COMMITTEE ON PAYMENT AND SETTLEMENT SYSTEMS
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SURVEY OF ELECTRONIC MONEY DEVELOPMENTS

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Foreword

In recent years there has been considerable interest in the development of electronic money schemes. Electronic money has the potential to take over from cash as the primary means of making small-value payments and could make such transactions easier and cheaper for both consumers and merchants. However, it also raises policy issues for central banks because of the possible implications for central banks' revenues, their implementation of monetary policy and their payment system oversight role. Having considered these issues, the G10 central bank governors announced in 1996 that they intended to monitor closely the evolution of electronic money schemes and, while respecting competition and innovation, to take any appropriate action if necessary.

Since then the Bank for International Settlements (BIS), through the Secretariat to the Committee on Payment and Settlement Systems (CPSS) and with the invaluable help of central banks worldwide, has been regularly surveying electronic money developments. The main focus of this exercise has been to ensure that central banks have adequate information to monitor the growth of electronic money and to assess its possible consequences. However, given the widespread interest in this new means of making payments, the CPSS has now decided to also make this report on electronic money developments publicly available.

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").

This report provides information on electronic money products that are in use or being planned in 68 countries or territories. The information relates to late 1999 or early 2000. The report also includes some information on the policy stance adopted by the various authorities concerned, including central banks. 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 91 00).

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).

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Countries participating in the survey

* Western Africa monetary union countries (Benin, Burkina, Ivory Coast, Mali, Nigeria, Senegal and Togo).

ARMENIA

1. Card-based products

No major developments are currently reported with respect to e-money products. Since May 1996 some Armenian banks have been serving both domestic magnetic plastic cards and cards issued by international organisations, such as Visa, Eurocard and MasterCard.

At present the central bank, together with the Armenian Banking Association, is considering possible schemes for the creation of a national unified card-based payment system in Armenia. Under these schemes the issued cards will be based on chip technology, although the system will be adopted to process wildly used international cards with magnetic stripes as well. At the first stage only debit cards, and later electronic purses for low-value transactions, will be circulated in the system. Cards will be served in online and offline working modes.

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 presently no significant developments, but will take into account the recommendations of the EMI and the experience of developed countries in this matter.

AUSTRALIA

1. Card-based products

Use of e-money in Australia is limited to a number of trials. Most of the trials to date have been card-based schemes. None of the current trials, outlined below, are of significant size.

ECARD. The Hospital Benefit Fund of Western Australia (HBF), in conjunction with ERG Group has issued 450,000 membership cards. These multi-function smart cards contain an electronic purse using Proton technology 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.

The ERG Motorola Alliance has agreed to supply single chip, contact and contactless smart cards to Western Australian bus operator Bunbury City Transit. The trial is currently restricted to the transport network, but there are plans to integrate it with the existing ECARD scheme.

The ERG Group has entered into a contract to supply ECARD to 22,000 students and 3,000 staff at La Trobe University, Victoria, commencing early 2000. The smart card will also contain a magnetic strip and bar code, and use both contact and contactless technology. The electronic purse will be available for transactions both on and off campus including photocopying and printing, vending machines and retail purchases.

Westpac, a major financial institution, intends to upgrade its EFTPOS/retail terminals to support the ERG Group's smart card technology and will deploy terminals where customers can reload cards and make purchases.

VISA Cash. VISA smart cards can be used at Gold Coast theme parks in Queensland. This represents the remnants of an earlier more extensive trial on the Gold Coast.

The South Australian Cricket Association in conjunction with St George Bank and VISA International has issued 17,000 multi-function smart cards to its members. The card can be used as a VISA credit card, an ATM/EFTPOS card and as an electronic purse at retail outlets at the Adelaide Oval.

VISA has acquired sole rights for its smart cards to be used at the Olympic village for the Sydney 2000 Olympic Games. At this stage, however, it appears VISA will only promote its smart card technology at the Games.

VISA International and the ERG Group have signed a Memorandum of Understanding to use the Common Electronic Purse Specifications in combining chip card based transit applications with VISA Cash.

Telstra. Telstra, Australia's largest telecommunications company commenced issuing disposable smart phonecards in August 1997 and is trialling multi-function reloadable cards based on the Chipper card system.

Telstra has issued more than 45,000 reloadable smart cards to students and staff at selected Technical and Further Education campuses in New South Wales and 16,000 cards to students at the University of Adelaide. The cards are being used for student identification, library borrowing, access and small value purchases such as payphones, shops, vending machines and parking meters. They can be loaded to a maximum value of AUD 500. The trial at the University of Adelaide is being piloted with a loyalty scheme at about 40 external retailers in the Adelaide CBD. These retailers include snack bars, newsagents, entertainment venues, dry cleaners, chemists and parking meters.

Disposable Telstra smart cards are being trialled in some Adelaide schools for use at the school canteen as well as in Telstra public phones.

Telstra has joined the Global Chipcard Alliance, a consortium of telecommunication companies and payment system providers, which aims to develop open systems allowing cards issued by a scheme to be used in and accepted by all other networks. In addition, Telstra, ERG and ANZ have agreed to non-binding principles to develop a common open platform to process smart card transactions in Australia.

Transcard. Transcard is a multi-application contactless smart card scheme primarily used for public transport ticketing. The scheme was first piloted in 1995/96 and now operates in western and north-western Sydney and on the Gold Coast corridor services of Queensland Rail. Almost 94% of the 1.3 million transactions made using Transcard have been made on the public transport network. There are 39 merchants accepting Transcard, and since its inception, over AUD 5 million has been reloaded onto the cards. Reloadable cards with a maximum balance of AUD 500 can be obtained from newsagents or the St George Bank, which acts as an agent for the owners of the technology, Catuity Inc (formerly Chip Application Technologies). Transcard also has a loyalty programme.

Mondex. The four major Australian Banks own the Australian Mondex franchise. Three of the banks are conducting in-house trials, of which two have expanded their in-house trials to incorporate about 30 external merchants. However, the cards are still only issued to staff of the banks.

2. Network/software-based products

eCash (formerly DigiCash). Advance Bank, now merged with St George Bank, began issuing Australian dollar denominated DigiCash electronic cash in June 1997. The developer of DigiCash filed for bankruptcy in the US in 1998 and the technology was bought by eCash Technologies. St George continued to offer the electronic cash which subsequently became known as eCash.

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

The recently created Payments System Board of the Reserve Bank of Australia (RBA) has policy responsibility for payment systems. Consistent with the general philosophy of ensuring the development and introduction of new technologies proceeds as freely as possible, the RBA has not imposed any specific rules for smart cards or e-commerce. It is, however, closely monitoring developments including the introduction of new products.

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). In addition, 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).

In July 1999 ASIC released a discussion paper proposing to expand the existing EFT Code of Conduct (a voluntary code that deals with transactions initiated using a card and a PIN) to cover all forms of consumer EFT technologies, including stored value cards and other new electronic payment products.

AUSTRIA

1. Card-based products

Today (end of 10/1999) 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 (e.g. VISA Cash, Mondex), although relevant adaptations could be agreed upon at a later point in time, especially if there is a market need.

Issuer. The Quick purse is issued by Europay Austria Zahlungssysteme GmbH. The cards are manufactured by Austria Card Plastikkarten und Ausweissysteme GmbH, the latter having been wholly owned by the Oesterreichische Nationalbank (ANB) since 1994. Europay, the issuer, has been given bank status and is thus subject to banking supervision and other relevant regulations (in accordance with the recommendation of the EMI Council of May 1994 that only banks should be authorised to issue prepaid cards).

Distribution and operation. The Quick purse can be loaded up to an amount of ATS 1,999 at 2,615 ATM terminals, 1,508 teller terminals and 1,149 self-service terminals. At the end of October 1999, 5,272 Quick loading terminals had been installed. Quick is distributed to customers via commercial banks as a chip contained on combined Eurocheque and ATM cards (around 2.4 million), ATM cards (1.2 million), bank customer cards (0.3 million), or as pure electronic purse cards without relation to a bank account (0.9 million). Only value in ATS can be loaded; to date, the system has no multicurrency features and thus does not enable cross-border transactions, although such extensions would technically be feasible with the existing platform. All necessary security features are provided (safe authentication, encryption, tamper-resistance, control of payment flows).

Payments. Payments can be made at several retailers' 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 and is thus always counted in the monetary aggregates. Such sight deposits derived from stored-value instruments are also subject to minimum reserve requirements. At the end of October 1999, 28,047 Quick POS terminals had been installed; in 1999 there are 2.1 million Quick card POS transactions amounting to ATS 160 million. In 2000 3.4 million Quick transactions with a volume of ATS 230 million are expected.

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 chip cards, 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 transfer of 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. The card manufacturer is Austria Card. While chips embedded in cards are provided by Philips and Siemens. Various terminals (e.g. ATM, POS, Teller and self-service terminals) are supplied by Bull, IBM, Krone, PDTS and Siemens.

2. Network/software-based products

At present network/software-based products exist only on a very limited scale in Austria.

In May 1998 Austria's largest bank, Bank Austria, started with eCash of DigiCash. DigiCash's eCash™ is a software-based payment system which allows users to send electronic payments from any personal computer to any other PC or workstation using any computer network, including the internet.

Issuer. ECash is issued in Austria by Bank Austria AG. Other eCash issuers in Europe are Deutsche Bank in Germany or Credit Suisse in Switzerland.

Distribution and operation. The basic requirement to participate in the Bank Austria eCash-system is to have a Bank Austria giro account. Therefore at the moment only customers of Bank Austria are able to use the eCash-system.

– an eCash-deposit - this is analogous to a safe deposit room in a bank. Every user of eCash has its own eCash-deposit (on the Bank Austria eCash server);

– an eCash purse installed on the hard disk of the user PC. The purse contains electronic "coins". The purse of coins is managed automatically by the eCash software.

One transfers eCash (using the eCash purse) from the deposit to the purse. As this occurs the eCash is converted into electronic coins that are installed on the hard disk of the PC.

Payments. During the first step Bank Austria eCash-clients can only pay at Bank Austria eCash-merchants. This means, that cross-border payments are not possible during this period.

Costs and fees. In 1999 the participation in the eCash payment system is free for Bank Austria customers (private and commercial).

3. Policy responses

The ANB's policy responses are based on the ECB's policy stance on electronic money, stipulated in the ECB's 1998 report on electronic money.

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 values stored on customers' cards are posted on sight deposits (subject to minimum reserve requirements) and, as such, are counted in the monetary aggregates.

Seignoriage. To date, the circulation of notes and coins is not expected to be substantially reduced by electronic stored-value devices (this judgement 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 the fact that, as calculated in studies

conducted in the framework of the ECB, in a more extreme scenario seignorage could potentially decrease by around 15%.

Legal issues. 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 license issued by the Federal Minister of Finance. Neither prepaid card money nor network money have 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. Any legal provisions in this respect to be implemented in the future will follow the coordinated guidelines agreed upon at an EU-wide level.

Security issues. Apart from the required physical robustness of the components involved in the electronic retail payment scheme (e.g. tamper-resistance of the stored-value chip), particular attention needs to be paid to the software aspects of the systems and the use of the most advanced encryption techniques is deemed to be necessary to safeguard the operation of electronic payment schemes and to enhance consumers' trust in such systems, especially if they are operated as software-based schemes. Although anonymity of payment should be guaranteed for electronic prepaid instruments, a certain traceability should be allowed for in order to prevent illegal activities. The assessment of these security issues has been entrusted to a group of security experts (ARGE SZS) in cooperation with the ANB.

On 21 May 1999 the Secure Information Technology Centre (A-SIT), a joint effort of the Ministry of Finance representing the republic of Austria, the ANB and Graz University of Technology was founded. In its preparatory phase, A-SIT has contributed to the proposed Austrian electronic signature legislation as well as to the European signature guidelines. Its prime goal is to function as 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 will be done in close cooperation with international bodies.

Provider issues. As stated above and in line with the recommendation of the EMI Council of May 1994, only banks are allowed to issue electronic money, be it on stored-value cards or as network money.

Payment system issues: As the ANB seeks to be involved in the implementation of the schemes from the beginning, any payment system issues arising can be taken into account and eventually resolved directly among the parties involved.

Supervisory issues. As only banks can issue electronic money, no specific policy responses are to be undertaken with respect to supervision of e-money issuers.

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, no specific measures to prevent money laundering through such instruments have been implemented so far, apart from security features to prevent any counterfeiting activities. Nevertheless, all developments with respect to increasing possibilities for money laundering through electronic retail payment schemes, especially network money, are closely followed not only on a national level, but also within the relevant multilateral committees and any necessary steps will be taken in an internationally coordinated manner. The latter applies also to cross-border issues which, at the present stage of implementation of the Austrian electronic purse scheme, have not arisen in practice.

BAHAMAS

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

BARBADOS

The Board is currently examining the issues related to e-money developments with a view to establishing a formal policy.

BCEAO[1]

1. Card-based products

No significant development so far. A few banks have formed alliances with international societies such as Visa, MasterCard to provide electronic purse credit card (Visa, MasterCard).

2. Network/software-based products

The project relating to the reform of the payment system will address this issue. See below.

3. Policy responses

The BCEAO has launched a project aimed at modernising the Payment System of the West African Monetary Union member states. This reform is going to deal with policy relating to every payment media and namely to define a framework likely to favour the development of card-based operations.

In that view, statistical information is being collected on a quarterly basis from all banks.

BELGIUM

1. Card-based products

The 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.

[1] Western African Monetary Union countries: Benin, Burkina, Ivory Coast, Mali, Niger, Senegal and Togo.

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 (USD 12.9) at neighbourhood shops, vending machines, car parks, ticket machines, payphones and on public transport. It can be loaded with amounts ranging from BEF 100 (USD 2.6) to BEF 5,000 (USD 129). Card-to-card payments are not possible. Proton is a monocurrency system, the payments being made in either BEF or EUR since July 1999. The choice between these two currencies is made by the holder when loading/reloading the purse.[2]

The loading transaction is processed with verification of a PIN code and of the funds available on the 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 bank account through a simple telephone call from his 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 USD 0 to USD 5.1). 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 December 1999, more than 7,000,000 cards were issued with the e-money facility (number of cards that had been loaded at least once); the total amount outstanding was around BEF 1.73 billion (USD 44.4 million). A daily average of 149,261 purchase transactions were made in December 1999 for an average amount of BEF 156 (USD 4).

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 smart card group, joined this venture in October 1998. The venture, Proton World International, 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

[2] BEF per default. If loading/reloading occurs in EUR, the choice of currency becomes irreversible.

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 recently 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 draft Directives relating to the taking-up and pursuit of business by e-money institutions and the prudential supervision thereof are close to being adopted by the EU's Council of Ministers and the European Parliament. Both Directives will have to be transposed into the banking law after adoption.

(b) *Oversight of payment systems:* the NBB's organic law entrusts the Bank explicitly with the task of overseeing clearing and payment systems. The NBB is currently conducting an evaluation of the reliability of the Proton scheme from the technical, operational and legal viewpoints. This exercise is intended to evaluate the conformity of the system with the minimum requirements contained in the ECB report on e-money. This overall examination will be completed by the end of this year. A previous informal evaluation had already been conducted in 1996.

(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 his/her 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 draft bill concerning the use of electronic signatures is under discussion. This initiative has to be connected with a draft EU Directive on a common framework for electronic signatures.

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 evaluation currently being conducted by the NBB (see above under ***Policy responses***) also covers the security features of the Proton scheme.

Provider issues. See above under ***General legal issues***.

Payment system issues. No particular problems to mention concerning the clearing and settlement arrangements for e-money schemes. The NBB has not taken any particular step to influence the design and operation of e-money schemes.

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 being drawn up 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 on 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.

BRAZIL

1. Card-based products

There are two systems currently in use, as presented below.

VISA Cash. VISA Cash is an electronic purse based on the TIBC (Tarjeta Inteligente de Bancos 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.

The system has an online loading procedure, but payment transactions are made in the offline mode. Since purse-to-purse transfers are not permitted, auditability is possible at any time. Moreover, the system has multi-application capability. These applications can be dynamically loaded.

E-money loading and downloading transactions by customers and merchants are transmitted to/from VISA Miami (USA) by telephone, using a local area network. After the information is processed, VISA sends the credit card processors a file containing the day's cash transactions, which is processed by a system called "Sistema Automático de Controle de Monedero Electrônico".

VISA Miami also sends each card processor a balance that reflects, by institution, financial transfers to be made. Funds are transferred from a floating account to a reserve account. Visanet receives the value position to be transferred to each authorised store. VISA transfers funds from a reserve account to Visanet through Banco do Brasil S.A. Visanet then transfers the credit information to merchants through the banking system.

Visanet, whose controllers are the member banks of VISA do Brasil, has acquired the VISA franchise. Visanet is responsible for relations with the POS network (registration of affiliates, installation and maintenance of POS terminals, payments to merchants and capture of transactions).

VISA owns the trademark and the licensing rights for use of the 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 operation and clearing using the same procedures adopted for its credit cards. There are 14 institutions issuing e-money through VISA Cash. The software and hardware infrastructure is provided either by Visanet or by suppliers certified by VISA. The security mechanism employs DES-type crytography with a different security key for each card.

E-money loading is carried out via terminals at the banks. New products are being developed to allow loading via the internet, an ATM or a special device using a telephone line.

Parameters such as the loading ceiling can be set for a specific card or member bank. Currently, cards are assigned ceilings from USD 51 to USD 154.

It is possible to adapt the system to accept payments through network-based systems. However, its current operating configuration does not perform this interaction.

As far as costs are concerned, Visanet charges affiliates 3% of the transaction value, while the member banks pay a fixed amount of USD 0.0075 per transaction.

The VISA Cash card operates only with the national currency. It is planned to issue credit cards with multi-applications, including electronic purse, in the next year**.**

SIBS. The SIBS system (from Portugal) has been used by only one issuing bank in Brazil, which has acquired the rights of use and also made functional changes to adapt the original technology to local needs, especially those regarding security. The most important change was the introduction of a password, which is required by the system whenever loading exceeds a certain amount (currently fixed at USD 51).

The software and hardware infrastructure is provided by Papelaco do Brasil, subsidiary of the Portuguese parent company. The issuing bank is the operator and clearing agent for the system.

The system uses triple-DES cryptography.

Smart cards are loaded in online mode, with money being withdrawn from customers' current accounts. These operations can be carried out via ATM terminals or the internet. Customers with no current account follow a different procedure, having their cards loaded through prepaid credit via ATM terminals.

Merchants have a portable offline terminal to store the value of payments received. These payments are then credited to merchants' accounts. The unloading of e-money is carried out via the internet or issuing banks' ATM terminals. The individual maximum loaded amount is USD 307 for current account holders and USD 51 for non-current account holders. Purse-to-purse transactions are not allowed.

The SIBS is a card-based system with no interactivity and no network-based operation capability.

The system is set up and has been working for three years.

The issuing bank does not charge either merchants or customers any utilisation fee. Currently, there are 40,100 cards and 690 portable terminals in 500 businesses.

The float of outstanding e-money amounts to USD 23.6 million. The monthly average transaction volume is 20,100, which means 960 loading operations per working day.

2. Network/software-based products

No products have been adopted to date. There are, however, some projects involving internet-based products.

3. Policy responses

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

Recent developments in working group activities. In October 1995, FEBRABAN (the Brazilian Federation of Banks), SIMPRO (the Brazilian Association to Simplify Technical Procedures) and ABNT (the Brazilian Association of Technical Procedures) set up the Card and Access Committee in order to study and propose Brazilian standards concerning magnetic cards and smart cards. Owing to the priority given to integrated circuit cards with contacts, there was some liaison with the world's main technological providers such as MasterCard, VISA and Europay in order to discuss debit and credit cards with chips and European electronic pursue standardisation. Some studies relating to electronic money standards have been undertaken in Brazil.

In November 1995, a Financial Application Working Group was set up. Its members are exclusively banks. It is focusing on a Brazilian electronic purse product model, which covers debit and credit cards, tickets, tokens, wages, benefits, etc.

Since September 1996 the central bank has participated in the meetings of both groups. Work has focused on smart card standards, agreements, electronic purse products, financial application products, models, trends and projects in Brazil, and impact on the money in circulation. These topics are still under discussion. The central bank needs to define the model for electronic money, the rules, standards and so on and the banks need to define infrastructural aspects.

Joint work between the central bank and the Working Group has been suggested, which would include, amongst other things:

(a) an exchange of information with other countries;

(b) definition of a Brazilian electronic purse model;

(c) definition of operational rules;

(d) definition of a portfolio application;

(e) specification of a security system;

(f) studies on how to make the system technically feasible.

It is important to note that this phase was intended mainly to cover technological aspects. However, electronic money standards and their applications have also been considered.

The Working Group has defined and identified a number of electronic purse models. Its working proposal is that a specific Brazilian electronic purse model be developed. It should include electronic money as well as other functions and will probably result in a third model (i.e. as opposed to the Proton and VISA schemes, major existing international electronic purse schemes) which will be more suitable to Brazilian conditions. The first step should be to develop the electronic money function, since its specification may affect the design of any other features. Debit and credit applications can then be developed as a next step. Banks should adopt the Brazilian electronic purse standard in order to develop and implement financial applications. Participation in the system will be open, meaning that the banking system as a whole will be allowed to participate.

CANADA

1. Card-based products

There are two major e-money card schemes which are currently running pilot projects: Mondex Canada and VISA Cash. The Exact pilot, which used Proton technology, was terminated on 31 March 1998.

Mondex Canada. Mondex e-money value is issued by Mondex Originator, which is an affiliate of Mondex Canada. Mondex has been involved in two community-wide initiatives to introduce its e-money product to the Canadian market. The first pilot project, September 1996 to October 1998, was situated in Guelph, Ontario, and involved a number of Canadian deposit-taking financial institutions. Over the life of the project, there were approximately 15,000 cards and CAD 3 million in Mondex value issued.

A second project was launched 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 technology is an open platform capable of separately operating multiple applications. Initially, more than 600 merchants are participating in the project in addition to various self-serve devices such as parking metres and laundromats. The card can be loaded through automated teller machines, specialised loading machines, Mondex compatible phones and the internet with the 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.

VISA Cash. VISA Cash is currently involved in two ongoing projects. Disposable, unifunctional, stored-value cards issued by VanCity Credit Union were launched in Vancouver, British Columbia, in 1996. 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 stores e-money value up to 50 customer loyalty plans, with 18 plans currently in place, and has an automated transit fare collection function for Barrie Transit. The cards are 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 computing banking site. There are also preliminary plans to extend VISA Cash to internet payments. There are approximately 48,000 cards in circulation with a 65% activation rate. The Bank of Nova Scotia claims usage for the card has grown about twice as quickly as debit card usage during the comparable start-up period. The chips are capable of storing up to CAD 1,000, however the load limit is currently set at CAD 500.

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 Canada Deposit Insurance Corporation is reviewing many of the public policy aspects of e-money and monitoring the development of pilot projects. Furthermore, the Task Force on the Future of the Canadian Financial Services Sector (commissioned by Minister of Finance) has produced a research report which makes no specific recommendations but highlights legal issues concerning electronic money (e.g. status as legal tender, applicability to the Currency Act, negotiability, security and need for insurance coverage).

Monetary policy and seigniorage. No serious difficulties are foreseen. E-money balances will be included in monetary aggregates as and when they reach a significant size. At present they are monitored informally. The expected impact on seigniorage will be small for the next few years, although uncertain in the long run. Expenses of the central bank are only 9% of the seigniorage revenue in 1997. So far the Bank of Canada has no plan to be an issuer of e-money.

Provider issues. Currently there is no prohibition on the issue 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.

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

Supervisory issues. The applicability of deposit insurance to e-money is under review.

Consumer protection issues. With regard to fraud, loss, theft and disputes, civil codes and rules for credit institutions are generally applicable. Industry associations are developing standards on security against fraud and theft for e-money. Applicability of deposit insurance to e-money is under review. The statutes governing federally regulated financial institutions were amended in 1997 to permit the issuance of regulations on privacy. No such regulations have been issued.

