some technology providers. Based on this report, the RBI set up a Working group headed by its Executive Director to study the recommendations and publish the standards for use. The group, after examination of the recommendations, has studied the standards and recommended them to the Bureau of Indian

Standards for adoption as National Standards. Meanwhile, guidelines to be observed by banks when issuing smart/debit cards have been released by the Reserve Bank. These guidelines cover a range of operational aspects - coverage of the card, its functionalities, eligibility of customers, treatment of liability, security and other aspects, terms and conditions for issue, etc.

Smartcards which are multipurpose in nature and where settlement across different banks/organisations is involved are currently being issued by banks in the country. Although five banks have started issuing smartcards, the number of such cards in circulation is not very high. Special purpose smartcards such as those used for telecommunications (telephone cards), transport (bus cards) or identification (driving licence) have begun to make their presence felt in the country; they do not, however, have any multipurpose character and do not involve any settlement function across different agencies/banks. Five commercial banks in India have started issuing smartcards to their customers. These are: United Bank of India, Dena Bank, IDBI Bank, Bank of Baroda and ICICI Bank.

2. Network/software-based products

There are no such schemes in the country as of now.

3. Policy responses

The prime response - from a policy perspective - has been the release of guidelines by the Reserve Bank in respect of the issuance of smart/debit cards by banks. In order to ensure that smartcards and the systems relating to such cards function in an open, interoperable manner without any proprietary restrictions attributable to any vendor/system integrator or operator, action has been initiated to provide for national standards. These standards address operational issues and matters relating to security, card layout, settlement parameters, etc.

INDONESIA

There has so far been no development of e-money in Indonesia. Banks and other non-bank financial institutions have yet to offer alternatives for the relatively high percentage of cash being handled, except for offering debit cards. This may be due to the ongoing crisis. Some banks were quite active in seeking alternatives before the crisis, including looking at the Mondex e-purse.

IRELAND

1. Card-based products

There are no multipurpose prepaid card schemes in Ireland at the moment. Two pilot schemes were in operation in 1999-2000. Both schemes have now finished.

2. Network/software-based products

No developments to report.

3. Policy responses

Given that no scheme exists at present and that the two pilot schemes operated for short periods of time, the specifics of any policy regime have yet to be articulated, although some initial preparatory

work has begun in this area. It should be noted that the Central Bank of Ireland is the regulator of payment and securities settlement systems.

ITALY

1. Card-based products

In Italy, only one card-based electronic purse scheme - MINIpay - is currently operational. Cassamat and Visa Cash were also operational until the middle of 2000.

MINIpay is a nationwide electronic purse. It was launched at the end of June 1996 by SSB, a company for IT services controlled by the largest Italian banks, and has now reached wide acceptance across the country. The project was prepared jointly with Europay. Card-to-card payments are not allowed. The MINIpay card is issued by banks to all applicants, who need not be account holders. In fact, both registered and bearer cards are provided. In 1997, after a trial based in Turin, the MINIpay card, issued by 56 banks, was introduced in several other towns.

In March 1998, with a view to promoting the use of the euro, a specific pilot project based on the issue of MINIpay cards in euros was launched in some towns. It provides for both currencies (lira and euro) to be displayed on the retailer's terminal and on the user's receipt. In 1999 the initiative was then extended to other Italian towns; in one of them the Italian Post Office was also involved. Starting from January 2001, MINIpay cards can be loaded both with lire and euros.

The card can be reloaded at any branch of the issuing bank and, through a credit or debit card, also at the ATMs of other participating banks. It can also be loaded at home by telephone using a portable terminal. The bearer can redeem the residual value at the issuing bank at any time.

MINIpay funds can be spent through two types of terminal: one for retailers, which may be either fixed or mobile; and the other, equipped with a supplementary module, for vending machines and pay telephones. At the end of the working day, the merchant can transfer the value loaded onto the terminal to his bank current account by using a telephone link or by loading the value onto a "merchant card", which is then delivered to the bank.

Data are downloaded to TSP, a company owned by SSB, which monitors the float and handles MINIpay transactions. The payments made through MINIpay are channelled into the retail clearing subsystem and settled through banks' centralised accounts at the Bank of Italy.

The security infrastructure of the project takes account of different requirements, such as limits on transferability, online loading of electronic money, uniqueness of transaction identifier, card identifier and terminal identifier, key management and storage, physical integrity of the equipment, cryptography and full accountability. The components of the system are manufactured in such a way as to guarantee physical integrity (smartcards are tamper-proof). All operations (loading, payment, collection, etc) are preceded by identification and authentication. Cryptography is used mainly for authentication. Symmetric and asymmetric cryptography techniques are also used in combination.

Besides being a payment instrument, MINIpay could also be used as a citizen's card to obtain access to services other than payments.

2. Network/software-based products

Two "network-based" schemes (Omnipay prepagato and Moneta online) to be used over the internet were launched in the last quarter of 2000. These schemes - also known as "scratch cards" - work as follows: the user buys a plastic card that bears a 14/16 digit PIN code which is revealed by scratching away a coating hiding it from view. This code is used to set up and later access the amount the user has paid in advance; the PIN code is used instead of a signature to make payments over the internet to a merchant accepting the instrument.

Omnipay prepagato is a scheme developed by one of the major Italian telecommunications companies, managed by a financial intermediary and issued by a bank. The user buys a telephone card and, according to an agreement between the telecommunications company and the bank,

converts its telephone credit (provided it is still intact) into a credit at the bank (Omnipay account) that can be used to purchase low-value goods over the internet at merchants subscribing to the scheme. The financial intermediary manages the technological infrastructure, network transactions and relations with merchants. The telecommunications company creates scratch cards and PIN codes. The bank sets up and operates the Omnipay account (an account related to the card number whose funds are available through the PIN code).

When paying, the user is automatically routed to the Omnipay management system. When connected, the user - protected by adequate security systems[29] - transmits his Omnipay card number to the Omnipay management system. On no occasion does the retailer have access to the user's PIN code. Within the purchase transaction, the retailer's identity is ensured by an authentication process using electronic signature. Confidentiality is guaranteed by encryption mechanisms.

The client can have any residual credit of his Omnipay account refunded provided his credit is equal to, or more than, EUR 10, and his Omnipay account was created not less than three months and not more than 24 months before.

Moneta online is a scheme issued by one of the largest Italian banks. The user buys a scratch card (maximum amount EUR 200) that can be used to purchase low-value goods over the internet at merchants subscribing to Visa. The card can be bought at any branch and ATM of the issuing bank. Technological infrastructure, network transactions and relations with merchants are outsourced by the bank. Scratch cards and PIN codes are created by the issuing bank. The card becomes operative when the user - protected by adequate security systems - connects to the Moneta online website by using his PIN code, and the bank sets up an account related to the card number.

When paying, the user connects to the Moneta online website and gets a temporary, disposable Visa PIN code to be used in the payment transaction on the merchant's website. From this moment on the payment process follows the rules of the Visa system.

The client can have any residual credit refunded provided his credit is equal to, or more than, EUR 10, and there are at least 12 months left before the expiry date on the card.

3. Policy responses

Monetary policy and seigniorage. Since March 1997, the Bank of Italy has been collecting statistical data on e-money on either a monthly or a semiannual basis, covering the number of cards in circulation, the value loaded, the value and volume of payments made, the outstanding value available and the number of terminals.

With the start of EMU, the conduct of monetary policy operating procedures, also with regard to possible adjustments necessitated by the advent of e-money, has fallen within the responsibilities of the ESCB. The ECB regulation on statistical reporting (ECB/1998/16) does not provide for separate statistics on e-money balances; e-money is treated as an on-balance sheet liability of the issuing institution, similar to other liquid liabilities such as overnight deposits.

Currently, the potential for replacement of notes and coins by e-money is very limited, and therefore the loss of seigniorage revenues is negligible. No specific measures have so far been envisaged to offset the possible loss of revenues due to the development of e-money. At present the Bank of Italy does not envisage issuing e-money itself.

General legal issues. The legal framework for the issue of multipurpose prepaid cards is provided by the 1993 Banking Law as amended by Article 64 of the Legislative Decree 415/1996. In particular, this amendment specifies that "any form of fund-raising related to the issue of generally spendable means of payment (instruments with general purchasing power) is restricted to banks". Therefore, according to this principle only banks can issue multipurpose cards and electronic money that are included within the assets covered by deposit insurance (with the exception of bearer instruments).

At present there is no specific regulation governing e-money. The general provisions of the Civil Code and the Transparency Law cover the contractual aspects relating to the issuance, use and circulation

[29] The connection uses the SSL 3, 128 bit cryptographic system with Verisign certification.

of payment instruments, as well as the rights and obligations of cardholders, merchants, card issuers and acquirers.

The legal framework is expected to change following the implementation of the EU Directive on the taking up, pursuit of and prudential supervision of the business of electronic money institutions, in accordance with which the category of supervised institutions allowed to issue e-money will be widened.

Security issues. The assessment of the technical features and the functional aspects of e-money schemes lies within the scope of the Bank of Italy in its capacity as payment system overseer.

In this regard, the Bank of Italy assesses whether the technical features implemented in the scheme are able to prevent, detect and limit threats of fraud, forgery and money laundering (see "Payment system oversight issues" below). In addition, the Bank assesses whether the internal procedures of the issuer or of the outsourcing company committed to managing the operational functions are effective in controlling and managing operational risks.

The Bank of Italy is actively involved in the ongoing work at the Eurosystem level aimed at defining the security objectives of e-money.

Provider issues. As mentioned above, only banks can issue multipurpose prepaid cards (e-money) since they represent a form of fund-raising equivalent to bank deposits and savings as referred to in the Second EC Banking Coordination Directive. However, the management of the related circuit can be outsourced to non-financial providers.

Single-purpose prepaid cards may also be issued by entities other than credit institutions and financial intermediaries.

Payment system oversight issues. The issues relating to e-money are currently under study at the Bank of Italy as part of its activity as payment system overseer. The 1993 Banking Law formally assigned payment system oversight to the central bank. Specifically, under Article 146: "The Bank of Italy shall promote the regular operation of payment systems. For this purpose it may issue regulations to ensure the efficiency and reliability of clearing and payment systems". This formal recognition of responsibility has enhanced the effectiveness of central bank action vis-à-vis not only banks but all payment system participants.

In line with the Eurosystem oversight policy stance, the Bank of Italy activity concerning e-money is based on the 1998 ECB *Report on electronic money*. The general picture of the oversight requirements for new products is also outlined in the *White paper on payment system oversight* published in 1999 by the Bank of Italy.

In the first months of 2001, the Bank of Italy informed the market of the issues concerning multipurpose prepaid electronic payment instruments to be used over the internet, in order to make operators aware of possible problems arising from these innovative products. It also stressed the importance of establishing adequate forms of cooperation between the overseer and operators, following a proactive approach to innovation. To this end, operators were requested to report in advance the characteristics of the various projects to the Bank of Italy following a format prepared by the central bank itself developing the requirements set out in the 1998 ECB report. In particular, the overseer is interested in information concerning the integrity of the circuit, the efficiency of coordination mechanisms and technical security.[30] Moreover, it is concerned with the real observance of Recommendation 97/489/EC on the transparency of electronic payment instruments.

The main requirements for multipurpose prepaid electronic payment instruments are:

– sound and transparent legal arrangements: the rights and obligations of customers, merchants, issuers and operators must be clearly defined and disclosed;

[30] In accordance with the recent regulations governing electronic documents (Law no 59 of 15 March 1997, Presidential Decree no 445 of 28 December 2000), the Italian Authority for Information Technology in the Public Administration (AIPA) has laid down the technical, financial and capital requirements for those wishing to engage in digital signature certification activities. These requirements must be adopted by banks and other financial intermediaries to certify electronic documents through digital signature in e-money schemes as well.

– technical security: electronic money schemes must maintain adequate technical and organisational procedures. The issuer must explicitly formulate the security policies. The arrangements between the issuer and the outsourcing companies should enable the former to monitor and check operational risks;

– settlement procedures: the procedures used must be efficient, reliable and secure;

– redeemability: the issuer is obliged to redeem the residual values against legal tender at the request of the holder;

– protection against criminal abuse: electronic payment schemes should foresee measures to prevent criminal abuse.

Supervisory issues. The fact that only banks can issue multipurpose prepaid electronic payment instruments has facilitated the supervisory function performed by the central bank insofar as no specific requirements relating to the integrity of issuers had to be imposed. However, the growing use of these products - which might possibly augment risks for supervised intermediaries - is bound to increasingly demand the attention of supervisors.

Law enforcement issues. The Bank of Italy checks that the schemes do not include features that might make them attractive for money laundering purposes. The guidelines adopted by the Bank in performing payment system oversight - inter alia, the setting of a maximum amount to be loaded onto the card and the redeemability of the value loaded - currently reduce the risks related to money laundering activities. The stipulations of the White Paper have also been confirmed by the anti-money laundering instructions for the detection of suspicious transactions issued by the Bank of Italy in 2001.

Cross-border issues. At present no problems exist relating to cross-border or multicurrency schemes: Minipay and Omnipay are used only at merchants - currently only Italian - subscribing to the schemes; however, Omnipay is planning to extend its circuit to some European merchants. Moneta online is used over the internet at merchants subscribing to the Visa circuit in accordance with its rules.

However, the introduction of the euro and the creation of the "EU passport" under the Directive on the pursuit and the prudential supervision of the business of electronic money institutions will increase the relevance of cross-border issues.

JAMAICA

1. Card-based schemes

One commercial bank is giving consideration to introducing a card-based e-money scheme. This consideration is at a very preliminary stage and no precise details are available. No other commercial bank or licensed deposit-taking institution is either considering or pilot testing or has implemented card-based e-money schemes.

2. Network/software-based money

There are no reported cases of any network-based/software-based e-money schemes either under consideration, being pilot tested or implemented by deposit-taking institutions in Jamaica.

JAPAN

Various pilot e-money projects continue to be implemented in Japan. Practical use of e-money, however, is very limited and the volume and value of e-money transactions are negligible compared with those of other retail payment instruments. In addition, the establishment of legal and regulatory

frameworks for e-money and electronic payments has been halted since the publication in June 1998 of a report prepared by a study group under the aegis of the Ministry of Finance.

1. Card-based products

Large-scale experiments with card-based products have been implemented since 1998, and some of them have already finished. Visa Cash started its pilot in Shibuya, Tokyo in July 1998, issued 120,000 cards and finished in October 1999. It is now in commercial use on a smaller scale. Super Cash, which started in April 1999 in Shinjuku, Tokyo, and issued about 20,000 cards, finished in May 2000. Meanwhile, a project by the Postal Services Agency (former Ministry of Posts and Telecommunications) is still continuing. It began in the Omiya area of Saitama Prefecture in February 1998. It is a pilot test of an IC card that has e-money as one of its applications. About 66,000 cards have been issued.

As for newly introduced schemes, Mondex was launched in August 2000. A pilot using a contactless IC card called Edy also started in March 2001. It will be provided for commercial use in October 2001.

2. Network/software-based products

Several projects for network-based e-money were also introduced. Internet Cash, which started the initial pilot in September 1999 and issued about 2,000 cards, finished in February 2000. It allows the transfer of electronic value among users, and there is a multicurrency facility which enables users to exchange Japanese yen for US dollars and vice versa. Super Cash, which started in April 1999, is a hybrid form of e-money which can be used at virtual malls via the internet as well as at real malls. The virtual mall experiment finished in May 2001. Mondex launched network-based products in December 2000.

3. Policy responses

The institutional framework for electronic money and payment services in Japan has been under discussion since 1996 by the working groups established under the Financial System Research Council, an advisory board to the Minister of Finance. In May 1997, the Working Group on Electronic Money and Electronic Payment Systems published a report that identified and discussed a wide range of policy issues concerning e-money and electronic payments, including monetary policy implications and the role of a certification authority.

In October 1997, the Working Group on the Future Framework for Electronic Money and Electronic Payment Systems was set up to examine further details of possible institutional arrangements on the basis of the findings in the May 1997 report. In June 1998, the Group finalised and released a report that set out a number of recommendations on the institutional framework for the provision of electronic money and payment services, in particular with a view to:

(i) maintaining the confidence of users in transactions using electronic money and payment services (eg consumer protection issues);

(ii) ensuring the integrity of electronic money issuers.

As for other issues relating to electronic money, the Law on electronic signature was enacted in May 2000. The government started an official electronic authentication service for corporations in October 2000.

JORDAN

1. Card-based products

Phonecards are offered by two local companies, ALO and JPP. They have placed a number of public phones in major cities all over the country. These cards are issued in several denominations and are

disposable. ALO signed an agreement with the Municipality of Greater Amman (the capital) to use its cards to pay for streetside parking; a number of machines are in place in Amman and have been operating for several months. This could be considered as the first multifunction card experience in the country.

Cellular phone charge cards are issued by the two market leaders, MobileCom and Fastlink. These disposable cards are issued in contactless form and in several denominations to satisfy the individual consumers' needs.

Internet access cards are issued by internet service providers. They contain a user name and a password that can be used for a limited period of time (usually three months from first use) and a limited number of hours. They are contactless and disposable.

These e-money cards can be bought from any outlet: kiosks, supermarkets, groceries, book and stationery stores, in addition to specialised communications hardware stores.

2. Network/software-based products

A number of Jordanian banks have established a commercial venture called Visa Jordan Card Service, which operates a network and a switch for card-based retail payments. A number of ATMs and POS terminals are connected to this switch, enabling them to execute bilateral settlements. Other banks work separately.

Most banks offer credit cards and debit cards that can be used in cash dispenser ATMs. One bank operates an online direct debit connection for use with its own debit cards with a large chain store which has a number of outlets in major cities.

Some banks are offering internet shopping cards with limited values to reduce the risk exposure of the users of credit cards over the internet. These cards can be reloaded.

3. Policy responses

The new Banking Law which came into force in the second half of 2000 included an important article that recognises electronic tools, methods and records. This law provides the general background for electronic banking issues and allows for the establishment of an electronic payment system. Another specialised law, the Electronic Transactions Law, is already drafted and is due to be passed as soon as possible. It deals with the related issues in more depth, but also leaves room for the central bank to regulate the markets in detailed regulations which will be introduced at a later stage. However, the present situation is secure enough given the current degree of sophistication provided by the marketplace.

The Central Bank of Jordan carries the responsibility for supervision of the banking system in general. This role extends to all banking activity, including electronic transfers.

The Central Bank of Jordan formed the National Payments Council in February 1998. The Council consists of 10 members, the majority of whom are the general managers of commercial banks. The main responsibility of the Council is to draw up the general policy and design outlines of the national payment system.

KAZAKHSTAN

In the Republic of Kazakhstan, mainly cards with a magnetic stripe (Visa, Eurocard/MasterCard, American Express, etc) have been issued, the issuers being the commercial banks. The only chip-based project was launched as a pilot at the beginning of this year and uses Visa debit-credit technology. This project is local. There are 10,000 microprocessor cards in circulation and 31 POS terminals.

The question of establishing a national payment system based on usage of microprocessor cards is being considered. The tendering for the technology and suppliers of software for a national system is planned to take place this year.

KENYA

1. Card-based schemes

Major cards: credit cards, ATM cards (about 200 ATM machines), debit cards, smartcards.

Major firms involved: Barclays Bank, Standard Chartered Bank, Kenya Commercial Bank, National Bank of Kenya, Citibank NA, Cooperative Bank of Kenya.

Suppliers: Visa, MasterCard.

2. Networked/software-based schemes

We currently do not have these schemes.

