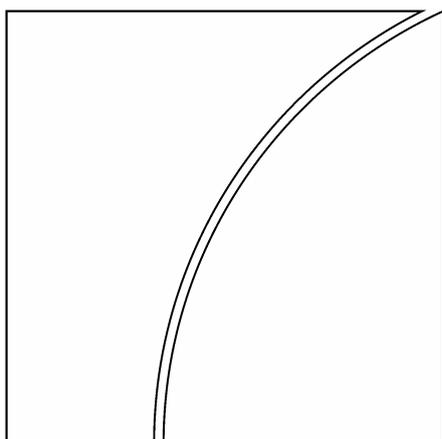


Committee on Payment and Settlement Systems



Survey of developments in electronic money and internet and mobile payments

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Foreword

A number of innovative products for making payments have been developed in recent years, taking advantage of rapid technological progress and financial market development. Transactions made using these innovative products are accounting for an increasing proportion of the volume and value of domestic and cross-border retail payments. The possibility of electronic money taking over from physical cash for most small-value payments continues to evoke considerable interest among both the public and the various authorities concerned, including central banks. Although e-money has not been a very dynamic area in the field of retail payments recently, its development raises policy issues for central banks as regards payment system oversight, the possible implications for central banks' revenues and the implementation of monetary policy. In view of these potential policy concerns, in 1996 the G10 central bank Governors announced their intention to closely monitor the evolution of electronic money schemes and products and, while respecting competition and innovation, to take any appropriate action if necessary. The Governors asked the BIS to monitor the developments of these new products on a regular and, as far as possible, global basis.

Since 1996, the BIS, in cooperation with the Committee on Payment and Settlement Systems (CPSS) and with the support of the CPSS Secretariat, has been regularly surveying electronic money developments around the globe with the help of central banks worldwide. The surveys were initially confidential, with information being shared only with the participating central banks. However, in view of the widespread public interest in this innovative means of payment, the CPSS decided to make the contents of the survey publicly available after obtaining the consent of the participating central banks. The first such *Survey of electronic money developments* was published by the BIS in May 2000, followed by an updated report in November 2001. The present report too is being made available to the public.

As payments made using the internet and mobile phones have advanced quite rapidly in recent years compared to e-money, the CPSS decided that these innovative methods of payment, having raised policy issues for central banks in much the same way as e-money issues did, should be included in the public survey. Internet and mobile payments are defined by the channel through which the payment instruction is entered into the payment system.

In this survey the number of participating central banks and monetary authorities has increased to 95. The report provides information on innovative products that are in use or being planned in the countries and territories concerned. Data included in the survey relate to end-2002 or 2003. The report also provides information on the policy stance adopted by the various authorities concerned, including central banks. An overview of the scope, definitions and policy issues is provided in the introduction to the report.

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

Tommaso Padoa-Schioppa, Chairman
Committee on Payment and Settlement Systems

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Introduction

1. Overview

1.1 A number of innovative products for making payments have been developed in recent years, taking advantage of rapid technological progress and financial market development. Transactions made using these innovative products are accounting for an increasing proportion of the volume and value of domestic and cross-border retail payments. Two categories of payment products are covered by this survey. The first category includes reloadable electronic money instruments in the form of stored value cards and electronic tokens stored in computer memory. Electronic money needs to be distinguished from payment instruments that allow (remote) access to a customer's account. The second category includes internet and mobile payments, defined by the channel through which the payment instruction is entered into the payment system.

1.2 Developments in electronic money schemes have been evoking considerable interest over the last few years, although their use is still very low compared to cash and traditional non-cash payment instruments. Electronic money or e-money, as a potential substitute for cash for making small-value payments, raises policy issues for central banks as regards the possible implications for central banks' revenues, their implementation of monetary policy and their payment system oversight role. In view of these potential policy concerns, in 1996 the G10 central bank Governors announced their intention to closely monitor the evolution of electronic money schemes and products and, while respecting competition and innovation, to take any appropriate action if necessary.

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

1.4 In view of the widespread public interest in this innovative means of payment, the CPSS decided to make the contents of the survey publicly available after obtaining the consent of the participating central banks. The first such *Survey of electronic money developments*¹ was published by the BIS in May 2000. In November 2001 the BIS published the updated *Survey of electronic money developments*.