CHILE

1. Card-based products

Although no e-money system is operating at the moment, a group of banks is preparing the introduction of card-based products in Chile during the next months.

2. Network/software-based products

No developments.

3. Policy responses

Recently, the Central Bank of Chile has enacted a norm for the issue and operation of e-money cards. The recently enacted norm for issuing e-money specifies the requirements on issuers and operators, in addition to some specifications about the relationship between users - issuers and operators. The next points summarise the main elements established in the norm:

- the norm establishes that only banks operating in Chile are authorised to issue e-money cards. The operation of e-money systems may be assumed by banks and non-banks. In case of non-banks, the operation of e-money systems must be the exclusive activity of the firm;
- bank issuers of e-money must be authorised by the Central Bank of Chile. For this purpose, the technology must offer minimum security guarantees;
- additionally, e-money operators must be authorised by the central bank. For this purpose, a minimum capital, equivalent to USD 750,000, is required;
- a contract between issuers and users of e-money is required in case of cards with storage capacity over USD 100. The contract must, at least, establish the maintenance and use costs, operating characteristics of e-money card and the right of users to ask for the total or partial restitution of cash. Additionally, any modification in the contract must be communicated

with, at least, 30 days of anticipation. In case of cards with storage capacity over USD 100, the property of cards must be identified. Otherwise, use of cards is at the bearer;

- contracts between issuers and operators and commercial establishments affiliated to the system are also required. The contract must clearly indicate that the payment responsibility to e-money card holders is assumed by the issuer. Additionally, any modification in the contract must be communicated with at least 30 days of anticipation;
- about the operation of e-money systems:
- the e-money issuer must inform users about transactions over USD 100. The issuer may send a monthly statement, which could include all transactions over a minimum amount (at least USD 100);
- commercial establishments affiliated to the system must provide a receipt for transactions with e-money cards, which are over USD 100;
- issuers of e-money cannot provide credit associated to e-money cards;
- in case of transactions between e-money users, the user who receives the amount involved in the transaction must inform the operator of this in order to make available the transferred amount;
- e-money is limited to local currency;
- e-money cannot pay interest rates;
- issuers must inform periodically the central bank about total e-money issued. For e-money cards with storage capacity over USD 100, issuers must have individual accounts for each user;
- reserve and legal requirements are applied to e-money. For this purpose, the same demand deposits requirements are applied;
- the central bank could suspend or revoke the authorisation for operating and/or issuing e-money cards, when the minimum requirements for issuers and/or operators established in the norm are not satisfied or the technology does not provide minimum security standards.

CHINA

1. Card-based products

In China, e-money schemes are just emerging. In order to reduce the amount of cash in circulation, increase the effectiveness and efficiency of banking business and minimise the risks of fraudulent use of payment cards issued by banks, the Government and the banking community have been considering the introduction of e-money. Since 1995, when the first IC card was issued in Hainan province, pilot projects have been carried out in two further cities (Quanzhou, a city in Fujian Province, and Shanghai). All the projects are exploratory. Generally, the schemes are based on an IC chip embedded in a plastic card, with or without a processor in the chip; many of them also have a magnetic stripe on the card. All three of the schemes were adopted by the branches of the local banks, with the agreement of their head offices and The People's Bank of China (PBC). Some other cities, including Beijing, Guangzhou and Shenzhen are also actively studying and considering how to develop and use e-money in their own regions. At present, the PBC is considering to sponsor some pilot projects of IC-cards for payment service in both Beijing and Shanghai. The projects should comply with the standard and specification of IC-cards issued by banks for payment transactions that are enacted by the PBC.

2. Network/software-based products

No developments.

3. Policy responses

According to the industry policy which was formulated by the public authorities, foreign companies will be allowed to take part in development projects of payment card systems (especially in providing the technical products and know-how), but only via a joint venture with at least one Chinese firm. China welcomes the involvement of foreign companies and international organisations, such as MasterCard, VISA and Europay, in the development of the payment card systems, but would not want to see a few of the big foreign companies or international corporations in a position where they could monopolise the Chinese market for payment cards.

In mid-1993, China's political leadership called for an acceleration in the construction of the infrastructure of payment systems, including the development and spread of payment cards, in order to decrease the amount of cash in circulation and increase the effectiveness and efficiency of banking business. Such an infrastructure was to be based on advanced telecommunication networks. It should be equipped with satellite, optical fibre and other telecommunication techniques, as well as other computer and IC chip technologies. China felt it would possible to cast off the backwardness of payment services in the country only if such an advanced infrastructure was provided.

In November 1993, the State Council authorised the setting-up of the National Office of "Golden Card" Projects (NOGCP) as inter-ministry coordinator of payment card projects. Its standing office was located at the former Ministry of Electronic Industry (MEI). Its chief, Mrs Zhang Qi, came from the former MEI, and she was also the Director General of the Department of Computer and IT Pervasiveness. Its director and vice-chiefs came from the agencies of other related ministries, committees or administration bureaus, one of which was the PBC. The NOGCP was under The Joint Committee for the Informatisation (Computerisation) of the National Economy (or The Steering Committee of National Information Infrastructure of the State Council), a temporary inter-ministry coordinator in the field of "informatisation (computerisation) of the economy". The Joint Committee consists of the senior officials from ministries, such as the former MEI, the PBC, the former Ministry of Post and Telecommunications (MPT), the former Minister of Domestic Trade and the former Foreign Economic Cooperation (MOFTEC), as well as some other ministries, committees and agencies. The chief of the Group was Mr Zou JiaHua, a former vice-premier, while Mr Hu QiLi, the Minister of the former MEI, was the standing vice-chief and Mr Chen Yuan, a former Deputy Governor of PBC, was one of the vice-chiefs.

By the end of 1993, the PBC, together with the major commercial banks, had drafted a report entitled "A Vision of Energetic Development of Credit Cards in Our Country". Based on the Vision report, a series of the essential issues, such as the goals, strategies and policies of development of bank payment card business, was set out. The key points of the Vision are the following:

The goals. By the beginning of the next century, about 300 million payment cards will be issued in about 400 cities and some of the developed counties in the coastal regions. This means that by around the year 2005 China hopes to reach a level at which more than 300 million residents living in urban areas will become cardholder customers.

The strategies. To establish, improve and perfect the institutions of management and operation for issuing and using cards; to develop and formulate the laws, regulations, rules, business procedures, technical standards and engineering specifications; and to first conduct some pilot projects in a few local urban regions, then to learn the lessons from them, and finally to spread these projects widely.

The policies. To set up a series of criteria, principles and guidelines. For example, the plans and standards must be unified, the networks must be interconnected, the expensive infrastructure should be shared, and the pilot projects should be implemented step by step. 70% of the total energy and effort will be put into the solving of issues related to coordination and organisation, and the other 30% will be put into solving the issues of technique. The schemes must be market-driven rather than just

technology-driven, and so the bank payment card businesses must meet the requirements of the market, and the raising of finance for their development should come from sales of services rather than direct investment by government. The cost benefit consideration is more important than ostentation and extravagance. A balance between competition and cooperation must be maintained. This means that cooperation is essential where the members have common interests. For example, they can reduce the cost of construction by sharing the network infrastructure. It also means that competition must be encouraged where the expansions of business and improving quality of services are needed. It is important to first establish rules and standardisation rather than set up a system - small steps quickly rather than big steps slowly.

In 1996, the State Council decided to establish the Steering Task Force for the Informatisation (Computerisation) of the National Economy, which Mr Zou JiaHua chairs, to take charge and formulate the policies and guidelines for the country's strategies and planning in this field. The "Golden Card" project is one of the major projects controlled by the Steering Task Force. Also in 1996, the PBC proposed that the "Golden Card" project should be managed in hierarchy, and the suggestion was agreed upon by the Steering Task Force of the "Golden Card" project. The roles and functions of all participants of the project were further specified and cooperation between them was thus strengthened. In March 1997, The State Council held the conference of informatisation of national economy in Shenzhen. The fundamental principles for informatisation (computerisation) of nation economy and society can be reduced to the following: ***State sponsored, jointly developed; standard unified, and resources share***. It means the following: (1) the government should steer the direction of the development of the informatisation through its policies; (2) all participants, who are beneficial, should be encouraged to develop jointly the infrastructure for common use; (3) all participants should comply with uniform standards; (4) resources such as infrastructure and information should be shared by as many users as possible.

In 1997, NOGCP initiates set up a non-bank-card development group to coordinate the development and application of the card technology in the non-bank area.

The major task of the PBC is to promote and organise the commercial banks so as to complete the following assignments: to set up and perfect the National Office of Bank Cards; to make a system design for China's National Bank Cards Switch Centre (CNBCSC) and implement it; to conduct a survey on the progress of the pilot projects in the 12 cities selected and approved by the PBC and the NOGCP; to formulate standards, criteria and regulations related to bankcards; and to study and develop smart cards and e-money.

In 1996, in order to promote the creation of an organisation of banks as an issuer and/or operator, using self-regulatory mechanisms, the PBC initiated the setting-up of the National Office of Bankcards. The staff of the Office comes from the PBC and the commercial banks who are major issuers and Mr Lieu Yong Chun, Director General of the Department of Payment and Technology of the PBC, was appointed as the head. Abiding by the principle of management in hierarchy, the Office will be responsible for the implementation of the bank card project, coordination of all members as participants, and liaison with the NPGCP. The Office of Bank Card Business will provide a channel of communication so that the different opinions and ideas from all individual banks can be expressed, discussed, consulted and agreed upon among the PBC and the commercial banks.

The Office will advocate creating a pool of banks, in which the banks, as issuers and/or operators, will become the partners in a joint venture in bank card business involving interbank transactions, in order to achieve general interoperability among the different banks and to put self-regulatory and self-constraint mechanisms in place.

Since the Office was established, its major tasks have been the following: (a) to establish procedures for discussing official business; (b) to set up a schedule of activities in the near future; (c) to set up the National Switch Centre for exchanging information on interbank transactions; (d) to conduct a survey of the pilot projects in twelve participating cities; and (e) to design the CBCNSC.

The draft system design for the CBCNSC was completed in 1996. Given the three administrative levels involved - namely the central bank level, the commercial bank level and the bank branch level, the relationship between the national switch centre, the headquarters of the commercial banks and the

local switch centres of the branches of banks was defined. The organisation of the centres at the city level was also defined, as were guidelines for the procedures of issuing, authorisation, charge back, clearing and settlement for interbank transactions.

The architecture of the National Switch Network for bank cards consists of the National Bank Card Switch Centre, centres located in cities, centres located in head offices of commercial banks and centres in banks' branches. The major function of the network system is to provide the services for transmitting information for authorisation and clearing of transactions as well as the settlement of interbank transactions. At present, the guidelines for construction of centres located in cities are as follows: the city in which a switch centre is located must be a centre of the region to facilitate development of the regional economy; there must be a large volume of transactions in the region; the banks (or their branches locally) as issuers/operators must be enthusiastic about getting involved in the development of a system with interoperability between banks; the construction of the centre must be supported by the local government; the post and telecommunication facilities must be able to satisfy the needs of the switch centre; and participants must be able to comply with the rules and regulations relating to interoperability, as well as the technological standards enacted by the PBC and the Office of Bank Cards (or an association of bank cards which would be set up when conditions become mature).

Standardisation. Detailed rules for exchanging messages, supported by the Office of Bank Cards, were drafted at the end of 1996. They were based on the studies of international standards and the specifications of EMV, as well as the experience of the pilot projects in the province HaiNan, the ICBC and the Development Bank of Pu-Dong (DBP). Temporary specifications relating to security and the applications of the IC cards were enacted in March 1996. Thereafter, a series of specifications, regulations and criteria - such as the set of instructions for bank cards, the procedures for transactions, the management of security, the structure of files and technical requirements for terminals - were issued. The section of the requirements specifying banks' IC cards was completed at the end of 1996. After the approval by the PBC, the commercial banks started issuing the smart cards in a few of the cities involved in the pilot bank card projects from the end of 1995 to early 1996. The banks have each issued their own IC cards with various functions, such as a card with an overdraft ceiling, prepaid value, electronic purse and passbook functions - i.e. generally one card with multiple functions. In 1997, the banks, those who are card issuers with and are coordinated by the PBC, developed the specifications of bank cards with an IC chip in China. Recognising the crucial role of unifying the standards, the PBC has taken two steps. One is to promote developing an IC card standard complied with by all issuers nationwide; another is to give strict controls on issuing IC cards before enacting the uniform standards, in order to prevent waste due to differences among the different standards. The specifications for bank cards with an IC chip were developed using EMV standards as reference, and cooperated with and supported by VISA. They also considered experience provided by the practices of the pilot projects in the 12 selected cities participating in the "Golden Card" project.

A task force involving the major commercial banks and the PBC has studied new foreign e-money schemes, such as Mondex, VISA Cash and Proton. They have made a careful analysis of the implications for seigniorage, the role of the central bank as the traditional lender of last resort and security measures as well as the cost benefit ratio of investment in order to seek the right way to develop smart cards in China.

Owing to the efforts made by the banks and other related sectors, at the end of 1997, the system for interbank transactions started operating in all of the 12 cities, the number of cards issued by the banks totalled over 70 million including about 1.3 million of bank IC cards. Compared with the 3.6 million cards at the end of 1993, this represented very substantial progress.

COLOMBIA

1. Card-based products

There are two major experiments with electronic money in Colombia. The purpose of the experiments is to determine the viability of full implementation in the Colombian environment. It is reported that the recent progress in the experiments have, however, been slower than expected due to the fact that the interested parties consider that a definition of a stable and lasting international standard has still not been reached.

VISA Cash. VISA, through Ascredibanco (VISA's representative in Colombia), offers a product known as VISA Cash. At the moment 2,000 cards are in circulation, which can be used at 69 businesses. Cardholders are charged a fee that varies, according to the issuer's policy, between Pesos equivalent to USD 28.5 and USD 52 a year. In addition, the beneficiary of a payment is charged with a fee that, depending on the volume of transactions, fluctuates between Pesos equivalent to USD 0.12 per transaction and between 2.5% and 3.5% of value.

The system in use is the one standardised by the Sociedad Española de Pagos (Spanish Society of Payments) and the recognised equipment suppliers are Veriphone, from the US, and ULL, from France. These firms provide the software and the required devices at each point of sale. The chip has 16 fields for security matter and it requires the use of the PIN for charges. The card is multifunctional due to the fact that it is, at the same time, a debit card ("Visa electron") with a magnetic band, and it has a chip incorporated with the electronic purse functionality.

The settlement process for electronic money transactions is handled by Ascredibanco in the same way as the settlement of VISA's credit card operations, and takes place one day after the transaction is made. The scheme is intended neither for different currencies nor for payments abroad.

MasterCard. Multicolor Net, MasterCard International's representative in Colombia, has had an experimental e-money project using smart cards since April 1996.

Cardholders are charged a fee that varies, depending on the issuer of the card, between Pesos equivalent to USD 28.6 and USD 51.5 a year. This amount is charged as a yearly maintenance fee. In addition, the beneficiary of a payment is charged with a transaction value based fee, which is not standardised, with a maximum of 1.5%. The issuing bank is charged Pesos equivalent to USD 0.055 per transaction.

The supplier used by Multicolor Net is Genplus from France. Schlumberger and Dassault, from France, and WSA, from Germany, are in the certification process.

By the end of 1997 the technological platform switched from PCOS to Genplus' MPCOS, which affected the issuance pace of cards, but allows a higher degree of security and efficiency. All the transactions are encrypted with the triple-DES system. In a way that the card is authenticated against the terminal verifying both sides; there is credit authentication at the moment of charge and there is verification of the signature when the transaction is realised. On the other hand, the card is fully multifunctional including the information of the magnetic band in the chip. It is also foreseen the accumulation of loyalty programmes in the chip, like mileage programmes, etc.

Transactions are settled in the same way as credit card operations, one day after the transaction is made. The mechanism is not intended for different currencies.

Apart from the two major experiments above**,** the most important experiments made recently concern the use of smart cards incorporated in the identity cards of students of nine universities in Colombia. By means of this mechanism electronic money is being used to make low-value payments in services such as payment for library services, photocopies, vending machines, and other retail payments. E-money is also being used for various payments in the Metro in Medellín and it is hoped to install it for a mass transport bus system in Bogotá. All these "experiments", however, correspond to projects

with relatively limited aims. The number of cards issued for these experimental projects is more than 100,000 and are used in more than 10,000 dataphones.

2. Network/software-based products

No developments reported.

3. Policy responses

To date, there has been no consideration of any special regulations for electronic money. The relations between users, card issuers and system operators are regulated by means of contracts, which contain the necessary provisions covering matters such as fees, validity dates, responsibilities, etc.

COSTA RICA

1. Card-based products

Futura 3000 Project (BCIE). This project was designed by the Central American Bank for Economic Integration (Banco Centroamericano de Integración Económica - BCIE), in consultation with CECA (Confederación de Cajas de Ahorro - Confederation of Savings Banks) of Spain and using the services of Banponce of Puerto Rico under direct contract. This scheme involves implementation of a chip card through which small value payments can be made with affiliated merchants. The operator of the scheme, who at the same time functions as the clearing institution, is BCIE in San José, Costa Rica. The settlement of the transactions will be affected through accounts that each financial institution maintains with Banco Central de Costa Rica.

The scheme is based on a card which, related to a bank account, can function both as a debit card or an electronic purse. If it is used as a debit card, it requires a magnetic stripe and an on-line connection whereas, if used as an electronic purse, it merely requires a terminal with the affiliated merchant and not necessarily an on-line link. If the card is used as a debit card, a document (voucher) is produced, establishing a link between the client and the merchant. If used as an electronic purse, no document is produced.

In Costa Rica 16 financial entities, public as well as private, banks and non-banks, have signed an agreement with BCIE. At the moment the card is nationally valid and only transactions in the local currency, Colones, are affected. On the other hand, there are no restrictions with regard to associating the card with a foreign brand; this depends strictly on each of the issuers in the scheme.

Within this scheme, it is possible to transfer funds from the savings account to the reloadable electronic purse. Nevertheless, the maximum amount that can be loaded has been initially set at Colones 30,000 (approximately USD 110 at the current exchange rate); this limit was set by the issuers who have the possibility to change the limit whenever they wish. Affiliated merchants will be equipped with a terminal on which the sales carried out using this method will accumulate. The amounts can be transferred to the institution in charge of clearing and settlement via the telephone network. The maximum amount that can be accumulated on each terminal has been set at Colones 750,000 (USD 2,730); this is not a technical limit, but a parameter agreed by participating institutions. In transferring these amounts to the institution in charge of clearing and settlement, security methods such as algorithms and encryption are utilised.

The project was launched in San Isidro del General on 20 March 1998 and the Banco Nacional has since expanded it to 12 cities across the country. For the first quarter of 1999, the Banco Nacional has plans to implement the scheme in 14 additional zones. Statistics published by the Banco Nacional

show 1,821 affiliated merchants and 32,000 holders of electronic purses. A number of agreements with universities, companies and government institutions are about to be signed with a view to increasing the issuance of electronic purses.

The BCIE has established a fee structure as a point of reference, the fees being ultimately decided between the issuers and the respective affiliated merchants. The fee structure is not fixed, but follows various criteria depending on the type of goods or services offered by affiliated merchants. Currently fees range between 2 and 4%.

Mondex by Credomatic (a non-bank financial institution). Credomatic is a non-bank financial institution which has been developing an electronic money scheme in association with the universally recognised Mondex. Credomatic has obtained the Mondex franchise for Central America and Panama. Furthermore, advertising has been undertaken with a view to massive introduction of the electronic purse and agreements have been made with universities to issue cards associated with student ids.

The card in question is a reloadable electronic purse with a chip. Issuance started in February 1998. In addition to the chip, the card has a magnetic stripe which provides a connection to the relevant account at the financial institution in such a manner that it can be associated with a debit or credit card. Transactions effected with this electronic purse are anonymous in the sense that the client cannot be associated with the respective transaction, with the exception of direct transactions of the client on the account the client maintains with the financial institution.

The amounts that can be used on the card are variable, but the system will start off with small amounts (USD 183), which will be adjusted as more experience is gained and new needs arise. With regard to the amount which can be handled by the terminals, there will be a (non-technical) maximum of USD 1,833. For transfer of the funds there are security features including encryption and algorithms. The Mondex electronic purse uses both a public and a private key for message encryption and the algorithms used are the most complex on the market (asymmetric cryptography).

At the moment, the card is used in domestic operations, but in the future it could be used in international transactions, in particular when taking into account that Credomatic acquired the franchise for Central America and Panama.

The system operator is Credomatic and it is only by affiliating to this institution that merchants will be able to make use of the organisation and affiliate infrastructure it currently possesses. Since initially it is not planned to have participating institutions other than Credomatic, there is no need for clearing. However, as soon as different financial institutions wish to participate in the system, the Banco de San José - another member of the financial group to which Credomatic belongs - will act as clearing house. Settlement of operations with affiliated merchants (payment of the merchants) is carried out via the Banco de San José.

At mid-January 1999, there were 13,000 electronic purses and 300 affiliated merchants.

2. Network/software-based products

No developments have been observed.

3. Policy responses

None of the currently utilised schemes have so far been subject to considerations relating to regulation, supervision or monetary policy directly affecting the Banco Central (such as for instance an estimate of the possible loss of revenue for the Banco Central due to a reduction in notes and coins in circulation or the impact on the money multiplier.

These schemes operate in accordance with the existing legal framework.

CROATIA

No development at this stage.

CZECH REPUBLIC

1. Card-based products

In the Czech Republic there is one e-money system, FUNCHIP, with 20,000 active cards. Another electronic purse system, CLIP, was terminated after the conclusion of the pilot project, and system MONET was stopped last year.

2. Network/software-based products

There is no network/software-based e-money system. Only the traditional home banking services are offered by several domestic commercial banks over the network to their clients. There is also one e-commerce system on the internet. It is based on payments to virtual department stores. This application is based on SET standard and one bank is cooperating with this project.

3. Policy responses

Discussions have been taking place at the Czech National Bank on the proposal of an EC Directive on the "pursuit of and prudential supervision of the business of electronic money institutions" and on how it should be implemented.

EASTERN CARIBBEAN

1. Card-based products

Caribbean phone cards. Cable & Wireless and its subsidiaries in the ECCB member territories introduced these prepaid calling phone cards in 1989. They are a replacement for cash/coins in payphones and have greatly facilitated the upgrading of the payphone network. The phone cards are denominated in EC $10, $20, $40 and $60 values and can be purchased from a number of designated retailers throughout the ECCB area.

Calling cards. These prepaid calling (telephone) cards were introduced into St. Kitts in June 1998 by Cable & Wireless St. Kitts/Nevis Limited. These cards have a PIN as well as a magnetic stripe, which facilitates their use in payphones. Cards are denominated EC $15, $25, $50 and $75.

2. Network/software-based products

No specific developments at the moment.

3. Policy responses

The ECCB has not yet formulated a policy approach to E-money developments.

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 the proposal for a European Parliament and Council Directive on the taking up, the pursuit and the prudential supervision of the business of electronic money institutions (September 1999).

EUROPEAN CENTRAL BANK

1. Introduction

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

The potential for rapid growth has led the EU central banks and, more recently, the Eurosystem,[3] to analyse the implications for their tasks in the future, should a period of rapid growth in e-money take place. This analysis has concluded that e-money may have significant implications for those tasks of the central banks related to the conduct of monetary policy, the promotion of 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 is of the opinion that it is crucial that the development of e-money should take place within a regulatory framework which takes into account the public interests pursued by central banks. In fact, the Eurosystem's view is that a clear and prudent regulatory

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

framework for e-money will actually promote its acceptance by the general public and its development.

Section 2 of this article provides a short description of the concerns of the Eurosystem. In order to address these concerns, the Eurosystem has defined minimum requirements for the regulatory framework, which are discussed in Section 3. Section 4 presents some of the statistical issues and, finally, Section 5 discusses the potential diffusion of e-money.