3. Policy responses

The Central Bank of Kenya has no policy on e-money products. However, the East African National Payment System Harmonization Committee (EANPSHC), on which the bank is represented, has issued *Development of guidelines for licensing and regulating e-money schemes and products in East Africa*, a model policy paper on electronic money products and schemes. This paper is still under review and has yet to be adopted in Kenya.

Monetary policy and seigniorage. This item is under discussion by the EANPSHC, constituted by the East African central bank governors' Monetary Affairs Committee.

General legal issues. The government of Kenya is currently working on legislation concerning these products. However, they are covered under the existing Law of Contracts.

Relevant security issues. This item is under discussion by the EANPSHC.

Issuer details. This item is under discussion by the EANPSHC.

Payment system issues. We have no e-money schemes in Kenya.

Oversight issues. The model policy paper addresses this issue. The Bank Supervision Department together with the National Payment Office will be involved in this.

Supervisory issues. The model policy paper addresses this issue. The Bank Supervision Department together with the National Payment Office will be involved in this.

Law enforcement issues. The government of Kenya is currently working on legislation concerning these products that touches on money laundering.

Cross-border issues. This aspect is being addressed by the EANPSHC.

KOREA

1. Card-based products

K-Cash. Since early 1996, banks, telecommunications companies and credit card companies have been working to develop K-Cash. A pilot project for K-Cash, a pan-bank scheme, was launched in Yoksam-dong, in the southern part of Seoul in July 2000 and in Choonchun, a medium-sized

provincial city in September 2000. Suwon City plans to set up a retail payment system based on K-Cash in the course of 2001. Ten banks had issued about 4,300 cards, 350 merchant terminals had been installed, the volume of transactions was 56,000 and their value was USD 135,000 at the end of April 2001. As the pilot project has been successful in terms of safety tests, clearing procedures, etc, banks are planning nationwide operation of the scheme. The features of K-Cash are:

- security devices are installed for consumer protection and prevention of unauthorised use;
- maximum amount per card is KRW 200,000 (raised to KRW 500,000 from 1 July 2001);
- closed-loop type;
- outstanding balance is refundable;
- compliant with transportation card system;
- contact and contactless features.

Mondex/MYBI. Mondex cards are provided by Mondex Korea, established in January 1998 as a subsidiary of MasterCard Corp. The pilot project was launched in June 2000 at COEX (Convention and Exhibition Center), Samsung-dong, Seoul. Transferability is possible within families. About 3,000 cards had been issued at the end of April 2001.

MYBI card, developed by Pusan Bank, is a closed-loop type. It has contact and contactless features. The pilot project was launched in Pusan in September 2000 and its use is being expanded to include transportation applications.

2. Network/software-based products

K-Cash. It is planned to allow the utilisation of K-Cash via network (internet) in 2001 using a special device such as a card reader.

Mondex/MYBI. Mondex and MYBI cards are to be equipped with network-based functions in 2001.

3. Policy responses

Monetary policy and seigniorage. At present, e-money balances are not included in monetary statistics because the amount is negligible. However, when e-money comes into nationwide use or the amount issued increases significantly, The Bank of Korea (BOK) thinks it will be necessary to include it. It is not thought that e-money will have any considerable impact on seigniorage, because its use is not expected to increase significantly in the near future.

General legal issues. The regulatory provisions governing prepaid cards including e-money are set out in the Act on Financial Companies Specializing in Loan Business (which represents a revision of the former Credit Card Business Act, and was passed into law in January 1998). The provisions include the obligation to set aside 10% of the amount of e-money issuance for collateral and repayment procedures, etc. Because its provisions were originally established to regulate the disposable M/S type prepaid cards in January 1994, they are not adequate to regulate e-money. The BOK, therefore, is considering the preparation of new draft legislation.

Relevant security issues. The e-money scheme incorporates some features for security enhancement such as ruling out card-to-card transactions, authenticating transactions at each stage, setting a ceiling on the value loaded, managing keys, etc. The government intends to develop and provide encryption systems for the e-money scheme.

Provider issues. Only banks and credit card companies are at present authorised to issue e-money (and credit card companies will be able to clear their e-money only through bank accounts).

Payment system issues. The BOK is actively participating in the process of determining features of the e-money scheme in line with its policy considerations as a member of the committee that coordinates banks' projects related to payment and information systems. The Korea Financial Telecommunications and Clearings Institute (KFTC) is in charge of the technical development, operation and clearing of pan-bank e-money funds, and final interbank settlement of e-money is carried out across their accounts with the central bank.

Supervisory issues. There have as yet been no officially announced initiatives related to the development of e-money. However, The BOK believes there is a need to develop ways to examine the financial situation of the credit card companies that issue and operate e-money.

Law enforcement issues. Korean e-money products seem to have little attraction for money laundering because of various features such as the prohibition of card-to-card transactions and the ceiling on the value loaded. No official action has so far been taken by the government on this matter. The BOK, however, is trying to minimise possible risks through the formulation of detailed procedures for system operation and issuance.

Cross-border issues. It is not expected that customers will be inclined to use domestic currency-based e-money overseas or to use foreign currency-based e-money in Korea because the infrastructures are different and incompatible at the moment.

Standardisation issues. Because e-money standards have been set out and apply to all the banks and credit card companies, a system using these standards will operate nationwide.

Other issues. There have been no specific measures taken by the government on issues and questions related to taxation, consumer protection, the implementation of operational and technical standards, access and competition, etc.

KYRGYZ REPUBLIC

Electronic money schemes are not very advanced in the Kyrgyz Republic. Only one bank is using network-based/software-based schemes (Bank ++) for transactions between foreign clients. Some people use the internet for individual transactions.

In accordance with international standards adopted for plastic card systems, the National Bank of the Kyrgyz Republic developed and ratified the Act governing bank payment cards of the Kyrgyz Republic in February 2001.

Plastic cards are used by nine (out of 22) commercial banks which have signed an agreement with CIS banks which are associate members of international systems such as Visa International, Europay International, MasterCard International and Diners Club. Two banks as agents issue cards under Visa and MasterCard. About 104 Visa cards and 10 MasterCards were issued in 2000 (5% of the total issued).

Since 1998, the JSOT “settlement-saving company” has been issuing Alai-Card, a smart debit card for accounts in national currency. The project is operated within the Russian payment system Zolotaja Korona. The processing centre is in Novosibirsk, Russia. The main goal is to disburse salaries to employees of corporate customers and to collect bills. Moreover, Alai-Card is oriented towards private individuals who perform a large number of small purchases and sales on a daily basis. Alai-Card has an extensive network of commercial terminals and cash machines (approximately 45). There is one ATM in the Kyrgyz Republic. Alai-Card terminals are installed in Bishkek and in all the country’s regional centres. In 2000, 2,045 Alai-Cards were issued (91.4% of the total issued).

LATVIA

1. Introduction

At present there are no e-money schemes in Latvia, either card- or network-based. However, banks and payment card service centres are actively preparing for the transition to chipcards, which would be a strong foundation for development in this area.

Netcard, a company specialised in the electronic card business in Latvia, has expressed an interest in issuing e-money in Latvia. In collaboration with the Bank of Latvia and commercial banks, Netcard is

currently discussing several possibilities which could be successfully developed in the future. Netcard uses Proton technologies and systems in its projects and existing products.

2. Policy responses

One of the key objectives of the Bank of Latvia is to promote the smooth functioning of the payment system in Latvia. The Bank primarily focuses on large-value funds transfer systems, whose safe and efficient operation is the basis for the efficiency of the financial system in general.

Nevertheless, oversight of the whole payment system, including payment instruments, is essential to the elimination of the risks inherent in the system and to promoting public confidence in electronic payment instruments and the financial system as a whole. E-money is one such instrument which the Bank of Latvia will oversee as it develops in Latvia. The Bank will assess risks which could appear in the payment system arising from such an instrument. The Bank of Latvia complies fully with ECBS standards and it is happy to cooperate in evaluating compliance with these requirements and defining necessary improvements in this area.

Like the European System of Central Banks, the Bank of Latvia pays attention to e-money for several reasons. Inadequate oversight of the issuance of e-money could damage not only the stability of a particular e-money scheme, but also public confidence in such instruments. The Bank must also ensure that price stability and the function of money as a unit of account not endangered. Expanded use of e-money could also have implications for the monetary policy of the central bank.

The Bank of Latvia has developed a Regulation for Compiling Credit Institution Payment Statistics. The Regulation contains (among others) the requirement to report data on e-money payments by chipcards and digital cash. By monitoring these positions the Bank of Latvia can trace the appearance of e-money in the Latvian economy.

In the near future, the development of e-money will not significantly reduce the value of notes and coins in circulation or affect the size of the central bank balance sheet considerably. The given conclusions are based on indicators (see Annex) which are calculated according to the methodology given in the Report on implications for central banks of the development of electronic money, published by the BIS in October 1996.

The Bank of Latvia maintains the position of observer in the field of e-money issuance. The central bank suggests that issuance of e-money should fall to the private banking sector, whereby the banks should take responsibility for e-money issued and guarantee its full redemption.

Legal issues. The position of the Bank of Latvia is that all parties involved in issuing and servicing of e-money must comply with at least the minimum requirements established for the ECBS and stated in the *Report on electronic money* by the ECB and the EC Directives and Recommendations.

To ensure that national legislation is fully compliant with these requirements, the Bank of Latvia has drafted amendments to the Law on Credit Institutions authorising only credit institutions to issue and service non-cash payment instruments. This requirement also applies to e-money schemes. In the near future, the Bank of Latvia plans to issue recommendations for banks concerning transactions using electronic payment instruments.

LEBANON

No multipurpose prepaid cards exist in Lebanon. Some single- or limited-purpose prepaid cards are in use, including a number of specific cards used at petrol stations in addition to smartcards for mobile telephones.

LIBYA

The exercise of introducing e-money products in Libya has yet to be initiated by the Central Bank of Libya.

LITHUANIA

1. Card-based schemes

Currently, there is one card-based electronic money scheme in Lithuania, called eLitoCard. The issuer, operator and supporter of the eLitoCard scheme is Snoras Bank. Six card-based products - eLitoCard, eLitoCard LAS, eLitoCard Tangomanija, eLitoCard Amber, eLitoCard LSP and ImparCard+EC/MC - have been issued under the eLitoCard scheme. eLitoCard is a smartcard-based product. ImparCard+EC/MC is a hybrid product (both magnetic stripe and microprocessor are present) and is used additionally for servicing in the Europay/MasterCard International payment system. eLitoCard LSP is a hybrid product issued in cooperation with the Lithuanian Student Association and is additionally used as a student ID card. eLitoCard Amber is a multifunctional microprocessor card with the Multos 4.0 operating system.

The eLitoCard (formerly ImparCard) project was launched in May 1996. Snoras Bank has been issuing ImparCard since 1996, eLitoCard and ImparCard+EC/MC since 1999 and eLitoCard LSP since 2000.

At the end of April 2001, 1,150 POS terminals, 500 PC-based terminals and 205 ATMs were active nationwide. The number of e-cards in circulation as of 1 May 2001 amounted to 105,000 (almost 20% of all payment cards issued in Lithuania). It is planned to issue 130,000 cards by the end of this year.

eLitoCard is a reloadable, preauthorised electronic purse scheme allowing the use of two different currencies and loyalty points as a third currency. The card is loaded from the cardholder's accounts by means of online authorisation using the PIN code. There is no restriction (except microprocessor capacity) on the maximum loading amount. The cardholder has the possibility to review the last three loads and last 10 payments for every currency. Payment takes place offline with the use of the PIN. The value of the transaction is transferred from the card to the merchant payment device. All security keys are saved on the merchant's card, which is also used to encrypt transactions and identify the merchant's POS. The merchant's card is a microprocessor card with MULTOS 4.0.

Snoras Bank has planned to develop its system by implementing the multifunctional card with the MULTOS 4.0 operating system. At present four applications have been developed:

- EuroCard/MasterCard M/Chip;
- Smart Visa;
- ID card for the Lithuanian Student Association;
- Multicurrency e-purse.

2. Network/software-based products

Currently there are no network-based/software-based schemes being developed in Lithuania.

3. Policy responses

According to the Law of the Republic of Lithuania on Payments, only banks and other credit institutions may issue multipurpose prepaid card products. The Bank of Lithuania is the supervisory authority for banks and other credit institutions.

The Bank of Lithuania monitors the development of e-money products in Lithuania. In accordance with the resolution of the Board of the Bank of Lithuania, banks periodically provide the Bank of Lithuania with statistical data about payment instruments including inter alia, information on e-money circulation.

The Commission of the European Communities Recommendation of 30 July 1997 concerning transactions by electronic payment instrument, and in particular the relationship between issuer and holder, is under consideration by the Government of the Republic of Lithuania.

MACEDONIA

There are no e-money schemes or e-money developments in the Republic of Macedonia.

MALAYSIA

1. Card-based products

The e-money scheme MEPS Cash was launched on a commercial pilot basis in September 1999 in Bangsar, a suburb of Kuala Lumpur. It uses Proton technology and does not allow card-to-card transfers. The maximum amount that may be loaded is MYR 500. Cards can be used for retail purchases of goods and services and are reloadable over the counter at participating bank branches or through unattended loading devices. The MEPS Cash card is currently available as a standalone card in two forms, reloadable and disposable. The scheme is operated by the Malaysian Electronic Payment System (1997) Sdn Bhd (MEPS), with the current participation of six banking institutions.

MEPS and the participating banking institutions are presently taking steps to extend the implementation of MEPS Cash beyond the commercial pilot area. Wider acceptance of MEPS Cash is also being explored to include other sectors such as transportation (for payment of tolls and bus, train and LRT fares) and telecommunications (for use in public telephones). Utility companies and parking operators in the Klang Valley have also shown support for MEPS Cash.

Malaysia was the first country to launch a national smart multi-application identity card. The Government Multipurpose Card (GMPC) is part of Malaysia's Multipurpose Card Project and is one of the seven flagship applications for the development of the Multimedia Super Corridor (MSC). The soft launch of the GMPC took place on 12 April 2001 in the MSC and Klang Valley. In addition to the basic government applications, that is the national ID, driving licence, medical and immigration details, the GMPC will also maintain the PKI and MEPS Cash as an optional application. The Payment Multipurpose Card (PMPC), on the other hand, will contain E-POS, ATM and MEPS Cash, including the "Touch 'n Go" application, which is a contactless facility for payment of tolls on the highways. The PMPC will be launched on a staggered basis commencing in November 2001.

Meanwhile, closed communities such as University Putra Malaysia and Multimedia University have also commenced using the smartcard as a student card for accessing the campus facilities and making payments.

2. Network/software-based products

No specific developments at the moment.

3. Policy responses

***Monetary policy and seigniorage*.** At present, the development of electronic money is not expected to have significant implications for monetary policy implementation. Statistics on the e-cash scheme

are collected and aggregated on a monthly basis and the developments are closely monitored by the Central Bank of Malaysia. The Bank has no plans to issue electronic money at present.

Legal issues. The legal framework for regulating the issue of card-based e-money or multipurpose stored value cards is contained in the Banking and Financial Institutions Act 1989. Section 119 of the Act requires the prior approval of the Central Bank of Malaysia to operate any electronic funds transfer system, which includes the issuance of prepaid cards and stored value cards. Therefore, no specific laws or regulations have been adopted to deal with e-money as it is considered that the existing legal framework is adequate for this purpose.

Security issues. The issuer has to ensure that the e-money scheme has adequate safeguards against fraud, forgery and money laundering, adequate controls to manage the operational risks, and appropriate contingency plans in the event of a major system breakdown or compromise of the scheme.

Provider issues. Currently, there is no prohibition on the issue of electronic money by non-financial institutions. The issuers of single-purpose prepaid cards (where the issuer and the supplier of goods or services are identical) are not subject to banking supervision.

Payment system issues. As the Central Bank of Malaysia is involved in the implementation of the e-cash scheme and the PMPC, any payment system issues arising can be taken into account and resolved among the parties involved. There have been no known serious problems concerning clearing and settlement arrangements for the e-money scheme.

Supervisory issues. The policy responses with respect to e-money developments are stated in the paragraphs under legal issues and provider issues.

Law enforcement and cross-border issues. As the amount which can be loaded onto prepaid cards is limited and such cards are used mainly for small-value transactions, there is little incentive for them to be used as a medium for money laundering. At present, no problems exist relating to cross-border or multicurrency schemes as the scheme only allows for a single denomination (Malaysian ringgit) and has no cross-border features.

MALTA

1. Card-based products

There are no card-based schemes in operation, being piloted or implemented.

2. Network/software-based products

There are no network-based schemes in operation, being piloted or implemented.

3. Policy responses

Monetary policy and seigniorage. There is no value for e-money for the time being, since no card- or software-based systems exists; hence, e-money is not currently affecting monetary policy. We think that in the short to medium term e-money systems will not impact money in circulation significantly and will thus have a negligible effect on the central bank's balance sheet and seigniorage.

General legal issues. At the moment the Central Bank of Malta is in the process of updating the Banking Act 1994, which is the main legislation regulating the credit institutions in Malta. The Banking Act will be updated to include the definition of e-money institution as indicated in the related EU Directive. Furthermore, the main technical requirements of the EU Directive will be inserted into a banking directive which has the strength of secondary legislation.

The legislator is updating the Central Bank of Malta Act 1967 with regard to regulation and operation of payment systems. The proposals appoint the Central Bank of Malta as the sole regulator of payment systems, and enable the Bank to operate such systems.

Relevant security issues. Any banking institution operating on the island must be licensed by the competent authority under the terms of the Banking Act 1994. The competent authority does not go into the details of the security aspects of the product; however, it has issued best practice guidelines established in Banking Notice 3 on Internal Controls. Banks are expected to follow such guidelines as applicable.

Issuer details. At present no e-money products exist. However, issuers will probably need to be established through a licence under the Banking Act 1994, which is due to be updated to include the requirements of the relative EU Directive on e-money institutions.

Payment system issues. Since we have no e-money systems in place we are not facing any practical clearing issues.

Oversight issues. As indicated under general legal issues, an e-money institution would be regulated under the Banking Act 1994. Such institutions would therefore be subject to oversight activities by the Central Bank of Malta as the competent authority under the same Act. Furthermore, the institution would be subject to oversight activities by the Central Bank of Malta as the payment system overseer.

Supervisory issues. The supervisory issues which are being addressed are those established in the EU e-money Directive, as has been stated above, and all the other prudential provisions established in the EU Codified Directive (2000/12/EC) as applicable and as reflected in the local Banking Directives.

Law enforcement issues. Credit institutions operating in Malta are considered as subject persons under the terms of the Prevention of Money Laundering Regulations 1994. As such, they would therefore have to abide by the Prevention of Money Laundering Act 1994, the above-mentioned Regulations and the relevant guidelines. The same would apply to e-money and e-banking institutions.

Cross-border issues. As already mentioned, the Banking Act 1994 will be amended to reflect the requirements of the EU e-money Directive. As such, any cross-border issues will be dealt with in the light of the above legislation and would also apply to e-money and e-banking institutions.

MAURITIUS

E-money has so far not been introduced by domestic banks in Mauritius.

The Electronic Transaction Act 2000 was passed in the National Assembly and received the assent of the President on 1 August 2000. The Act provides for an appropriate legal framework to facilitate electronic transactions and communications by regulating electronic records and electronic signatures and the security thereof.