1.5 As payments made using the internet and mobile phones have advanced quite rapidly in recent years compared to e-money, the CPSS commissioned a one-off survey amongst CPSS member countries at the end of 2002. The CPSS decided that these innovative methods of payment, which raise policy issues for central banks in much the same way as e-money issues do, should be included in the public survey.

1.6 For this survey, the number of participating central banks and monetary authorities was expanded. In all, 95 countries and territories from around the world responded. As in the past, participating central banks were requested to deliver information on card-based schemes, network-/software-based schemes, policy responses and statistical data on the use of e-money in their respective countries.

1.7 In addition, in this survey the CPSS Secretariat has collected information on internet and mobile payments, defined by the channel through which the payment instruction is entered into the payment system. The focus, nevertheless, is not on technological aspects, but on the market impact of innovations. The participating central banks were requested to furnish information on internet and mobile schemes, policy responses and statistical data on the use of internet and mobile payments in their respective countries.

1.8 This introduction reviews the development of e-money, internet and mobile payment products, and policy responses on the basis of the survey conducted at the end of 2003. It is followed

¹ Available on the BIS website (www.bis.org).

by the individual country responses and comparative tables on the use of innovative products and system design features, based on the information provided by selected survey respondents. Data included in the survey relate to end-2002 or 2003 and cover schemes being considered, piloted or implemented. Tables A and B provide information on electronic money products, while Tables C and D relate to internet and mobile payments. A list of the most frequently used abbreviations is included before the individual country responses.

2. Electronic money

2.1 Definition of e-money

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

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

2.1.3 In this survey, electronic money continues to be defined² as a stored value or prepaid product in which a record of the funds or value available to the consumer for multipurpose use is stored on an electronic device in the consumer's possession. This definition includes both prepaid cards (sometimes called electronic purses) and prepaid software products that use computer networks (sometimes called digital cash). In the case of card-based products, the prepaid value is typically stored in a microprocessor chip embedded in a plastic card - "smartcard". On the other hand, network-based products use specialised software installed on a standard personal computer for storing the "value". The loading of value onto the device is akin to the withdrawal of cash from an ATM, and the product is used for purchases through a transfer of value to the merchant's electronic device.

2.2 Development of e-money products

2.2.1 Card-based products

2.2.1.1 Card-based e-money schemes have been launched and are operating relatively successfully in a sizeable number of the countries surveyed: Australia, Austria, Belgium, Bolivia, Brazil, China, the Czech Republic, Denmark, Finland, France, Germany, Ghana, Greece, Hong Kong SAR, India, Italy, Japan, Korea, Lithuania, Luxembourg, Malawi, Malaysia, Mexico, the Netherlands, Nigeria, Norway, the Philippines, Russia, Singapore, Spain, Switzerland, Taiwan (China; hereafter Taiwan), Turkey and Venezuela. While in many countries card-based products are gradually gaining acceptance, in others, like Canada, the United Kingdom and the United States, some of the e-money schemes have been discontinued. The e-money products are available on a nationwide basis or only within specific regions or cities. Comparatively successful are e-money products supported by public transport and public telephone companies, and parking meter or vending machine operators. Card-based e-money products have been piloted in some other countries.³

² A legal definition of electronic money is included in Article 1 of European Parliament and Council Directive 2000/46/EC (OJ L 275 of 27 October 2000, pp 39-43). The definition states that "electronic money shall mean monetary value as represented by a claim on the issuer which is: (i) stored on an electronic device; (ii) issued on receipt of funds of an amount not less in value than the monetary value issued; (iii) accepted as means of payment by undertakings other than the issuer".

³ Pilot projects are under way in Colombia, Finland, Japan, South Africa, Thailand, Trinidad and Tobago and Turkey.

2.2.1.2 In contrast, a number of the central banks which responded to the survey questionnaire stated that there are no plans to introduce e-money schemes in the near future in their respective countries.

2.2.2 Network-/software-based products

2.2.2.1 Compared to card-based schemes, developments in network-based or software-based e-money schemes have been much less rapid. Network-based schemes are operational or are under trial in a few countries (for instance Austria, Colombia, Greece, Hong Kong, Italy, Korea, Norway, Russia, Spain and Taiwan), but remain limited in their usage, scope and application. Network-based products are being considered in Jamaica and Singapore.