2. The concerns of the Eurosystem

2.1 Monetary policy concerns[4]

From a monetary policy perspective, the main concerns of the Eurosystem in respect of the issuance of e-money arise from the fact that it may affect the conduct of monetary policy and its primary objective to maintain price stability. It is believed that the main risks to price stability could stem from a potential unrestrained issuance of e-money. The marginal cost of producing e-money can be very low, in a situation where no interest payments have to be made.

Furthermore, there is a need to preserve the unit of account function of money. If, in the absence of any regulation, the use of certain e-money products were to spread at a rapid rate, the market's perceptions with regard to the creditworthiness of issuers could start to play a role in determining the value of outstanding e-money. In such an event, e-money products from different issuers could be traded at varying exchange rates, which would be detrimental to the role of money in terms of providing a common financial denominator for the whole economy.

In addition, developments in e-money may have implications for monetary policy by changing the behaviour of monetary aggregates in relation to developments in the economy. In this respect, the availability of statistics on the use of e-money is crucial. The widespread private issuance of e-money could also have implications for a central bank's balance sheet and the control by the central bank of short-term interest rates.

However, the risk of unrestrained issuance of e-money could be limited and the unit of account function of money maintained by imposing an obligatory redeemability requirement on all e-money issuers. This would ensure a clear link between e-money and central bank money and would ensure that the central bank retains the control of short-term interest rates. In addition, e-money has features similar to sight deposits. Therefore, the possibility of imposing minimum reserve requirements on e-money issuers would need to be considered against the background of ensuring equal treatment of issuers of e-money and issuers of other forms of money.

2.2 Concerns in respect of payment systems policy, the protection of e-money holders, the stability of financial markets and the prevention of criminal abuse

Efficient operation of payment systems and confidence in payment instruments

The development of e-money should not, in any way, jeopardise the smooth functioning of payment systems. E-money provides a payment technology which allows efficiency gains to be achieved. However, these efficiency gains can only be realised if sufficient safeguards are put in place to ensure that the general public has confidence in e-money, i.e. that it is seen to be a reliable way of making payments. In this respect, as with any innovation, a number of risks can be identified. In particular, float mismanagement, the intrusion of counterfeit value, major technical failures 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.

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[4] For a more detailed discussion on this subject, see the ECB "Report on electronic money", dated August 1998.

Protection of holders of e-money

In principle, in a market economy, it is the task of the creditor to assess the creditworthiness of his/her debtor. However, in practice, it is questionable whether this can be guaranteed in the field of electronic money issuance. In many respects, the problems of efficient market control are similar to those of traditional credit institutions. For example, most customers cannot assess the quality of the issuing institutions owing to the asymmetric availability of information and to a lack of understanding of the technical security features of the schemes they offer. In addition, even a well qualified and well informed observer may not be able to monitor the exposures of an issuing institution to various types of risks, as these risk exposures can change very quickly. Therefore, a proper prudential supervisory framework would need to be applied to the issuers of e-money.

Indeed, it may be assumed that a significant source of revenue for issuers of e-money is investing the proceeds, money exchanges for e-money, in a profitable way. As is the case with the value of bank deposits, the value of e-money could decrease, or even disappear, if the liabilities of the issuer were higher than the value of the assets. Thus, the financial integrity of the issuer would be jeopardised if the investment policy it pursued were not sufficiently sound. The risks for the issuers could, in particular, be triggered by liquidity constraints (if assets are liquidated resulting in heavy losses). Since the issuance of e-money amounts, in economic terms, to deposit-taking, the application of a prudential supervisory framework for e-money issuers can be justified.

Stability of financial markets

Since the issuers of e-money might have, or be suspected of having limited liquid reserves, there is a risk of a confidence crisis triggered either by rumours or news on the issuer's financial status. This could trigger a run on the issuer and, in the worst case scenario, give rise to "domino" effects whereby the failure of one scheme may cause other schemes to fail and, ultimately, may even affect the real economy. Therefore, the avoidance of systemic risk and, consequently, the protection of the stability of financial markets have always been a principle regulatory concern. Owing to the close resemblance of e-money to bank deposits, there is no reason why, to a certain extent, the same concerns should not arise in respect of e-money should it come to be used in large amounts.

Protection against criminal abuse

The inadequate management of operational risk and lack of technical security make e-money schemes vulnerable to counterfeiting and fraud. If counterfeit money were introduced into the scheme, it could lead to an increase in claims against the issuer, which would no longer be backed by the available assets. Thus, the financial integrity of the issuer would be under threat.

Another area of criminal abuse associated with e-money schemes is money laundering. Were electronic money schemes to provide the opportunity to execute anonymous transfers of large sums of money, they could be increasingly used for money laundering.

3. The Eurosystem's policy

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 electronic money" published by the ECB (August 1998) and further elaborated on in the Opinion of the ECB[5] on draft

[5] 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, the pursuit and the 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).

community legislation on electronic money.[6] In the Report, the Eurosystem places particular importance on the following minimum requirements for the framework for the issuance of e-money, the issuers of which would therefore be required to fulfil:

Requirement 1: Prudential supervision

Issuers of e-money must be subject to prudential supervision.

Requirement 2: Solid and transparent legal arrangements

The rights and obligations on the part of the respective participants (customers, merchants, issuers and operators) in any e-money scheme must be clearly defined and disclosed. Such rights and obligations must be enforceable in all relevant jurisdictions.

Requirement 3: Technical security

E-money schemes must maintain adequate technical, organisational and procedural safeguards to prevent, contain and detect threats to the security of the scheme, particularly the threat of counterfeits.

Requiremen 4: Protection against criminal abuse

Protection against criminal abuse, such as money laundering, must be taken into account when designing and implementing e-money schemes.

Requirement 5: Monetary statistics reporting

E-money schemes must supply the central bank in each relevant country with whatever information may be required for the purpose of monetary policy.

Requirement 6: Redeemability

Issuers of e-money must be legally obliged to redeem it at par value at the request of the holder of the e-money either against central bank money or, with the holder's consent, via banking channels by making an irrevocable payment order crediting the holder's bank account.[7]

Requirement 7: Reserve requirements

The possibility must exist for the ECB to impose reserve requirements on all issuers of e-money.

In the Report, it is also stated that when applying these minimum requirements, particular attention should be paid to the following aspects:

Smaller schemes: schemes which satisfy certain clear criteria may benefit from a lighter regulatory regime commensurate with the lower level of risk inherent in them;

Co-operation between oversight and supervisory authorities: in evaluating the integrity of e-money schemes, central banks, in their capacity as overseers of payment systems, should co-operate closely with the competent supervisory authorities; and

Cross-border supply of e-money: given the world-wide aspects of e-money, especially the types of e-money which can be used in networks, thereby running the risk of delocation, the Eurosystem stresses the need for international co-ordination in this field.

In addition to the minimum requirements, the Eurosystem has identified two further objectives which it deems desirable to pursue:

– the interoperability of e-money schemes; and

– the adoption of adequate guarantee, insurance or loss-sharing schemes.

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[6] Both the Report and the ECB Opinion are available on the ECB website: www.ecb.int.

[7] Detailed requirements on redeemability are set out in the ECB Opinion (ECB/1999/1) on draft Community legislation.

The Eurosystem considers that the most straightforward solution would be to limit the issuance of e-money to credit institutions, which would, inter alia, enable the ECB to impose minimum reserve requirements on all issuers of e-money.

The EU Council, together with the European Parliament, has been preparing Community legislation on e-money which would, in principle, limit the issuance of the latter to "traditional" credit institutions and to the new type of credit institutions called e-money institutions (ELMIs), on which the draft legislation will impose a specialised regulatory framework.[8] These draft Directives take into account many of the Eurosystem's concerns, however, certain major issues relating to, for instance, the waiver, have yet to be resolved. The proposed waiver would allow the Member States, under certain very broad conditions, to waive the application of some or all of the provisions of the draft Directives, including the redeemability requirement. As a result, large segments of the e-money business could now fall outside the scope of the relevant provisions. The preparatory work for this Community legislation is currently at quite an advanced stage, and it may even be put in place during the year 2000.

4. Statistical issues

The European System of Central Banks (ESCB)[9] conducted a "fact-finding" exercise in spring 1999 on multi-purpose e-money, which included, inter alia, the collection of background information on the availability of statistical data and accounting rules as well as the collection of statistical data on an ad hoc basis. The study revealed that data received by the national central banks are, in many cases, available on a monthly basis, that the data come from the accounting systems of the issuers and that the quality of the data is of a high standard.[10] However, in some cases, the information is only obtained after a considerable delay. With regard to the classification of e-money, it was recommended that the latter, irrespective of whether it was hardware or software-based, should be treated as an "on-balance sheet" liability of the issuing institution and be classified as "overnight deposits" for statistical purposes.

The data collection revealed that the reported outstanding amount of e-money schemes for the euro area amounted to EUR 119 million at the end of December 1998. The largest contributions to this amount came from Germany, the Netherlands and Belgium. For the non-participating Member States, the total outstanding amount of e-money issued stood at EUR 4 million in March 1999.

The low amounts reported and certain other features, such as the non-existence of cross-border schemes and the denomination of e-money in the national denominations which make up the euro (as opposed to the euro itself) lead to the assumption that outstanding amounts in respect of e-money schemes will not reach levels which are significant from a macroeconomic point of view in the short term. For this reason and owing to the fact that most e-money is issued by credit institutions and hence reported within their balance sheets, in the short term there is no need to amend the ECB Regulation[11] in order to obtain detailed information on e-money balances and to cover non-monetary financial institutions issuing e-money. The existing data on e-money will be reported regularly to the ECB and a review of the statistical treatment of e-money will be conducted on an annual basis.

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8 Draft Directives on the taking-up, pursuit and prudential supervision of the business of electronic money institutions and on amending Council Directive No. 77/780/EEC of 12 December 1977 on the co-ordination of the laws, regulations and administrative provisions relating to the taking-up and pursuit of the business of credit institutions.

9 The ESCB comprises the national central banks of the EU Member States and the ECB.

10 Nevertheless, these may not be entirely accurate.

11 The Regulation of the European Central Bank of 1 December 1998 concerning the consolidated balance sheet of the Monetary Financial Institutions sector (ECB/1998/16).

5. Diffusion of e-money

The ECB Report entitled "The effects of technology on the EU banking systems" (July 1999), discusses, inter alia, the diffusion of e-money within the EU and analyses the prospects for significant growth in e-money systems. The use of card-based e-money is not yet widespread in the EU. In most EU Member States, e-money is still at a relatively experimental stage, at least when compared with cash or traditional non-cash payment instruments. Developments in the area of software-based e-money have, thus far, been even less noticeable than in the area of card-based products.

Customers seem to be adapting their payment habits rather slowly to the use of e-money and in many cases, retailers have been unwilling to invest in technology to facilitate payment using e-money. One of the crucial issues here appears to be the associated costs. The cost considerations of consumers (e.g. electronic money loading fees) and merchants (e.g. minimum transaction costs and installation costs) appear to have played an important role in the decision on whether to use and/or accept e-money as a means of payment, even though there might be a reduction in costs owing to reduced cash handling. In addition, one of the problems is due to the fact that many customers may not see the benefits of paying for goods and services using both cash and e-money. Other potential impediments to a more widespread use of e-money include: (i) insufficient customer information during the introductory phase; (ii) the lack of a critical mass necessary to facilitate a speedy diffusion; (iii) the lack of cross-border compatible schemes in the market owing to a lack of international standardisation and multi-currency capability; and (iv) inadequate experience of issuers in respect of the security of card-based or network products (e.g. in vending machines) and storage media, in addition to other technical deficiencies or disadvantages.

With regard to the future diffusion of e-money, notwithstanding costs, the integration of several functions into a chip card or the combination of the e-money facility with credit or debit cards may enhance customer acceptance of e-money. Furthermore, as a growing number of retailers' point-of-sale terminals already accept e-money, this may further stimulate acceptance. The future cross-border use of e-money will, to a large extent, depend on the standardisation and inter-operability of features as well as on the solution of security problems, especially in the area of e-money for Internet use.

In spite of the impediments mentioned above, card-based e-money could play a significant role in the future in face-to-face micro-payments, such as those made into parking meters, vending machines and public transport ticket machines, as well as those made via the Internet. However, as the future diffusion and market niche of e-money seem to be uncertain at the moment, there appear to be doubts within the banking industry as to whether the costs involved in setting up the infrastructure in order to make e-money a successful payment medium can be justified.

Finally, there is an element of interplay between electronic money and electronic commerce (e-commerce). Many observers expect e-commerce to expand dramatically in the future. At present, many observers expect to see the highest growth potential, both in business-to-business and in business-to-household transactions, in the areas of: (i) standardised low-value goods and information (books, CDs, newspapers and travel information); (ii) distribution services (buying via the Internet with home delivery); (iii) information searches (e.g. travel and investment advice); (iv) computers and related products (software); (v) discount brokerage for commodity services; and (vi) banking services.

E-money can indeed play an essential role in the further development of e-commerce, especially in the area of micro-payments via the Internet.[12] The emergence of e-commerce together with Internet banking and e-money is an example of one technological innovation reinforcing other innovations. There are also other examples of technological "mutual reinforcement effects" in banking. However, the use of e-money is not a prerequisite for the spread of e-commerce. E-money used in networks will

[12] Micro-payments are expected to gain considerable importance with regard to payments related to, for example, the downloading of information.

have to compete against credit card payments, increasingly used as a result of the new credit card payment mechanisms on the Internet, such as SET.[13]

FINLAND

1. Card-based products

Avant. Avant Finland Ltd, a subsidiary of the Bank of Finland (Suomen Pankki), launched the first phase of a multipurpose electronic purse system, ***Avant I*** in 1993. At first the cards were disposable, but from mid-1994 reloadable electronic purses also became available. In November 1995 the scheme was sold to the private sector (three banks and a bank-owned ATM network operating company, Automatia Rahakortit Ltd). Avant I has been replaced by the second-phase product (Avant II), and was phased out by the end of 1998. The second phase of Avant (Avant II) started in March 1997. Automatia has widened the use of Avant II to include the Internet by using card readers since the end of October 1997. Merita Bank, OKO Bank and Leonia Bank issue new reloadable cards and the value on them, and Automatia is the system operator (Automatia also issues disposable cards). Electronic cash is loaded onto the new cards via ATMs, or via internet using a card reader and supporting software attached to a PC. Among the areas covered by the existing range of "retailers" are public payphones, parking, public transport, shops and kiosks and, using a PC-attachable card reader, some internet-based service providers. At the end of 1999 the total amount of cards in circulation was 450,000. The number of retailers accepting Avant was 600, and the number of terminals in use 5,700. Total number of payment transactions during 1999 was 510,000.

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 also provides its system and operating services for Rovaniemi and Seinäjoki Citycard schemes mentioned below.

Citycards. Three local multipurpose prepaid card schemes called Citycard schemes are being implemented in Vaasa, Rovaniemi and Seinäjoki. Citycards can be used, for example, in paying bus fares and some communal fees. The Vaasa Citycard scheme is not yet launched for public use. During 1999 several new citycard schemes were prepared for launch in Espoo, Vantaa, Oulu, Pori and Turku.

UniCard. In 1998 the student union of the University of Helsinki launched a chip-based student card called 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, e.g. student cafeterias and restaurants, book shops and computer stores. E-money can be loaded into cards from service providers' terminals.

2. Network/software-based products

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

[13] SET (Secure Electronic Transactions), which is being promoted by major credit card companies, allows the use of credit cards in combination with encryption software from a PC.

3. Policy responses

Monetary policy and seigniorage. According to the current Finnish legislation the issuance of electronic money cannot be considered as 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 issued, outstanding and redeemed e-money (as well as, for example, number of cards issued and number of e-money accepting merchants) have been placed on one e-money scheme, namely Automatia Rahakortit Ltd's Avant II scheme. Automatia started reporting at the beginning of 1998. The amounts outstanding within this scheme will be regarded as overnight deposits (according to the recommendations agreed upon by the EMI Council) and thus included in the monetary aggregates in the future.

At the moment the remaining electronic money schemes in Finland are not regarded as such 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. At the moment there is no special legislation governing e-money and the issuance of e-money is not restricted in any way.

A working group under the Ministry of Finance published a proposal on how electronic money schemes should be regulated in December 1996. In October 1997 the Ministry of Finance established a new working group to monitor the progress of electronic money schemes in Finland and abroad, to follow the regulatory solutions of other countries and, if considered necessary, to make a proposal for legislation concerning the issuance of e-money. The working group finished its work in February 1999. In a published report the group emphasised active participation in efforts to create an European Union directive regulating electronic money, and stated that if the directive is substantially delayed, readiness to implement national legislation must be maintained.

The legislative power considering e-money is divided: that 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, i.e. 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 evaluation of 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.

Provider issues. In Finland the issuance of e-money is not restricted, as indicated in "General legal issues" above. For the future regulatory development the Bank of Finland policy approach is in line with the EMI/ECB's view, namely that the issuers of e-money should fulfil the minimum requirements mentioned in the Opinion of the EMI/ECB Council on the Issuance of Electronic Money, regardless of the nature of the issuer and that the most straightforward solution would be to limit the issuance of e-money to credit institutions.

Payment system issues. There have been no known serious problems concerning clearing and settlement arrangements for e-money schemes. The Bank of Finland (and also the Financial Supervision Authority) have been influencing the design and operation of the Avant II prepaid card scheme. In this case the central bank's authority is based on its role as the payment system overseer and on the deed of purchase with which it sold Toimiraha Ltd. (the developer of the Avant I prepaid card scheme) to Automatia Rahakortit Ltd. The Financial Supervision Authority has authority over the banks that own Automatia Rahakortit and who issue Avant II reloadable e-money, and thereby has indirect influence on Automatia Rahakortit Ltd.

Supervisory issues. If the 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. See also "General legal issues" above.

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 must also be extended to that person insofar as this is possible with the means available. Identification records must be kept in a reliable manner for not less than five years after the termination of the business transaction or the customer relationship.

The above requirements also apply to customers other than regular customers where the business transaction, carried out as one single operation or several linked operations, is the equivalent of at least ECU 15,000 in Finnish markkaa, but not less than FIM 85,000, or if there is reason to doubt the legitimate origin of the funds involved in the transaction.

The Credit Institutions Act further provides that a credit institution or a financial institution as referred to above must, with due diligence, ascertain the reasons and purpose for the use of its services if it notices that they differ from what is normal with respect to their structure or size, the size of the organisation or the location of its place of business or that they have no evident economic purpose or that they are incompatible with the economic circumstances or business transactions of the customer.

Money laundering also constitutes a crime under the Penal Code: anybody who receives, transforms or transfers funds or other assets known to be acquired through a crime, or the substitute of such assets, for purposes of disguising or concealing the illegal source of the assets or for purposes assisting the offender in avoiding the legal consequences of the crime, is liable to prosecution for a receiving offence. Likewise, anyone who disguises or conceals the true nature, source, location or disposition of, or rights to the assets referred to above or conceals information regarding the above matters that under law must be reported, is liable to prosecution for a receiving offence.

Chapter 37 of the Finnish Penal Code was revised in 1997. Under Section 8 (19th June 1997/602) of Chapter 37, modern recorded material and software, based on modern information technology and classified as means of payment, as are suitable, for example, for use in network-based payment transfers are also considered as means of payment and related forms now.

Moreover, the wording of Chapter 37 of the Penal Code concerning means of payment was revised so as to take into account technical advances that facilitate the unauthorised manufacture of means of payment.

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. However, the Bank of Finland considers it necessary that national legislation be applied also for foreign e-money schemes located in another member state before the EU legislation on electronic money issuance is put in force, because regulatory arbitrage can be quite severe. Some countries may not have any regulatory standards at all, while some have introduced standards that may be even more stringent than the future harmonised minimum framework.

In any case it is practically impossible to prohibit citizens from using foreign e-money, especially in the case of foreign network money. Therefore, informing the public which e-money schemes are supervised and regulated and what kind of risks persons may incur in using non-regulated foreign e-money is vitally important.

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 it can be exempted from VAT.

FRANCE

1. Card-based products

Three banking consortia have been created, each of them promoting an electronic purse system with a specific technology and a different market approach. They have now launched trials and the national roll-out phase is scheduled for 2001.

MODEUS. MODEUS gathers around the foundering financial institutions (La Poste, the savings banks and Société Générale), the French Railways (SNCF), the Paris Transport Network (RATP) and France Telecom. The product is a mixed IC card with a ticketing application and an electronic purse which is meant to be universally accepted. The interface with the accepting devices is contactless, which brings both a better ergonomy and strong constraints in terms of transaction times and security. Following the evaluation of the project, the pilot phase has been delayed until 2000. It is launched in the surroundings of a major railway and subway station in Paris, and involves approximately 250 merchants and 10,000 cardholders. The project should naturally benefit from the distribution and acquisition network of the transportation companies. The targeted customers are mass transportation users, of which only 50% of them are bank card holders.

SEME. Société Européenne de Monnaie Electronique (SEME), a company gathering seven banks including BNP and Crédit Agricole, has launched a product called MONEO in the city of Tours. This pilot scheme started in September 1999 with approximately 1,500 merchants, 800 vending machines and a target of a 100,000 electronic purses. MONEO is based on the Geldkarte technology as a result of the on-going partnership of GCB (Groupement des Cartes Bancaires, the association of the main French banks which regulates the domestic debit cards system) and its German counterpart ZKA (Zentraler Kredit Ausschuss) in the field of interoperable electronic purses; however, MONEO has some specific features, including an off-line loading facility at the point of sale terminal that ensures that the card bearer never runs out of electronic cash. MONEO is typically a mixed card with the traditional chip-based French debit card application along with the electronic purse; both payment instruments are used in their respective efficiency domains, since only payments under the threshold of FRF 100 are made with the purse. The customers targeted by SEME are mainly bank card holders. A loyalty system is also included in the card so as to get wider merchant support. Interoperability with Germany and Luxembourg could be achieved by 2001, but with a product that would not be compliant with the Common Electronic Purse Specifications at that stage.

MONDEX France. The Credit Mutuel group has created a special purpose company called MONDEX France to buy and operate the licence of the MONDEX INTERNATIONAL (MXI, controlled by MASTERCARD) technology for the French territory and the euro. A pilot scheme is being launched in Strasbourg with a target of 1,500 merchants and 50,000 cards. The MONDEX system replicates the structure and organisation of cash systems: a unique issuer called "originator" provides electronic value to members which distribute and acquire the electronic value; purse-to-purse electronic value transfers could be technically feasible between all actors 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 Credit Mutuel in this project is to offer a wide range of applications to its card owners through the open operating system MULTOS.

All eleven banks participating in those three consortia are committed to the convergence or the interoperability of the schemes after the trials and have agreed upon a unique 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

on-going basis. It will then be able to guarantee to all e-money holders the redemption of their electronic value.

With this singular 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 has successfully applied for credit institution status in September 1999.

2. Network/software-based products

Kleline, a subsidiary of the BNP-PARIBAS group, has developed a comprehensive payment package for information, services or goods provided by internet suppliers where customers may either make a traditional payment using their bank card or use a virtual electronic purse. This purse is currently limited to FRF 500 (USD 98) and does not allow purse-to-purse payments. The corresponding e-money liabilities are held in the books of Kleline which, at the request of Banque de France, has become a credit institution since the beginning of 1997. Kleline's product (Klebox, recently renamed K-Wallet) is accepted by 300 merchants of which 50% are foreign.

Kleline's operations will have to be replaced in the framework of the internet strategy of the BNP-PARIBAS merger.