MEXICO

1. Card-based products

There are three e-money pilot programmes in Mexico. One of them, Visa Cash, uses technology provided by Visa and is promoted by Banco Santander Mexicano and Banorte. Inbursa, a Mexican bank with a Proton licence, promotes Monedero Electrónico Inbursa. Both of these pilots started in the second quarter of 1998. The third pilot project is promoted by a large bank, Banamex, which holds a Mondex licence with two other banks, BBVA-Bancomer and Bital. This pilot started in the first quarter of 2001.

The Visa Cash and Proton pilots use single-currency rechargeable stored value cards. The Visa Cash project has issued 30,000 cards and has 20 participating merchants. It has issued e-money with a value of around USD 6,200.[31]

Banco Inbursa has issued 5,000 cards, modified 105,000 public phones in order to make transactions through them with Monedero Electrónico Inbursa, and is working with a group of retailers, petrol stations and transportation service providers to introduce Monedero Electrónico Inbursa. The value of e-money issued in the pilot so far is around USD 130,000. Visa Cash member banks charge the merchants 2-4% on purchases, while Monedero Electrónico Inbursa has not started charging fees.

Banamex, Bancomer and Bital, the three largest credit card issuers in Mexico and three of the major commercial banks in Mexico, are joining forces to promote a new national smartcard infrastructure incorporating Mondex electronic cash. On 26 March 2001, Banamex launched a pilot programme with 13,000 cards and seven participating merchants; so far, the e-money issued is around USD 20,000. Banamex charges no fees for cardholder transactions. However, there is a fee of approximately 1.5-2% charged to merchants.

2. Network/software-based products

No developments so far.

3. Policy responses

Monetary policy and seignoriage. A Bank of Mexico e-money task force concluded in 1998 that e-money will not have a significant impact on the central bank's monetary policy implementation and seignoriage in the near future. The task force views direct taxation as a source of revenue that is better than seignoriage and does not recommend that the central bank issue e-money.

General legal issues. There is no specific legal framework for e-money at present.

Relevant security issues. The Bank of Mexico has formed a task force specialised in security issues which is reviewing the security schemes under consideration.

Provider issues and supervisory issues. Current relevant Mexican law stipulates that only banks can take deposits from the public. Thus, only banks are allowed to issue e-money linked with deposit-taking from the public. No specific supervisory policy responses have been made at present.

Payment system issues. The three schemes under consideration plan to use the existing clearing and settlement arrangement and thus are expected to cause no specific issues in this area.

Law enforcement issues. The National Banking and Securities Commission has established policies for detecting and preventing money laundering in the financial system that could be adapted for e-money products.

Other issues. There is no tax initiative on e-money products. There have been no central bank attempts to standardise e-money products.

MOLDOVA

1. Card-based products

The multipurpose prepaid card scheme "MoldCardSystem" has been operating in Moldova since 1998. At the moment the scheme covers four commercial banks, among which three act as card issuers and acquirers and one as acquirer. The cards used in the scheme are Schlumberger contact chipcards, such as MicroPayflex, Payflex and MicroSAMflex. A client's card contains three electronic purses. Two

[31] Only 1-2% of the issued cards have been charged by customers.

of these are used for payment of goods and services at trade and service establishments and receiving banking services in participating banks, including cash money withdrawals. The third is designed for retailers' applications. One purse widely used by one of the issuing banks is designated for use in filling stations situated around the country. For the time being, loading of prepaid value onto a card is executed exclusively at electronic terminals of the issuing banks. Distributed processing is used within the framework of the scheme; settlement between acquirer and issuer is executed on a bilateral basis.

2. Network/software-based products

There are no significant developments at the moment.

3. Policy responses

In 1997, the National Bank of Moldova issued Regulations on organisation of payments by cards by the commercial banks in the Republic of Moldova. Under the Regulations, no special authorisation from the National Bank of Moldova is needed for commercial banks to issue payment cards. However, the Regulations stipulate the rights and obligations concerning cardholder and card issuer.

NETHERLANDS

In the Netherlands electronic money is generally defined as a prepaid, general, multipurpose means of payment. All e-money schemes in the Netherlands are card-based.

1. Card-based products

Two competing systems of chipcards have been in existence since 1997. The banks introduced the Chipknip in 1996, a multipurpose prepaid card with the same functionality as the Belgian Proton card. Parallel to this, the chipcard system Chipper was introduced a few months later in 1997 by the ING daughter Postbank in conjunction with the national telecom company.

Although there are several differences in the actual characteristics and implementations of Chipper and Chipknip, as well as in their market introduction strategies, the schemes technically work in a similar way. The chipcard purse has to be loaded at a terminal with a minimum amount of NLG 25 (EUR 11.34). The balance on the card generally cannot exceed NLG 500 (EUR 226.89), although some banks have set this ceiling at NLG 1,000 (approximately EUR 454).

When paying, the cardholder does not have to enter the PIN code. Retailers have to unload their terminals at least once every two weeks. This is done by transmitting the information by telephone to Interpay (for the Chipknip scheme) or Chipper Services BV. Neither of the schemes allows card-to-card transfers.

In order to be able to accept either Chipper or Chipknip, retailers had to have a security access module (one for each) in their terminal. Of course, this was a costly and relatively inefficient situation. Integration of the two systems was therefore desirable for all market parties. The banks met this demand and the objective of interoperability of the two schemes was expressed in an agreement in 1999. The banks reached an agreement on the integration of the technical infrastructure of the two electronic purse systems in March 2001, as a consequence of which the Chipper scheme will be discontinued in early 2002. In the meantime, in October 1999, a Memorandum of Understanding was agreed by the two schemes to stimulate and promote introduction of chipcard-capable machines by their members. In combination with these measures, it has been announced that a fixed fee for joining the two schemes will not be charged during a certain period, and that after that period only one fee will be charged.

Currently, the number of Chipknip loading terminals is approximately 7,000, while Chippers can be loaded at approximately 20,000 public phones. Another possibility is constituted by portable loading

devices that can be connected to the telephone and used at home. The number of terminals accepting payment is approximately 163,000. The number of customers in possession of a Chipknip card is about 14,500,000. There are 7,000,000 chipper cards in circulation.

Use of the chipcards remains low, but is gradually expanding. There are no exact data available on the value of transactions and frequency of use of the electronic purse systems. A rough estimate of the annual value of transactions is approximately EUR 14 million. The growth of the use of Chipper and Chipknip is concentrated in the areas of parking, vending and restaurant/canteen services. Parking meters, especially, have been the focus of joint attention since June 1998. Expected future applications of the chipcard will include identification and security enhancement of internet communication and electronic signatures.

2. Network/software-based products

No network-based e-money exists in the Netherlands at the moment. The PayPal system is available in the Netherlands and may play a role in e-money developments in the network sphere. However, it has not yet been implemented on an important scale. Banks now offer different services that facilitate payment via the internet; generally, these are methods of payment that are linked to a bank account. The most common forms of payment over the internet remain credit card, direct debit and paper-based transfer.

3. Policy responses

Monetary policy and seignorage. The Netherlands Bank has changed the reporting requirements of credit institutions in order to obtain information about e-money in circulation. As to reserve requirements, the e-money float funds are being treated as current account funds. The Bank has investigated the declining income and the more difficult implementation of monetary policy likely to result from the further development of e-money, and has concluded that it will be able to cope with even an extreme use of e-money. The Bank is not considering issuing e-money itself.

General legal issues. The terms and conditions for using prepaid chipcards are governed by contract law and current legislation on financial products (in the area of money laundering). No specific laws are envisaged. As to deposit insurance rules, it has been decided to exempt claims on electronic money from the current rules, given the fact that a special purpose insurance scheme is already part of the chipcard schemes.

Security issues. The criteria that the central bank uses for evaluation of security are part of the supervisory framework (see supervisory issues). It has proved to be important to require credit institutions to formulate a sound security policy for the product as well as to arrange for an external independent evaluation of the security of the product through a system-wide risk analysis. This evaluation should establish whether and how the security policy goals are being achieved.

In future, chipcards will probably gain more widespread acceptance as they become multifunctional (functions such as identification and storing information). These non-bank functions should not influence purse functionality. Therefore the architecture of the chip, the design of the applications on the chip, the organisational responsibilities between the different parties and the security policy/security risk analysis have to be adapted to reflect this evaluation criterion. Although the Bank acknowledges that multifunctionality may make electronic purses more acceptable to the public, decreasing security might undermine growth. The Bank does not enter negotiations between market parties.

Provider issues. Implementation of the e-money directive in Dutch law is due by April 2002. The provisions in law on who is allowed to issue e-money will be incorporated in the current banking supervision law (see supervisory issues).

Payment system issues. The Netherlands Bank oversees these activities mainly because of its task of promoting the smooth operation of the payment system.

Supervisory issues. Reflecting the fact that supervision and oversight of e-purse schemes pose new challenges, the central bank has developed a framework in order to assess the functioning, reliability and security of purse schemes. At the Netherlands Bank both the Payment Directorate (Payment Systems Policy Department, section Oversight) and the Supervisory Directorate are involved. New payment products and major changes in existing products are assessed by the overseers prior to

market introduction in order to establish the consequences for the payment system in general. The supervisors assess these products in order to establish the consequences for the individual credit institution. Both the overseers and supervisors cover to a large extent the same aspects (albeit from a different perspective): organisational, legal, administrative, technical and security aspects of the product as well as of the scheme operator. In order to prevent double work and to prevent a divergence in requirements and assessments, the overseers and supervisors cooperate closely.

Following the EU Directive on e-money, in the Netherlands the choice was made to extend the current banking supervision law to include e-money issuers. The motive underlying this choice was that, in principle, it should be possible for non-banks to issue electronic money instruments. According to the e-money Directive, issuing e-money does not necessarily involve taking deposits from the public, for which activity a bank licence is required and the bank supervision law applies. In order to ensure that e-money issuers are subject to supervision, the applicability of the supervision law has been extended to include e-money schemes as a separate category next to banks. Under the revised law, non-bank e-money issuers are subject to a dedicated form of supervision as well. Only small-scale schemes may be exempt from this law. These exemptions will not be general, but will be awarded case by case after careful analysis.

Law enforcement. With respect to money laundering activities, e-schemes are being monitored just like transfers with other payment instruments. However, the limited value that can be stored on electronic purses does not seem to make them a likely vehicle for money laundering.

Cross-border issues. Although market developments may give rise to an increase in cross-border activity, cross-border retail payments still remain a small percentage (less than 0.5%) of all retail payments in the Netherlands. Electronic purses can only be used nationally. As to the possibility of foreign entrants issuing e-money in the Netherlands, this appears to be unlikely, due to the current market coverage of e-money schemes. However, if this were to occur, the banking supervision act would apply. In this respect it should be noted that the Bank has formulated policy rules with respect to the internet, as a result of which any organisation that specifically aims at attracting deposits by means of the internet will fall under the scope of the current Dutch banking supervision law. In this rule it is not the geographical location of the bank or the server which is essential, but the fact that the activity is aimed at Dutch consumers.

NICARAGUA

1. Card-based products

There are no significant developments with respect to e-money in Nicaragua today. There are prepaid disposable phonecards used for public phones and prepaid cellular phonecards introduced by the cellular network provider in July 1999 for use on their networks. They have an estimated 100,000 clients and sell phonecards in denominations of USD 10, 12, 20 and USD 40. The majority of banks offer debit cards to their clients.

2. Network/software-based products

No developments at the present time.

3. Policy responses

No policy approach to e-money has been formulated as there are presently no significant developments.

NIGERIA

1. Card-based products

There are two types of card-based e-money schemes in Nigeria, ie multipurpose and single-purpose stored value cards.

Single-purpose stored value cards. In respect of these cards, the same party is both the service provider and the issuer. Nigerian Telecommunications Limited and other telephone service providers have for some years now been issuing this type of prepaid card, which is exclusively used for making telephone calls.

Multipurpose stored value cards. A number of such schemes exist and the cards are used in making payments for goods and services in any retail outlet that accepts them.

(a) ***Valucard.*** This is a smartcard or electronic payment scheme that was introduced (with the approval of the central bank) by a special purpose vehicle, Smartcard Nigeria plc (now called Valucard Nigeria plc), which was incorporated by a consortium of commercial and merchant banks. The trial run of the scheme commenced in selected Nigerian cities in April 1999. The full and final implementation of the scheme has now commenced and the cards are currently accepted by 1,950 retail outlets in 17 major cities in the country. About 72,306 cards have been issued since its launch. Smartcard Nigeria plc, which acts as the clearing and settlement institution, also coordinates the hardware and software supply, while the software was supplied by Card Services International, Dublin. The participating banks serve as card issuers. The cards, which are reloadable, are PIN-protected, while cardholders are required to maintain an account with the issuing bank.

(b) ***Smartpay.*** This is also a multipurpose smartcard or electronic payment scheme that was introduced in November 1999 by Gemcard Nigeria Ltd (now called Smartpay Nigeria Ltd) in conjunction with a consortium of some Nigerian commercial and merchant banks. The company serves as the clearing and settlement institution and coordinates the hardware and software supply while the participating banks serve as card issuers. The hardware was supplied by Giesecke and Devrient (G&D) of Germany, while the software (Starcoin) was supplied by Retriever Payment Systems, New York. Cardholders are required to maintain an account with the issuing bank.

The cards, which are reloadable and PIN-protected, can be used for loading of funds or withdrawal of such funds in any of the participating banks, payment for goods and services and participation in loyalty schemes.

About 31,345 cards have been issued to date and are accepted by 491 retail outlets spread over some 18 cities in Nigeria.

(c) ***Esca.*** This is another reloadable electronic purse, which is operated by a commercial bank named Allstates Trust Bank Ltd. The bank, which is the issuer, also serves as the clearing institution for Esca. Merchant terminals and bank teller machines were supplied by Verifone, the cards by Gemplus and the computers by Compaq.

The security features of Esca include the encryption of transcriptions and processes using triple-DES algorithms and RSA keys.

For purposes of year 2000 compliance, the bank moved to a CardBASE 2000 platform from CSI/IBM in 1999. This software supports multifunctional applications.

To date, over 5,818 Esca cards have been issued, while merchant terminals total over 58.

2. Network/software-based products

There are currently no developments with regard to network/software-based e-money products via the internet.

3. Policy responses

A joint monitoring committee, comprising staff of the Central Bank of Nigeria (CBN) and representatives from Valucard Nigeria plc and Smartpay Nigeria Ltd, has been constituted to monitor developments in the Valucard and Smartpay projects.

Monetary policy and seigniorage. With regard to its monitoring process, the CBN is considering ways of requiring banks which are issuers of electronic money to include it in the monthly statistics reported by banks in order to obtain information about the amount of e-money in circulation. Due to the present level of development, electronic money in the country is not expected to have strong implications for monetary policy implementation as the amounts are still low. The CBN for now does not envisage issuing e-money itself.

General legal issues. There is currently no legislation specifically adapted to dealing with electronic money, but such schemes are being accommodated within the existing legal framework.

Supervisory issues. In Nigeria, the issuance of multipurpose stored value cards (for electronic money) is restricted to licensed banks who require prior approval of the CBN before issuing e-money. Single-purpose cards where the goods and services are provided only by the issuer of the card, such as telephone cards, do not require approval of the CBN and the issuers are not subject to its supervision.

Security issues. All e-money issuers must ensure adequate safeguards against counterfeiting, tampering or fraudulent use and money laundering activities, and the products must have a satisfactory audit trail of all transactions as well as adequate provision for recovery in case of loss.

Law enforcement issues. Issuers must ensure adequate controls to guard against money laundering, such as a complete audit trail and the linking of a card to a specific card (float) account (containing full particulars of the cardholder) for the purpose of loading and offloading money from the cards.

Payment system issues. The CBN is currently not aware of any particular problems arising from clearing and settlement of transactions with e-money.

Cross-border issues. The existing Valucard and Smartpay schemes have no cross-border features since they function only in Nigeria and allow the use of only one currency, which is the Nigerian naira.

Other issues. None reported.

NORWAY

1. Card-based products

No nationwide prepaid card system has been rolled out in Norway yet. A modified Visa Cash system was piloted in February 1997. A local bank issued 8,500 cards and processed 16,700 transactions with an average value of around USD 10 (which was higher than expected, ie not only small-value transactions). There are no immediate plans to continue this project.

The ErgoGroup (an IT subsidiary of the Norwegian state postal organisation) purchased the franchise rights for Mondex electronic cash in Norway in 1998 and is currently considering introducing the system. Small pilots were conducted with Mondex cards at conferences in 1999. Norsk Tipping, the Norwegian state lottery, piloted Mondex lottery cards in the last two quarters of 2000 with a view to providing all of Norway's 1.8 million players with cards. The University of Oslo participated in a pilot in 2000 to test a multi-application card that offers Mondex, electronic ID and access to premises. A pilot with Mondex and Norwegian Navy recruits was conducted at a navy facility in autumn 2000. All these pilots have been terminated, although the projects were considered to be successful.

In September 1999 several of the larger Norwegian banks and a cable television company announced a joint venture to examine the possibility of introducing smartcard solutions in Norway. BBS, a bank-owned automated clearing house, is responsible for the coordination and the operational aspects of the smartcard project. An electronic purse pilot, based on smartcards for pay-per-view TV, is planned for June 2001. The Banks' Central Clearing House has come to an agreement with Proton World that facilitates the use of Proton technology. The purse is designed as an open system, and is supposed to

be used for other services and in other places. Before this can happen, new participants will have to adopt the system, and the enlargement of the project depends on the success of the pilot.

2. Network/software-based products

Der norske Bank has been running a pilot project on e-money from DigiCash. The project has been finished and there are no plans for wider distribution.

No network/software-based electronic money schemes are operating in Norway as at May 2001.

3. Policy responses

Statistical information. The Central Bank of Norway would regard electronic money issued by banks as "money". As a consequence, it is considering ways of including e-money in the regular monetary statistics reported by banks. E-money issued by non-banks would not be included in the monetary statistics (by convention), although such issuing could temporarily boost the velocity of money supply.

Impact on notes and coins. As the development of e-money is still at a very early stage in Norway, no major impact is expected on notes and coins. However, the central bank does not rule out the possibility that the spread of e-money products may become more extensive in the long run. Thus, a wider study of the use of notes and coins (including the development of alternative means of payments, such as e-money) has been initiated.

Monetary policy and seigniorage. The central bank does not expect a major impact on its seigniorage. The share of notes and coins as a percentage of its balance sheet is low (16%) and note and coin circulation would have to fall substantially (by more than 75%) to represent a threat to the Bank's income position.

As regards monetary policy operating procedures, no consideration has been given to this aspect yet. However, a large shift from currency into e-money would not be considered to represent too much of a problem, given current operating procedures. Any excess cash balances with the banks resulting from the public's shift out of cash would be neutralised with fixed rate deposits (F-deposits) with the central bank. Thus, the central bank's balance sheet would not be reduced, but its seigniorage income would be reduced (as banks would earn the seigniorage that is currently possessed by the central bank).[32]

Issue of e-money. The Bank currently has no intention of issuing e-money.

Legal provisions. The Payment Systems Law 2000 does not regulate e-money systems. However, the Banking Law Commission (BLC) has submitted a draft act regarding financial institutions that included proposals concerning the issuance of e-money. According to this draft law, only banks and finance and mortgage companies may receive deposits from an unrestricted range of depositors, and only such institutions will be authorised to operate prepaid cards, etc for an unrestricted range of customers. It is also suggested that "small" systems for prepaid cards, etc, defined as systems with cards of less than NOK 1,000 in prepaid value, will not need any authorisation. It is worth noting that if a small e-money system evolves into a larger system, it may be subject to regulation.