2.2.2.2 A vast majority of the participating central banks have indicated that there are no plans to introduce network-based e-money products in their respective countries.

2.3 Statistical data

2.3.1 Statistical data on e-money schemes are relatively limited. Table A provides an overview of the system design features of e-money schemes. These differ considerably from country to country and from product to product. Most schemes operate with reloadable cards, enabling periodic replenishment of balances from bank accounts through ATMs or in some cases through the telephone or internet.⁴ Relatively low limits (typically a few hundred US dollars) have been placed in all cases on the maximum value that can be stored on the cards. Transferability of value from purse to purse without the involvement of the issuer is not available in virtually any scheme.⁵ In some countries the e-money facility has been combined with other functionalities such as a credit or debit card, or holder identification. In several countries the card-based schemes have been adapted for network payments.⁶

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

3. Internet and mobile payments

3.1 Scope

The rapid growth of e-commerce and the use of the internet has led to the development of new payment mechanisms capable of exploiting the internet's unique potential for speed and convenience. Similarly, the broader usage of mobile phones has encouraged banks and non-banks to develop new payment services for their customers. Internet payments and mobile payments are defined by the channel through which the payment instruction is entered into the payment system. The responses to this survey provide information on the traditional payment instruments that are used over the internet

⁴ Special terminals are provided in some cases for replenishment of balances. In Belgium, the Netherlands and Singapore a handheld terminal allows for loading via the telephone line. In Sweden the loading is done through special terminals and over the phone, as in Lithuania, where PC-based terminals are used for the same purpose. In Belgium, Canada, Finland, Greece, Italy, Korea, Singapore and Taiwan cards can be reloaded through the internet.

⁵ Ghana, Norway and Singapore report schemes which allow purse-to-purse transactions. In Italy and Jamaica such a possibility is being considered.

⁶ CashCard in Singapore, card-based schemes in Italy and Korea, Mondex in Ghana and Taiwan, Monedero 4B and Visa Cash in Spain, Quick in Austria, Waasa Card in Finland and Buypass in Norway. Network payment has also been piloted for Avant in Finland and Euro 6000 in Spain. Adaptation for network payment is being planned for Visa Cash in Brazil, Pay Plus Card in Jamaica and MEPS Cash in Malaysia.

and also details of new instruments. Since the purpose of the survey is to report on innovations in payments, the focus is on payment instruments devised for the new channels.

3.2 Development of internet payments

3.2.1 Payments made using the internet and mobile phones⁷ have advanced rapidly and have become quite important in the field of electronic retail payments recently compared to e-money. There are several new schemes which increasingly combine information and communication technology to meet the demands of consumers. This has also resulted in the possibility of customers being able to choose from a wide variety of payment schemes. The internet is used for making payments in 67 of the reporting countries. Whereas some products have been successful over the past few years, other initiatives are at an early stage of development. Some products have been discontinued after a short time.⁸

3.2.2 Business-to-business (B2B), business-to-customer (B2C) and person-to-person (P2P) payments are the common types of payment transactions carried out through the internet. Payment transactions in all these models use additional security measures involving both hardware and software encryption tools. Payments can be made over the internet using traditional debit and credit cards or electronic money instruments, debit or credit transfers and also by providing dematerialised invoices to customers to enable them to make payments under EBPP (electronic bill presentment and payment) schemes.⁹ Furthermore, P2P funds transfer services, which enable card-to-card transfer, have been developed by Visa (Visa Direct) and MasterCard (MoneySend) and will soon be introduced worldwide.

3.2.3 Typically payments are initiated from the payment provider's secure website, with notification of the payment taking place via e-mail. The systems differ according to the type of account from which the funds are drawn, and the payment networks used to complete the funds transfer. A number of providers - typically banks - have developed systems that require establishment of a special purpose transaction bank account. In other systems value is transferred between special purpose non-bank accounts.¹⁰

3.2.4 In many instances, the available infrastructure in retail payments is used by these new schemes to effect payment and settlement.