3. Policy responses

***Monetary policy*.** At present, the development of electronic money is not expected to have strong implications on monetary policy implementation. Indeed, it will need to be closely monitored if electronic 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 of 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 way of increasing reserve requirements. Furthermore, the redeemability of electronic 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 Banque de France keeps the view that there is a case for restricting the issuance of electronic 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 adequate solution since only credit institutions are subject to reserve requirements and, as eligible counterparties of the central bank, have direct access to marginal lending facilities in central bank money. The draft European directive for the issuance of electronic money accommodates most of Banque de 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 adapted 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, receiving deposits from the public and management as well as delivery of means of payment (including e-money issuing and distributing) are banking operations, reserved 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 the Banque de France is responsible for.

For these reasons, the Banque de 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 to be assessed for compliance with existing banking regulations. In particular, if transportation or telecommunication 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. A strong competition between banks in the field of electronic purses, where security could be at stake, led Banque de France to push the market players to write down formally minimum functional security requirements for these products. This exercise involved IT security experts from the banking and smart card industry communities.

In this process, the policy of Banque de France was to ensure a level playing field between the various projects, to achieve the international recognition of the evaluation process and to require that skilled and independent evaluation centres realise the evaluation. To match those constraints, the requirements were written in the language of the ISO 15408 standard,[14] usually referred to as "Common criteria for the security of IT systems"; Banque de France used a tool called "protection profile" meant for IT users to express their security requirements for families of products; the evaluations were to be undertaken in the national scheme for the evaluation and certification of the security of IT systems, placed under the responsibility of a governmental certification authority. Finally, Banque de 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 against the protection profile for the trial as well as the eventual roll-out phase.

Supervisory issues. As only credit institutions are allowed to issue electronic money, the issuers will be subject to the same kind of requirements than 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 anonymous purses of the various schemes does not exceed 100 euros and their holders will be identified during the loading process.[15]

GERMANY

1. Card-based products

In Germany a number of products using prepaid multifunction cards, also known as electronic purses, are currently under development. The following describes the major prepaid card project, GeldKarte, and PayCard.

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 Zentraler Kreditausschuss (Central Credit Committee), although the issuers (of both the cards themselves and the value on them) are exclusively banks and saving banks. A GeldKarte can be loaded with up to DEM 400 (USD 240) maximum per card, as a rule 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 a so-called electronic purse clearing account. The functions of an EC or bank customer card can be embedded in the same card. Payment

[14] This ISO standard is the convergence of northern 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).

[15] 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.

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 merchant card within the transaction terminal. The value received is then generally transferred once a day by the merchant 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 merchants, the unloading fee is 0.3% of turnover (at least DEM 0.02 per transaction).

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

PayCard. This is a prepaid rechargeable chip card developed by German Railways (Deutsche Bahn AG), the Association of German Transport Operators (VDV) and Deutsche Telekom. 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 has 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 are able to directly buy goods and services provided by 35 retailers. Since mid-1999 the system has gradually left the pilot stage.

Dresdner Bank together with Landesbank Sachsen and CyberCash started a pilot project by the end of 1997. About ten retailers and up to 5,000 customers and employees of the Dresdner Bank and Landesbank Sachsen are participating in the project. After the end of the testing phase, payment systems in the Internet for ***CyberCoin*** (system for small-value payments) and others will be offered.

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 in a special liability position in their monthly bank balance sheet ("stored-value card loading countervalue"). Since January 1997 this countervalue has been incorporated in the money stock M1 and thus also in 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 spread 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, 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 support this assessment.

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, those reserves are interest-bearing. In the event of a considerable shrinking of the central bank's balance sheet - a risk which from the present perspective seems small, but which cannot be ruled out - the imposition of higher minimum reserves could 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 are envisaged to offset any possible loss of revenue.

The Bundesbank believes that the option of issuing electronic money itself should be kept open as a sort of "last resort if needed". 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. The report published in 1996 by the BIS on the security of electronic money is regarded by the Bundesbank as a yardstick against which card-based systems appearing on a national scale can be assessed in terms of the extent to which they correspond to the state of the art as described in the report. In order to analyse a specific system, for which we employ the technical expertise of the Federal Office for Security in Information Technology (*Bundesamt für Sicherheit in der Informationstechnik*), we have developed a questionnaire as an introduction to the security check which is based on relevant preliminary work by the G10 Task Force on Security of Electronic Money.

In cooperation with the Federal Banking Supervisory Office, we are striving to achieve the aim of exercising influence on the operators of new card-based 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.

As mentioned above, in 1997 a software-based network money product for effecting payments via the Internet has been launched and will be placed on the market for the first time in Germany. This product has up until now been a one-bank solution, that is, both customers and merchants have had to hold accounts at the same bank in order to execute money transactions. This new form of money also harbours security risks, which are to some degree different from those inherent in card-based systems, since physical card protection must be replaced completely by software and organisational measures. We examine the security of the new network money together with the Federal Office for Security in Information Technology too.

Provider issues. 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); and

– 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, though, 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 because of systemic considerations concerning the protection of 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 electronic money schemes and, moreover, could 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.

Because the issuance of e-money (card-based money and network money) is supervised, there are no further considerations to be taken into account, for the time being, concerning this subject.

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

Supervisory issues. Any enterprise wishing to issue e-money should be subject to supervision by a competent authority. 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. See the response to provider issues.

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 bank 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 merchant/bank relationship and (c) the rights and duties as 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 case of a loss of 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 "hot line" allowing the cardholder in the case of loss to block reloading transactions (reloading is, of course, only possible using a PIN).

The standard terms and conditions to be used as *between banks and connected merchants* specify that the merchant is under a legal obligation to accept the card for payment if the customer wishes to use it and that the merchant 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 card holder and a merchant gives the merchant 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 as between banks (i) on account of the loading transaction which may occur through ATM facilities with banks different from the card-issuing bank and (ii) in the context of the collection of cash countervalue for electronic value which a merchant 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 (e.g. 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

In Greece, at present, there are no e-money schemes in operation. In recent years, two banks have been active in a limited scale in this area, but the schemes which were developed remained in a pilot phase.

In particular, the Commercial Bank of Greece along with the National Bank of Greece participated in the pilot programme of the European electronic purse, based on the CAFE technology. The electronic purse was used in the canteen of the headquarters of both banks by their staff and the maximum amount to be stored in the reloadable cards was GRD 10,000, which was fully guaranteed by the banks. Once the project was completed at a European level, the banks discontinued their operation at the national level.

At the same time the National Bank of Greece launched its own scheme, which started operating in a pilot phase in June 1995 in the canteen of the head offices of a subsidiary company called National Management and Organisation S.A. The standards used regarding the chip are ISO 7816 and EMV Part 1 and the technical characteristics regarding IC card is GEMPLUS/PCOS and IC type is microprocessor. Even though there was a marketing and business plan for a nationwide electronic purse, no further developments have taken place and the use of the cards, which is still in a pilot phase, remains restricted to the premises of the bank's subsidiary.

Since both schemes were in a pilot phase, no statistical data were collected by the Bank of Greece. There is no specific legal framework to regulate the issuance of e-money apart from the Governor's

Act No 2366/3.8.95, which provides that multipurpose prepaid cards can be issued exclusively by those institutions, which have the right to accept deposits under Article 4, part 1 of Law 2076/92. No specific rules concerning e-money security issues currently exist; however, the oversight of such schemes, as well as payment systems in general, falls under the scope of the oversight responsibilities of the Bank of Greece.

Regarding network/software-based schemes, XIOS bank has designed a scheme, which is still in pilot phase and uses the SET protocol. VISA International has certified that XIOS/VISA uses SET and is entitled to issue SET certificates.

HONG KONG

1. Card-based products

Prime VISA Cash. The first general multipurpose stored-value card, Prime VISA Cash, jointly developed by two banks and VISA International, was launched on a pilot 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 saving 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, discussed below).

Currently, VISA Cash cards are issued by several bank groups. They are available in two types of cards, the disposable Visa Cash card and the reloadable Visa Cash card. 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 about 500 designated cash dispensers (ATMs).

Since the pilot scheme began in August 1996, more than 1.2 million transactions with a total value of HKD 60 million (USD 7.7 million) have been recorded. Up to 31 August 1999, there were approximately 310,000 cards issued, including 200,000 reloadable cards and 110,000 disposable cards. Currently, over 1,000 merchants of various retail businesses, including supermarkets, fast food chains, convenience stores, department stores, gasoline stations, book stores, hair salons and so on have signed up for the scheme, and about 4,000 merchant terminals are available to accept payments by Visa Cash.

Mondex. The Mondex system, which is more akin to banknotes, was first launched in designated shopping malls in October 1996. The first phase roll-out of Mondex took place in November 1997 which 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 in 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 made 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 ten transactions. Mondex electronic purses contain a four-digit "lock code". By pressing the lock key on devices such as a wallet or telephone, the cardholders' money is kept secure and their transactions private. A Mondex purse can, at any one time, hold up to five different currencies, 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 expected around a few hundred Hong Kong dollars and the cards are mainly used for purchases of small items. So far, there are about 7,000 merchant terminals available to accept payments by Mondex.

Limited-purpose and single-purpose cards. On 1 September 1997, Creative Star Limited, a company jointly owned by transport operators issued a "contactless" stored-value card called "Octopus Card". The primary use of the card is for payment of transport services provided by the shareholders and other transport operators. The card can also be used to pay for the goods and services provided by shops and kiosks within the premises of the transport stations, however, these kinds of uses are regarded as related and ancillary or incidental uses and are limited to 15% of the value of all use of the card. The maximum value that can be stored on the card is currently set at HKD 1,000 (USD 129). The card can be reloaded at designated terminals within the premises of the transport stations and some convenience stores. The Hong Kong Monetary Authority (HKMA) has granted an exemption for the issue of the Octopus card as the usage of the card is limited to the payment of transport services and the risk of its use to the payment system and cardholders is slight.

The sales of the Octopus card have been very successful. By the end of August 1999, the cumulative sales of the card reached 5.6 million cards, recording 3.9 million transactions per day.

The Hong Kong Jockey Club has launched a pilot scheme for the issue of a stored-value card for use in betting services and other club facilities by its members. In addition, the Transport Department of the Hong Kong Government in April 1998 issued a disposable stored-value card – E-Park Card in denominations of HKD 100 (USD 13), HKD 200 (USD 16) and HKD 300 (USD 39), for payments on 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 agreements between the various parties involved in a card scheme are confidential and cannot be made available. The Hong Kong Monetary Authority (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 multipurpose cards.

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 electronic money being implemented in Hong Kong to date.

3. Policy responses

Implications for monetary policy operations. Issuers of e-money 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. The HKMA is considering whether and how e-money should be captured in the definition of money supply.

Multipurpose cards (i.e. Mondex and VisaCash) have been in the market place for some time now. However, it seems that these products have not yet gained wide acceptance. It is therefore difficult at this stage to forecast whether the development of e-money will significantly reduce the value of notes and coins in circulation. If this were to happen, the HKMA could require the issuer of e-money to hold at least part of the float in non-interest-bearing Certificates of Indebtedness (CIs) bought from the

HKMA for the account of the Exchange Fund (this is similar to the existing arrangement for the issue of conventional banknotes by the three note-issuing banks - see paragraph below). However, the HKMA currently has no plan to issue e-money itself.

At this stage, it is considered that the introduction of electronic cash is unlikely to have any major direct impact on the foreign exchange and money market operations carried out to maintain exchange rate stability. In the case of Hong Kong, the note-issuing banks surrender US dollars to the Exchange Fund in exchange for CIs which are legally required to be held as cover for the banknote issue. If the emergence of electronic cash leads to a decline in the demand for banknotes, the excess banknotes would be returned by the public. The note-issuing banks would redeem the CIs and the Exchange Fund would pay back the US dollars. However, such redemption, if any, is not expected to occur on a large scale within a short period of time. Thus, the impact on the Exchange Fund's assets is likely to be fairly limited and gradual.

There may also be a concern as to whether the popularity of electronic cash will affect the ability of central banks to control money supply. This, however, is not a particular problem for Hong Kong because, as with other fixed exchange rate regimes, the HKMA does not control or target the money supply in its monetary policy operations. Specially relating to banknotes, the amount of notes issued is primarily determined by public demand for such notes.

General legal issues. The legal framework for regulating the issue of card-based e-money or multipurpose stored-value cards (MPCs) is contained in the Banking (Amendment) Ordinance 1997. Briefly, the Ordinance provides that:

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

b. special-purpose vehicles whose principal business is to issue MPCs may be authorised as a deposit-taking company 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 a MPC where the usage of the card is very limited and the risk of its use to the payment system and cardholders is slight; and

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, HKMA issued a guideline explaining the principles and criteria that the HKMA will use in exercising his powers for the authorisation of multipurpose stored-value card.

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 1. 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; and

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 interest 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 multipurpose cards. In developing the legal framework for multipurpose cards, 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 multipurpose cards, 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; and

e. the main concern of legislation should be with multipurpose cards 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. The HKMA is not aware of any particular problems which have arisen relating to the clearing and settlement arrangements for e-money. The HKMA will consider the soundness of the clearing and settlement arrangement as part of its overall consideration of the soundness of the e-money scheme.

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

Law enforcement issues. The potential for e-money being exploited for money laundering purposes argues for restricting the issue of multipurpose cards 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 bulk of cash. As part of the criteria for approving the issue of multipurpose cards, 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, arising from lost or stolen cards or from counterfeit value). Whilst the HKMA does not consider it to be within its role to prohibit anti-competition 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 controls, the HKMA does not have any policy to require their standardisation.

HUNGARY

1. Card-based products

No multipurpose prepaid card project is under way in Hungary, but there are some single or limited purpose smart card schemes.

The most remarkable project is closely linked to the national student card programme. Ordinary student cards are configured to have stored-value function for university students in the city of Pécs. The cardholders using their cards at touch-screen terminals at the university or through their home PCs have access to several online services, e.g. they can thus enter for exams. The PCs have to be equipped with a card reader and an internet browser. The card can also be used for purchases, e.g. soft drinks from vending machines within the colleges.

The issuer of the card is the university, and the system is operated by a computer company, CompuWorx Ltd. This company is the supplier of the student cards nationwide. CompuWorx polls transaction data from the merchant terminals and sends them to the bank keeping the account (or the university) for settlement.

The cardholders have to have an account with the National Savings Bank (NSB). Value can be loaded onto the card at the ATMs of the NSB, and the corresponding balances are transferred to a separate account with the bank. The settlement of purchases with the card takes place between the acquiring merchants and the NSB. This card could be considered a limited purpose prepaid card.

This system is expected to spread nationwide in the future. Every university student in the country received a smart card in the first half of 1999, but for the time being it can only be used for identification, though the chip incorporated in the card can be utilised for a number of different functions.

Another pilot scheme is run in the Sony factory, located in the city of Gödöllő. The system has been designed and is operated by CompuWorx. The cards serve both identification and payment purposes within the factory. The employees can reload their cards up to an amount deductible from their payroll, using touch-screen terminals.

Aral - the German petrol retailer - is marketing its chip cards in Hungary. The cards are accepted at the 60 Aral petrol stations in the country for purchases of gasoline as well as various articles and services available at station shops. The cardholders can reload their cards against cash at station cash desks, without any limitation regarding the amount of value stored on the card.

2. Network/software-based products

The above-mentioned student cards can be used for internet purchases at the signed-up online shops.

3. Policy responses

The central bank accepts the minimum requirements and desirable objectives laid down in the Report on Electronic Money (August 1998) published by the European Central Bank. It closely monitors the new developments and takes action when necessary.

A government decree based on European Union Recommendation 97/489 was introduced in May 1999, covering the definition of the electronic money instrument and some basic rules. The current regulation restricts electronic money issuance to credit institutions in Hungary.

ICELAND

1. Card-based products

Two different electronic purse schemes are in the making in Iceland. One will be operated by the two major credit card companies (VISA Iceland and Europay). The two companies plan to reissue the current debit cards with a chip which will be used for electronic purse and multipurpose applications. A pilot project is planned in November and general usage from the beginning of next year. Agreements have already been reached with several businesses, e.g. the municipal authority of Reykjavík, which will cover usage such as payment of bus fares and swimming pool entrance fees. The new purse scheme will be based on the GeldKarte model and will be rolled out under the brand names VISA Electron and Maestro. Pricing and legal issues are currently under consideration.

The other scheme is run by a newly formed company called Kort hf., which is owned by several software, hardware and retail companies. One of the owners, Smartkort ehf., ran a pilot project in a local community, Kópavogur, which involved a local savings bank that issued the cards to 40 young people. The cards were preloaded with 2,000 Icelandic krónur. Several local businesses participated in the pilot. The cards were reloaded once. The pilot was successful, but plans for the future have not been published. The card is based on a local scheme and does not comply with foreign e-purse schemes. The card will be VISA Cash compliant. Encryption is used. The company is cooperating with foreign companies: Gemplus, Ingenico Fortronic, Thyon and Metra Inz. The card will be issued for use in Iceland only and will support the local currency. The card is a multi-application smartcard with e-cash and loyalty and will support automatic reload. Pricing and legal issues are currently under consideration.

Single purpose prepaid cards have been issued for some time, for use in public telephones and for ticket vending machines in parking areas.

2. Network/software-based products

No developments.

3. Policy responses

In December 1995, the Board of Governors of the Central Bank of Iceland appointed a working group within the central bank to study the various implications of electronic money for the functions of the central bank and other financial institutions, and how the Bank should react to the possible emergence of electronic money. The working group presented its report to the Governors in June 1996, and the report was formally published by the Bank in September 1996.

Monetary policy and seigniorage. Since there is no multipurpose e-money in operation in Iceland, no statistical information is available. The value of notes and coins in circulation in Iceland as a percentage of GNP is less than 1%. This ratio is lower in Iceland than in any of the G10 countries. Data for 1995 show that this ratio in the G10 countries was lowest in the United Kingdom at 2.9% and highest in Japan at 10.4%. The Central Bank of Iceland is therefore of the opinion that the development of e-money would not affect the size of its balance sheet dramatically and that monetary policy operating procedures will be more or less the same as before. There are no measures being envisaged to offset the loss of revenue for the central bank from the development of e-money. It is felt at this stage that the central bank should not itself be involved in the issuance of e-money although no formal decision has been taken. On the contrary, it was stated in the report that the issuance of e-money should be in the hands of the private sector. Furthermore, the report stated that only if the private sector failed in the operation of e-money would there be a possibility for the central bank to accept the role of issuing e-money, and then most likely as sole issuer.

General legal issues. The report of the working group was the first step taken to clarify the legal provisions relating to the future existence of e-money products. The report indicates the main legal uncertainties with respect to the new products. No laws or regulations have so far been adapted to deal with these uncertainties. The central bank regards it as one of its roles in this area to take part in the development of the necessary changes to the existing legal provisions. Iceland as EEA member will follow the EU legislation which will be applicable in the EEA area.

Relevant security issues. The central bank, including the bank inspectorate, has not so far laid down any specific criteria to be used for evaluating whether the security features of the new products are adequate or not. Since it is expected that the first new products in this field in Iceland will be developed abroad, no particular issues arise in that context. However, the so-called Mondex system would have to be studied very carefully before it could be accepted in Iceland.

Provider issues. It is the opinion of the central bank that many problems would be solved if e-money value were treated as a deposit. Then only "banks" would be allowed to issue e-money value according to the present law. However, no specific policy approaches have been formulated in this respect. International cooperation is one of the factors that would influence possible future policy responses. Such cooperation is now taking place, at both EU/EEA and EMI level.

Payment system issues. Since there are not yet any e-money schemes operating in Iceland, no problems have arisen relating to the clearing and settlement arrangements for e-money schemes. For that reason the central bank, as payment system overseer, has not taken any steps to influence the design and operation of e-money schemes.

Supervisory issues. The bank inspectorate is one of the departments of the central bank. No specific policy responses have been made regarding supervisory issues. It is likely that if non-bank financial institutions or non-financial institutions were to be allowed to issue e-money value, the issuance would be under the supervision of the bank inspectorate, but this may require a change in existing legislation.

Law enforcement issues. No particular policy approaches have been proposed or formulated by the law enforcement agencies.

Cross-border issues. These issues are quite complicated and need thorough study. Problems involved will be solved by international cooperation. It has not been decided what policy approach would be taken if cross-border e-money schemes were to be developed involving the domestic currency. The central bank has not at this stage taken any stand regarding cross-border schemes.

INDIA

The issuing of Smart cards for banking transactions in the country continues to be vested with the two banks already indicated earlier - Dena Bank and United Bank of India which have been authorised to issue Smart cards.

The pilot project for the use of Smart cards - called the Smart Rupee System (SMARS) - launched at the Indian Institute of Technology, Mumbai, has now completed more than 10 months of operation. A report on the standards to be used in Smart card technology was submitted to the Reserve Bank of India in August 1999 by the group comprising 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 who have been working on the SMARS project.

Responding to this report, the Reserve Bank of India has set up a working group headed by the Executive Director to study the recommendations and publish the standards for use. The group, set up in September 1999, has been examining the recommendations to determine the standards for the Indian banking industry. The report of the group is expected shortly. The recommendations on standards have been divided into two categories - those which are international standards and could therefore be adopted directly, and those standards which are specific to SMARS in India alone. The standards which are specific to the Indian scenario would be studied, and on acceptance would be recommended to the Bureau of Indian Standards for adoption as national standards.

INDONESIA

There are neither multipurpose prepaid cards nor software/network-based products in Indonesia.

According to the latest survey conducted by the central bank, several banks have studied and have had presentations about e-money by international companies like VISA and MasterCard, but none of the banks at this stage have decided to make any commitments in developing e-money with those companies, except one domestic bank. This bank has conducted an in-depth study on e-money and planned to launch an e-money product in 1999. This plan was delayed because of the economic crisis in Indonesia. The scheme, which this bank was interested in, is Mondex.

Currently there is no specific policy and/or regulations that have been developed by Bank Indonesia on this issue.

IRELAND

1. Card-based products

There are no multipurpose prepaid card schemes in Ireland at the moment. However, there is one pilot scheme still in existence. The two major banks in Ireland (AIB and Bank of Ireland) are conducting a pilot e-purse scheme in the town of Ennis which has a population of approximately 15,000. The system used is the *Visa Cash* product (offered by Visa International) - a stored-value smart card. As an "e-purse" rather than an "e-cash" scheme, direct card-to-card transactions are not permitted; rather all transactions are collected and settled through a central system. The scheme is a fully redeemable one.

In addition, another Irish bank - National Irish Bank - proposes to launch a pilot scheme based on the Mondex product in early 2000.

2. Network/software-based products

No developments to report.

3. Policy responses

Given that there exists just one pilot scheme at present, the specifics of any policy regime have yet to be articulated. It should be noted that the Central Bank of Ireland is the prudential supervisor in Ireland. In addition, it is also the regulator of payment and securities settlement systems.

ISRAEL

1. Card-based products

At present, ten projects involving card-based electronic purses are planned in Israel. Most of them are intended to serve a specific population segment, but two of the projects are defined by their proposers as multipurpose e-purses for general distribution. One of the projects, that of Israel Telecommunication Corporation (Bezeq), is currently operating on a trial basis at Bar Ilan University. Another project, which is associated with Mondex started operating in the third quarter of 1998 in Rehovot (a mid-sized city), and at Israeli universities. As far as the other projects are concerned, no final operative decision has as yet been made.

2. Network/software-based products

No developments have been observed.

3. Policy responses

In mid-1996 the Governor of the Bank of Israel appointed an interdepartmental committee to study the subject of e-purses and submit recommendations. The committee completed its deliberations and its recommendations were adopted by the senior management of the Bank of Israel in March 1997. The committee found that at present there is no appropriate legislative framework for dealing with e-money and recommended that the Bank of Israel act to change the law in this respect.

Until the law is amended, corporations wishing to introduce e-money projects are required to voluntarily accept the requirements, which will come into force at a later stage.

Issuance of electronic money by the Bank of Israel. It is proposed that at this stage electronic money should not be issued by the Bank of Israel, although if the private sector is the only issuing agency the Bank of Israel could lose seigniorage deriving from the printing of money in the amount of between NIS 100 million (though not at the initial stage). However, the Bank of Israel seeks to refrain from intervening in competition and innovation in the private sector. Sufficient experience in the use of these products has not yet been acquired, so that it is difficult to assess how safe such products are in comparison with conventional means of payment.