Legal uncertainties. It is uncertain when the new draft from the BLC will be enacted, and if it will differ from the draft act. Norway will adopt the e-money Directives 2000/28/EC and 2000/46/EC like all the other countries in the European Economic Area (EEA). The effect the Directives will have on the draft BLC act is not yet established.

Role of various authorities. The Payment Systems Act states that the central bank shall authorise interbank systems, while the Banking, Insurance and Securities Commission (BISC) shall authorise all retail systems for payment services.

Relevant security issues. The central bank has left security issues to the market participants. The need for integrity and good reputation will be adequate incentive for the participants to include a high

[32] The problem of a "shrinking balance sheet" would probably be more acute if substantial excess cash (due to a shift into e-money) had to be sterilised by the sale of government paper.

level of security in the system(s). However, with the new Payment Systems Act, all issues related to retail payment systems, including security issues, are the responsibility of the BISC.

Provider issues. Consideration has been given to the regulatory treatment of non-bank issuers in a possible Mondex system. If banks were to take on the role of issuers in the system, there would be no new issues. If a bank-owned institution were to issue the electronic money, it is still not clear how such a special purpose vehicle should be treated. Issues related to the shareholdings of banks in the company would also have to be addressed.

Payment system issues. The central bank's key objective is to maintain a cost-effective and universal payment system, while leaving the development of specific payment instruments to the market participants. The Bank is concerned that in the longer run, new e-money schemes may lead to a fragmented national payment system, but considers it appropriate in the short run for the private sector to pilot different systems until it can be determined which is the most viable option.

Supervisory issues. No specific initiative has been taken so far. Any supervisory issues will be handled by the BISC according to the draft act from the BLC and EU e-money Directives.

Law enforcement issues. E-money schemes with purse-to-purse transfer function (and without shadow balances) will represent a potential law enforcement problem. The issue has received some attention in relation to a possible Mondex system. A policy response has not been established.

Cross-border issues. We do not consider the participation of local banks in cross-border e-money schemes involving Norwegian kroner to raise any new policy issues. Transfers of funds by residents to foreign e-money schemes will be captured in the balance of payments statistics. Transactions over foreign accounts held by residents should be reported to the central bank. This would probably also apply to e-money accounts held by foreign issuers.

Other issues. The electronic payment system in Norway is highly integrated and includes all commercial and savings banks. However, the technology platform (magnetic stripe card) is not suited to chipcards. In cooperation with the Banks' Central Clearing House, four of Norway's largest banks initiated the Smart Card Norway Project. The project's objective is to prepare for the transition from magnetic stripe technology to smartcard technology for Norwegian payment cards and payment terminals. The smartcard technology will be based on the international EMV standard, and the plan is to complete the transition by the end of 2004. As part of this project, banks also have plans to introduce new solutions for small payments with smartcards (electronic purses). Alternatively, new actors (non-banks) can choose to establish card systems outside the current infrastructure, although this seems somewhat unlikely at the moment.

PHILIPPINES

While some forms of e-money are already being accepted locally, data on its operational features/procedures, security aspects and other statistics are not readily available.

POLAND

1. Card-based products

There is currently no electronic purse system operating in Poland. There are, however projects for pilot programmes developing chipcard technology in the local areas, for instance one university, a small city, ski lifts, parking meters, public transport. Most of the schemes are for single-purpose cards and the National Bank of Poland (NBP) does not treat them as e-money.

Up to now there are no plans to introduce multipurpose prepaid card schemes in Poland.

2. Network/software-based products

So far, no projects have been started.

3. Policy responses

The possible effects of the development of e-money in Poland have been discussed within the NBP. The Monetary and Credit Policy Department is of the opinion that, in the near future, implementation of e-money in Poland will not affect seigniorage and note and coin demand to any great extent.

PORTUGAL

1. Card-based products

Portugal currently has one electronic money system (Porta Moedas Multibanco - PMB), based on the storage of money in a chipcard and in which only credit institutions participate. The PMB scheme was developed by SIBS, the Interbank Services Company (ACH). Launched in March 1995 by credit institutions, it rapidly expanded and covered the whole country.

Both card issuance and transactions are anonymous; this means that a lost PMB card is equivalent to lost cash. Any ATM or PMB terminal provides cardholders with information on stored value and also produces a record of the last 30 transactions made with their card. Some debit and/or credit cards already include the PMB card facility. Clearing is carried out through SIBS and settlement takes place at the Bank of Portugal.

The Bank of Portugal has published regulations on the issue of multipurpose prepaid cards, which may be summarised as follows: (a) only credit institutions authorised to take deposits may issue multipurpose prepaid cards; (b) the issue of cards by a credit institution requires prior authorisation from the Bank of Portugal, and the request for authorisation must be accompanied by the conditions for their utilisation and include the rights and duties of both the issuing institution and the cardholder; and (c) the amounts loaded on the multipurpose prepaid cards, before being transferred to the accounts of the economic agents supplying the goods and services, are to be entered in the books under a special account created specifically for that purpose.

2. Network/software-based products

With regard to network electronic money, the Bank of Portugal has no information on the existence of any development in this field, although it is believed that some credit institutions foresee it within their strategic planning.

3. Policy responses

Monetary policy and seigniorage. Concerning statistical information, the Bank of Portugal collects data from each bank on the total monetary liabilities loaded onto PMB cards and not yet spent or used as a means of payment. The accumulated information is included in the monetary statistics by the Bank of Portugal, specifically as part of the M1 aggregate. In terms of seigniorage, the impact of e-money on the circulation of notes and coins, and therefore on the central bank balance sheet, has not been significant so far, and it is not foreseen that it will significantly reduce seigniorage in the short term.

General legal issues. Neither current nor proposed legislation stipulates that value stored on a chipcard may be considered as money. Owing to the fact that electronic purses were created only a few years ago, there are no legal studies or judicial decisions on their legal nature. In the Bank of Portugal regulations on e-money (noted earlier), electronic purses are defined as multipurpose prepaid payment media which enable different types of transaction to be effected by means of amounts previously loaded by the issuing institution or by the cardholder through the electronic transfer of funds deposited in a demand deposit account held in his name with a credit institution.

Relevant security issues. The criteria used by the oversight authorities are those that the European Central Bank (formerly European Monetary Institute) established as guidelines on minimum common features for domestic payment systems, combined with the stipulation that only credit institutions authorised to take deposits are allowed to be e-money issuers.

Provider issues. Banks authorised to take deposits are the only types of institution allowed to issue e-money. Once there is money involved, these are the only institutions able to issue and manage such means of payment.

Payment system issues. No particular problems have arisen, mainly because all the authorised e-money issuers participate in the Portuguese clearing and settlement system, reducing the risk that problems could arise. The Bank of Portugal accepted the banks' proposal for the PMB scheme concerning this matter, as it respected the stipulated features to be put into practice.

Supervisory issues. The Portuguese e-money scheme allows only banks to be issuers, and so this question is not directly applicable to Portugal, where the only supervisory authority is the Bank of Portugal.

Law enforcement issues. The PMB scheme has features that discourage the practice of money laundering, especially important being the non-transferability of funds and the low limit on the value loaded (maximum PTE 63,000/USD 341).

Cross-border issues. Since the PMB scheme allows only one denomination (the escudo), and functions only on Portuguese territory, it has no cross-border features. However, a euro function is currently being developed.

ROMANIA

1. Network/software-based products

In Romania, the following network/software-based products are operational.

Online banking. Offered by Bank Austria Creditanstalt Romania SA since 2001, online banking is an internet banking product used by individuals as well as by legal entities. It allows electronic credit transfers (payment orders), standing orders, and term deposits denominated in US dollars, euros, Deutsche marks, Austrian schillings and Romanian lei, any time during the day.

The time limit for initiating domestic orders is 16:00 (processing time limit). All payment orders received by the bank after this hour are marked to be processed for the next banking day.

For domestic transfers which involve foreign exchange transactions using accounts of the same customer, exchange rates are no longer valid after the processing time limit, and those transactions will be processed during the next banking day, using the first valid exchange rate for that day.

Term deposits run:

- from the current day if deposits are requested before the closing procedure of the banking day starts;
- from the next banking day if deposits are requested after the closing procedure of the banking day starts;
- starting from maximum two days after the current day if the customer wants to push the start day forward.

The minimum amount for a term deposit is USD 5,000 or the equivalent in Romanian lei, Deutsche marks, euros or Austrian schillings.

This product is available without an opening fee.

The fees for credit transfers denominated in Romanian lei are:

- for interbank credit transfers - 0.1% (min USD 1.00 - max USD 7.50);
- for intrabank credit transfers - free of charge;

- for cancelling credit transfers - 0.1% (min USD 1.00 - max USD 7.50);
- for standing orders - USD 1.00 per transaction.

CitiDirect. Offered by Citibank Romania SA since 2000, CitiDirect uses internet technology as well as Citibank's electronic transfer system PayLink/IBBS. This product offers Citibank's customers facilities such as:

- querying and monitoring statements of account;
- initiating credit transfers.

Web servers designed and maintained by Citibank receive those requests. The information carried out by the transfer order is printed automatically by the PayLink/IBBS system on a payment order form (paper-based).

Communication between the customer and the bank is encrypted, using 128-bit SSL (Secure Sockets Layer) technology.

For message authentication, the system uses challenge/response technology based on dynamic authentication of customers by a DesGold Card hardware device uniquely assigned by the bank to each customer.

Unauthorised access to the accounts is impossible because of the PIN code request. Inserting the wrong PIN code three times consecutively makes the hardware device unusable, meaning that a new DesGold Card hardware device needs to be issued by Citibank.

DemirNet internet banking. Offered by Demirbank (Romania) SA since 2001, this product gives Demirbank's customers the possibility of performing electronic credit transfers, standing orders and foreign exchange transactions, and viewing statements of account, term deposits and loans.

The system design is based on client-server technology. The application server operates under Lotus Domino version 5.4, Global Edition with SSL facilities and 128-bit encryption.

Access is based on setting up the encrypted access profiles, which are defined in the agreement between the bank and its client. Before inputting the access data, the user will be authenticated by firewall and by the application server. The application server accepts only the users defined in the server's securitisation profiles. There are two secured access methods:

- VPN (virtual private network) uses dedicated software (Checkpoint SecuRemote) which allows data authentication and encryption based on a triple-DES algorithm; this solution involves dedicated software installed on the customer's PC;
- SSL (Secure Sockets Layer) allows the use of implicit facilities of authentication and encryption of the customer's browser and application server. This access method uses 128-bit encryption.

Libra Web Banking. Offered by Libra Bank SA, Libra Web Banking performs the following operations:

- credit transfers denominated in Romanian lei;
- credit transfers denominated in foreign currencies;
- term deposits;
- initiation of foreign currency buying orders;
- initiation of foreign currency selling orders;
- initiation of foreign currency exchange orders;
- viewing statements of account;
- reports regarding term deposits, cash flow and account movements.

The product uses encryption keys issued by a Certification Authority. These encrypted certificates contain the public key of the requesting customer and other authentication data.

Internet banking. Offered by Commercial Bank of Greece (Romania) SA, this scheme is similar to Libra Web Banking, mentioned above.

The fees charged for operations performed through internet banking are:

(a) Credit transfers

(i) Issuance of a credit transfer order denominated in foreign currencies:

– clean credit transfers - 0.2% (min USD 20 - max USD 1,000);

– credit transfers supported by documents - 0.3% (min $25 - max $1,500).

(ii) Issuance of a credit transfer denominated in Romanian lei (including promissory notes and cheques):

– in amounts up to ROL 499,999,999.00 - 0.1% (min ROL 15,000 - max ROL 50,000);

– in amounts over ROL 500,000,000 - ROL 100,000.

(iii) Receipt of credit transfers in favour of its customers - free of charge.

(iv) Credit transfers between the accounts held by the bank - free of charge.

(b) Term deposits - free of charge.

(c) Foreign currency sale - free of charge.

(d) Foreign currency buy - free of charge.

(e) Foreign currency cross exchange - free of charge.

RUSSIA

1. Card-based products

No specific developments at the moment.

2. Network/software-based products

Bank Tavrichesky has developed a prepaid scheme, called PayCash, for information, services or goods provided by internet suppliers where customers make a payment using a virtual electronic purse. PayCash purse is installed on the hard disk of the user PC and allows purse-to-purse transactions. PayCash is to be launched in the city of St Petersburg.

Payments. During the first step, PayCash clients can only pay at Bank Tavrichesky PayCash merchants. This means cross-border payments are not possible. PayCash is a monocurrency system; payments can only be made in new roubles.

Costs and fees. Are private and commercial.

Suppliers. Alcorsoft Ltd.

3. Policy responses

The Central Bank of the Russian Federation has policy responsibility for payment systems.

In 1997, the Board of Governors of the Central Bank of the Russian Federation appointed the Department of Payment Systems and Settlements to study the various implications of electronic money for the functions of the central bank and credit institutions, and how the Bank should react to the possible emergence of e-money. It is, however, also closely monitoring developments including the introduction of new products.

General legal issues. The central bank has worked out the Directive N 277-U (3 July 1998), “The procedure of granting registration certificates to resident credit institutions for issuing prepaid financial products”, in order to prevent uncontrolled issuing and circulation of prepaid card products and prepaid software products on the territory of the Russian Federation.

The Bank has not imposed any specific rules for smartcards and e-commerce.

No specific law or regulations have been adopted to deal in particular with e-money.

SIERRA LEONE

1. Card-based products

There are at present no electronic money products in Sierra Leone.

SINGAPORE

1. Card-based products

There are two types of card-based e-money schemes in Singapore: single-purpose and multipurpose stored value cards (SVCs). Single-purpose SVCs are those where the card issuer and the goods/service provider are the same party, such as those for use in telephones and public transport. Multipurpose SVCs, on the other hand, can be used at any retail outlet that accepts them for payment.

The CashCard, a smartcard-based multipurpose SVC, was issued by a consortium of banks in November 1996. The CashCard is a bearer SVC containing stored value and is widely accepted by retailers in Singapore as a convenient mode of cashless payment. In addition, some of the debit cards issued for use at electronic funds transfer at point of sale (EFTPOS) terminals and automated teller machines (ATMs) also have CashCard features. At the end of 2000, about 4.7 million CashCards were in circulation.

In addition to making payments at retail outlets, the CashCard can be used for payment at car parks, public phones, libraries and vending machines, and for the Vehicle Entry Permit (VEP) Scheme and the Electronic Road Pricing (ERP) Scheme. The CashCard can also be used to make small-value payments for purchases on the internet via NETSCash. The stored value in the CashCard can be topped up at ATMs, self-service terminals, kiosks and also over the internet, via selected mobile phones or using HomeNETS via the telephone line using a handheld terminal.

2. Network/software-based products

There are no such schemes in Singapore at the moment.

3. Policy responses

The Monetary Authority of Singapore (MAS) takes the view that proceeds arising from the issuance of multipurpose SVCs are similar to bank deposits. Under the Banking Act, only banks in Singapore may issue multipurpose SVCs, with the approval of MAS. The Banking Act also requires banks to maintain reserves and liquid assets against the proceeds arising from the issuance of multipurpose SVCs. In addition, banks that issue multipurpose SVCs are required to provide monthly reports on the amount of SVC proceeds outstanding as part of their regular reporting to MAS.

In assessing applications by banks to issue SVCs, an important factor that MAS considers is whether the issuing bank has put in place adequate safeguards to protect cardholders. This includes a robust security system to prevent counterfeiting and fraud that could lead to losses by both stored value cardholders and merchants. A strong security system will build up cardholder confidence and encourage greater usage of such cards. MAS also requires the issuers to review their card distribution procedures regularly to deter the possibility of counterfeit multipurpose SVCs being sold.

MAS will continue to monitor the development of card-based e-money technologies and the use of SVCs in Singapore.

SLOVAK REPUBLIC

1. Card-based products

There are no card-based e-money schemes at the moment.

2. Network/software-based products

There are no network/software-based schemes being implemented in the Slovak Republic. Two projects are being tested. The first is called MicroPay, provided by Tatra Banka AS and the second is mKonto, provided by eBitech (a non-banking scheme). Both will allow customers to make micropayments over the internet.

3. Policy responses

The National Bank of Slovakia is closely monitoring the new developments, aiming in particular at establishing a clear framework for stored value electronic instruments - the first step was laid down in the central bank decree regulating the issuance and use of the electronic purse as an instrument of payment.

SLOVENIA

1. Card-based products

There are no electronic purse systems currently operating in Slovenia. Most of the cards used are magnetic stripe debit and credit cards or single-purpose stored value cards, ie telephone cards, toll pay cards, etc. The Bank Association of Slovenia has no reports of any projects already undertaken by any of the commercial banks. While the banks are still rather reserved about issuing e-money, some other companies like mobile phone operators have shown interest in offering the service. The idea is to offer customers the possibility to use a mobile phone for buying various products and services. All owners of mobile phones (with prepaid schemes or subscriptions) would be entitled to use the service, using special procedures for identification and confirmation of each transaction. After that, based on mutual agreements, merchants would charge purchased items to the mobile phone operator, which would then periodically charge its customers (eg when issuing the bill for phone services). According to the above-mentioned law, the operator would need special permission from the Bank of Slovenia for offering such a service.

2. Network/software-based products

There are no projects regarding network-based products under way at the moment. Internet access is still not widespread enough among households to stimulate development of such projects, but rapid growth in internet usage and improved security procedures will probably lead financial institutions to offer additional services such as making small-value transactions via computer network.

Many commercial banks are using internet banking to enable customers to monitor and manage funds on their accounts. Special attention is being given to technologies to ensure the highest security for those kinds of transactions and will likewise be useful when introducing real e-money transactions over the internet.

3. Policy responses

Considering the latest e-money developments, the Bank of Slovenia is setting up a legal basis for issuing e-money. Currently, the process of preparing the Law on Payment Operations (to be adopted by the end of 2001) is under way. The current draft includes, among other provisions on e-money, taking into consideration the Directive on the taking up, pursuit of and prudential supervision of the business of electronic money institutions (Directive 2000/46/EC).

SOUTH AFRICA

1. Card-based products

***Visa/Pep Bank/Metrorail*.** Pep Bank, a division of BOE Bank Ltd, Visa International and Metrorail, a suburban commuter rail operator, launched a pilot project in Cape Town in November 2000 which allows rail commuters to purchase rail tickets from a ticket-vending machine using the value stored on a smartcard. The value on the card may also be used to purchase goods at participating retailers. The intention is to issue 25,000 cards to commuters during the pilot project, 15,000 of which will not be linked to a bank account. Value can be loaded onto the card by using standalone vending machines situated at railway stations. The remaining 10,000 cards will be linked to Pep Bank savings accounts and value will be loaded directly from the savings account onto the card. The pilot project is based on Proton technology.

***Tertiary institutions/smartcards for students*.** A university and a technikon are currently in the process of evaluating smartcard-based payment systems to be utilised on campus. The cards will carry details of, and allow access to, bursaries and will also be utilised to make various payments on campus.

***GSM*.** Prepaid cellular communication has once again undergone rapid expansion in South Africa and comprises approximately 8.4 million cards.

***Gaming*.** A casino operator has introduced smartcards in its casinos across South Africa and intends to create a tokenless and coinless gaming environment. The cards can only be used inside the casino and entertainment resort and can be used for gambling, buying food and beverages, etc. The cards can be loaded at numerous terminals in the casino which also allow for the loading of value from credit cards.

2. Network/software-based products

South Africa is still in the early stages with regard to the development of network- and software-based products. The South African Reserve Bank is monitoring the development of these products and awaits with interest advances in digital certification and sophisticated encryption techniques, as well as the establishment of more secure payment methods.

3. Policy responses

Monetary policy and seigniorage. E-money will be included in money aggregates as and when systems are established and reach a significant size. Development of e-money products is monitored on a continuous basis.

General legal issues. The South African Reserve Bank issued the Position Paper on Electronic Money in April 1999 as well as Submission Guidelines for Electronic Money Products and Schemes for persons wishing to implement e-money schemes in South Africa. Potential operators should also ensure that their proposed schemes are not in contravention of relevant South African legislation.

A concern of the National Payment System Department of the South African Reserve Bank is the establishment of so-called prepaid service schemes that offer multiple goods or services which are not necessarily those of the issuer of the prepaid tokens. A large float may be built up by the selling of tokens by scheme operators and where such operators are not subject to any prudential and risk

management requirements, the risk to the participants in the scheme may be unacceptable. A further issue is whether such schemes could be in contravention of the Banks Act with regard to deposit-taking and of the National Payment System Act with regard to offering payment and clearing services as a regular part of the issuer's business.

The South African Reserve Bank continuously monitors the development of prepaid stored value payment systems in order to ensure that appropriate regulatory adjustments are effected as and when necessary.

Issuer details. The Position Paper on Electronic Money 1999 indicates that only banks will be permitted to issue e-money. Primary and intermediary issuers of electronic value will therefore be subject to regulation and supervision by the South African Reserve Bank.

At this stage, there is no intention that the South African Reserve Bank will itself issue stored value cards, or provide other forms of e-money to the public. However, the possibility that this might happen some time in the future cannot be completely ruled out.

Other issues.

Electronic Communications and Transactions Bill. The Department of Communications of the South African government will be promulgating legislation by the end of 2001 to enable and facilitate electronic communications and transactions. The Electronic Communications and Transactions Bill intends to promote universal access to electronic communications and transactions, create legal certainty in respect of e-transactions, protect consumers and encourage electronic government services.

Electronic fare collection for public transport. Two public transport smartcard-based payment systems are currently undergoing a tender process in South Africa:

(1) *Taxi recapitalisation project.* The South African government has embarked on a project to transform the minibus taxi industry in South Africa so that the taxi industry can fulfil an appropriate function in the provision of public transport services. An integral part of the project is the introduction of a smartcard-based electronic fare collection system. Tenders are currently being evaluated and are expected to be finalised by the end of 2001.

(2) *MetroRail*. The South African Railway Commuter Corporation is currently in the process of preparing tender documents for the provision of a smartcard-based fare collection system for suburban train services. Tenders are expected to be finalised by the end of 2001.

The Smart-ID card. The South African government, through the Department of Home Affairs, plans to issue a multi-application smartcard, known as the Smart-ID card, to each South African citizen, which will replace the present "paper book" identity documents. A number of government departments have expressed an interest in placing an application on the card. The Smart-ID card will become South Africa's national identity card, with the following features: a colour photograph of the holder; biometric identification by fingerprints; a payment application for state pensioners to receive their monthly grant (approximately 3,000,000 state pensioners); driver's and gun licences; a health application; a housing subsidy application; unemployment insurance benefits; and an e-purse.

SPAIN

1. Card-based products

Since 1996, the three Spanish card network providers (Sistema 4B, SEMP and the Spanish Confederation of Savings Banks) have been endorsing the multipurpose prepaid card schemes that are currently being used in Spain.

***Monedero 4B*.** This is a reloadable electronic purse scheme that can be issued by all members of Sistema 4B (a processing company owned by banks and an automatic clearing house in the debit/credit card market). Only banks are issuers of the purses and of the electronic value stored in the chip and Sistema 4B is the technical operator of the scheme. The project was launched in November 1995 and during 1996 the 4B scheme began to operate nationwide.

***Visa Cash*.** This is an electronic purse that can be issued by credit institution members of SEMP (Sociedad Española de Medios de Pago), an entity owned by credit institutions that operates in the area of credit and debit cards. Visa Cash started its nationwide expansion in the second half of 1996, after being tested in two small towns in Spain. Visa Cash e-purses have also been pioneers as regards the promotion of card readers, allowing chip-based payment instruments to also offer a feasible solution for internet transactions. The Visa Cash project was implemented in cooperation with Sistema 4B and its bank members.

***Euro 6000*.** This is the electronic purse scheme developed by the Spanish Confederation of Savings Banks (CECA). This system is used by the member savings banks of Red 6000 (the card network and technical operator for the Spanish savings banks). Many savings banks have joined the project, which was launched at a national level early in 1997.

All three Spanish systems (Monedero 4B, Visa Cash and Euro 6000) have some similar features. All are intended to be a replacement for notes and coins in small-value payments at vending machines, coffee shops, kiosks, taxis, cinemas, for the lottery, parking, etc. At first, only ATMs will be used to load (and reload) the cards, although in the near future other specialised equipment (modified telephones, etc) will be used. Loading from specially adapted ATMs is executed online using a PIN, while purchases with these cards are normally made offline, without recourse to a PIN or issuer authorisation, mainly for reasons of cost and speed of transactions. When purchasing, the stored value passes from the customer card to the merchant's device, debiting the amount from the customer's e-purse. Transactions are credited to the merchant's account on an aggregated basis for the total value of the purchases collected. The existing card networks are used to manage the exchange, clearing and settlement of transactions, in order to reduce the costs of developing the system. Card-to-card transactions are not permitted.

Banks freely fix the charges to be paid by customers and merchants.

Cardholders are also able to check the balance stored on the cards at ATMs, at the merchants' terminals before and after each transaction and also at vending machines. Customers have the possibility of checking the last transactions at ATMs with the card.

2. Network/software-based products

The development of network-based or software-based e-money schemes in Spain is at a very preliminary stage. However, a growing interest in the aforementioned payment solutions is currently being shown, thus favouring the initiation of several, but still small schemes. As a general common feature, these systems are designed to operate on a "virtual account" on which funds transfers can be ordered once an up to 16 digit secret code has been entered (the availability of funds - prepayment - is a prerequisite). All network-based cards are designed to be anonymous and to allow for reloads against the major credit card brands.

3. Policy responses

***Monetary policy and seigniorage*.** The Bank of Spain collects general statistical data on the schemes on a monthly basis. The amount of e-money liabilities is included in M1, but the effect on monetary policy implementation has been insignificant due to the limited amount of floats outstanding. In terms of loss of seigniorage, the impact of the prepaid card schemes has not been very significant and though a certain increase in the usage of e-money is to be expected, it is not foreseen that it will substantially reduce seigniorage in the near future. However, the Bank will closely monitor this issue.

The Bank of Spain has no plans at present to issue electronic money.

***General legal issues*.** The EU Directives 2000/28/EC and 2000/46/EC have established the current legal regime that will be regulating e-money and e-money issuers within the European Union. According to the provisions contained in the aforementioned legal documents only credit institutions, as defined by the current wording of Directive 2000/12/EC, will be allowed to issue e-money and will, therefore, benefit from the mutual recognition agreements. The law also regulates the type of asset portfolio (high liquidity and low risk) that any ELMI (electronic money institution) may predominantly hold and imposes the compulsory redeemability of the outstanding floats in any e-money devices.

Under certain circumstances (an average volume of claims of less than EUR 6 million at any time or a clearly defined and limited environment where the particular e-money device can be used) several exemptions from the general regime are allowed.

Money stored on prepaid cards is covered by the Spanish deposit guarantee scheme like any other repayable funds from any customer, ie all balances in favour of a single customer in the same credit institution are covered up to EUR 20,000.

There is no other specific legislation regarding either this new payment instrument or the transactions made with it. The relationships between the parties involved are established under contractual agreements.

***Provider issues*.** Of the three operators of prepaid card schemes, only CECA has the legal status of a credit institution, while 4B and SEMP are non-credit institutions. However, the owners of the three schemes are all credit institutions, as are the issuers of the cards. Therefore, in the present situation, credit institutions and non-credit institutions owned by credit institutions are cooperating in order to develop e-money schemes, but in all cases the issuer of the prepaid card is a credit institution.

As regards software-based e-money schemes, the few issuers that operate nowadays are, in any case, credit institutions.

***Payment system issues*.** Generally, transactions are sent to the technical operator using two methods: (a) online collection, where the merchant decides when to send the transactions, through telecommunication lines; and (b) offline collection, where transactions are downloaded onto a high-capacity card that the merchant unloads on an ATM. The latter option is used when the merchant's terminal is not linked to a data transmission network (taxis, kiosks, etc). In this respect a new generation of portable EFTPOS terminals has been launched. The wireless technology developed against the GSM standards for cellular phones enables online collections even in activities where mobility is frequent. Usually the collection of outstanding balances in favour of the merchant takes place on an online basis performed at the end of day. The interchange of data among credit institutions and the settlement of the operations are effected through the SNCE (Sistema Nacional de Compensación Electrónica – National Electronic Clearing System), the Spanish retail payment system.

***Supervisory issues*.** In compliance with the recent provisions of the European Directives on e-money, all issuers of electronic value must be credit institutions. Therefore the supervisory activity is performed by the authorised body in each country, which, in the case of Spain, is the Bank of Spain. The latter is also entrusted with oversight functions, part of which consist of monitoring and analysing innovations arising from the new technologies, particularly e-money.

***Law enforcement issues*.** The features of the Spanish prepaid schemes, especially the non-transferability of funds from card to card and the relatively low limits on the value loaded, make them not particularly appropriate for use in money laundering operations. However, this is a highly sensitive issue and thus greater attention is paid to ensuring that e-money does not become a channel for illegal activities.

***Other issues*.** Representatives of the Spanish networks have already signed an agreement to make their systems interoperable both in the domestic and in the foreign markets. At the present moment, the Common Electronic Purse Specifications (CEPS) and the EMV projects stand for the most feasible initiatives in this field, since they have already established the foundations for a first practical testing calendar. The year 2002 has been laid down as the common deadline for the final real implementation.

Consumer protection is currently becoming a growing concern among central banks, which are increasingly heedful of any new development in relation to e-money schemes so as to guarantee the protection of the legitimate interests of the banking clientele. Operational, technical and business issues are being carefully analysed in order to identify potential risks before they arise.

The technology of the Visa Cash prepaid card scheme has been used in some Latin American pilot projects (namely in Colombia, Argentina and Brazil).

CECA has developed a feature by which single-purpose prepaid cards can be transformed into multipurpose cards by downloading the required applications from an ATM.

SWEDEN

1. Card-based products

There is one card-based scheme in operation, behind which four of the largest Swedish banks stand as issuers (Nordbanken, Sparbanken, S-E Banken and Handelsbanken). These four banks together have over 80% of the Swedish bank card market, both as issuers and as acquirers. This fact has reportedly been the main driving force behind this interbank cooperation. The banks believe that they will more easily achieve the so-called "critical mass" of users by working together in this project. Although they share the same technology, the banks compete with each other by issuing their own cards. The bank-specific systems use common standards, ie all Cash terminals accept cards issued by the four banks. Moreover, all loading terminals can be used by cardholders regardless of the identity of the issuing bank.

The card scheme in Sweden goes by the name of Cash Card. The technology used is licensed by the Proton system. The system uses triple-DES security, a patented dynamic key management system, and has payment execution times of less than half a second. It has been designed to the specifications set by Europay, MasterCard and Visa and has been profiled as a substitute for physical cash in small-value transactions (under USD 15). At the moment it cannot be used for network payments.

The Cash Card system works as follows. The user has to register at the issuing bank when the card is bought, which implies that the user must be identified. The card is personal - only the registered user is lawfully allowed to use it. The user is given a PIN code to be used when the card is reloaded. The card can be reloaded by personal visits to the bank or at special ATMs. Users who own a smart phone can reload their cards at home. A smart phone costs about USD 25 and more than 25,000 have been sold.

The system allows "transaction anonymity" as users are not required to identify themselves when making a purchase. However, banks have a complete audit trail of transactions made with the cards. This is possible as each card is linked to a "shadow account" where all Proton units are cleared and settled between the acquiring and issuing banks and the transactions behind these payments are registered. This is meant to be a security-enhancing feature for the issuing banks, allowing them to identify fraudulent transactions and forgery. Transactions are offline; no communication is needed between the POS and the issuing bank for verification. The system does not allow transferability.

Users receive no interest payment for the money on the smartcard. Float revenue helps to finance the system. According to banking officials, the float amounts to only 2-3% of revenues.

The system was launched nationwide in 1998. According to the banks, an evaluation of the market response after a few months showed good results, but also pointed to the necessity of including more functions on the card. One conclusion from this first evaluation was that the cash function would be accepted more widely if it were installed on a multifunctional card, instead of a standalone product, as was then the case. The then three banks behind the Cash association (Handelsbanken joined in 2000) integrated the Proton technology into their bank card products. The evaluation also showed that better loading possibilities, for example PC loading with a card reader and adjustment to digital networks, were important prerequisites for achieving wider acceptance. Accordingly, the issuing banks started a joint cooperation project with Telia, the government-owned Swedish telecommunications company, aimed at enabling users to reload the cards at home with the aid of a computer or smart phone.

Commercial associations were not quite as positive shortly after the national rollout. They disagreed with the scheme developers over pricing, particularly as regards the distribution of costs and fees between banks and vendors. Some of the issuing banks responded by changing their pricing structure and introducing a charge-free period for merchants. The objective was to increase merchant adoption and thereby the incentives for cardholders to use the technology. Today, merchants are offered an incentive contract based on the number of transactions. Currently, there are about 41,000 terminals that accept Cash payments. This can be compared to the 81,135 EFTPOS terminals that were in place in 1999. However, it took almost 20 years to achieve this degree of EFTPOS acceptance. The number of Cash Cards issued amounts to about 3,000,000 of which 600,000 have been activated by the cardholders. The number of activated cards is increasing after the introduction of a simplified

activating procedure. Transactions are currently reported to number 500,000 per month. The average transaction is USD 7.

Issuing banks are also planning to introduce new functions for the multifunctional card. The intention is to make the Cash Card loadable via the internet with the aid of a card reader that the banks themselves have developed. The system is currently being tested in a pilot. However, it will not be launched before the card can be used for shopping on the internet - a feature specifically demanded by the users. One major problem is that the Cash system is a national system while the internet is international. Cash payments via digital TV is therefore a more likely alternative, and is currently being investigated. The Cash Card could then be used for both shopping and paying for the programmes. There is, at this stage, no need for identification vis-à-vis a third party. There are no plans to adopt scheme specifications to meet CEPS requirements in the short run. Compliance with CEPS is, however, expected to be implemented before 2004.

2. Network/software-based products

At the moment there are no plans for either testing or implementing such schemes in Sweden.

3. Policy responses

Supervisory issues. The Swedish Financial Supervisory Authority, Finansinspektionen, has been in continuous talks with the banks involved in the Cash Card project. The authority received all relevant information about the system needed for authorisation before its launch. The supervisory authority continuously monitors the scheme. It is also in charge of evaluating the security and operational aspects of the scheme. Since only banks are currently involved in e-money schemes, these activities naturally fall under the supervisory responsibility of Finansinspektionen. Today, both banks and credit institutions have the right to issue e-money. The Swedish government is currently working on the implementation of EU Directive 2000/46/EC on taking up, pursuit of and prudential supervision of the business of electronic money institutions. The Directive allows institutions other than credit institutions to issue e-money and stipulates minimum requirements and appropriate supervision. In the case of Sweden, it is most likely that the regulatory and supervisory tasks will be given to Finansinspektionen.

***Monetary policy and seigniorage*.** The Swedish central bank has contributed its own calculations to the analysis carried out by the CPSS in the field of seigniorage losses. Major issues relating to e-money were discussed at the Riksbank at an early stage of this development. In 1997, the Riksbank published a report on electronic money that reflected the conclusions drawn from the internal analysis and discussion. In this report, consideration was given to whether monetary operating procedures might have to be adapted in case a large substitution of e-money for banknotes led to a shrinkage of the central bank's balance sheet. The Riksbank's standpoint is that there is no cause for concern on this subject. The procedures for implementation of monetary policy are not dependent on the size of the balance sheet and the central bank also has measures at its disposal to counteract the shrinkage of the balance sheet. The same applies to possible loss of seigniorage, which can also be counteracted by specific measures, such as the imposition of minimum requirements, should the loss become large. The Riksbank does not have any plans to issue electronic money itself. Statistical information on e-money is already included in monetary statistics. Since 1997, the figures pertaining to the issue of e-money have been reported under deposits as the sub-item "of which prepaid cards". In 1999, this amounted to SEK 241 million (approx USD 24 million).

***Provider issues*.** There is nothing more to report on this item besides what is already mentioned under general legal issues and supervisory issues.

***Law enforcement issues*.** The Swedish commission has emphasised the importance of ensuring that e-money schemes do not have features that may facilitate criminal activities, and of ensuring that the Money Laundering Directive applies to these schemes.

***Payment system issues*.** E-money payments are cleared and settled via the same regular channels and procedures as other retail payments.

***Cross-border issues*.** The Swedish position is that open access for cross-border activities should be aimed for in line with the principles of the Single Market, unless strong and well founded reasons call for restriction.

SWITZERLAND

1. Card-based products

Banks in Switzerland launched a national rollout of a Proton-based scheme, called CASH, in January 1997. In autumn 1997 Swiss Post joined the system with the CASH PostCard. At the same time the banks' ATMs (Bancomats) and Swiss Post's ATMs (Postomats) mutually opened their networks and now provide a fully compatible loading facility. The installation of merchant terminals is being implemented gradually. The promoter of CASH is Europay Switzerland; the operator is Telekurs Payserv. The maximum value that can be held on a consumer card at any time is CHF 300 (with reloading possible up to a maximum of CHF 1,000 per day). Swiss banks are the issuers of value, although the float is kept at the centralised CASH pool account (the CASH pool was established as a civil partnership under which individual participating banks assume liability of debts jointly and severally). With regard to fee structure, merchants pay 0.7% of the transferred amount plus CHF 0.01-0.02 per transaction.

2. Network/software-based products

In summer 1998 Swiss NetPay AG, a joint venture of Credit Suisse and Ecofin AG, introduced a pilot with e-cash licensed by DigiCash. Swiss NetPay offers its payment service with Swiss franc-denominated tokens. The exchange from deposits to tokens and vice versa has so far taken place solely via the accounts of Credit Suisse. However, consumers not holding a deposit account at Credit Suisse can initiate traditional giro transfers from their own bank to a Swiss NetPay account at Credit Suisse in order to acquire e-cash tokens. Merchants accepting e-cash have to hold a deposit account at Credit Suisse at this stage. The maximum payment amount with e-cash per customer is limited to CHF 5,000 per month. After having evaluated the results of the pilot stage, it is planned to expand the scheme to a multibank system, where consumers and merchants of all participating banks can pay multilaterally with e-cash. In December 1999 Swiss NetPay AG shut down the pilot.

Starting with a pilot project for network-based credit card payments over the internet in mid-1997, Telekurs Payserv and Europay (Switzerland) SA meanwhile expanded their scheme to a large-scale introduction. The scheme is based on the SET standard jointly developed by MasterCard and Visa.

3. Policy responses

Monetary policy and seigniorage. The inclusion of e-money in monetary statistics is under review. To date, the potential substitution of notes and coins is expected to be moderate.

General legal issues. Currently, there is no specific legislation concerning electronic money. The new law on money laundering, which came into force in spring 1998, is applicable to financial intermediaries in general. E-money issuers are deemed to be financial intermediaries in terms of this law.

Provider issues. For the time being, no legislation exists that restricts the issuance of e-money to a certain type of institution.