Legislation and regulation. There is currently no appropriate legal-framework for supervising e-purses. The committee feels that such a framework is essential for protecting Israel's payment system and suggests that legislation should be introduced. This would give the Bank of Israel a leading

role in supervising e-money, because of its implications for the payment system and the management of monetary policy, both of which are clearly under the responsibility of the Bank and also because of its ability to monitor such projects with the aid of the existing mechanisms of the Banking Supervision and Monetary Departments. In August 1998 the Debit Cards Law was amended in order to include e-purses. In general an e-purse holder is protected in case of loss or theft of e-purse. The law also tackles the criminal aspects pertaining to e-purses.

Monetary aspects. If the distribution of e-purses were to be widespread, they could become substitutes for other means of payment and even affect demand for the various monetary aggregates. This process is not expected to occur rapidly, but in time it will combine with other influences on the monetary aggregates (because of the wider use of e-money of other kinds) and could have a significant effect. It is therefore proposed that these developments be monitored and, where appropriate, that the utilised floats in e-purses be added to the monetary aggregates and also that changes in the liquidity requirement with respect to this element be considered.

ITALY

1. Card-based products

In Italy three electronic purse schemes are currently under way.

Cassamat is a local electronic purse which was launched in October 1994 in the district of Alto Adige by the Raiffeisen federation of cooperative credit institutions, composed of 53 banks. This card does not allow the transfer of purchasing power from purse to purse.

The technology chosen is a contactless rewritable chip card. This system is capable of interacting with other electronic purse systems, even with the ones based on contact cards. For security reasons, a customer identification code must be used for purchases exceeding ITL 50,000 or for a number of purchases totalling over ITL 100,000. The settlement of transactions is carried out by Cassa Centrale Raiffeisen.

MINIpay is a nationwide electronic purse. It was launched at the end of June 1996 by SSB, a computer services company controlled by the largest Italian banks, which has now reached wide acceptance across the country. The project was prepared jointly with Europay. Although technically feasible, this scheme does not offer the possibility of making card-to-card payments. The MINIpay card is issued by banks to all applicants, who may not be account-holders. In fact, both registered and bearer cards are provided for. In 1997, after a trial period in Turin, the MINIpay card, issued by 56 banks, was extended to several other towns.

With a view to promoting the use of the euro, in March 1998 a specific pilot project based on the issue of MINIpay cards in euros was launched in some towns. It provides for the visualisation of both currencies (lira and euro) on the retailer's terminal and on the user's receipt. Last year the initiative was extended to other Italian towns; in one of them the Italian Post Office was also involved.

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

MINIpay funds can be spent via two types of terminal: one for retailers, which may be 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 on the terminal to his banking current account by using a telephone link or by loading the value on a "merchant card" which is then delivered to the bank.

Data are downloaded to TSP, a company owned by SSB, which is in a position to monitor the float and handle 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 (smart cards are tamper-proof). All operations (loading, payment, collection, etc.) are preceded by identification and authentication operations.

Besides being a payment instrument, MINIpay can also be used as a citizen's card to have access to public utility services, e.g. as an identification document, for the payment of public transport fares, for health services, or for the issue of certificates (birth, marriage, residence, etc.).

Last year, TSP also launched a project called "Pay on Web" which consists of micropayments on the internet using the MINIpay electronic purse inserted in a PC plug-in. The system has been planned to handle several currencies, including the euro.

The system envisages specific measures to ensure the security of transactions. In particular, with the "security receipt" the customer obtains a receipt of the purchase which specifies its amount and the website on which it was made. The merchant is provided with a Security Application Module (SAM) or a chip card which ensures the security of transfers as well as their recordings. At the end of day, the value received by the merchants is automatically transferred to TSP, which distributes the payments to the banks in order to credit the merchants' current accounts. The card may be linked to a current account or be a bearer instrument. In the former case it can be reloaded online, at an ATM or bank branch.

VISA Cash. At the end of 1996, VISA, jointly with one of the Italian leading banks, launched a pilot electronic purse. The scheme envisages the issuing only of bearer cards that do not offer the possibility of making purse-to-purse payments. The maximum amount that can be loaded onto the cards is ITL 100,000. The settlement of transactions is carried out by VISA International.

2. Network/software-based money

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

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 requested by the issue of e-money, have 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 deposit".

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 Legislative Decree 415/1996. In particular, this amendment specifies that the raising of funds associated with the issuance of payment instruments with general purchasing power is restricted to banks. Therefore, according to this principle only banks can issue multi-purpose electronic money. E-money is included in the assets covered by deposit insurance (with the exception of bearer prepaid cards).

At present there is no specific regulation governing e-money. The general provisions of the Civil Code and of the Transparency Law cover the contractual aspects relating to the issuance, use and circulation of payment instruments, as well as the rights and obligations of card holders, merchants, card issuers and acquirers.

The Italian regulation on e-money schemes will be reviewed after the approval of the Directive "on the pursuit and the prudential supervision of the business of electronic money institutions".

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 issues" below). In addition, before authorising issue, the Bank assesses whether the internal procedures of the issuer or of the outsourcing company committed to managing the operational functions are able to control and manage operational risks.

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 legal framework laid down in the 1993 Banking Law also allows *non-banks* to issue prepaid instruments, provided that the latter do not have *general purchasing power*. The issuance of these limited purpose prepaid cards is restricted to financial intermediaries entered in a register kept by the Italian Foreign Exchange Office on behalf of the Ministry of the Treasury. Entry in the register is subject to the following requirements:

– legal form: public limited company, private limited company, cooperative or partnership limited by shares;

– exclusiveness of financial activity;

– paid-up share capital of not less than ITL 1 billion;

– members and corporate officers must satisfy experience and integrity requirements.

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

Payment system 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. In fact 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.

E-money schemes are therefore subject to the central bank's examination of their main aspects, in terms of soundness and efficiency of the system and reliability of procedures. So far, in assessing e-money schemes, the Bank has followed a number of guidelines, specifically:

– only a limited amount can be loaded onto the cards;

– it is not possible to make card-to-card payments;

– specific accounts must be opened by the issuers on which entries relating to loaded and unloaded values are to be recorded; and

– the settlement of interbank transactions made by e-money has to be carried out in central bank money.

In addition, the Bank has recently published a white paper on oversight in which, on the basis of the 1998 ECB Report, the general picture of the oversight requirements for new products is outlined:

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

– 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;

– reliability of the settlement procedures: the funds transfer systems among the issuers of e-money must provide for settlement in central bank money;

– redeemability: the issuer is obliged to redeem the residual values loaded on e-money cards against legal tender at the request of the holder;

– protection against criminal abuse: the electronic money schemes should foresee measures to prevent their use for criminal abuse.

Moreover, the Bank of Italy is drawing up a procedure for evaluating the efficiency and reliability of e-money schemes and products. Following the EU guidelines and in cooperation with supervisory authorities, the evaluation procedure will take account of transparency and security requirements, above all for technical aspects (cryptography, PIN generation algorithm, etc.).

In accordance with the recent regulations governing electronic documents,[16] in February 1999 the Italian Authority for Information Technology in Public Administration (AIPA) 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 also in e-money schemes.

Supervisory issues. The fact that only banks can issue e-money 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.

Law enforcement issues. The Bank of Italy also 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 to be loaded onto the card and the ban on making card-to-card payments - currently reduce the risks related to money laundering activities.

Cross-border issues. At present no problems exist relating to cross-border or multicurrency schemes.

JAMAICA

There are no e-money schemes in operation in Jamaica at present.

[16] Law no. 59 of 15 March 1997 (in particular, Article 15) and Presidential Decree no. 513 of 10 November 1997.

JAPAN

Various pilot projects of electronic money continue to be implemented in Japan. Practical use of electronic money, however, is very limited and the volume and value of electronic money transactions are negligible compared with those of other retail payment instruments. In addition, the establishment of legal and regulatory frameworks for electronic money and electronic payments has been halted since the publication of a report in June 1998 which was prepared by the study group under the Ministry of Finance.

1. Card-based products

Large-scale experiments with card-based products have been implemented since 1998. For example, ***VISA Cash*** started a pilot in Shibuya, Tokyo in July 1998. About 120,000 cards were issued, and more than 1,000 retailers participate in the experiment. ***University Co-op IC card***, introduced to co-op member students in a university, has been expanding the scale of its project by increasing the number of participating universities. A project by the Ministry of Posts and Telecommunications began in Omiya city in Saitama Prefecture in February 1998. This is a pilot test of an IC card for CD/ATM with quasi-payment applications and about 65,000 cards were issued. ***Super Cash*** started in April 1999 in Shinjuku, Tokyo. This is a banks' joint project using the scheme based on joint research by NTT and the Institute for Monetary and Economic Studies of the Bank of Japan with some modifications. This scheme features the compatibility of anonymity in payment with traceability of invalid usage. Many major banks, including almost all city banks, participate in this project, and about 20,000 cards were issued.

In October 1999, a council was organised by a city bank and two credit card companies to carry forward a pilot of ***Mondex*** in Japan. It plans to launch the services of card-based products from August 2000, and network-based products from December 2000.

2. Network/software-based products

Several projects for network-based electronic money are also in progress. As far as domestic products are concerned, ***Internet Cash,*** which is using NTT's electronic money scheme, started the initial pilot in September 1998 with the support of the Ministry of Posts and Telecommunications, and 650 cards were issued by the end of the pilot. It has implemented the advanced pilot since April 1999. It adopted the transferability of electronic value among users since May 1999, and from October 1999 multi-currency services are implemented which enable users to exchange Japanese yen for US dollars and vice versa. ***Super Cash*** referred to above is a hybrid form of electronic money which can be used at "virtual" malls via the Internet as well as at "real" malls. The "virtual" mall experiment started in April 1999.

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 electronic money and electronic payments, including monetary policy implications and roles 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 (e.g. consumer protection issues), and (ii) ensuring the integrity of electronic money issuers.

As for other issues relating to electronic money, the bill on electronic signature will be submitted to the ordinary session of the Diet in 2000 by the Ministries of Posts and Telecommunications, International Trade and Industry, and Justice. The government plans to establish an official electronic authentication system around April 2001.

KOREA

1. Card-based products

Since early 1996, banks have been working together to develop a pan-bank e-money scheme. The details of the developments are as follows. Banks and credit card companies will be allowed to issue e-money according to the law that regulates the business of credit cards and prepaid cards. Clearing and administration will be carried out by the Korea Financial Telecommunications and Clearings Institute (KFTC). The operator of the scheme will be the general assembly of KFTC participants. (KFTC is a clearing institute established by all domestic banks.)

E-money cards will be a multifunctional instrument containing the functions of credit and debit cards as well as multipurpose prepaid cards. E-money will be reloadable through CDs/ATMs as well as at bank counters and the scheme will be a closed-loop type that does not permit card-to-card transactions. Multicurrency or cross-border transactions using e-money have not been considered yet.

Banks launched a pan-bank e-money pilot project in January 1999. In July 1999 the e-money standard was revised to add a contactless feature to the IC card. After the pilot project, which runs until November 1999, the first IC cards will be issued to the public in December 1999 and spread nationwide. Telecommunications companies as well as banks and credit card companies are participating in the development of the e-money system.

2. Network/software-based products

With regard to network/software-based e-money, there are no specific developments at the moment. But it is planned to utilise the above-mentioned IC card over the network by using a special device, for example a card reader.

3. Policy responses

Monetary policy and seigniorage. At present the value issued on magnetic stripe (M/S) prepaid cards is not included in the monetary statistics because the amount is negligible and the Bank of Korea does not collect statistical information on single purpose prepaid cards issued by non-banks. However, when e-money on IC cards is used nationwide or its issued amount increases significantly, the Bank thinks it will be necessary to include e-money in the monetary statistics. The Bank does not think that e-money will make considerable impact on seigniorage, because the use of e-money is not expected to increase significantly in the near future.

General legal issues. The regulatory provisions on prepaid cards are contained in the Act on Financial Companies Specialising in Loan Business (which was revised from the Credit Card Business Act, and enacted 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 these provisions were established originally to regulate the disposable M/S type prepaid cards in January 1994, they are not

adequate to regulate the reloadable IC card type of e-money and The Bank of Korea is thinking of preparing new provisions.

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, and managing keys. The Government intends to develop and provide encryption systems for the e-money scheme.

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

Payment system issues. The Bank of Korea is actively participating in the process of determining some features of the e-money scheme according to its policy considerations as a member of the committee which coordinates banks' projects related to the payment and information systems.

Supervisory issues. There has been no visible policy response related to the development of e-money so far, but the Bank of Korea believes that it should develop ways to examine the financial situation of the credit card companies that issue and operate e-money.

Law enforcement issues. The Korean e-money product seems to have little attraction for money laundering because of its various features such as the prohibition of card-to-card transactions and the ceiling on the value loaded. There is no visible action from the Government in this matter. The Bank of Korea, however, is trying to minimise the risks through formulation of the detailed procedures for system operation and issuance in the future.

Cross-border issues. It is expected that customers would be less likely to use domestic currency e-money overseas or to use foreign currency e-money in Korea because their infrastructures are different at the moment.

Standardisation issues. Because e-money standards are already drawn up and apply to all the banks and credit card companies, one system using these standards will be operated nationwide.

Other issues. There is no specific action from the Government regarding issues and questions related to taxation, consumer protection, implementation of operational and technical standards, access and competition, etc.

LATVIA

1. Card-based products

No significant developments at the moment; some small pilot schemes had been established but turned out to be unsuccessful.

2. Network/software-based products

No significant developments at the moment.

3. Policy responses

Currently there is no centralised policy towards this issue in Latvia, and the rather rudimentary attempts by some commercial banks and other would-be users to introduce e-money-like instruments have turned out not to be successful enough to compile useful information or draw any kind of conclusions.

LEBANON

There are two prepaid cards in Lebanon: CLIC and PREMIERE, which are used for mobile telephones.

LITHUANIA

1. Card-based products

Lithuania currently has one card-based electronic money scheme, called ImparCard. The issuer, operator as well as supporter of the ImparCard scheme is Snoras Bank. Three card-based products, ***ImparCard***, ***ImparCard+EC/MC*** and ***ImparCard+Maestro,*** have been issued under the ImparCard scheme. ImparCard is a smart card-based product. ImparCard+EC/MC and ImparCard+Maestro are hybrid products (both magnetic stripe and microprocessor are present). ImparCard+EC/MC and ImparCard+Maestro are used additionally for servicing in the Europay/MasterCard international payment system.

The ImparCard project was launched in May 1996. Snoras Bank has been issuing ImparCard since 1996, and ImparCard+EC/MC and ImparCard+Maestro since 1999.

At the end of August 1999, 690 POS terminals, 475 PC-based terminals and 180 ATMs were active nationwide. The number of cards in circulation as of 1 September 1999 amounted to 53,000 (~23% of all payment cards issued in Lithuania) and the total value of transactions for the period January-September 1999 LTL 205.4 million (USD 51.35 million) (~20% of all payment card transactions in Lithuania). The average value of all transactions per card for the period January-September 1999 amounted to LTL 3,884 (USD 971). It is planned to issue 70,000 cards by the end of this year.

ImparCard is a reloadable, pre-authorised electronic purse scheme that allows one to use three different currencies. The card is loaded from the cardholder's account by means of online authorisation using the PIN code. There is no restriction on the maximum loading amount. The cardholder has the possibility to review the last three loads. Payment by the card takes place offline with the use of the PIN. The value of the transaction is transferred from the customer's card to the merchant's payment device. Snoras Bank is connected to the merchant's payment device and collects information for processing at least once a day. The cardholder is able to go through the last 10 purchases.

Snoras Bank has planned to develop its system by implementing the multifunctional (multiapplicational) card with the "Multos" operating system. At present four applications have been developed:

- cryptographic operation card for e-banking (application features: RSA Key generation, date encryption/decryption);
- multicurrency e-purse;
- merchant terminal card (application features: authentication and identification of the user's smart card and the merchant's POS terminal);
- user smart card key management and cryptogram calculation, transaction collection, saving and transferring.

Snoras Bank is planning to develop some other applications, based on the Multos card, for loyalty, home banking, parking-lot services and telephone calls.

2. Network/software-based products

There are no projects under way in Lithuania at the moment.

3. Policy responses

The Bank of Lithuania monitors the development of e-money in Lithuania. It intends to formulate a specific policy approach in accordance with the ECB report on electronic money (August 1998). The Commission of the European Community's Recommendation of 30 July 1997 concerning transactions by electronic payment instruments and in particular the relationship between issuer and holder are under consideration.

LUXEMBOURG

1. Card-based products

Luxembourg has just launched a prepaid rechargeable electronic purse called ***MiniCASH,*** usable for low-value transactions on national territory and in national currency as well as in euros. MiniCASH was launched in March 1999 by Cetrel, a bank-owned IT company, and is issued by the major commercial banks active in the field of retail payments and the Luxembourg Post Office.

MiniCASH operates through a prepaid rechargeable chip embedded in the existing debit cards. The MiniCASH technology relies on the German Geldkarte system. Like all prepaid card schemes, it is intended to be a substitute for small-value cash payments in neighbourhood shops, vending machines, car parks, ticket machines, public transport and payphones. The first few months of operation have shown that it is most successful in car parks.

MiniCASH can be loaded with amounts ranging from EUR 10 (LUF 400) to EUR 125 (LUF 5,000). Cards can be loaded by entering a PIN code, either at cash dispensers (ATMs) or at special purpose loading terminals (operated by the banks or Cetrel).

A "value-checker" that indicates the balance in hand, the last 15 payments and the last three loadings and unloadings processed is also available at Cetrel for EUR 6.2 (LUF 250).

Transactions at the point of sale are offline, which means that the amount stored on the card of the consumer is decreased and the amount stored in the merchant's terminal is increased by the same amount. Card-to-card payments are not possible.

With regard to fee structure, the cardholder does not have to bear any costs apart from the card fee (LUF 600 for three years). Merchants have to bear a fixed rental cost for the card acceptance terminal (LUF 500 per month), a transaction fee (0.7% of turnover) and an unloading fee.

As regards future developments, interoperability with the German scheme is being studied.

2. Network/software-based products

No development at this stage.

3. Policy responses

Since the introduction of the electronic money scheme is fairly recent and the legal basis for its oversight needs to be clarified, the Central Bank of Luxembourg has not yet finalised its policy on the subject of electronic money. Any policy response will be based on the guidelines agreed by the ESCB.

Since in the present scheme the issuers are credit institutions together with the Luxembourg Post Office, monitoring is carried out by the CSSF (Commission de Surveillance du Secteur Financier), which is the official agency in charge of banking supervision in Luxembourg.

MALAYSIA

1. Card-based products

The commercial pilot for ***MEPS Cash*** was launched in September 1999 at selected suburbs in Kuala Lumpur, the capital city of Malaysia. As at mid-April 2000, a total of six banking institutions were participating in the programme either as an issuer, acquirer or both with a total of 286 merchants accepting the MEPS Cash card. In terms of transactions, over 17,000 transactions totalling more than USD 64,000 were recorded.

Presently, the participating banking institutions together with the system operator are taking steps to extend the implementation of MEPS Cash beyond the commercial pilot areas. It is envisaged that the MEPS Cash application will be introduced at universities and chain stores. In addition, several strategic approaches are being studied to integrate the MEPS Cash application, which is currently operating on contact technology, with another stored value card that operates on the contactless platform. The integration of both the contact and contactless application is necessary to achieve critical mass at a shortest time possible. The MEPS Cash card is currently available as a standalone card in two forms, reloadable and disposable. These cards are issued by the participating banking institutions.

The development of the Government multipurpose card (GMPC) and the Payment multipurpose card (PMPC) is underway. The GMPC cards will comprise the basic government applications, that is, the national ID, driving license, medical and immigration, and MEPS Cash as an optional application. Currently, the development of the GMPC is at the final stages and the pilot is scheduled to be conducted by September 2000 in the Kuala Lumpur and MSC areas. As for the PMPC, the card will contain four payment applications, namely, ATM, debit, credit and MEPS Cash. The specifications of the system have been completed, and Malaysian Electronic Payment System (1997) Sdn. Bhd. (MEPS), the system operator, is currently evaluating the best approach to move forward. It is envisaged that the implementation of the GMPC and PMPC will spur e-money acceptance in Malaysia.

2. Network/software-based products

No specific developments at the moment.

3. Policy responses

Under Section 119 of the Malaysian Banking and Financial Institutions Act 1989 (BAFIA), prior approval from Bank Negara Malaysia is required to operate any electronic funds transfer system, which includes the issuance of prepaid cards and stored-value cards. Applications to Bank Negara Malaysia for consideration should provide the scheme of operation of the system and the rules, contracts, by-laws or other documents relating to the rights, duties and liabilities of the persons

participating in the system. The BAFIA also empowers Bank Negara Malaysia to inspect the premises, equipment, machinery, books or other documents, and accounts or transactions relating to the system.

MAURITIUS

1. Card-based products

Presently, stored-value cards are only issued by two companies, namely, Mauritius Telecom and Shell (Mtius) Ltd. However, these cards are *single-purpose* prepaid cards. No other card-based schemes are under consideration by the commercial banks or the central bank.

Major firms involved in stored-value card-based products such as VISA, Proton and Mondex are not engaged in any such project in the banking sector.

No general legal framework has so far been put in place to govern the functional aspects of e-money.

In the circumstances, security aspects, fee structure for e-money schemes, multifunctional and cross-border features of prepaid products are not under active consideration.

2. Network/software-based products

No network/software-based scheme is currently in operation.

3. Policy responses

Monetary policy and seigniorage. No information on e-money for the purpose of monetary statistics is collected.

In view of the liberalised financial sector, scope for stored-value products exists. The impact of the development of e-money on the value of notes and coins in circulation in the country will be considered in due course.

Appropriate monetary policy measures will be adapted if the value of currency in circulation and the central bank's balance sheet were to shrink considerably due to extensive use of e-money.

No significant impact on seigniorage is expected in the near future.

The central bank does not rule out the possibility of issuing e-money.

General legal issues. Laws and regulations have not been adapted so far to deal with the e-money developments as stored-value products are yet to manifest themselves.

Provider issues. It is considered that only commercial banks, which are supervised by the Bank of Mauritius, could be allowed to issue e-money. Accordingly, the central bank will be in a position to have a full oversight on e-money, for both monetary control and anti-money laundering purposes.

Factors that could influence future policy responses:

– cost to users and issuers;

– safety for users and issuers;

– convenience for users and issuers; and

– safeguarding against money-laundering transactions.

Security issues. The criteria applied to evaluate security aspects will be the track record of the issuer and technical soundness of the product.

Payment system issues. Appropriate clearing and settlement arrangements for e-money products will be put in place when these products are introduced in Mauritius.

Law enforcement issues. Anti-money laundering legislation is to be enacted shortly and is expected to also cover e-money transactions.

Cross-border issues. As indicated above, all e-money schemes, including cross-border transactions, will be subject to the supervision of the Bank of Mauritius in cooperation with the relevant authorities in other countries.

Other issues. The Bank of Mauritius will see to it that the stored-value products documentation is fair and reasonable with regard to the obligations of the various parties involved.

MEXICO

1. Card-based products

There are two e-money pilot programmes in Mexico. One of them, branded Visa Cash, uses technology provided by Visa and is promoted by a group of banks.[17] Inbursa, a Mexican bank with a Proton license, promotes Monedero Electronico Inbursa. Both pilots, started in the second quarter of 1998.

Both pilots use single currency rechargeable stored value cards. There are six commercial bank issuers in the Visa Cash project. They have issued 25,000 cards and have 380 participating merchants. They have issued e-money with a value of around USD 90,000. Monedero Electronico Inbursa has issued 2,500 cards and has 78 participating merchants, 27 vending machines and 1,230 public phones. The value of e-money issued is around USD 60,000. Visa Cash member banks charge the merchants 2-4% over purchases while Monedero Electronico Inbursa has not started charging fees.