Payment system issues. The CASH pool holds its funds on a giro account at the Swiss National Bank. The reason for choosing an account at the central bank is the elimination of the clearing agent's credit and liquidity risk.

Supervisory issues. The authorities have not adopted any specific regulations on the issuance of electronic money.

Law enforcement issues. The features of CASH are seen to be relatively unattractive for money laundering or other criminal activities: no transferability from purse to purse, account-based scheme, low maximum amounts that can be stored on the card and single currency. As regards e-cash, only owners of a Swiss bank or postal account can participate in the system. Furthermore, the money laundering law is fully applicable to the e-cash scheme.

TAIWAN (CHINA)[33]

1. Card-based products

In Taiwan, three pilot projects of e-money, namely FISCard, FISC-E-bank and Mondex card, are in progress.

FISCard. The FISCard is an IC card system with electronic value stored in a microchip. It was launched as early as August 1993. This card was originally used for cash withdrawal and credit/debit purposes through the shared ATM/POS system, developed by a non-profit legal entity, the Financial Information Services Co Ltd (FISC). It was then incorporated with the additional functions of stored value and prepaid card for micropayment purposes in February 1998. There are now 22 financial institutions involved in this undertaking, with a total of 21,000,000 IC cards issued as well as 8,183 merchants contracted and 11,676 ATMs available for processing the IC facility. It can be used for consumption by electronic funds transfer (maximum TWD 2 million per bill, amounting to USD 60,600); by credit/debit transfer (given authorised overdraft); by stored value or e-purse (with floor/ceiling of TWD 500-10,000 per loading, around USD 15-303); and by prepaid for public telephone booths (with floor/ceiling of TWD 200-1,000 per loading, around USD 6-30). This facility is designed to allow different types of payments involving both online and offline transactions in a single card in which the stored value and prepaid function are redeemable but not inconvertible like fiat money. As of the end of 2000, the total float outstanding registered TWD 104.58 million, compared to currency in circulation of TWD 527,748 million. It is thus too early to draw any conclusion about the development of e-money, although it can at least to be said that it is not expected to replace all cash functions in one card.

For business promotion, the FISC plans to adopt a development strategy, and combine with the citizen card and health insurance card, so as to embed extra functionality into the IC card. It also intends to advance its technology by alliance with some universities and/or high-tech industries. The final aim is to create one card combining all functions.

FISC-E-bank. The FISC-E-bank system is a network-based facility, using the SET standard drawn up by Visa and MasterCard International. It was developed to provide internet banking services.

In the wake of emerging e-commerce, many banks in Taiwan have devoted themselves to building up their value-added networks (VANs), so as to extend their services to customer sites via an internet channel. To avoid double investments and to unify the specification of VANs, the Taiwan Banking Association proposed to develop each member's payment gateway on one common system. This shared payment gateway system, finally established by the FISC in February 1999, enables participants to offer home/firm banking through the internet channel. Forty-nine financial institutions participate in the system, and the end users registered, in total, about 38,000 in May 2001. To prevent money laundering and fraudulence, the maximum value per transaction is limited to TWD 2 million (USD 60,600), while end users must apply for a personal digital signature from the Taiwan Certificate Authority before making payment through the internet system. Certificates can be obtained free of charge during the current period of propagation.

Mondex Taiwan. The Mondex card system is provided by Mondex Taiwan, a subsidiary of MasterCard Corp as well as a joint venture company with Taiwan's ACER Group. Since only registered banks are allowed to issue e-money in accordance with the newly revised Banking Law Article 47-1, Mondex card is issued by Fubon Bank, a private commercial bank in Taiwan. The pilot project was launched in September 1999 at Oriental Scientific Industrial Zone, in a suburb of the Taipei metropolis. The pilot scheme lasted six months, until March 2000, during which period there were about 2,000 Mondex cards issued and 60 merchants contracted. At the pilot stage, no payment exceeded TWD 2,000 (around USD 63), and total monthly payments were limited to TWD 50,000 (USD 1,563). Given the fixed and closed laboratory, average transactions reached USD 563 per day in March 2000. After that, this pilot scheme saw little progress due to the licensing problem. Under regulations currently being enacted by Ministry the of Finance, it is prohibited to issue stored value

[33] Hereinafter referred to as Taiwan.

cards that make payments with card-to-card transfers; also, multicurrency stored value cards should not be circulated in local jurisdiction. Mondex Taiwan has stood fast to struggle for survival, however, it has no other choice but to compromise.

2. Policy responses

Apart from the Mondex card system, electronic money in Taiwan is mainly provided by the FISC. The FISC has launched two kinds of card/network-based e-money; both are designed to be compatible with the shared ATM/POS system and its nationwide Interbank Remittance System. The diffusion of e-money in Taiwan is still at an experimental stage, as there are presently no significant developments, compared, at least, with traditional cash or non-cash instruments. The circulation of physical cash is not expected to be substantially reduced by the stored value card or e-money. However, the central bank continues to closely monitor the development of payment innovation, including new technological products, as far as possible.

At this time, the central bank is starting to review possible policy responses regarding various issues related to e-money, and trying to deal with these issues by reference to existing regulations. As mentioned above, a smartcard can be used in offline transactions, and thus has less influence on system risk than online transactions. Even so, issues may arise relating to card issuance and the supervision of the e-money provider. According to Article 47-1 of the Banking Law, only depository institutions that come within the scope of the reserve requirement system should be authorised to issue stored value cards. Furthermore, the proceeds arising from the issue of stored value cards should be subject to reserve requirements as stipulated by Article 23 of the Central Bank of China Act. These regulations are applied to all kinds of e-money, wherever the value is stored in an IC card or software package.

TANZANIA

1. Card-based products

There are no card-based schemes in Tanzania. However, there have been efforts by some commercial banks to introduce such schemes.

As per the Bank of Tanzania guidelines on the introduction and operation of auditable card-based electronic money schemes in Tanzania, the proposed schemes, which are at the conceptual level, are expected to be based on auditable principles. Auditability in this context implies that banks would be able to trace card transactions from the time the card is loaded with e-money up to the point of finality of payment.

2. Network-based/software-based schemes

At present there are no network-based e-money schemes or plans to introduce such schemes in the country.

3. Policy responses

In response to initiatives made by the commercial banks, in January 2000 the Bank of Tanzania issued guidelines on the introduction and operation of auditable card-based electronic money schemes in Tanzania.

In addition, in September 2000, the East African Payment System Harmonisation Committee adopted these guidelines with some adjustment to accommodate non-auditable e-money schemes. The guidelines mainly provide conditions for licensing and regulating e-money products and schemes in the East African countries.

Monetary policy and seigniorage. Both sets of guidelines stipulate that:

- e-money issuers shall be required to submit to the central bank statistics on e-money loaded and redeemed values in their periodic financial statements;
- redemption shall be through central bank money, at par, as and when required by the bank;
- all e-money products denominated in the national currency should be treated as sight deposits. In this regard, e-money must be issued in exchange for the equivalent in central bank money or highly liquid assets acceptable to the central bank;
- the central bank shall reserve all rights to the use of the name of the national currency (Tanzanian shilling) in any electronic money scheme at all times (that is, during pilots and in live operation of such schemes);
- card issuers may be required by the central bank to provide information regarding the issued cards and to do so within 24 hours. This would help the Bank not only to collect statistics for the purposes of monitoring developments in e-money, but also to manage risks; and
- the scheme should be able to demonstrate a means of providing sufficient and reliable information to monitor and control the quantity and velocity of e-money supply in the economy.

General legal issues. The guidelines stipulate that:

- the scheme shall not contravene any of the laws governing contracts, insolvency, consumer protection, banking or any other relevant legislation;
- the rights and obligations of the central bank and other participants shall be clearly defined, comprehensive and understandable;[34]
- the scheme shall provide for arbitration and dispute resolution mechanisms which are effective both domestically and internationally; and
- an adequate regulatory framework shall be put in place to cater for prevention of money laundering and other relevant criminal activities.

Security issues. The guidelines require that there should be clear risk management measures which are acceptable to the Bank and in conformity with national payment system risk management principles. Particularly, there should be an indication of how the scheme operator will provide the Bank with risk-related information that will enable it to assess, control and monitor all relevant payment system risks related to such a scheme.

Issuer details. The guidelines require that the scheme should provide an equal opportunity to all commercial banks that are supervised and regulated by the Bank of Tanzania to be allowed to be primary issuers of e-money. Secondary issuers, if any, should also be subject to regulation and supervision by the central bank.

Payment system issues. The guidelines require that only commercial banks should participate in the e-money clearing and settlement mechanisms. The central bank shall be the Settlement Agent for e-money transactions.

The scheme should facilitate provision of final settlement not more than 24 hours after a payment instruction has been initiated in the banking system.

Oversight issues. As indicated above, the Bank of Tanzania has already issued guidelines for e-money products and schemes. The guidelines clearly state that only auditable card-based electronic money schemes are allowed in Tanzania for the moment.

However, the central banks in the East African Community have jointly issued guidelines for licensing and regulating e-money schemes and products in East Africa. These guidelines cover both auditable and non-auditable e-money products and schemes.

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[34] Written in plain language which is understood by all potential participants in the scheme.

The guidelines state that the central bank shall provide for conditions of the licence and for the licensing of e-money products and schemes. Only institutions that are supervised and regulated by the central bank may apply for a licence to introduce e-money products and schemes.

Supervision issues. The guidelines provide that the Bank of Tanzania, as a regulator of the banking industry, will undertake some roles and responsibilities in supporting operations of any authorised interbank auditable e-money schemes based on payment cards in the country. Such roles and responsibilities include, but are not limited to:

- regulation of the e-money products and schemes based on the payment card products;
- development of policies and guidelines that would be required to implement such schemes.

Law enforcement issues. The guidelines require that the Bank of Tanzania:

- put in place, in consultation with the Government, the required legal framework in support of such schemes in general and the Electronic Funds Transfer (EFT) legislation in particular. The Bank may also assist in the establishment of institutional arrangements or mechanisms for dispute resolution; and
- establish risk management measures to address the issues associated with fraudulent activities and any other measures that may be required to maintain security within such schemes. In connection with this task, the central bank recommends that, provisionally, all participants should read, understand and deploy, as much as possible, recommendations from the Group of Ten report on *Risk Management for Electronic Banking and Electronic Money Activities*.[35]

Cross-border issues. The guidelines for licensing and regulating e-money schemes and products in East Africa provide for issues related to cross-border e-money transactions.

Other issues. The guidelines require that:

- the scheme should abide by internationally acceptable standards and recognised practices to facilitate national and international interoperability of e-money products and product-accepting devices; and
- the operator should indicate consideration of the impact of such developments on the low-income, unbanked and rural communities, which form a high percentage of the country's population.

The guidelines further stipulate that there should be a clear business plan that outlines, among other things, the overall implementation plan, automation strategies and a capacity building plan. The key issues to be addressed in the capacity building plan are:

- training - to provide knowledge and skills to local staff with regard to e-money products, processing mechanisms and risk management, among others;
- institutional development, including structures, processes, facilities and accommodation of existing investments as far as possible;
- outsourcing technical assistance, where necessary;
- establishment of sustainable maintenance capability; and
- appropriate staffing and retention schemes to reduce chances of operational risk.

In addition, the guidelines require that each proposed scheme's implementation plan must have a controlled mandatory pilot phase.

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[35] Basel Committee on Banking Supervision, *Risk Management for Electronic Banking and Electronic Money Activities*, Basel, March 1998. BS/97/122. Also available at the website of the Bank for International Settlements (www.bis.org).

THAILAND

1. Card-based products

To date, there are two multipurpose electronic money schemes at the implementation stage. One is MicroCash, which was introduced in 1996. The other is a closed-system e-money scheme provided by Siam Commercial Bank, Advanced Vision Systems Co Ltd, Chulalongkorn University and other universities. It was launched in May 1999.

***MicroCash*.** The scheme has been implemented full-scale in the Bangkok Metropolitan Area. The issuer of MicroCash cards in the early stage from 1996 to 1998 was a non-bank institution, the Bangkok Payment Technology Company (BPT). The company was a joint venture by four participants - a public bus provider, a computer/software distributor, an ATM processing centre company, and the DBS Thai Danu Bank Public Company Ltd (DTDB), which held a 10% stake. In early 1999, DTDB acquired all the assets and liabilities of BPT and proposed to develop and implement smartcard business and technology as an alternative financial instrument. DTDB believes that the smartcard is a potential product for the near future.

The MicroCash card is a reloadable anonymous electronic purse. The system architectures are those of Finland's Avant scheme. MicroCash cardholders can use the card to pay for goods and services at designated merchants such as retail stores, petrol stations, bookstores and school shops. Direct consumer-to-consumer transfer features are not available. The value stored on the card is denominated in Thai baht only.

***SCB Smart Card*.** Siam Commercial Bank, Advanced Vision Systems Co Ltd and Chulalongkorn University have cooperated to provide smartcards and software, including online registration via the University's intranet. Issued to various users such as students, lecturers and officers, SCB Smart Card is used as an identity card as well as an ATM/debit card for low-value payments in shops such as the campus bookstore. In May 1999, one year after its launch, an electronic purse feature was added to the smartcard. The maximum loading amount is USD 250. Due to its successful implementation, this programme has been extended to other universities in Thailand, through which 40,000 cards have now been issued.

***Recent developments*.** CP Seven Eleven Public Co Ltd, a convenience store with a large number of branches and a significant customer base, in cooperation with a consortium of three leading banks, is considering implementing an electronic purse to help reduce cash handling costs by the last quarter of 2002.

2. Network/software-based products

To date there is no software-based electronic money scheme in Thailand. However, the Bank of Thailand takes the view, at least on a preliminary basis, that there should be no fundamental differences in the legal or regulatory approach between card-based schemes and software-based schemes.

3. Policy responses

***Monetary policy and seigniorage*.** As cash and cheques remain the most popular means of payment in the Thai economy, the existing e-money products are used primarily for small-value transactions within the city of Bangkok. The products can only replace coins and small-denomination banknotes, and this will not significantly reduce the value of notes and coins in circulation.

At present, DTDB reports general statistical information on the scheme to the Bank of Thailand on a quarterly basis. The proportion of electronic money to notes and coins in circulation is less than 0.01% and is not significant enough to warrant the inclusion of e-money in monetary statistics. However, no specific study has been conducted on what measures could be taken if the development of e-money were to have a significant impact on money supply and seigniorage. The Bank does not have any plans to issue its own electronic money.

***General legal issues*.** Up to now, electronic money has not been addressed by specific provisions within the legal framework. The Bank of Thailand is collaborating with relevant authorities to lay down a legal framework for regulating the issuance of multipurpose e-money.

Relevant security issues. The Bank of Thailand has been referring to the conclusions of the G10 Task Force on Security of Electronic Money as the basis for an assessment of the technical security of an e-money system.

Issuer details. The Bank of Thailand is aware that multipurpose electronic money provided by non-bank institutions would not be subject to regulation and supervision under the Bank of Thailand's authority. However, we realise that imposing any regulations at this early stage, for example allowing only commercial banks to issue multipurpose e-money, could hinder or distort private initiatives or innovation, particularly given the potential advantages in technology adoption and marketing incentives of non-bank institutions over commercial banks. Still, it is important to maintain the stability of the payment system. Therefore, the policy stance regarding provider issues is currently under review.

Payment system issues. Problems with the clearing and settlement arrangements for the existing scheme have not yet emerged. However, the Bank of Thailand is considering restricting the use of e-money to consumer spending.

Oversight issues. The Bank of Thailand Payment Systems Group has been periodically meeting with the card issuer to encourage and recommend them to have electronic money designed to meet with Thailand Smart Card Working Group standards and to take the issue of consumer protection into account.

Supervisory issues. The Bank of Thailand is proposing an amendment to the Bank of Thailand Act that will empower the Bank more explicitly to oversee payment instruments and their issuer institutions, including those of electronic money.

Law enforcement and cross-border issues. No specific measures to prevent money laundering through such instruments have been implemented so far. Nevertheless, the Bank of Thailand has a plan only to allow electronic money denominated in Thai baht. Moreover, as the Money Laundering Act has been in force since August 1999, the framework for the prevention of money laundering through electronic payment schemes will have to be concurrent with that law.

Standardisation issues. Thailand Smart Card Working Group, comprised of the National Electronics and Computer Technology Center, the Bank of Thailand and other authorities, has identified technical and interoperability issues that need to be addressed for each type of application, technological challenges and solutions, infrastructure requirements, as well as existing foreign and/or international standards that can be used or should be complied with. The Working Group has also developed a set of recommendations for an interoperable framework of smartcard applications in Thailand.

TONGA

1. Card-based products

There are no developments with regard to e-money products in Tonga.

TRINIDAD AND TOBAGO

The major payment instruments in use in Trinidad and Tobago are the traditional retail payment products like cash, cheques, debit and credit cards, etc. At the moment there are no developments to report with regard to e-money. However, the process of reforming the payment clearance and settlement systems is under way. The main focus at this time is on the establishment of automated systems for small- and large-value systems (ACH and RTGS systems) and the complementary legislative changes that are necessary to support the reform.

The central bank has recently begun to look at legislation concerning e-money, and the issues referred to in this context and with regard to monetary policy are expected to receive attention in the period ahead.

TURKEY

1. Card-based products

One of the recent e-money schemes is Kampukart (Campuscart), issued by Kentbank. This reloadable, multipurpose, prepaid smartcard is widely used in a district of Istanbul (Bahçeşehir) and on a university campus located in this district. Related figures are given in the table at the end of the report.

İş Bankası has started a pilot project at its headquarters and in a university in Ankara. Smartcards issued by the bank have an embedded chip that is capable of holding value and identification information for the user. Cards are used to purchase goods at the vending machines and to allow users access to restricted areas. Money transfer to the card is performed at the ATMs of the bank.

Besides banks, some municipalities of the major cities such as Istanbul, Ankara and İzmir are providing "intelligent tickets" for public transportation. These are in the form of prepaid cards with magnetic stripes or embedded chips.

There are also some other prepaid cards, like phonecards and gas cards. The former are available all over the country whereas the latter are only used in a couple of metropolitan areas.

2. Policy responses

The central bank of the Republic of Turkey (CBT) does not have a direct role in the development of e-money, which has instead been a matter for the commercial banks and the Turkish Bankers Association. The CBT would only be involved if there were settlement problems, in which case its role as a regulatory body would be relevant.

UKRAINE

International payment systems such as Europay International, Visa International, American Express and Diners Club International, work successfully in Ukraine. Most large Ukrainian commercial banks are members of these payment systems and ensure settlements through the systems' payment cards.

In addition to the international payment systems, some domestic ones also operate in Ukraine. The National System of Mass-Scale Electronic Payments is going through the pilot project stage. The system is based on smartcard technology and is aimed at ensuring the possibility of large-and small-value cashless settlements in real time for a broad section of the population.

UNITED KINGDOM

1. Card-based products

Two card-based e-money schemes have been trialled in the United Kingdom. The first is Mondex; the second is Visa Cash.

***Mondex*.** Mondex was introduced to the United Kingdom in July 1995 with a trial undertaken in Swindon. During the course of the pilot, approximately 14,000 cards were issued and about 700 retailers participated. The cards were also accepted in parking ticket machines, public telephones and on buses. The trial was closed in July 1998.

As at June 2001, Mondex is currently in operation at universities in Exeter, York, Nottingham and Aston. Over 83,000 cards are currently in circulation. The cards are being used for additional functions besides e-money, eg access control, library ticketing and identification (although none are combined with other payment functions). Future Mondex cards will all be based on the MULTOS operating system to allow them to carry multiple applications. In a number of the universities, steps have been taken to include retailers outside the campus which normally see a significant amount of student trade, eg bars, convenience stores and bookstores. The campus cards are limited to storing a maximum of GBP 100 each; the average load amount for those cards in use is GBP 10.