Furthermore, Banco Nacional de Mexico SA (Banamex), Bancomer SA (Bancomer) and Banco Internacional SA (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 smart card infrastructure incorporating Mondex electronic cash. They plan to launch an electronic purse pilot program in the third quarter of 2000.

2. Network/software-based products

No developments so far.

3. Policy responses

Monetary policy and seignoriage. A task force formed in Bank of Mexico has recently concluded that e-money will not have significant impacts on the central bank's monetary policy implementation and seignoriage in the near future. The task force currently views direct taxation as a better source of revenue. E-money issue by the central bank is not envisaged.

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

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

[17] Bancrecer, Banorte, BBV, Citibank, Santander Mexicano and Serfin.

Provider issues and supervisory issues. Current relevant Mexican law stipulates that only banks can take deposits from the public. Thus, issuance of e-money linked with deposit taking from the public is only allowed to banks. No specific supervisory policy responses have been taken 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 the 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 for the standardisation of e-money products.

MOLDOVA

1. Card-based products

There are two multipurpose prepaid card schemes operated in Moldova. "MoldCardSystem" is based on specialised hardware and software of the Russian company New Computer Technologies and is operated by three commercial banks, Mobiasbanca, FinComBank and Energbank. Two of them, FinComBank and Mobiasbanca, perform the functions of issuer, acquirer and processor. Energbank acts only as processor and acquirer. The creation of a common processing centre is also being considered under this scheme. Under a quadripartite agreement signed in 1999 on issuing cards under a common brand and reciprocal acceptance at POS terminals, Universalbank joined the scheme.

The joint-stock commercial bank InvestPrivatBank, which acts as licensee of the multi-issuer payment system Dekart Media Pay (run by domestic restricted liability company Dekart, which conducts research in the area of IT data security and smartcards), operates the other scheme.

The schemes differ in approach to a multi-issuer concept.

Under both schemes, the card issued is a contact smartcard, which contains electronic purses. Two purses (one denominated in the national currency, the other in a convertible foreign currency) are designed to allow purchases with merchants, access to the cardholder's bank account for receiving conventional banking services, settlement of public utilities bills, cash withdrawals, etc. Currently, only the purse denominated in the national currency - Moldavian lei (MDL) is in use. The purse can be loaded on average with a value up to MDL 30,000 (approximately USD 2,300). The third electronic purse is designed purely for retailers' applications. The card issued under "MoldCardSystem", for instance, can support up to eight types of prepaid commodities or services. For the time being, prepaid value can be loaded onto the card only at terminals of the issuing bank, and smartcard payments can be made at the banks concerned and at several retailers, most of which are supermarkets and petrol stations. Settlement between the acquirer and the issuer is on the bilateral basis.

At end-1999, 1,309 domestic smartcards were in circulation. Expenditure, including purchases as well as cash withdrawals on these cards was almost USD 77,000 in 1999 Q4, while transactions totalled just over 1,500.

2. Network/software-based products

There are no significant developments at the moment.

3. Policy responses

In 1997 the National Bank of Moldova issued the Regulations on card payments in Moldova, under which no special authorisation is needed for banks to issue card-based electronic money, but any scheme must be submitted to the National Bank. Banks must show that they fulfil disclosure requirements regarding consumer rights and obligations.

MOROCCO

1. Card-based products

Cards used as a commercial transaction medium in Morocco can be divided into three broad categories according to type of issuer (this classification is of a functional rather than a legal nature):

– cards with a credit function, issued by specialist organisations (Diners Club, MasterCard, Wafasalaf, etc.). These are payment and/or credit cards which allow goods or services to be obtained from affiliated merchants;

– bank cards, which can be equipped with multiple functions (cash withdrawal card, payment card, credit card);

– charge cards, provided by distribution or large retail chains in order to allow the purchase of goods or services from them. These cards allow their holders to buy on credit and are generally issued in cooperation with credit institutions (Shell/BMCI card, Marjane/ATTIJARI CETELEM, etc.).

There are currently four banking networks, which operate independently:

– the Interbank group, comprising ten banks;

– the Wafabank group, via its subsidiaries specialising in the management of payment media, Wafamonétique and Diners Club Morocco;

– the BMCE group;

– the Crédit Populaire du Maroc group.

Given the absence of interoperability between these four networks, the issuing institutions and the banking industry are planning to set up a national card centre and to interconnect the four networks in order to achieve, in the long term, a proper unified national card payment system.

Certain member banks of the Interbank group have developed and put in place their own servers to process all operations initiated by their customers via their ATMs. Interbank is involved only in the clearing of its members' interbank settlements and for routing operations.

Cards issued by credit institutions can be used abroad under certain conditions: exporters and resident businessmen who regularly travel abroad on business may obtain credit cards for use outside Moroccan territory, subject to foreign exchange control limits.

At end-December 1998, 731,264 cards were in circulation, compared with 580,169 one year earlier, representing an increase of 26%. With regard to the number of ATMs and cash dispensers, there were 484 terminals (of which eight operate offline), as against 365 at end-December 1997, up by 36.6%.

It should be mentioned, in addition, that Itissalat Al-Maghrib (the company responsible for telecommunications) has for some years been issuing prepaid cards for use in public telephones. Towards the end of 1998, it launched reloadable cards aimed at mobile phone subscribers (GSM network).

In 1998, a total of 12,282,547 withdrawal operations were carried out, for a value of Dirham 7.9 billion. Foreign-issued cards accepted in Morocco accounted for 858,892 transactions, totalling Dirham 1.2 billion.

There were 780,839 payments using Moroccan-issued cards in 1998, representing a turnover of MDA 944 million.

Foreign-issued cards accounted for 1,083,160 transactions, or MAD 2.3 billion.

The number of transactions carried out abroad by holders of Moroccan-issued cards was 24,355, representing MAD 231.9 million.

2. Network/software-based products

In 1998, Crédit du Maroc, a subsidiary of Crédit Lyonnais, set up a platform for communication via its website. This new environment, called CdmNET, is the first Internet-based interactive banking server in Morocco. It allows those of the bank's customers who have subscribed to the server to manage a large portion of their banking operations remotely, for example to consult their accounts, issue transfer orders, place orders for the purchase or sale of publicly quoted securities, order cheque books, cancel transactions and consult exchange rates.

Even though no developments were reported with regard to network/software based e-money products, other ways to effect "electornic payments" are as follows:

(a) Remote banking

Remote banking covers the exchange and circulation of information between the customer location (home, office, etc) and the premises or production centres of the bank. It also encompasses the marketing, sale and distribution of services and access to services, without the need for the customer and banker to be physically present at the same time in the same place.

In addition to ATMs and cash dispensers, which were introduced in Morocco at the beginning of the 1980s, some Moroccan banks (Wafabank, BCM, BMCI, etc) have, since the early 1990s, been using voice servers which allow customers to enquire about their account balance, the last five transactions carried out and where applicable the amount outstanding on their payment cards, exchange rates and listed share prices.

In parallel with these developments, new forms of remote banking have emerged, thanks to the internet and electronic data interchange (EDI).

(b) Banking via the internet

In 1998, Crédit du Maroc, a subsidiary of Crédit Lyonnais, set up a platform for communication via its website. This new environment, called CdmNET, is the first internet-based interactive banking server in Morocco. It allows the bank's customers who are linked to the server to manage a large portion of their banking operations remotely, for example to consult their accounts, issue transfer orders, place orders for the purchase or sale of listed securities, order cheque books, cancel transactions and consult exchange rates.

Crédit du Maroc subsequently launched CREDICOM, a service which enables firms to consult their bank statements via PC to optimise their treasury management.

In addition, Banque Marocaine pour le Commerce et l'Industrie (BCMI), a subsidiary of Banque Nationale de Paris, has recently set up an internet site, as has Banque Commerciale du Maroc (BCM), which allows customers subscribing to the service to carry out certain basic operations such as consulting account balances, making transfers, ordering cheque books, etc. It also allows them to access stock market information (BMCI bourse publications, guide to listed securities, international stock exchange indices) and place orders for the purchase or sale of securities.

(c) The EDI system

Three banks (ABN AMRO, BCM and BMCE BANK) have set up a system whereby firms of various sizes and administrations can exchange, in electronic and structured form, commercial documents such as invoices, notices and declarations between their computer systems. In addition, the system's participants can consult their account balance via PC 24 hours a day and seven days a week, and call up details of account statements, notices of transactions, unpaid bills and exchange rates. EDI also allows them to make payments to suppliers and employees, and pay their taxes and other duties.

3. Policy responses

No developments.

NETHERLANDS

1. Card-based products

The development of card-based chipcard applications in the Netherlands, started in 1989 with a small scale chip-card trial in the town of Woerden. This trial was a joint trial of all banks, consumer organisations and retailers to gain experience with the use of chipcard-technology at the point of sale. When the trial ended in 1990, the banks decided not to pursue the introduction of chipcard technology at that point of time, but to promote the introduction of debit-payments at the point of sale with the magnetic stripe and the PIN-code.

In mid-1994, a non-banking institution, set up by a number of retailers, started a pilot scheme with a multipurpose prepaid card called ***Primeur Card***. The use of this electronic purse was restricted to various retailers in two small towns. The card-application used was similar to the application in Woerden, but also included non-bank functionality (loyalty programs for participating retailers). In September 1997 Primeur Card announced to discontinue operation of their multipurpose prepaid cards because of the emergence of Chipknip and Chipper described below.

Another relevant organisation in these years was ***PTT Telecom***, the Dutch telephone operator, which wanted to migrate from optical telephone cards to chip cards. It informed banks of its intention and asked whether cooperation with respect to an electronic purse application was possible. As the banks did not want to develop a joint purse, Telecom pursued the introduction of telephone chip cards by itself, thus creating a solid chip card market position (4 million telephone cards to be used in payphones). Telecom also set up some joint experiments with IBM and universities to test small-scale multifunctional closed purse systems.

In view of both national (Primeur and Telecom) and international (Danmønt, Banksys/Proton) initiatives, the Dutch banks developed a purse scheme together. As a result, in October 1995 banks introduced a multipurpose prepaid card called ***Chipknip*** in the city of Arnhem. The banks considered this as the first stage of a broader introduction at national level, which they envisaged to start in 1996. For the first stage, banks chose an electronic purse with the same functionality as the Belgian Proton card. The banks intended this instrument to be used for very low-value payments (and thus to be complementary to, rather than in competition with, the debit card).

Soon after the introduction of the Chipknip the banks could not agree on a common strategy for the next phase. Within one month after introduction of the first phase of the Chipknip, the Postbank decided to join with PTT Telecom and announced the development of a separate Telecom/Postbank purse scheme (called Chipper). The other banks (ABN/AMRO and RABO) were very surprised and as a reaction speeded up their roll-out to be able to provide combined debit cards and Chipknips at the end of 1996. Currently the number of Chipknip loading terminals is 7,000, the number of

payment-accepting terminals is 150,000 and the number of customers in possession of a Chipknip card is 13 million. However, the product is not used very often. Additional features that are planned to be introduced are: multifunctionality, issuing of a retailer card with a Chipknip purse and retailer loyalty functions.

Postbank and Telecom have started to roll out their ***Chipper*** initiative in the second half of 1997. Chipper includes a purse and also loyalty functions for the two main issuers (i.e. Postbank and Telecom). Both issuers are adding the Chipper chip to their existing card base. As of August 1998 all banks that, like Postbank, are part of the ING Group have decided to switch from the use of Chipknip to Chipper. As a result the number of Chipper issuing banks has increased. Currently all payphones in the Netherlands (20,000) have been adapted to be able to process payments as well as load transactions. Roll-out of retailer payment terminals has followed.

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 load terminal (with a minimum amount of Fl 25 (USD 12). The balance on the card cannot exceed Fl 500 (about USD 250). Retailers have to install either a chip-only terminal for accepting chipcard payments or a combination terminal (which also accepts debit-card payments). In order to be able to accept either the Chipper or Chipknip scheme retailers have to have a security access module (one for each scheme) in their terminal. When paying, the cardholder does not have to enter the PIN-code (this is only necessary for loading the card). Retailers have to unload their terminals at least once every two weeks. This is done by connecting their terminal to the telephone system and transmitting the information to either Interpay (for the Chipknip scheme) or Chipper Services BV (the Chipper scheme). None of the schemes allow card-to-card transfers.

In order to generate momentum and increase the use of the electronic purse, Chipper and Chipknip have decided to jointly promote the use of chipcards at vending locations and parking meters. Especially the segment of parking meters has been the focus of their joint attention since June 1998. Parking meters that can accept both Chipper and Chipknip have been installed in Rotterdam, Delft and in Amsterdam. In order to better outline the joint intentions and shape expectations of all market parties involved, an interoperability agreement has been signed in April 1999. This agreement outlined a short-term and long-term commitment to ensure interoperability of the schemes. Furthermore, in October 1999, the two schemes agreed to a memorandum of understanding with associations of providers of vending machines. This MOU states that the associations will stimulate and promote the introdoction of chipcard-capable machines by their members. In combination with the above measures, is has been announced that the fixed fee for joining the two schemes will not be charged during a certain introduction period; after this period only one fee will be charged.

2. Network/software-based products

There are currently no prepaid software/network products in the Netherlands. Although a Dutch company (*DigiCash*) has developed a software package that could be used for payments over the Internet, this package has not been bought or incorporated by any Dutch banks. Instead, Interpay Nederland (the banks' clearing house) was commissioned to set up and administer an Internet payment trial, called *I-pay*. The trial was a joint initiative by the banks (including Postbank), Interpay and Planet Internet (the largest Internet provider in the Netherlands). Only 10,000 customers joined the trial.

Instead of the coin-like DigiCash system *Ecash*, the *I-pay* software was used to generate electronic money orders that contain a description of the goods ordered via the Internet (the IBM 3kP protocol is the basis). This transaction is processed online by Interpay and after a successful transfer both merchant and customer receive a receipt. The ordering and payment process can take place within one minute. The accounts used are not the customers' bank accounts, but are separate I-accounts administered by Interpay Nederland. These I-accounts have an upper limit of Fl 250 (USD 125) and have the same account number as the corresponding bank account, from which they can be loaded (only once in three days, with a maximum of Fl 250).

The trial officially ended in February 1997. Results show that the system worked well in a technical sense, but that consumers did not use it a lot. Meanwhile, the Dutch banks also develop extensions to their current home banking applications. As of July 1999, the official I-pay product has been announced. In its new version, a hardware token will be used to authenticate the consumer. Also the use of the so called "I-accounts" has been eliminated. The commercial offer for the product is being shaped by each individual bank, according to its strategy. As a result, the tokens for I-pay, as well as the price to the consumer, differ per institution. Currently the hard- and software is being offered to consumers at a price of 5 to 8 US dollars.

3. Policy responses

Monetary policy and seigniorage. The Netherlands Bank has changed the reporting requirements of credit institutions in order to obtain information about the amount of e-money in circulation. As for reserve requirements, the e-money float funds are being treated as current account funds. The Bank has investigated the declining income and more difficult implementation of monetary policy likely to result from the further development of e-money and has concluded that for both issues the Bank will be able to cope with even an extreme use of e-money. Although the Bank had considered issuing e-money itself, this is no longer an option being actively considered.

General legal issues. There is some discussion about how to legally define payments made with prepaid cards. The Bank has not taken a position on this issue and has left it to the banks to choose the definition that seems appropriate. The terms and conditions for using prepaid chip cards are governed by contract law and current legislation on financial products (in the area of money laundering). No specific laws are being adapted or envisaged. As for deposit insurance rules, it has been decided to exempt claims on electronic money from the current deposit insurance rules, given the fact that a special-purpose insurance scheme is already part of the chip card products.

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 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.

As for non-bank multifunctionality (which is a part of both systems in the Netherlands) the Bank specifically wants to establish the fact that other functions on the chip cannot influence the purse functionality. Therefore the architecture of the chip, the design of the applications on the chip, the organisational responsibilities between different parties and the security policy/security risk analysis have to be adapted to reflect this evaluation criterion.

Provider issues. The ECB report on electronic money (August 1998) states that non-bank issuers may be allowed to issue electronic money, provided that adequate prudential supervision applies. The European Commission has incorporated the ECB-advice on this issue in a proposal for a Directive. It appears that in the Netherlands, the implementation of this Directive will be possible in the framework of the current banking supervision law.

Payment system issues. Retail payment systems do not form a basis for systemic risk. The Bank has not acted in the area of electronic money as a result of concern about systemic risk, but in its role as supervisor or overseer.

Supervisory issues. The Netherlands Bank and the Ministry of Finance concluded in 1995 that institutions attracting funds by issuing multipurpose prepaid cards and investing the resulting "float" at their own risk should, under existing banking supervision law, be considered credit institutions (a credit institution being defined as an institution receiving repayable funds and granting credits or making investments at own risk). For any non-banking institutions issuing, or intending to issue, multipurpose prepaid cards this conclusion means that they have to become a credit institution or at least have to closely cooperate with a credit institution.

Reflecting the fact that supervision and oversight of purse schemes poses new challenges, the Netherlands Bank has developed a framework in order to assess the functioning, reliability and safety of purse schemes. This framework covers organisational, legal, administrative, technical, financial and security aspects and consists of a series of questions to be answered by the purse issuer (or the purse scheme administrator). The supervisory aim is to establish whether the parties involved in the purse scheme are well aware of the risks involved and whether they have established the right measures to counter these risks.

A recent legal opinion has shown that prepaid software products should be subject to banking supervision. Provisions are now under consideration to ensure that measures for small-scale schemes will reflect their smaller and more local nature.

Law enforcement. Although the Bank does not view e-money products at this moment as having features that are attractive to money launderers, a task force consisting of several regulators is currently studying this topic.

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 5%) of all retail payments in the Netherlands. The market for retail payments is, therefore, largely a domestic market. As for 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 bank 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 addressed to Dutch consumers.

NEW ZEALAND

1. Card-based products

The development of large-scale bank sponsored schemes has ceased, and there appears to be no plans for any product launches in the near future. Development continues on some small-scale, closed environment schemes, and product launches may occur within the next year.

2. Network/software-based products

There appears to be no significant developments in New Zealand in relation to network/software-based products.

3. Policy responses

The Reserve Bank continues to monitor developments and keep in touch with those responsible for product development in New Zealand. It appears that regulatory changes as a result of the development of e-money will not be necessary.

NIGERIA

1. Card-based products

A consortium comprising a number of Nigerian banks has set up a company - Smart Card Nigeria Plc - with the objective of launching the "value card", an e-money product. Two companies, that is, Smart card Nigeria Plc and Gemcard Nigeria Limited, have each obtained CBN approval in principle to operate a smart card-based payment scheme in conjunction with a consortium of commercial and merchant banks. Both products are undergoing trial runs in some selected locations before full and final implementation. The companies will act as clearing and settlement agents as well as coordinate hardware and software supply while the participating banks will serve as card issuers.

Meanwhile, there exist two electronic purses, Paycard and Esca, operated by two commercial banks. The clearing institution for Esca is the same as the issuer. 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 transactions and processes using triple-DES algorithms and RSA keys. The fee structure is:

- loading value at customer's branch - no fee;
- loading value at a remote branch - NGN 100 to cover communication costs;
- bank charges (customers) - NGN 1 per NGN 1,000;
- transaction fees (merchants) - no fee;
- bank charges - (merchants) - 1% to cover cost of terminals.

The scheme has multicurrency and cross-border functions. These functions are, however, currently not in use. Prepaid cards are also not used at present, although the scheme supports them. For purposes of year 2000 compliance, the bank moved to cardbase 2000 platforms from CSI/IBM in 1999. This software supports multifunctional applications.

The scheme currently operates as a single issuer/acquirer application.

To date, a total of 5,818 Esca smartcity cards have been issued while merchant terminals total 58. Other features and information on the Esca are in the attached table.

2. Network/software-based products

The two e-money products above are also network/software-based products.

3. Policy responses

The launching of any e-money product by a bank requires the prior approval of the central bank, which thereafter monitors the product.

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 total of 8,500 cards were issued by a local bank. They processed 16,700 transactions, with an average value of around USD 10 (which was higher than expected, i.e. not only small-value transactions). There are no immediate follow-up plans.

Posten SDS (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. Posten SDS has conducted small pilots with Mondex cards at various conferences in Norway this year. Telenor Conax (a subsidiary of the Norwegian state telecommunications company) has joined Posten SDS in the Mondex franchise. No bank has joined them yet.

In September 1999 several of the larger Norwegian banks announced a joint venture to examine possibilities for introducing various smart card solutions in Norway. BBS, a bank-owned automated clearing house, will be responsible for the coordination and the operational aspects of the smart card project. An electronic purse pilot is being planned for 2000 based on smart cards for pay-per-view TV. BBS has made a deal with Proton World that facilitates the use of Proton technology.

2. Network/software-based products

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

Telenor Link (a subsidiary of the Norwegian state telecommunications company) has been considering introducing a system for prepayment of goods and services that are sold via the Internet, but the project will be terminated by the end of this year.

3. Policy responses

Statistical information. Norges Bank would consider electronic money issued by banks as "money", and is considering ways of including it 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.

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, Norges Bank does not rule out the possibility that the spread of e-money products could become more extensive in the longer run, and it is consequently planning a larger study on the future use of notes and coins in general (including the development of alternative means of payment such as e-money).

Seigniorage and monetary policy. Norges Bank does not expect a large impact on its seigniorage since the share of notes and coins as a percentage of the central bank's total balance sheet is low (23% vs. 55% for BIS central banks) and note and coin circulation would have to fall very substantially (by more than 75%) to represent a threat to the Bank's income position.

As for 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 interest income would be reduced (as the banks would earn the seigniorage currently with the central bank).[18]

Issuing of e-money. Norges Bank currently has no intention of issuing e-money.

New legal provisions. The recently proposed Payment Systems Law does not regulate e-money systems. However, the Banking Law Commission (BLC) has submitted a draft law regarding financial institutions that includes proposals that concern the issuance 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 considerable system, it may be subject to regulation.

Legal uncertainties. The proposed Payment System Law will probably be enacted in 2000/2001. It is uncertain when the new draft law from the BLC will be enacted and if it will differ from the draft law. When any common legislation regarding e-money institutions is passed by the EU, Norway will probably have to adopt it.

Role of various authorities. It is proposed under the Payment Systems Law that the central bank should authorise interbank systems, while the Banking, Insurance and Securities Commission (BISC) should authorise all retail systems for payment services.

Relevant security issues. Norges Bank would not want to get involved in this area as it feels it has no particular competence in security issues.

Provider issues. Considerations have been given to the regulatory treatment of a non-bank issuer in a possible Mondex system. If banks were to take on the role of issuers in the system, no new issues would arise. If a bank-owned institution were to issue the electronic money, it is still not clear how such a special purpose vehicle would 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 market participants. It is concerned that in the longer run new e-money schemes may lead to a fragmented national payment system, but consider it appropriate in the short run for the private sector to pilot different systems, before it can be determined which is the most viable option.

Supervisory issues. No specific initiative has been taken so far. Any eventual supervisory issues will be handled by the BISC.

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 yet 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. Transfer 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 Norges Bank; this would probably also apply to e-money accounts held with foreign issuers.

[18] 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.

Other issues. The electronic payment system in Norway is highly integrated, including all commercial and savings banks. However, the technology platform (magnetic stripe card) is not suited to chip cards, and this could possibly delay the establishment of new e-money schemes in Norway, until it is considered economical to migrate to a new platform. Alternatively, new actors (non-banks) can choose to establish chip card systems outside the current infrastructure.

OMAN

1. Card-based products

Some of the financial institutions in Oman have undertaken initial studies on products such as Mondex and Proton. None of these financial institutions, however, have commenced any e-money products so far.

However, the commercial banks in Oman have developed a facility which permits their customers to use the automatic teller machine (ATM) card in certain specific machines installed at selected merchants' outlets to transfer payments for the merchandise purchased by debiting the shopper's account and crediting the merchant's account at the bank simultaneously.