The university schemes are being operated, and the value issued, by HSBC and NatWest Bank, who are members of Mondex UK, which holds the franchise to operate the scheme in the United Kingdom. The Mondex UK originator (the actual issuer of the e-money, which is sold to - or bought from - the participant banks) is owned by HSBC and NatWest Bank.

Cards can be reloaded with value at Mondex-enabled ATMs (loading from a current or credit card account) or at a special purpose machine (loading from cash). Payments to retailers are made by inserting the card into a terminal. On the retailer's instruction, the terminal debits the amount due from the card and automatically credits the retailer; the retailer's card accumulates the total value of all transactions made with Mondex cards. Periodically (usually daily) the retailer takes the card from the point of sale terminal and transmits the stored value to the bank. This can be done by telephone, or, in some cases, by using the same machine that the students use to load their cards. In time, terminals will be available with the capability to contact the bank and transmit the stored value direct.

***Visa Cash*.** A Visa Cash pilot was operated in Leeds from October 1997 until August 2000. The participating banks were Abbey National, Barclays, Co-operative Bank, Halifax, Lloyds TSB and Royal Bank of Scotland. Visa International operated a net settlement process between issuing and acquiring banks.

The cards were either disposable e-money only, or multifunction cards with the Visa Cash application (on a chip) being combined with a debit and/or credit card (on either a magnetic stripe or a chip). The cards were able to store a maximum value of GBP 50. Disposable cards could be purchased from kiosks or card dispensing machines. The non-disposable cards were reloadable from an ATM (against a debit to the current account) or a special purpose machine (allowing loading from a credit card). The value was only transferable to merchants - not to other cardholders. Points of sale accepting the cards in Leeds included car parks, public transport, fast food outlets, newsagents and vending machines.

Payments were made by the cardholder inserting the card into the merchant's terminal (or a slot in a vending or ticketing machine) and confirming the transaction by pressing the "yes" button. The terminal debited the amount due from the card and automatically credited the merchant's card. At the end of each day, merchants transmitted a full record of the transactions made during the day to their bank. Their account was then credited, and the transaction data passed to Visa for clearing, settlement and archiving. This meant that issuers could have access to a full record of all transactions made on each card in issue.

Visa EU has now amended its operating rules concerning purse schemes such that any new Visa Cash programme will be based on CEPS (Common Electronic Purse Specifications), an open and global interoperable standard.

2. Network/software-based products

Network-based schemes in the United Kingdom remain relatively small-scale, and of limited application. Thus, for example, Mondex has provided built-in payment capability for over a million "set-top boxes" for digital interactive television services. The University of Exeter has also developed software which enables Mondex payments to be made over the internet. It will use this to sell "pay as you go" distance learning packages to remotely located students and is already using it to enable campus-based students to pay for centralised printing.

Another project is ***Magex***, which was launched by the NatWest Group in October 1999 and became an independent company in April 2000, funded by, amongst others, the Royal Bank of Scotland. This initiative enables customers to download digital products (music currently) from the internet, and includes an online payment facility called the Magex wallet. Customers open a "wallet" and put value in it (and thereafter top it up) from their credit or debit card through a transaction at the Magex website. Once the customer agrees to a purchase, the cost is automatically deducted from the Magex wallet. At regular intervals the customer connects to the Magex website to upload accumulated transactions, so that those selling the digital products can be paid. Hence, the customer does not need to give credit card details to any counterparty other than Magex itself. Magex accumulates amounts owed to the seller and pays the accumulated sum at regular intervals by direct credit to the seller's designated bank account.

3. Policy responses

The Bank of England is in favour of developments which increase the efficiency and convenience of payment systems, including electronic money. There may, however, be implications of such schemes for monetary policy, systemic risk, consumer protection and law enforcement, and these need to be considered.

Since 1 June 1998, the Bank of England has no longer been responsible for the prudential supervision of banks. The statutory responsibility for supervision passed to a new body, the Financial Services Authority (FSA), which is responsible for the regulation of all financial services activities including insurance, securities trading, investment management, and building societies. The Bank of England, however, retains its role in monitoring overall systemic stability. The Bank and FSA are cooperating closely on e-money policy.

Monetary policy and seigniorage. The Bank has collected monthly data on e-money issued by banks since September 1997 and will arrange to collect data on issuance by non-banks if/when the amounts become material. The Bank agrees with the conclusions of the G10 study on monetary policy undertaken during 1996. The effect of e-money on monetary policy and on seigniorage revenues is likely to be negligible during its initial stages. The Bank of England is not funded from seigniorage income - such income accrues to HM Treasury.

General legal position. It has been established that the issuing of electronic money does not contravene the 1844 Bank Charter Act, which made the new issue of notes in England and Wales a monopoly of the central bank. However, with regard to the Banking Act 1987, which restricts the taking of deposits to authorised institutions, the position of e-money schemes in general is not clear. Schemes set up in a certain way might fall under the Act, but many schemes are sufficiently unlike deposit-taking to escape the Act's scope. In October 2000, the EU published Directives on the issuance of electronic money and prudential supervision of electronic money institutions. These have to be incorporated into UK law by April 2002. At the same time, the Government intends to amend the Financial Services and Markets Act 2000 to include e-money issuance as a regulated activity. This will bring all e-money issuers in the United Kingdom under the supervision of the FSA.

Relevant security issues. The Bank fully supports the conclusions of the G10 Task Force on Security of Electronic Money ("Sendrovic Group"). An assessment of technical security and of systems and controls should be part of a banking supervisor's examination of an e-money system (probably undertaken by external consultants specialising in the field). Products developed abroad could give rise to further issues if regulatory/security standards were lower.

Provider issues. All e-money issuance will be regulated, whether undertaken by existing credit institutions or by new electronic money institutions. It is the intention of the EU Directives to establish a level playing field between these different categories of issuer so as to ensure fair competition to the

benefit of consumers. Any non-bank issuer of e-money in the United Kingdom will be authorised provided that it meets the necessary criteria laid down by law and by the FSA's regulatory framework.

***Payment system issues*.** The Bank does not undertake detailed oversight of e-money schemes. It is improbable that, in the short or even medium term, e-money systems will present significant concerns for the safety and efficiency of payment systems, given the low level of use in the United Kingdom. However, the Bank will continue to monitor the potential risks posed by e-money settlement systems to the stability of other payment systems, notably in the case that counterfeit e-money were to be discovered.

***Supervisory issues*.** The FSA is monitoring e-money developments and is considering how it would treat e-money issuers once the EU Directives are enacted in UK law. In the meantime, where a bank is involved in an e-money scheme, the FSA takes into account the overall effect that this involvement has on the bank's risk exposures. Proposers of schemes which were not to be operated by banks are advised to approach the FSA supervisors at an early stage; they would be encouraged to take their own legal advice on the question of whether their particular product fell within the 1987 Banking Act. As the law currently stands, issuers of products which do not represent deposit-taking (within the meaning of the Act) are not subject to supervision, except where they are owned by commercial banks and thus subject to consolidated supervision.

***Law enforcement issues*.** Features that would make electronic money products particularly attractive for money laundering include unlimited transferability (including via telephone or the internet), a high or no limit on the value stored on cards, and anonymity of users. Strict adherence to "know your customer" criteria, and suitable "fit for purpose" limits will help to overcome the risk of money laundering on a significant scale. The provisions of the Money Laundering Regulations 1993 - which implement the EU Money Laundering Directive - will apply to all forms of e-money. A second EU Money Laundering Directive is expected in the future and this is likely to make specific reference to e-money schemes. The FSA encourages prospective scheme providers to contact relevant law enforcement agencies.

***Cross-border issues*.** As yet no significant cross-border activity involving UK institutions or customers is taking place, although this may change in the future. In the case of EEA credit institutions using a passport to offer such services, supervision would largely be the responsibility of the home state regulator. Any other foreign scheme being offered in the United Kingdom would be subject to the same treatment as domestic schemes.

***Other issues*.** The Bank has to date considered that questions of interoperability, standardisation and contracts with cardholders are best determined by market forces, but part of its monitoring role is to watch for evidence of market failure.

UNITED STATES

1. Card-based products

Following the wind-down of much-publicised card trials in New York City and Celebration, FL, the only current Visa Cash projects involve several military bases as well as Visa USA's corporate campus and corporate campuses at several Visa member banks in the United States.

During the past two years there has been growing use of prepaid debit cards, which are being issued by several banks. Prepaid cards are typically linked to a bank account established by the cardholder's employer. The card arrangement is used to make payroll disbursements to employees who do not have a bank account. The cards are used to make purchases at points of sale or to withdraw currency at ATMs. Prepaid cards are also used by individuals (for example, students) who cannot open a bank account or a revolving credit line in their own name. The cards are mostly used to make purchases at points of sale or over the internet. American Express's Cobalt card and Visa's Buxx are two examples of prepaid debit cards targeted at teenagers, while other cards, such as MasterCard's Ecount, are being promoted for a wider market.

The Washington Metropolitan Area Transit Authority (WMATA) has implemented a contactless fare card system for the local subway system. The Smartrip cards accept up to USD 180 in value and

complement the traditional magnetic stripe cards throughout the subway system. WMATA is planning to expand the service to metropolitan area buses in 2002. Since its inception, over 180,000 Smartrip cards have been purchased.

Similar card projects are under development in San Francisco, CA and Seattle, WA. In 1999, the San Francisco Bay Area's Metropolitan Transportation Commission awarded a 10-year contract to a Motorola-led consortium to operate and maintain a single ticket system relying on smartcard technology for several local transit systems. Full deployment is expected in 2002. Seven transit agencies in the Seattle area have issued requests for proposal (Central Puget Sound Regional Fare Coordination Project) to develop a similar system relying on a single smartcard fare system. Contract awarding is expected in 2001, with beta testing in 2002 and full operation in 2003.

Various other "closed system" stored value card projects are in operation or being implemented in areas such as sports facilities, university campuses, military bases, and other facilities. An example of a university smartcard project is George Washington University's GWorld Card. The chip-based card provides official university identification, security access to buildings, stored value for on-campus dining, and a prepaid debit account for on- and off-campus purchases, including parking, photocopying, university clubs, in addition to nearly 30 off-campus merchants. Value can be added through the internet, at the university office, or at value transfer machines located on campus.

The University of Michigan discontinued its stored value card programme in 2001.

Smartcard developers currently have several platforms to choose from, including Microsoft's Windows for Smart Cards, Sun Microsystems' Java Card and MAOSCO's (London-based) MULTOS.

2. Network/software-based products

Several banks and technology companies are currently expanding "wallet" technology for internet-based transactions. While this technology does not represent a fundamentally new payment instrument, it does facilitate the use of current payment instruments for online environments. A wallet provider aggregates a consumer's credit card, debit card and shipping information. Whenever merchants allow the use of a wallet on their website, customers no longer need to complete payment and shipping instructions. Rather, the information is transferred via a few simple steps from the wallet provider to the merchant. Presently, the technology serves primarily as an interface for making payments with conventional instruments such as credit cards. Several of the larger participants include Visa, MBNA and Microsoft.

CyberCash was acquired by VeriSign. CyberCash's payment technology is part of VeriSign's payment platform.

3. Policy responses

Monetary policy and seigniorage. Electronic money liabilities issued by depository institutions are likely to be regarded as transaction balances, subject to reserve requirements, and included in M1. The Federal Reserve at present has no legal authority to require statistical reporting of any e-money balances issued by non-depository institutions. Voluntary reporting, as has been the case with traveller's cheques issued by non-banks, may be encouraged.

At present, the introduction of e-money is not expected to have any effect on monetary policy implementation - neither reserve demand nor reserve supply is expected to be significantly affected. The situation will need to be monitored if and as electronic money balances expand.

The introduction of e-money, if successful, would presumably reduce the demand for banknotes and coin; the magnitude of this effect obviously depends on the demand for electronic money. The Federal Reserve would be expected to accommodate any reduced demand for currency.

Provider issues. The Federal Reserve and other US banking agencies have not recommended restrictions on issuance of e-money to any particular type of entity. Issuance could take a variety of forms. For example, federal banking agencies, including the Federal Reserve and the Office of the Comptroller of the Currency (OCC), have approved investment by banks and bank holding companies in non-bank issuers of general purpose stored value cards, subject to certain conditions. Such issuers and arrangements would generally be subject to examination or other means of oversight by the primary regulators of the investing banks or bank holding companies.

Non-depository institution issuers of stored value cards or other forms of electronic money may be subject to existing state government regulations applicable to money transmitters and issuers of payment instruments such as traveller's cheques. These regulations often involve examination by state banking authorities, portfolio restrictions, audits and reporting requirements.

Supervisory issues. Currently, federal banking authorities are updating bank examination procedures to encompass electronic banking developments and their associated risks. Given the very limited experience with e-money products and the small number of institutions offering such products in the United States, however, specific supervisory guidance in this area is likely to be developed over time as necessary.

Law enforcement issues. In August 1999, the Financial Crimes Enforcement Network (FinCEN), a bureau of the US Treasury Department, issued final regulations defining money services businesses (MSBs) and requiring registration with the US Treasury Department of certain types of such businesses, such as currency dealers, cheque cashers and issuers, sellers, and redeemers of traveller's cheques or money orders. In March 2000, FinCEN issued final regulations requiring certain MSBs to file reports of suspicious activity. Although issuers, sellers and redeemers of stored value products were included in the definition of an MSB, thereby requiring them to comply with certain applicable provisions of anti-money laundering regulations, they were specifically excluded from the registration and suspicious activity requirements.

Cross-border issues. No significant use of or problems involving cross-border or multicurrency e-money products have been reported to date.

Other issues. In April 1996, the Federal Reserve requested public comment on a proposal to exempt certain types of stored value cards from many of the requirements of Federal Reserve Regulation E. Regulation E, which implements the Electronic Fund Transfer Act, establishes consumer protection requirements for electronic funds transfers. In September 1996, Congress directed the Federal Reserve to prepare a report evaluating whether provisions of the Electronic Fund Transfer Act could be applied to electronic stored value products without adversely affecting the cost, development and operation of such products. This report was completed in March 1997. The study examined the costs and benefits of various regulatory alternatives, but did not endorse or recommend any specific course of action. To date, the Board has not taken further action on the April 1996 proposal; the Board, however, continues to monitor development and issues concerning electronic stored value products, and may take further action on the proposal in the future.

In August 1996, the Federal Deposit Insurance Corporation (FDIC) published an opinion concluding that certain types of stored value cards issued by insured depository institutions are not deposits as defined under the Federal Deposit Insurance Act and thus are not covered by federal deposit insurance.

URUGUAY

There are no developments with regard to e-money in Uruguay.

VENEZUELA

1. Card-based schemes

Currently, there are three card-based e-money schemes, which are operated by banks in association with the international companies Mondex and Visa.

There is no particular legal framework for these initiatives, although a newly approved Law of Electronic Messages and Digital Signatures should provide some support for future development.

Mondex. There are four commercial banks testing usage of Mondex cards on two Venezuelan university campuses. The deployment is in its initial stages, therefore there is no significant data relating to usage. The fee structure among the participants has been not decided. The prototype is being issued as a student ID card plus e-money card. Although the card has been designed to be multicurrency, usage is currently restricted to local currency.

Visa Travel Money (prepaid ATM card). Currently issued by two large banks and one "Casa de Cambio" (institution that intermediates in foreign exchange currency). The scheme was introduced in late 2000, but has not achieved significant volume yet. The cards are issued in US dollars.

Visa Cash. Visa Venezuela has announced the start of pilot programmes for this e-purse card.

2. Network-based schemes

Currently there are three network-based e-money schemes: the first two are short-lived credit cards issued by banks and the third is an internet payment system.

eCard Mercantil. Issued by a large commercial bank, Banco Mercantil. It is a service provided to both credit card and deposit customers. They can apply by internet or by phone for an eCard number that is valid for one transaction only. It was designed for online shopping.

Pasaporte Digital. Has recently been announced by another large bank, Banco de Venezuela, and closely follows the features of the eCard scheme.

P-Cash. This service was introduced recently by a financial internet portal (Patagon.com) with subsidiaries in the securities and insurance markets. It offers a so-called "prepaid" scheme whereby the customer deposits cash into the company's accounts at four commercial banks. Then, the customer can use the balance to pay for goods and services at online shops affiliated to the scheme. The legal arrangement for this scheme is not clear and is now under scrutiny by the central bank. There is a fee structure related to usage (amount and frequency).

3. Policy issues

Since most of the schemes are being developed by banks, both the central bank and the banking supervisory authority have taken a prudent approach when considering new products by regulated entities.

In the case of P-Cash, since the entity that is offering the service is a non-regulated company, the central bank and other regulators (banking, securities and insurance) are looking at the legal, financial and regulatory issues with regard to the service offered by Patagon. In general, the approach has been that this innovative service should be provided by regulated financial institutions.

Monetary policy and seigniorage. It is considered that the e-money schemes currently lack the volume to influence the value of notes and coins in circulation, nor it is envisaged that they will be able to obtain such a volume in the near future, primarily due to the fact that a large proportion of the population do not have easy access to the internet.

Legal issues. As was mentioned before, new legislation has changed the legal standing of electronic messages and has given validity to digital signatures. At the same time, a new banking law is being discussed that will address services provided by banks online. Finally, the Central Bank Law will be amended to allow the central bank to oversee every kind of payment system, including e-money schemes.

Multicurrency issues. There is some concern regarding both card- and network-based schemes with multicurrency features and foreign exchange market stability. Currently, Venezuela does not have any forex transaction restrictions, except for reporting requirements related to anti-money laundering policies. It is not clear if the e-money schemes could be used to side step those requirements.

VIETNAM

1. Card-based products

To date, no multipurpose prepaid cards have been launched in Vietnam. Most cards used are credit cards or single-purpose stored value cards, ie telephone cards. A number of commercial banks have been considered to monitor a pilot phase for prepaid and debit card schemes, but at the moment they are unsuccessful.

2. Network/software-based products

At present, there are no software-based e-money schemes in Vietnam.

3. Policy responses

Monetary policy and seigniorage. The amount of single-purpose stored value cards issued by non-banks is negligible and excluded from monetary statistics. There are no significant developments in e-money issued by banks at the moment; thus e-money will not have a considerable impact on seigniorage even in the near future.

General legal issues. Currently, according to the Law on Credit Institutions promulgated in 1997, e-money as a means of payment shall be provided by banks only. There have been some specific regulations issued by the State Bank of Vietnam with regard to electronic fund transfers, but they are still not sufficient. The legal framework for e-commerce, especially for dealing with the legality of digital signatures, has not been formed. But in the near future, commercial banks may acquire necessary legal base and incentives to develop e-money.

Provider issues. Only banks will be allowed to issue e-money.

YEMEN

There are no developments with regard to e-money in Yemen.

ZAMBIA

There are no developments with regard to e-money in Zambia. However, Zambia is participating in the COMESA/PTA Bank smartcard project that will introduce e-money within the COMESA grouping, using the Mondex electronic cash application. A pilot will be established in Kenya before launching the project in other COMESA countries. The specific territories of the COMESA to participate in Mondex in the initial stage include Angola, Burundi, Comoros, DR Congo, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Rwanda, Seychelles, Sudan, Tanzania, Uganda, Zambia and Zimbabwe.

Table A

System design features

Country	Name of systems	Type of system	Loading procedures	Value limit on card or consumer software (in USD)	Transferability among end-users	Adapted for network payment	Multicurrency features	Multifunctional payment systems
Austria	Quick	Card-based	ATM	145.35[1]	No	Yes (launch 2001)	No	Yes
Belgium	Proton	Card-based	ATM, phone, Internet	105	No	Piloted	No	Yes
Brazil	VISA Cash	Card-based	ATM	45-136	No	Considered	No	Yes
Canada	Mondex Canada Sherbrooke, Quebec	Card-based	Phone (residential), ATMs, other Mondex cards, internet, specialised loading units	335 (average)[1]	Yes	Considered	No	Yes
	VISA Cash Barrie, Ontario	Card-based	Specialised loading units, internet	335[1]	No	Considered	No	Yes
Denmark	DANMØNT	Card-based	ATM		No	No	No	No
Finland	Avant	Card-based	ATM, internet	311	No	Yes	No	Yes
	Matkahuolto	Card-based	Other	na	No	No	No	No
	UniCard	Card-based	Other	155	No	No	No	No
	Vaasa Citycard	Card-based	Other	155	No	No	No	No
	Rovaniemi Citycard	Card-based	Other	na	No	No	No	No
	Seinäjoki Citycard	Card-based	Other	na	No	No	No	No
	Espoo Citycard	Card-based	ATM, internet, other	311	No	No	No	Yes
	Pori Citycard	Card-based	ATM, internet, other	311	No	No	No	Yes

Country	Name of systems	Type of system	Loading procedures	Value limit on card or consumer software (in USD)	Transferability among end-users	Adapted for network payment	Multicurrency features	Multifunctional payment systems
Finland (cont)	Vantaa Citycard	Card-based	ATM, internet, other	311	No	No	No	Yes
France	Monéo	Card-based	ATM	na	No	No	No	Yes, Debit card function
	Mondex France	Card-based	ATM	na	Yes	No	No	Yes, Debit card function
	MinutePay	Network-based	Internet	670	Yes	Yes	No	No
Germany	GeldKarte	Card-based	ATM	400 (DM)	No	Yes	No	Yes
Honduras	FUTURA 3000	Card-based	Via participating banks	Limit set by the amount transferred by the client when charging the card	Between banking institutions only	Electronic clearing	Yes, Central American currencies and USD	No
Hong Kong	Mondex	Card-based software	– 1 ATM – Internet (for i-life card)	385	Yes	Yes	Available but not currently used	Available but not currently used
	Visa Cash	Card-based	– ATM	385	No	Piloted	Piloted	Piloted
	Octopus	Card-based	– Self-service add value machines – Over-counter	129	No	No	No	No
Italy	Minipay	Card-based	Bank branch, ATM, phone	180	No	Yes	No	No
	Ominipay Prepagato	Network-based	Internet	143	No	Yes (only for internet)	Considered	Considered
	Moneta On Line	Network-based	ATM and bank branch (for purchasing the prepaid scratch cards) Internet (for loading)	185	No	YES (only for internet)	No	No
Lithuania	eLitoCard	Card-based	ATM, PC-based terminal	No limit	No	Considered	Yes	Yes

Country	Name of systems	Type of system	Loading procedures	Value limit on card or consumer software (in USD)	Transferability among end-users	Adapted for network payment	Multicurrency features	Multifunctional payment systems
Malaysia	MEPS CASH (Proton)	Network/Card	Loading devices (attended/ unattended)	RM500.00@ RM1=USD3.80	No	Yes	No	No
Moldova	MoldCard system	Card-based	Electronic terminal	2,413	No	No	No	Yes[1]
Netherlands	Chipknip	Card-based	Terminals (7000)	226 or 452[1]	No	Yes	No	Debit card
	Chipper	Card-based	Public phones (20,000)	226	No	Yes	No	Debit card
Nigeria	Valucard	Card-based	Others	Varies with each issuing bank, but capable of carrying up to NGN 16m	No	No	No	Yes
	Smartpay	Card-based	Others	-do-	No	No	No	Yes
	Esca	Card-based	Others	Up to NGN 16m	No	No	No	No
Portugal	PMB (Porta-Moedas Multibanco)	Card-based	ATM	341	No	No	No	Debit and/or credit card; ATM access
Russia	PayCash	Network-based	Internet	No limit	Yes	Yes	No	No
Singapore	CashCard	Card-based	ATMs, kiosks, HomeNETS,[1] mobile phones, internet reload	289	No[2]	Yes[3]	No	ATM and debit cards
Slovak Republic	MicroPay[1]	Network-based	Internet	Small values	na	Yes	No	No
	mKonto[1]	Network-based	Internet	Small values	na	Yes	No	No
Spain	Monedero 4B	Card-based	ATM	170.72	No	Yes	No[1]	Yes
	VISA Cash	Card-based	ATM[2]	170.72	No	Yes	No[1]	Yes
	Euro 6.000	Card-based	ATM[3]	204.86	No	Piloted	No[1]	Yes
	Virtual C@sh+	Network-based	ATM/Internet	239.01	No	Yes	No[1]	Yes
	Cybertarjeta La Caixa	Network-based	Internet	1707.2	No	Yes	No[1]	Yes
	Cybertarjeta Banco Herrero	Network-based	Internet	1707.2	No	Yes	No[1]	Yes

Country	Name of systems	Type of system	Loading procedures	Value limit on card or consumer software (in USD)	Transferability among end-users	Adapted for network payment	Multicurrency features	Multifunctional payment systems
Sweden	Cash Card	Card-based	Special terminals and phone	150	No	No	No	Yes. Debit card and ATM access.
Switzerland	Cash	Card-based	ATM	204 per card (680 per day)	No	No	No	Yes
	e-cash™	Network-based	Internet	3,401 per month	No	Yes	No	No
Taiwan	FISCard	IC Card	ATM and public phone	15.2 lower limit 303 upper limit	No	No	No	Yes. ATM, debit and phone card.
	FISC-E-bank	Network-based	Internet	60,600 upper limit 90,900 (per day)	No	Yes	No	No
	Mondex Taiwan	Card-based	Array of Mondex devices	63 per card 1,563 per month	No (piloted)	Yes (considered)	Yes (up to 5 currencies can be stored)	Yes. Credit card.
Thailand	MicroCash	Card-based	Offline loading device	125	No	No	No	e-purse only
	SCB Smart Card	Card-based	Online loading device	250	No	No	No	2 types: - e-purse - ATM/e-purse
Turkey	"Kampuskart" (Campuscard)	Card-based	At POS terminals	na	No	No	No	Yes
United Kingdom[1]	Mondex	Both	ATM (for loading from current or credit card account)/ specific machine (for loading by cash)	165 (GBP 100, ie unchanged, but in USD)	Yes	Limited	No (although planned later)	ID and access control. No other payment function at present, but planned later.
	Visa Cash	Card-based	ATM (for loading from bank account)/ specific machine (for loading from credit card). Trialling phone.	83 (GBP 50, ie unchanged, but in USD)	No	No	No (although planned later)	Debit/credit/ cheque guarantee/ ATM card

Country	Name of systems	Type of system	Loading procedures	Value limit on card or consumer software (in USD)	Transferability among end-users	Adapted for network payment	Multicurrency features	Multifunctional payment systems
United Kingdom (cont)	Magex Wallet	Network-based	Value loaded from credit or debit card at central Magex website	na	No	Yes	No	–
United States	Visa Cash[1,2] (New York)	Card-based	ATM	500	na	na	No	ATM
	Mondex[1,3] (New York)	Card-based	ATM	200	na	na	No	ATM
	American Express Cobaltcard[4]	Network-based	Credit card or checking account	2000	na	Yes	Yes	ATM
	MasterCard Ecount[4]	Network-based	Credit card or checking account	500		Yes	Yes	ATM
	Visa Buxx[4]	Network-based	Credit card or checking account	1500		Yes	Yes	ATM
Venezuela	Mondex	ePurse Card	ATMs at campus	200	Yes. Currently restricted among merchants	Yes	Up to 5 currencies. Currently restricted to local currency	Yes: ID card, debit/credit card
	Visa Travel	Prepaid Card	Branch	250	No	No	No	No
	Visa Cash	ePurse Card	ATM, POS	na	Yes	Yes	Yes	na
	eCard	Virtual Credit Card	Internet, phone	Credit limit on main credit card	No	Yes	Yes	No
	Pasaporte Digital	Virtual Credit Card	Internet	Credit limit on main credit card	No	Yes	Yes	No
	P-Cash	Virtual prepaid	Deposit at branch	1,400	Yes	Yes	No	No

Austria: [1] In EUR.

Canada: Note: Exchange rate: CAD = USD 0.67 (year-end closing exchange rate). [1] The limits quoted refer to the limit a loading device will permit. The maximum limit on the chip for both Mondex and VISA Cash is USD 670.

Moldova: [1] A card combines some financial applications with some retailers' ones.

Netherlands: [1] In EUR. Depends on issuing bank.

Singapore: [1] Handheld terminal which allows CashCard top-ups at home via the telephone line. [2] Presently, purse-to-purse transactions are not possible. [3] The CashCard can be used to make small-value payments for purchases on the Internet. This scheme is known as NETSCash.

Slovak Republic: [1] Both mentioned schemes are being tested.

Spain: [1] Devices with a single-currency feature (pesetas or euro). [2] Although at a very early stage, several devices called Self-service EFT have been tested in member CIs. No cash withdrawals can be done but the loading of e-money products. [3] There is also the possibility of loading the electronic purse (prior cash payment) in special devices placed inside of any branch of the issuer. Decoders operating for Pay-TV are currently being modified as to allow for loading and consumption.

United Kingdom: [1] Note that the Visa Cash pilot closed in August 2000.

United States: [1] Joint experiment by Mondex and Visa Cash. An average of $38 in stored value was loaded onto user's cards, and more than $1 million in user purchases had been electronically deposited into merchants' accounts by the close of the programme. [2] The only current US Visa Cash programmes involve several military bases as well as Visa USA's corporate campus and corporate campuses at several Visa member banks. [3] Although Mondex e-money programmes exist outside the United States, no e-money projects are currently in operation within the United States. [4] While some aspects of these products do not fit completely the traditional definition of e-money (for example, the record of funds is held by the issuer), they are included in the survey to reflect recent developments in the evolution of e-money.

Table B

Data on use of e-money products

Country	Name of systems	Type of system	Number of issuers	Number of cards issued (or home PC users)	Number of merchant terminals (or merchant PCs)	Float outstanding (in USD millions)	Volume of daily (purchase) transactions	Value of daily (purchase) transactions (in USD)	Average value of (purchase) transactions (in USD)	Memo item	
										Reporting period	Launch date of product
Austria	Quick	Card-based	1	5.5 million 5.6 million	41,585 45,860	3.9 (EUR) 4.3 (EUR)	8,400 12,500	41,500 (EUR)[1] 51,600 (EUR)[1]	4.95 (EUR) 4.17 (EUR)	2000 April 2001	1995
Belgium	Proton	Card-based	36	8,500,000	70,000	43.43	156,357	495,652	3.17	February 2001	February 1995
Brazil	VISA Cash	Card-based	13	95,000	75,000	37.7	334	1,236	3.77	Dec 1996 - Apr 2001	Oct 1996
Canada	Mondex Canada Sherbrooke, Quebec	Card-based	2	25,108	650	0.1055	679	3,001.95	4.42	As of 31 Dec 2000	26 Aug 1999
	VISA Cash	Card-based	1	61,503	595 (of which 246 are vending terminals)	0.0315[1]	na	na	1.68	As of 31 Dec 2000	October 1997
Denmark	DANMØNT	Card-based	1	593,000	1,954	2.74	21,685	23,913	1.10	2000	1993
France	Monéo	Card-based	13	60,000	na	na	4,000	12,000	3	Nov 2000 Mar 2001	End 99
	Mondex France	Card-based	2	110,000	na	0.225	1,500	3,800	2.5	Sept 1999 - April 2001	Sept 1999
	MinutePay	Network-based	1	na	na	na	na	na	na		July 2001
Germany	GeldKarte	Card-based	3,500	60,000,000	70,000	58 (EUR)	75,000	166,000 (EUR)	2.21	February 2001	1996
Honduras	FUTURA 3000	Card-based	–	–	–	–	–	–	–	–	–

Country	Name of systems	Type of system	Number of issuers	Number of cards issued (or home PC users)	Number of merchant terminals (or merchant PCs)	Float outstanding (in USD millions)	Volume of daily (purchase) transactions	Value of daily (purchase) transactions (in USD)	Average value of (purchase) transactions (in USD)	Memo item	
										Reporting period	Launch date of product
Hong Kong	Mondex	Card-based software	2	243,000	3,420	4m	na	na	na	Mar 2001	Nov 1997
	Visa Cash	Card-based	9	340,000	4,500	Confidential	na	na	5.9	Mar 2001	Aug 1996
	Octopus	Card-based	1	7 million	16,000	Confidential	6 million	5.4 million	0.89	Mar 2001	Sep 1997
Italy	Minipay	Card-based	45	40,712	6,430	0.49	798.11	1,272	1.6	1 Jan-31 Dec 2000	June 1996
	Ominipay Prepagato	Network-based	1	97	55	0.0011	3	29	10	1 Jan-1 Mar 2001	October 2000
	Moneta On Line	Network-based	1	4,002	Merchants of Visa circuit on internet	0.1392	32.43	1,861	57	1 Mar-30 Apr 2001	December 2000
Lithuania	eLitoCard	Card-based	1	105,000	1,150	12.45	3,025	19,667	6.51	April 2001	1996
Malaysia	MEPS CASH (Proton)	Card/ Network	6	53,534	376	RM0.23@ RM1= USD3.80	8	RM6.88@ RM1= USD3.80	RM6.88@ RM1= USD3.80	April 2001	Sep 1999
Moldova	MoldCard system	Card-based	3	3,944	17	0.041	211	4,444	21	Quarter IV 2000	1998-2000[1]
Netherlands	Chipknip	Card-based	67	14,500,000	163,000[1]	25,900,000[2] (NLG 57,000,000)	na	68,000[3]	8[3]	–	October 1996
	Chipper	Card-based	6	7,000,000			na			–	June 1997
Nigeria	Valucard	Card-based	38	72,306	1,950	400m (NGN)	na	na	6.67m (NGN)	April 2001	–
	Smartpay	Card-based	33	31,345	491	88m (NGN)	na	na	0.222m (NGN)	June 2001	–
	Esca	Card-based	3	5,818	58	na	na	na	na	April 2001	–

Country	Name of systems	Type of system	Number of issuers	Number of cards issued (or home PC users)	Number of merchant terminals (or merchant PCs)	Float outstanding (in USD millions)	Volume of daily (purchase) transactions	Value of daily (purchase) transactions (in USD)	Average value of (purchase) transactions (in USD)	Memo item	
										Reporting period	Launch date of product
Portugal	PMB (Porta-moedas Multibanco)	Card-based	20	Balance>0: 184,736[1] Balance=0: 3,315,621[1]	67,534[1]	0.82[1]	13,090	11,180	0.86	January-December 2000	April 1995
Russia	PayCash	Network-based	1	na	na	na	na	na	na	na	na
Singapore[1]	CashCard	Card-based	5[2]	4,696,861	16,270	19.63	364,198	274,152	0.75	December 2000	November 1996
Slovak Republic	MicroPay	network-based	na	na	na	na	na	na	na		
	mKonto	network-based	na	na	na	na	na	na	na		
Spain	Monedero 4B	Card-based									End-1996
	VISA Cash	Card-based									2nd half 1996
	Euro 6.000	Card-based									Mid-2000
	Virtual C@sh+	Network-based	130	8,802,825	131,702	27.344	5,545.42	14,387.69	2.067	Jan-Dec 99	End-1996
	Cybertarjeta La Caixa	Network-based									Mid-2000
	Cybertarjeta Banco Herrero	Network-based									Mid-2000
Sweden	Cash Card	Card based	4	3,000,000 (600,000 activated)	41,000	40 (estimate)	16,700	117,000	7	2000	Nationwide 1998
Switzerland	Cash	Card-based	Approx 350	3,600,000	27,000	na	na	na	2.22	March 2001	January 1997

Country	Name of systems	Type of system	Number of issuers	Number of cards issued (or home PC users)	Number of merchant terminals (or merchant PCs)	Float outstanding (in USD millions)	Volume of daily (purchase) transactions	Value of daily (purchase) transactions (in USD)	Average value of (purchase) transactions (in USD)	Memo item	
										Reporting period	Launch date of product
Taiwan	FISCard	IC Card	22	2,100,000	11,676	na	1,200	3,032	2.43	April 2001	February 1998
	FISC-E-Bank	Network-based	49	38,000	2	na	na	na	na	May 2001	February 1999
	Mondex Taiwan	Card-based	1 (pilot)	2,000	60	na	na	563	na	March 2000	September 1999
Turkey	"Kampus-kart" (Campus-card)	Card-based	1	950	20	na	30	100	3	March -May 2001	12 March 2001
United Kingdom	Mondex	Both	2								Jul 1995[4]
	Visa Cash	Card-based	6	160,000[1]	1,921[2]	0.263	507	8,284	16.34	1999[3]	Oct 1997 (closed Aug 2000)[4]
	Magex Wallet	Network-based	1								Oct 1999[4]
United States	Visa Cash (New York)	Card-based	1		600	na	na	na	na	10/97-12/98 (discontinued 12/98)	October 1997
	Mondex (New York)	Card-based	1	96,000	600	na	na	na	na	10/97-12/98 (discontinued 12/98)	October 1997
	American Express Cobaltcard	Network-based	1	na	Accepted at all retailers that accept the networks' traditional credit or debit products	na	na	na	na	na	October 2000
	MasterCard Ecount	Network-based	1	na	-do-	na	na	na	na	na	2000
	Visa Buxx	Network-based	5	na	-do-	na	na	na	na	na	August 2000
Venezuela	Mondex	ePurse Card	4	250	1	$3,500	na	na	na	January-April 2001	January 2001

Country	Name of systems	Type of system	Number of issuers	Number of cards issued (or home PC users)	Number of merchant terminals (or merchant PCs)	Float outstanding (in USD millions)	Volume of daily (purchase) transactions	Value of daily (purchase) transactions (in USD)	Average value of (purchase) transactions (in USD)	Memo item	
										Reporting period	Launch date of product
Venezuela (cont)	Visa Travel	Prepaid Card	3	na	No	na	na	na	na	na	October 2001
	Visa Cash	ePurse Card	0	na	0	0	0	0	na	na	To be announced
	eCard	Virtual Credit Card	1	na	na	na	na	na	na	na	March 2001
	Pasaporte Digital	Virtual Credit Card	1	na	na	na	na	na	na	na	Jun 01
	P-Cash	Virtual prepaid	1	na	na	na	na	na	na	na	Jun 01

Austria: [1] Estimated on the basis of monthly data.

Canada: Note: Exchange rate: CAD = USD 0.67. [1] Estimates.

Moldova: [1] Launch year for each of three participating banks.

Netherlands: [1] The number of terminals that can be used by both systems. [2] In EUR. [3] In EUR. Estimate.

Portugal: [1] Data for December 2000.

Singapore: [1] Exchange rate: US$1 = S$1.73 at end-Dec 2000. [2] DBS acquired POSBank in November 1998. Both banks were part of the original six CashCard issuing banks.

United Kingdom: [1] Individual data for each scheme is not available, therefore aggregated data is provided. [2] Number of purchase terminals. [3] Cards that have been loaded at least once. [4] All schemes are still in the pilot stage, or were at the reporting date (end-1998).