2. Network/software-based products

No developments at this stage.

3. Policy responses

No responses so far.

PERU

1. Card-based products

No developments reported so far. The only single-purpose prepaid cards are issued by telephone companies.

2. Network/software-based products

No developments.

3. Policy responses

No responses so far.

POLAND

1. Card-based products

There is currently no electronic purse system operating in Poland. There are, however, projects of pilot programmes developing electronic purse products in Poland designed by the group of Polish banks, VISA International, Europay International and Polcard (an interbank organisation responsible for clearing of card payments in Poland).

VISA considers the possibility of developing in Poland a stored-value card (VISA Cash) in cooperation with the Polish banks associated in Forum Visa Polska (organisations established in 1993 in which banks issuing VISA cards participate). No plans have been announced so far.

There is an initiative of ***Europay International*** to develop in Poland a smart card known as CLIP - the product serves as an electronic purse. The pilot project is going to be developed with one of the biggest Polish banks. Up to now there is no decision on the date of launching the pilot version of the product.

2. Network/software-based products

So far, no projects have been started.

3. Policy responses

The possible effects of the developing of e-money in Poland have been discussed within the NBP. The Monetary and Credit Policy Department is aware that in the near future implementation of e-money in Poland will not considerably affect the demand of seigniorage, notes and coins.

PORTUGAL

1. Card-based products

Portugal currently has one electronic money system (Porta Moedas Multibanco - PMB), based on the storage of money in a chip card 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 cards. Some debit and/or credit cards already include the PMB card facility. Clearing is made 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 is to 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 chip card 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 that are used by the oversight authorities are those that the European Central Bank (formerly European Monetary Institute) established as guidelines, as 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 that are 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, the function in euros is currently being developed.

ROMANIA

At the end of 1999, the Turkish-Romanian Bank started to operate the e-money system "BTR-Net", a network/software-based product, providing payment services for its customers through the internet.

RUSSIA

1. Card-based products

At the present time the prepaid cards (phone, petrol, subway travel cards, etc.) are widely issued and spread over the territory of the Russian Federation by non-bank financial institutions. From 1999 VISA travel money is distributed by SobinBank, Moscow.

2. Network/software-based products

Bank "Tavrichesky" in St. Petersburg is developing the e-money system PayCash, which will be used to make fast, effective and wide-ranging amount settlements through the Internet. Open testing of the technological version of the system was made on the Internet network from 15 January 1998.

3. Policy responses

The Central Bank of Russia (CBR) has analysed the various aspects of e-money issue and circulation and has the opinion that the law currently in force in the territory of the Russian Federation allows considering e-money as the issuer's money obligations made in electronic form which replaces in the process of their circulation demands for payments for goods and services of legal entities and/or physical persons.

The CBR considers that in the absence of the dispositive rules in the law currently in force, the regulation of issue and circulation of e-money should be based on the use of imperative rules of permissive and prohibitive nature.

The CBR at the present time does not plan to issue e-money on its own. The issue of e-money could be permitted to the credit institutions only.

The CBR should be the main agent to regulate the e-money developments. Its role as a regulative body first of all should be in analysis of the experience which is on hand of commercial institutions.

Using the analysis of future e-money pilot projects the CBR is planning to work out its requirements which will regulate:

– feasible schemes of e-money development;

– the CBR functions of control, management and participation proceeded from the criterion of reasonable sufficiency;

– principles of differentiation of authority and responsibilities between the CBR and issuers and their clients;

– the level of acceptable risk;

– principles of security of e-money system;

– forms of statistical data reports and methods of monitoring e-money issue and circulation;

– glossary.

At the first stage it is planned to put some limitations both on the volumes of e-money issued by credit institutions and time of their circulation, and on the list of permitted operations in connection with acquisition, alienation and storage of electronic value. Besides that, at the first stage it is supposed to use in settlements with e-money one currency scheme and to prohibit the cross-border settlements.

General legal issues. The CBR has worked out the Directive N277-U (dated 3 July 1998), "The procedure of issue of registration certificates for resident credit institutions for issue of prepaid financial products", in order to present non-admit uncontrolled issue and circulation of new financial products based on e-money technology at the territory of the Russian Federation (the RF), and in order to protect credit institutions' issuers and consumers from possible risks.

SAUDI ARABIA

1. Card-based products

The Saudi Arabian Monetary Agency (SAMA) continues to follow its policy of taking the lead in establishing and operating an integrated and comprehensive electronic payments infrastructure for the Kingdom while continuing to support traditional payment vehicles such as currency and cheques. With the new RTGS-based Saudi Arabian Riyal Interbank Express (SARIE) launched on 14 May 1997, the Kingdom now has a single EFT system for the transmission and settlement of high and low-value payments. The system also incorporates the settlement of all other payment systems in the Kingdom such as cheque clearings, ATM and POS networks, VISA, MasterCard and shares settlements. SAMA is committed to the development of secure efficient electronic payment systems and will both continue to take the lead in future developments and use pricing policies to encourage the move from paper-based systems to electronic systems.

With regard to card-based e-money projects, SAMA had made a lot of studies to formulate a national strategy for an electronic purse, but decided recently that the implementation of e-purse would be postponed. Instead, SAMA is now considering the implementation of EMV (Europay, MasterCard and Visa), a standard for the use of smart card technology for debit and credit cards.

Nevertheless, SAMA will be monitoring any standards developed under the umbrella of the international card organisations as these could be of major interest to the commercial banks in Saudi Arabia as well as developing its policies for electronic money with cooperation and information exchanges with many central banks and payment providers.

2. Network/software-based products

The introduction of SARIE provides the commercial banks in the Kingdom with an electronic interbank payment system. This facility in turn is extended to the customers both corporate and consumer through the product range introduced by the banks based on SARIE, i.e. direct debits, salary payments as well as individual payment orders, major government agencies and ministries have migrated their payroll systems to a direct transfers via SARIE in 1999. SARIE provides the banks with online facilities to monitor and control their current account with the central bank (SAMA). SARIE is operated by SAMA and at this time is a domestic scheme for Saudi Riyals only.

Commercial banks will be looking to extend online electronic services to their corporate customers for payments and account monitoring, but for now will be accepting direct debits and payment

instructions on some electronic media. The payment of salaries electronically have impacted the percentage of the banked population as banks have noticed a large increase on the new accounts opened in 1999, this will provide the core market for e-money products.

3. Policy responses

There are a number of policy issues that need to be resolved before the introduction of card-based e-money services. These include:

Seigniorage. What, if any, is the potential loss to SAMA as prepaid cards replace currency and coin? Should SAMA itself issue electronic money?

Legal and regulatory issues. Would transfer of value from these cards be recognised as an accepted means of payment in the same way as wire transfers or S.W.I.F.T. payments? Should only financial institutions be allowed to issue these cards? What will be the status of prepaid amounts in the event of issuer insolvency? Would the network/brand owner be liable?

Consumer protection and privacy. How will customers be protected against fraud or theft? In the event of error how will liability be determined? Use of cash leaves no audit trail, but e-money usage may be required to do so and therefore customers' privacy may be compromised.

Regulatory issues and implications on money laundering. In the absence of clear audit trails, how can we combat potential money laundering activities? How do we ensure that card issuers are properly regulated?

Monetary policy issues. For example, what effect will e-money have on reserve requirements and also how will the velocity of currency in circulation be affected by the frequency with which prepaid cards are used?

SAMA at this point is still identifying and reviewing the complex policy issues raised by e-money development. How these issues are addressed in other countries will be monitored carefully.

SINGAPORE

1. Card-based products

There are two types of card-based e-money schemes in Singapore: the single-purpose and the 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 smart card-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. About three million CashCards have been issued since its launch.

In addition to making payments at retail outlets, the CashCard is used for payment at car parks, public phones, and the Electronic Road Pricing (ERP) Scheme. The CashCard can also be used to make small-value payments for purchases on the Internet. The stored value in the CashCard can be topped up at more than 90% of ATMs, CashCard service terminals, and designated EFTPOS terminals. With the launch of HomeNETS in November 1998, users can also top-up their CashCards from home via the telephone line using a hand-held 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 the 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. The MAS also requires the issuers to review their card distribution procedures regularly to deter the possibility of counterfeit multipurpose SVCs being sold.

The 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 in the Slovak Republic.

2. Network/software-based products

There are no network/software-based schemes being piloted or implemented.

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 usage of e-purse as the 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 strip debit and credit cards or single-purpose stored-value cards, i.e. telephone cards, toll pay cards, etc. There are some considerations among commercial banks to start with e-money projects

(multipurpose stored-value cards), but so far only on the concept level. The Bank Association of Slovenia reports no projects undertaken by any of the commercial banks.

2. Network/software-based products

There are no projects regarding network-based products under way at the moment. Internet network is still not so widespread among households to stimulate development of such projects, but rapid growth in using Internet 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 give customers an insight and to manage their funds on their accounts. Special attention is being given to technologies to ensure the highest security for these kinds of transactions and will be useful likewise when starting with real e-money transactions over the Internet network.

3. Policy responses

Bank of Slovenia is reviewing e-money projects in developed countries. There has not yet been a final decision about a legal framework, but guidelines issued by the European Central Bank (ECB) in August 1998 will definitely be the leading model when considering the policy approach. The minimum requirements stated in the ECB document imply that only credit institutions that are subjected to central bank supervision should be allowed to issue e-money.

SOUTH AFRICA

1. Card-based products

Mondex. The South African franchise holders for the Rand Monetary Area (South Africa, Lesotho, Swaziland and Namibia) have established an originating company, and pilot testing is scheduled to commence during the third quarter of 2000.

VChip. The rollout of cards based on the South African Interbank Standard (SAIB) ceased during the middle of 1999 and cards issued in future will be based on the EMV standard.

Chip-based payment system. The operators of a chip card payment system for a large South African brewery have, to date, issued 2,000 cards. This application was implemented to improve security for the brewery and its retailers and to ensure the secure collection of payments. This is an entirely offline, smart card-based system utilising portable point of sale terminals to record the transactions when large consignments of stock are delivered. No cash changes hands and settlement takes place overnight.

Pensions. A pension payment scheme is operational in the Free State and Kwazulu Natal provinces. There are both fixed and mobile pay points. Biometrics stored on the chip card are used to authenticate the pensioner before issuing cash. To date, 150,000 cards have been issued.

GSM. Prepaid cellular communications has once again undergone rapid expansion within South Africa and comprises approximately 4 million cards.

Gaming. A casino developer has introduced smart cards in its new casino in the province of Gauteng and aims to create a tokenless and coinless environment. The cards can only be used within the casino and entertainment resort and can be used for gambling, the purchase of food and beverages, etc. The cards are PIN protected and can be loaded at numerous terminals within the casino, which also allows 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 (SARB) monitors the development of these products and awaits with interest the advancement in digital certification and sophisticated encryption techniques as well as the establishment of more secure payment methods.

3. Policy responses

The SARB continues to monitor the development of smart card technology and electronic commerce and it would appear that regulatory changes as a result of e-money products will not be necessary at this point in time.

Reserve Bank currency issue. At this stage, there is no intention that the SARB will itself issue stored-value cards, or provide other forms of electronic money to the public. However, the possibility that this might happen some time in the future cannot be completely ruled out. If electronic developments proceed to the point where payment using currency becomes inefficient and costly, then it could prove necessary to convert SARB paper and metal currency issues into electronic form in order to provide the public benefits that will continue to be necessary.

Prudential issues. A concern of the National Payment System Department (NPSD) of the SARB in this regard lies with the potential smart card schemes which are established to offer multiple goods or services which are not necessarily those of the issuer of the value on the cards. The implications are that a large float may be built up by the scheme operators and where such operators are not banks and, hence, not subject to the prudential and risk management requirements imposed on banks, the risk to the participants in the scheme may not be acceptable. A further issue is whether such schemes could be in contravention of the Banks Act with regard to deposit taking and the NPS Act with regard to offering payment and clearing services as a regular part of the issuer's business.

Statistics. Part of the SARB's role is to ensure that adequate information is available on the structure and operation of the financial system. Statistical and other information is an essential input into the monetary policy process and the evaluation of the efficiency and soundness of the financial system. Recent and pending payment system developments are posing some challenges in this respect. The Bank will be actively working with the various parties involved to ensure that its statistical collection and reporting arrangements are appropriately extended and adapted to meet the future information needs of both policymakers and market participants.

SPAIN

1. Card-based products

The three Spanish card network providers (Sistema 4B, SEMP and the Spanish Confederation of Savings Banks) have been, since 1996, endorsing different 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 of Spain. The VISA Cash project has been 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 savings bank member of Red 6000 (the card network 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, 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 done 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 electronic 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 development of the system. Card-to-card transactions are not permitted.

The charges paid by customers and merchants are freely fixed by the banks.

2. Network/software-based products

The development of network-based or software-based electronic money schemes in Spain is at a very preliminary stage. There are also no specific statutory provisions or regulations in Spain concerning network money.

3. Policy responses

Monetary policy and seigniorage. The Bank of Spain collects general statistical data on the three 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 important, 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.

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

General legal issues. Multipurpose prepaid cards can only be issued by credit institutions, following the 1994 Recommendation of the EMI Council in this area. The available balance on electronic prepaid cards is considered as repayable funds from the public and this activity is only authorised for credit institutions as they are defined in the first and second Banking Coordination Directive. This provision is contained in the Royal Decree 1245/1995 of 14 July. Due to the explicit consideration of e-money balances as repayable funds the compulsory redeemability of any outstanding floats is legally endorsed in Spain.

According to Bank of Spain's circular 2/1996 of 30 January, the available balance stored in electronic prepaid cards should be booked under the heading "current account" and, therefore, it is subject to compulsory reserve requirements.

Money stored on prepaid cards is covered by the Spanish deposit guarantee scheme like any other repayable funds from any customer, i.e. all balances in favour of a single customer in the same credit institution are covered up to EUR 15,000. (The limit will increase to EUR 20,000 after the year 2000.)

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.

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 telecommunications 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.). 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 operations is done through the SNCE (Sistema Nacional de Compensación Electrónica - National Electronic Clearing System), the Spanish retail payment system.

Supervisory issues. All the issuers of electronic value are credit institutions and supervisory activity is performed by the Bank of Spain. The oversight functions are also performed by the Bank of Spain through the exchange of information.

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 (maximum ESP 35,000), make them particularly inappropriate for use in money laundering operations.

Other issues. Representatives of the Spanish networks have already signed an agreement to make their systems interoperable in the domestic and in the foreign markets, as well. Currently, work is under way to define common specifications by joining the Common Electronic Purse Specifications (CEPS) and the EMV projects. Another important issue under consideration is consumer protection.

SWEDEN

1. Card-based products

There is one card-based scheme in operation, behind which three of the largest Swedish banks stand as issuers (Nordbanken, Sparbanken and S-E Banken). These three banks together have over 70% 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. These 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, i.e. all Cash terminals accept cards issued by the three 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 the Europay, MasterCard and VISA associations 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 only be reloaded by personal visits to the bank or at special ATMs.

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 or 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 revenues help to finance the system. According to banking officials, the float amounts to only 10% 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 stand-alone product as was then the case. The three banks behind the Cash association have now 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 is to increase merchant adoption and thereby the incentives for cardholders to use the technology. This new strategy has seemingly succeeded in increasing merchant acceptance. Currently, there are 40,000 terminals that accept Cash payments. This can be compared to the 60,000 EFTPOS terminals that are in place today. However, it took almost 20 years to achieve this degree of EFTPOS acceptance. The number of Cash Cards issued amounts to 2 million, of which only 395,000 have been activated by the cardholders. Transactions are currently reported to number 400,000 per month.

Issuing banks are also planning to introduce new functions for the multifunctional card; next in line for consideration is the identification function. This will initially only be used for customers wanting to identify themselves to the participating banks, as, for example, is the case for internet banking customers. The identification function will use public key technology, but involving two secret keys instead of a secret and a public key. This is because there will be no need for identification vis-à-vis a third party at this stage. There is thus no need to publish public keys. The development of the C-SET technology is also being closely monitored by participating banks, the goal being to eventually integrate the cash function with the SET technology and adapt the instrument for use over the internet. The Cash Card will be loadable via the internet with the aid of a card reader which the banks themselves have developed. Eventually, this card reader will provide not only a loading feature but also a deloading feature. This makes the Cash Card suitable for electronic commerce. The buyer deloads the card in the card reader while in communication with the seller and the seller loads the corresponding amount to his/her card reader. The system will not allow transferability between users. The transaction goes from buyer to seller and the seller redeems the electronic units with the corresponding acquiring bank. The application of the Cash Card in electronic commerce will initially be limited to digital goods. It is intended to cover small-value, two-party transactions that cannot be covered by SET.

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 scheme is continuously monitored by the supervisory authority, which 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. It has yet to be decided what kind of regulatory and supervisory regime would apply to non-bank issuers in the event that they are allowed to enter the market. On this subject, we await the results of the planned EU Directive. At present, the Swedish position is that issuing should not be restricted to credit institutions and that a regulatory and supervisory regime which is not overly restrictive should apply to all types of institutions engaged in these activities.

General legal issues. In 1997, the Swedish Government instructed a commission to analyse the legal issues that can arise in connection with electronic money systems. In particular, the commission was to examine the question of whether existing laws and regulations needed to be altered and, if so, specify what changes were necessary. Some of the issues to be covered were: the legal status of electronic money; acceptable issuer status; the extent of supervision requirements for issuers and other major market players; legal relationships between issuers, cardholders and payment receivers; the desirability of anonymity features in e-money systems; consumer protection; the need for new regulations to prevent the exploitation of e-money systems for criminal activities; and international issues, in particular export regulations regarding encryption algorithms. The first part of the commission's analysis was completed during 1998. It proposed a general framework for future e-money legislation, delineating some basic areas where regulation may be needed. It did not attempt to give more detailed guidelines as the EU Commission's Directive on this matter is expected soon. In general terms, it suggested some minimum requirements that were deemed necessary in order to guarantee financial stability of issuers and operational security. According to this proposal, credit institutions would not be the only entities allowed to issue e-money. Other financial institutions would be allowed to do so, provided they complied with the minimum requirements stipulated and were subject to the appropriate supervision.

Monetary policy and seigniorage. The Swedish central bank has contributed with its own calculations to the analysis done 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 which reflected the conclusions drawn from the internal analysis and discussions. 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 the 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 August 1997, this amounted to SEK 11 million (approx. ECU 1.3 million).

Provider issues. There is nothing more to report on this item besides what is already mentioned under "General legal issues" and "Supervisory issues". Sweden is also following the plans at EU level for a new EU Directive on provider 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 at, in line with the principles for the Single Market, unless strong and well-founded reasons call for restrictions.

SWITZERLAND

1. Card-based products

Banks in Switzerland launched a national roll-out of a Proton-based scheme, called ***CASH***, in January 1997. In autumn 1997 the Swiss Post joined the system with the Postcard CASH. At the same time the ATM network of the banks (Bancomats) and the network of the Post (Postomat) have mutually opened their network and provide now 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 SF 300 (with reloading possible up to a maximum of SF 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 has been 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 SF 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 have taken place solely at the accounts of Credit Suisse so far. 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 SF 5,000 per month. After having evaluated the results of the pilot stage, it is planned to expand the scheme to a multi-bank 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 delivered 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, 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

1. Card-based products

The IC FISCARD, which may be used for making cash withdrawals, for credit and debit purposes and for making prepayments, was launched in October 1993 by the Financial Information Service Co. Ltd. (FISC, formerly Financial Information System Center), with the stored-value function of electronic cash being incorporated in December 1997. There are currently 20 financial institutions involved in this undertaking. At the end of March 2000, a total of 1,751,259 cards had been issued with charge volume amounting to TWD 991,120,000, there being 7,396 contracted merchants.

2. Network/software-based products

FISC has been developing a network-based product under the SET standard drawn up by VISA and MasterCard International which will provide internet-based banking services, and in February 1999 launched a product to enable tax declarations to be submitted via the internet. At the end of March 2000, 25 financial institutions were involved in this kind of business and a total of 2,500 transaction certificates had been authorised, with 1,500 users having declared personal income tax and land tax via the internet. By July 2000, it might be possible to process all types of tax returns via the internet.

3. Policy responses

Issues that might arise as a result of the development of electronic money include the security of transactions, and the impact of electronic money on monetary policy and on the issuance of banknotes. Regarding the former issue, regulations relating to stored-value cards have been added to the recently revised Bank Act by the Ministry of Finance, and only depository institutions that come within the scope of the reserve requirements 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. As for the latter issue, the Central Bank of China has been carefully looking into its implications.

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 electronic 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 smart card business and technology as an alternative financial instrument. DTDB believes that the smart card 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 bus fares and mobile phone services on Micro Bus, for cinema tickets, and for goods and services at designated merchants such as retail stores, petrol stations, book stores and school shops. Direct consumer-to-consumer transfer features are not available. The value stored on the card is denominated only in Thai baht.

SCB Smart Card: Siam Commercial Bank, Advanced Vision Systems Co. Ltd. and Chulalongkorn University have cooperated to provide smart cards 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's bookstore. One year after its launch, an electronic purse feature was added to the smartcard in May 1999. 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

C.P. Seven Eleven Public Co. Ltd., a convenience store which has lots of branches and a large customer base, is considering implementing an electronic purse scheme to help reduce cash handling costs. A consortium of three leading banks has undertaken an in-depth study and evaluation and expects to develop a scheme in 2000.

2. Network/software-based products

To date, there is no software-based electronic money scheme in Thailand. However, a pilot project of smart card-based payments over the internet is being considered. 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 electronic money products seem to be used primarily for small-value transactions within the city of Bangkok. In our view, the products can only replace coins and small-denomination banknotes, and thus 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 electronic 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 electronic money.

Relevant security issues. The conclusion of the G10 Task Force on Security of Electronic Money can be used as a reference for an assessment of the technical security of an electronic money system.

Provider issues. 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 electronic 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 electronic money to consumer spending.

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 to allow only 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. The National Electronic and Computer Technology Centre has set up a working group to identify technical and interoperational issues that have 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 is developing a set of recommendations for an interoperable framework of smart card applications in Thailand.

TURKEY

1. Card-based products

One of the commercial banks, Esbank, has developed a card-based system to be used by retail stores. In this system, called "Akilli Bayi Karti" ("Smart Retailer Card"), prepaid cards are given to retailers and they use these cards for their payments to the wholesalers. Every goods distribution truck operated by the supplier has a POS device through which the customer (the retailer in the scheme) can make the payment. The POS devices work offline and the truck driver transfers funds at the end of day. The

value limit on the card is not fixed and determined by the bank. The system has been in operation since November 1998 and related figures are given in the tables at the end of the report.

The tables also include figures about "Parakart" (moneycard) that has been pilot tested in two university campuses in Ankara and Istanbul by one of the major commercial banks in Turkey, Akbank. This product is a reloadable multipurpose prepaid card based on smartcard technology and planned to be used for small-value payments. The pilot test has recently been halted. However, Akbank reports its intention to use the product on other sites.

Türk Ekonomi Bankasi (TEB) reported that they have developed a project group that is responsible for developing products like digital cash, cyber credit cards, etc.

Two other banks reported that they have been developing projects for similar products.

Besides banks, some municipalities of the major cities, such as Istanbul and Ankara, are providing "intelligent tickets" for public transportation. These are in the form of prepaid cards with magnetic stripes. There also exist some other prepaid cards, like phone cards and gas cards. The former are available all over the country whereas the latter are used in a couple of metropolitan areas only.

2. Network/software-based products

Garanti Bankasi started to operate an e-commerce application based on a SET compatible system at the end of February 1998. Two other banks are also carrying out studies on a similar application.

Another project to be mentioned here has been developed by İş Bankasi. Their interactive banking application that allows their customers to carry out their operations via the internet has been in service since June 1997. As of the first quarter of 2000, the number of operations performed using this service is reported to be 450,000 with a total amount of USD 3.7 billion. Among the services provided there are transactions like giving orders for buying/selling securities at the Istanbul Stock Exchange, free RTGS transfers and mobile banking via WAP technology.

Another project was brought into operation by Esbank in May 1999. This project, called "Şube Ötesi Bankacilik" (Banking Beyond Branch), has introduced an online/real-time integrated system of out-of-branch channels, which incorporates a call centre (EStel), an interactive voice response system (aloES) and an internet banking system (ESnet). Customers can use all 150 varieties of transactions, including RTGS transfers, free of charge.

3. 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.

UNITED KINGDOM

1. Card-based products

Two card-based e-money schemes are being trialled in the United Kingdom. The first is Mondex; the second is Visa Cash.

Mondex. Mondex was introduced to the UK 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.

Mondex is currently in operation at universities in Exeter, York, Nottingham, Edinburgh and Aston. Over 90,000 cards have now been issued in total. The cards are being used for additional functions besides e-money - e.g. 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 are now being taken to include retailers outside the campus which normally see a significant amount of student trade, e.g. bars, convenience stores, 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 9.

The university schemes are being operated, and the value issued, by HSBC, NatWest Bank and Bank of Scotland, who are members of Mondex UK, which holds the franchise to operate the scheme in the UK. 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 has been operating in Leeds since October 1997 and is expected to continue until August 2000. The participating banks are Abbey National, Barclays, Co-operative Bank, Halifax, Lloyds TSB and Royal Bank of Scotland. Visa International operates a net settlement process between issuing and acquiring banks.

The cards are either disposable e-money only, or are multi-function 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 can store a maximum value of GBP 50. Disposable cards can be purchased from kiosks or card dispensing machines. The non-disposable cards are reloadable from an ATM (against a debit to the current account) or a special purpose machine (allowing loading from a credit card). The value is only transferable to merchants - not to other cardholders. Points of sale accepting the cards in Leeds include car parks, public transport, fast food outlets, newsagents and vending machines.

Payments are 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 debits the amount due from the card and automatically credits the merchant's card. At the end of each day, merchants transmit a full record of the transactions made during the day to their bank. Their account is credited, and the transaction data is passed to VISA for clearing, settlement and archiving. This means that issuers can have access to a full record of all transactions made on each card in issue.

2. Network/software-based products

There are currently two schemes running small-scale network-based trials in the UK. A third scheme has recently closed its trial.

Mondex. Mondex is working with British Telecom in a trial of ADSL technology which is delivering high speed data to around 800 consumers, who are using Mondex electronic cash to pay for services such as videos, music and Internet games. The trialists can also use their PCs to reload Mondex onto their cards from their bank account, by way of a pre-authorised direct debit transaction.

Together with SmartAxis BV and NatWest, Mondex is also involved in a service which enables customers of a London Internet café to use Mondex electronic cash to pay for their log-on time and to make online purchases of digital goods like music, games, etc.

Other plans Mondex has for the future include involvement in the British Interactive Broadcasting consortium: over a million "set-top boxes" for digital interactive television services already have an in-built Mondex payment capability.

The University of Exeter has developed software which enables Mondex payments to be made over the Internet. They will use this to sell "pay as you go" distance learning packages to remotely located students and are already using it to enable campus-based students to pay for centralised printing.

Magex Wallet. The NatWest Group launched its Magex initiative in October 1999. This provides a facility for online sale and purchase of copyright on digital products (such as music) and includes an online payment facility called the Magex wallet. The service has been developed through a technology alliance with InterTrust Technologies Corp (based in California). Customers open a "wallet" and put value in it (and thereafter top it up) from their credit 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.

Barclaycoin. Barclaycard (the credit card division of Barclays Bank) offered this product until recently. It was entirely software-based and was operated for Barclaycard by CyberCash Inc. The scheme began in the first week of October 1997 and was closed at the end of 1999 to allow Barclaycard to focus on the development and enhancement of new micro payment solutions.

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 in detail.

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 electronic money policy.

Monetary policy and seigniorage. The Bank has collected monthly data on e-money issued by banks since September 1997; the Bank 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. At present, the Government is reviewing financial markets and services legislation as the final part of the process of transferring regulatory responsibilities from

various organisations to the FSA. The position with regard to electronic money schemes will also be affected by forthcoming EU legislation.

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 electronic 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. The ECB's 1998 report on electronic money recommended that the activity of issuing e-money should be restricted to credit institutions. The Bank of England does not accept that the existing regime for regulating credit institutions in the EEA would necessarily be appropriate for all issuers of electronic money; the risks presented by this activity are of a different character to those encountered in general banking business. Such issues are under discussion in EU fora considering proposed EU legislation on this issue.

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 small level of use in the UK. 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 were the proposed EU legislation to be carried into 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 Bank of England and 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 electronic money. A second EU Money Laundering Directive is expected in the future and this is likely to make specific reference to electronic 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-publicized 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 Sates.

The Washington Metropolitan Area Transit Authority (WMATA) has completed trials of a contactless fare card system for the local subway system. The 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 as well. Since its inception, riders have purchased over 40,000 of the so-called "Smartrip" cards.

Similar card projects are under development in Seattle, Washington and San Francisco, California. The San Francisco Bay Area's Metropolitan Transportation Corporation this year awarded a 10-year contract to a Motorola led consortium to operate and maintain a single ticket system relying on smart card technology for several local transit systems. Deployment is expected in 2001. 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 smart card fare system.

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 the growing number of university smart card projects is the University of Michigan's "M-Card." In addition to serving as a debit card, chip-based stored value functionality allows the card to be used for vending and photocopying purposes as well as for purchases at some 60 local merchants. The card can hold a maximum of USD 50.

Microsoft has introduced its "Windows for Smart Cards" chip operating system. Smart card developers now have three platforms to choose from including Sun Microsystem's 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, Bank One, Wells Fargo, MBNA, Microsoft, and CyberCash.

American Express has introduced a similar "wallet", which when used with its chip-based "Blue" card, provides a PIN protected environment for online purchases. The Blue card, which is essentially a credit card, uses embedded chip technology for enhanced security in authentication. Future applications for the chip beyond accessing an electronic wallet have yet to be determined.

eCash Technologies, a Seattle-based company has acquired DigiCash technologies including its "blind signature" encryption scheme.

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 electronic money balances issued by non-depository institutions. Voluntary reporting, as has been the case with travellers' cheques issued by non-banks, may be encouraged.

At present, the introduction of electronic 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 electronic 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 electronic money to any particular type of entity. Issuance of electronic money could take a variety of forms. For example, Federal banking agencies, including the Federal Reserve Board 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 travellers' 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 electronic 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 and requiring registration with the US Treasury Department of certain types of such money service businesses (MSBs) such as currency dealers, cheque cashers and issuers, sellers, and redeemers of travellers cheques or money orders. In March 2000, FinCEN issued final regulations requiring certain MSBs to file reports of suspicious activity. These regulations included issuers, sellers and redeemers of stored-value products within the definition of money services businesses thereby requiring such organisations to comply with certain applicable provisions of anti-money laundering regulations, but specifically excluded such organisations from the registration and suspicious activity requirements.

Cross-border issues. No significant use of or problems involving cross-border or multicurrency electronic money products have been reported to date.

Other issues. In April 1996, the Federal Reserve Board 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, the Congress directed the Board 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.

In August 1996, the 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. The FDIC has issued a request for public comment on questions related to deposit insurance coverage of stored-value cards and other emerging payment systems.

VIETNAM

1. Card-based products

Since the first bank card was issued by Vietcombank in 1993, bank cards have been used increasingly from year to year. However, under the influence of the Asian financial crisis, the volume and value of bank card transactions were affected somewhat at the beginning of 1998. At present, there are two commercial banks (Vietcombank and ACB) which are allowed to issue credit cards and debit cards. The trademarks of international credit cards that have been issued by Vietnam's commercial banks and used commonly in payment transactions are Master and VISA. The Vietnam Bank Card Association (VBCA) was established in 1996.

The State Bank of Vietnam (SBV) is responsible for preparing the legal framework for the issuance, use and settlement of bank cards and licensing the issue of bank cards.

2. Network/software-based products

No developments.

3. Policy responses

New legal provisions. The SBV adopted a regulation on the issuance, use and settlement of bank cards in October 1999. Commercial banks which meet the technological, financing and management requirements may be considered by the SBV for issuing bank cards. This regulation can be regarded as the first step towards providing the necessary legal conditions for the development of the bank card market in Vietnam.

Monetary policy and seigniorage. In spite of some improvement, the volume and value of bank card transactions are insignificant compared with those of other non-cash payment instruments. At the moment, the SBV is tending to replace direct monetary policy instruments with indirect ones (OMO). The development of non-cash payment instruments through the banking system is necessary to deepen the financial market and promote the effectiveness of the SBV's conducting of monetary policy via indirect instruments. Development of card-based products is regarded as the way to reduce the amount of cash in circulation and increase the incentives for the public to deposit money with banks.

Provider issues. According to the current regulation of the SBV, only banks can be considered for issuing bank cards. Other types of institutions are not allowed to issue bank cards.

ZAMBIA

No developments. However, Zambia is participating in the COMESA/PTA bank Smart Card project that will introduce e-money in the COMESA grouping, using Mondex electronic cash application. A pilot project will be established in Kenya before launching in other COMESA countries. The specific territories of the COMESA to participate in Mondex in an initial stage include Angola, Burundi, DR Congo, Comoros, Djibouti, Ethiopia, Eritrea, Kenya, Malawi, Madagascar, Rwanda, Seychelles, Sudan, Tanzania, Uganda, Zambia and Zimbabwe.

ZIMBABWE

No developments so far. The only prepaid cards in use are telephone and electricity-based cards issued by the Posts and Telecommunication Corporation and the Zimbabwe Electricity Supply Authority respectively. Cellular network providers have recently introduced prepaid cellular cards for use on their networks.

Table A

Specific features and statistics of e-money products

Country	Name of system	Type of system	Number of issuers	Loading procedures	Value limit on card or consumer software (USD)	Transferability among end-users	Adapted for network payment	Multicurrency features	Multifunctional payment features
Austria	Quick	Card-based	1	ATM	170	No	No	No	Yes
Belgium	Proton	Card-based	38	ATM, phone	133.8	No	Piloted	No	Yes
Brazil	VISA Cash	Card-based	14[1,2]	ATM, phone, internet	51–154	No	Considered	No	Yes
	SIBS	Card-based	1[3]	ATM, phone, internet	307	No	No	No	Yes
Canada	Mondex Canada Pilot program 1	Card-based	3	Phone (residential and public), ATMs, other Mondex cards	335[4]	Yes	No	No	No
	Mondex Canada Pilot program 2	Card-based	2	Phone (residential), ATMs, other Mondex cards, internet, specialised loading units	335[4] (average)	Yes	Considered	No	Yes
	VISA Cash	Card-based	1	Specialised loading units, internet	335[4] (average)	No	Considered	No	Yes
Costa Rica	Futura 3000	Card-based	16	Phone, ATM, internet	102	Yes	Yes	No	Yes
	Mondex (Credomatic)	Card-based	1	Phone, ATM, internet	330	Yes	Yes	No	Yes
Finland	Avant II	Card-based	4	ATM, network since autumn 1999	362	No	Yes	FIM and euro	Yes

Country	Name of system	Type of system	Number of issuers	Loading procedures	Value limit on card or consumer software (USD)	Transferability among end-users	Adapted for network payment	Multicurrency features	Multifunctional payment features
Finland (cont.)	Matkahuolto	Card-based	1	Other	150	No	No	No	Yes
	Rovaniemi Citycard	Card-based	1	Other	150	No	No	No	Yes
	Vaasa Citycard	Card-based	1	Other	170	No	No	No	Yes
	Seinājoki Citycard	Card-based	1	Other	n.a.	No	No	No	Yes
	UniCard	Card-based	1	Other	170	No	No	No	Yes
France	Kleline	Network-based	1	Internet	80	No	(Yes)	Yes	Debit/credit card
Germany	GeldKarte	Card-based	3,500	ATM	240	No	No	No	Yes
Hong Kong	Octopus	Card-based	1	Self-service add-value machines, ticketing office automatic add-value with subsequent deduction from bank accounts	129	No	No	No	No
	Mondex	Card-based	2	ATM	400	Yes	Yes	Available but not currently used	Available but not currently used
	VISACash	Card-based	15	ATM	385	No	No	No	Yes
Italy	Cassamat	Card-based	29	ATM, bank branch	300	No	No	No	No
	MINIpay	Card-based	56	Bank branch, ATM, phone	180	No	Yes	Experimental	No
	VISA Cash	Card-based	1	Non-reloadable	30	No	No	No	No
Lithuania	ImparCard	Card-based	1	ATM	No limit	No	Piloted	Yes	Yes

Country	Name of system	Type of system	Number of issuers	Loading procedures	Value limit on card or consumer software (USD)	Transferability among end-users	Adapted for network payment	Multicurrency features	Multifunctional payment features
Mexico	Visa Cash	Card-based	6	Bank branch load device	250[5]	No	No	No	No
	Monedero Electronico Inbursa (Proton)	Card-based	1	Branch load device, phone and internet	100	No	No	No	No
Netherlands	Chipknip	Card-based	67	Terminals at banks (7,000), portable phone-load devices	250	No	Yes	–	Debit cards
	Chipper	Card-based	6	Public phones (20,000), portable phone-load devices	250	No	Yes	–	Debit cards
Portugal	PMB (Porta-Moedas Multibanco)	Card-based	26	ATM	341	No	No	No	Debit and/or credit card functions; ATM access
Singapore	CashCard	Card-based	5[6]	Bank terminals, HomeNETS[7]	297	No[8]	Yes[9]	No	ATM and debit cards
Spain	Monedero 4B	Card-based	124	ATM	Minimum 170.72 Maximum 239.01	No	Yes	No[12]	Yes
	VISA Cash	Card-based		ATM[10]					
	Euro 6000	Card-based		ATM[11]					
	Virtual C@sh	Network-based		n.a.					
Switzerland	Cash	Card-based	Approx. 350	ATM	204 per card (680 per day)	No	No	No	Yes
	e-cash™	Network-based	1	Internet	3,401 per month	No	Yes	No	No

Country	Name of system	Type of system	Number of issuers	Loading procedures	Value limit on card or consumer software (USD)	Transferability among end-users	Adapted for network payment	Multicurrency features	Multifunctional payment features
Thailand	MicroCash	Card-based	1	Offline loading device	130	No	No	No	2 types: – e-purse only – ATM/credit cards/e-purse
	SCB Smart Card	Card-based	1	Online loading device	Unlimited	No	No	No	2 types: – e-purse only – ATM/credit cards/e-purse
Turkey	Akilli Bayi Kartlari (Smart Retailer Cards)	Card-based	1	EPROM	6,597.11	No	Yes (through the bank network)	No	No
	Parakart (Moneycard)	Card-based	1	Bank branches or ATM	60	No	No	No	No
UK	Barclaycoin[13]	Network-based	1	Value loaded from debit or credit card at Barclaycoin website	n.a.	No	Yes	No	–
	Mondex	Both	3[14]	ATM (for loading from current or credit card account)/ specific machine (for loading by cash)	165	Yes	Limited	No (although planned later)	ID and access control. No other payment function at present, but planned later.
	Visa Cash	Card-based	6	ATM (for loading from bank account)/ specific machine (for loading from credit card). Trialling phone.	83	No	No	No (although planned later)	Debit/credit/cheque guarantee/ATM card

Country	Name of system	Type of system	Number of issuers	Loading procedures	Value limit on card or consumer software (USD)	Transferability among end-users	Adapted for network payment	Multicurrency features	Multifunctional payment features
UK (cont.)	Magex Wallet	Network-based	1	Value loaded from credit card at central Magex website	n.a.	No	Yes	No	–
USA	Visa Cash[15,16] (New York)	Card-based	1	ATM	500	n.a.	n.a.	No	ATM
	Mondex[15,17] (New York)	Card-based	1	ATM	200	n.a.	n.a.	No	ATM
	eCash[18] Technologies	Network-based	n.a.	n.a.	n.a.	n.a.	Yes	No	No
	CyberCoin	Network-based	n.a.	Checking account or credit card	80	No	Yes	No	n.a.

[1] Unibanco, Banestado, Sudameris, Banespa, Boston, Brazil, Real, Noroeste, CEF, Finasa, HSBC Bamerindus, Itaú, Bradesco, Fininvest. [2] Comparing to the 1998 survey, the lower number is due to one bankruptcy. [3] Bradesco. [4] 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. [5] Santander Mexicano's value limit on Card is 2,500 pesos (USD 250). [6] In November 1998, DBS bank acquired POSB bank. Both banks were part of the original six CashCard issuing banks. [7] Handheld terminal which allows CashCard top-ups at home via the telephone line. [8] Presently, purse-to-purse transactions are not possible. [9] The CashCard can be used to make small-value payments for purchases on the internet. This scheme is known as CashCard for Open Network E-Commerce or C-One [10] 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. [11] There is also the possibility of loading the electronic purse (previous cash payment) in special devices placed inside any branch of the issuer. [12] Cards with a single-currency feature (pesetas or euro). [13] Note that the Barclaycoin trial closed at the end of 1999. [14] Mondex value can be purchased from three different banks, although the value is initially issued by the UK originator and the issuing banks purchase Mondex value from the originator to sell on to their customers. [15] Joint experiment by Mondex and Visa Cash. An average of USD 38 in stored value was loaded onto user's cards, and more than USD 1 million in user purchases had been electronically deposited into merchants' accounts by the close of the programme. [16] 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. [17] Although Mondex e-money programmes exist outside the United States, no e-money projects are currently in operation within the United States. [18] eCash Technologies purchased Digicash's "blind signature" technology and other assets in 1999. From October 1995–September 1998, Digicash operated a programme using this technology that involved 300 merchants and 5000 PC users.

Table B

Specific features and statistics of e-money products

Country	Name of system	Type of system	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	4.8 million	28,000	3.3	5,800	43,900[1]	6.00	October 1999	1994
Belgium	Proton	Card-based	7,000,000[2]	64,000	44.4	149,261	596,437	4.00	December 1999	February 1995
Brazil	VISA Cash	Card-based	95,000	1,050	44.2 (monthly average)	334	1,477	4.42	December 1996-September 1999	December 1996
	SIBS	Card-based	40,100	690	23.6 (monthly average)	960	3,073	3.20	September 1996-September 1999	September 1996
Canada	Mondex Canada Pilot program 1	Card-based	15,000	550	0.0289 (at termination) 0.0747[3] (average over project life)	n.a.	3,045.45[3]	4.00[3]	At termination[4]	February 1997, terminated October 1999
	Mondex Canada Pilot program 2	Card-based	10,000[3]	650	0.0597 (launch value)	n.a.	4,060.61[3]	n.a.	As of 31 October 1999[4]	26 August 1999
	VISA Cash	Card-based	48,000[3]	320	0.0328[3]	n.a.	n.a.	2.85[3]	As of 31 October 1999[4]	October 1997
Costa Rica	Futura 3000 (BCIE)	–	79,306	4,322	n.a.	n.a.	n.a.	n.a.	31 October 1999	–
	Mondex (Credomatic)	–	14,766	458	n.a.	n.a.	n.a.	n.a.	31 October 1999	–
France	Kleline	Network-based	15,000	400	n.a.	266[5]	320[6]	1.2[7]	November 1999	September 1996
Germany	Geldkarte	Card-based	60,000,000	60,000	70.8	58,000	208,671	3.60	August 1999	1996

Country	Name of system	Type of system	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	Octopus	Card-based	5.6 million	8,000	confidential	3.9 million	3.67 million	0.94	31 August 1999	September 1997
	Mondex	Card-based	about 0.2 million	about 7,000	about 4	n.a.	n.a.	n.a.	31 August 1999	November 1997
	VISACash	Card-based	about 0.31 million	about 4,000	confidential	n.a.	n.a.	2.55	31 August 1999	August 1996
Italy	Cassamat	Card-based	} 442,000	} 3,867	} 0.77	} 846	} 5,267	} 6.2	1998	October 1994
	MINIpay	Card-based							1998	June 1996
	VISA Cash	Card-based							1998	December 1996
Lithuania	ImparCard	Card-based	53,000	1,165	3.6 (at end-1998)	937	21,942	23.4	January-September 1999	May 1996
Mexico	Visa Cash	Card-based	25,000	380[8]	n.a.	n.a.	n.a.	1.3	October 1999	May 1998[9]
	Monedero Electronico Inbursa (Proton)	Card-based	2,500	78[8] 27[11] 1,230[13]	n.a.	n.a.	n.a.	.37[10] 4.39[12]	October 1999	June 1998[9]
Netherlands	Chipknip	Card-based	13,000,000	150,000	} 28	n.a.	n.a.	} 8	April-November 1999	October 1996
	Chipper	Card-based	7,000,000	150,000		n.a.	n.a.		April-November 1999	June 1997
Portugal	PMB (Porta-Moedas Multibanco)	Card-based	3,433,679[14]	58,634	1.5	13,606	17,654	1.3	January-September 1999	April 1995
Singapore	CashCard	Card-based	3,156,637	12,909	15.46	276,133	177,199	0.62	August 1999	November 1996

Country	Name of system	Type of system	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
Spain	Monedero 4B	Card-based	5,690,036	99,335	10.628	6,112	19,111	3.12	January-December 1998	End-1996
	VISA Cash	Card-based								Second half of 1996
	Euro 6000	Card-based								Early 1997
	Virtual C@sh	Network-based								End-1996
Switzerland	Cash	Card-based	3,000,000	17,800	n.a.	n.a.	n.a.	n.a.	October 1998	January 1997
	e-cash™	Network-based	3,400	28	n.a.	n.a.	n.a.	n.a.	June 1998 - November 1999	June 1998 - December 1999 (pilot)
Thailand	MicroCash	Card-based	58,710	734	0.18	413	1,600	4	January-September 1999	November 1996
	SCB Smart Card	Card-based	17,000	60	n.a.	750	1,000	330	January-October 1999	1998[15]
Turkey	Akilli Bayi Kartlari (Smart Retailer Cards)	Card-based	227	14 (POS terminals)	neg.	3	286.92	102.09	September 1999	November 1998
	Parakart (Moneycard)	Card-based	3,132	38 (POS terminals at 31 merchant stores)	neg.	– (use of product halted)	–	–	January-October 1999	10 December 1997

Country	Name of system	Type of system	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
UK	Barclaycoin	Network-based	140,000[16]	1,642[17]	0.263	507	8,284	16.34	1998	October 1997[18] (closed 1999)
	Mondex	Both								July 1995[18]
	Visa Cash	Card-based								October 1997[18]
	Magex Wallet	Network-based								October 1999[18]
USA	Visa Cash (New York)	Card-based	96,000	600	n.a.	n.a.	n.a.	n.a.	October 1997–December 1998 (discontinued December 1998)	October 1997
	Mondex (New York)	Card-based		600	n.a.	n.a.	n.a.	n.a.	October 1997–December 1998 (discontinued December 1998)	October 1997
	eCash Technologies	Network-based	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	May 2000
	CyberCoin	Network-based	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	January 1997–May 1999 (discontinued May 1999)	January 1997

[1] Estimated on the basis of monthly data. [2] Cards that have been loaded at least once. [3] Estimates. [4] Unless otherwise indicated. [5] 2000 including all payment features. [6] USD 204,000 including all pyment features. [7] USD 102 including all payment features. [8] Number of participating merchants. [9] Pilot program. [10] Vending machines. [11] Number of vending machines. [12] Merchants. [13] Number of public phones for loading. [14] At present, 261,136 of which have positive value and for the rest value can be loaded later. [15] E-money function has been added since May 1999, while the project was launched in 1998 with identity and ATM/debit card functions in its initial stage. [16] Individual data for each scheme is not available, therefore aggregated data is provided. [17] Number of purchase terminals. [18] All schemes are still in the pilot stage, or were at the reporting date (end-1998).

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