3.3 Development of mobile payments

3.3.1 Mobile payments cater largely to the micropayments segment. Several types of mobile phone payment arrangements operate or are being considered in Belgium, Denmark, Estonia, Fiji, Finland, France, Germany, Greece, Hong Kong, Indonesia, Ireland, Italy, Japan, Kenya, Macedonia, Nigeria, Norway, Portugal, Romania, Saudi Arabia, Singapore, South Africa, Spain, Sri Lanka, Taiwan, Thailand, Turkey and the United Kingdom. Mobile payments can be made through voice access, text messaging known as SMS (short messaging service) or WAP (wireless application protocol), which provides a gateway to the internet. WAP technology enables a mobile phone holder registered with this service to access his/her bank website for banking services. Two business models are in use - paying from a prepaid balance or paying later along with the mobile phone bill. Some products use the phone as an access channel through which to initiate and authenticate transactions from existing payment means such as bank accounts or payment cards.¹¹ Another arrangement allows customers to pay using the prepaid value stored on the mobile phone or pay ex post, where payments for

⁷ Sometimes referred to as e-payments and m-payments respectively.

⁸ Some of the internet payment products have been discontinued, for instance in France and Germany.

⁹ EBPP services are operational in Australia, Austria, Colombia, Sweden and Switzerland and are being considered in Belgium.

¹⁰ PayPal in the United States.

¹¹ For example, the Vodafone m-pay card system in the United Kingdom enables users to charge purchases directly to payment cards they have pre-registered with the service.

goods/services are placed as additional items on the customer's phone bill. Authentication of payments is done by keying in a unique PIN (personal identification number).

3.3.2 The fee structure differs from product to product. For promotional reasons, some institutions provide internet and mobile services without charging their subscribers any fees or commission; others make use of discount rates or follow a uniform pricing policy.

3.4 Statistical data

3.4.1 Statistical data on internet and mobile payments are relatively limited.¹² Table C provides some general information on the system design features of internet and mobile payment products being implemented in some of the participating countries. The types of instruments used for making payments through the internet and mobile phones include credit and debit bank transfers, e-money card-based or network-based products, server wallets and EBPP. The transaction speed varies from real-time¹³ to several days.

3.4.2 Table D provides statistical information on the schemes being implemented, such as the number of issuers and users, the total number of transactions and the total and average value of transactions carried out via internet and mobile phone channels. The volume and value of transactions are still low in many countries, while in some they represent a considerable market share.¹⁴ Some products developed in Denmark, Estonia, Germany, Greece, Kenya, Malawi, Norway, Singapore, Switzerland, the United Kingdom and the United States have multicurrency and cross-border features.

4. Policy issues related to e-money

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

4.2 **Monetary policy and seigniorage.** Although, for the moment, e-money is not expected to have major implications for monetary policy implementation, the reporting central banks are taking into consideration the need to closely monitor their development. A number of central banks, including those of Austria, Belgium, Finland, Germany, Hong Kong, Italy, Lithuania, Malawi, Malaysia, the Netherlands, Nigeria, Peru, Portugal, Singapore, the Slovak Republic, Spain, Sweden and Switzerland, are collecting data on the e-money issued by banks. Norway, Slovenia and Tanzania have reported that the inclusion of e-money data in monetary statistics is being considered, whereas in Denmark, Ghana and Korea there is no such requirement. The Federal Reserve in the United States currently has no statutory authority requiring non-depository institutions to report on the e-money balances issued. The Bank of England collects some data on the e-money issued by banks, while the Financial Services Authority collects data from authorised non-deposit-taking credit institutions in addition to its general data gathering from banks.

4.2.1 So far no central bank has indicated an adverse impact on the size of its balance sheet due to a decline in the value of the banknotes in circulation as a consequence of widespread adoption of e-money. The ECB is of the view that the national central banks can maintain the size of their balance

¹² The ECB initiated work in 2002 to improve the quality and availability of aggregate payment statistics for the European Union and the acceding countries. The initial results of this work are expected to become available in the course of 2004.

¹³ For instance, Ogone in Belgium, internet banks in Estonia, PPS in Hong Kong, Omnipay Prepagato in Italy, Inter Debit and Net Debit in Japan, Buypass in Norway, Mobipay in Spain, FISC-Internet in Taiwan and PayPal in the United States allow payments in real time.

¹⁴ For instance, in Estonia.

sheet if necessary by imposing minimum reserves on e-money issuers or by issuing e-money themselves.¹⁵ As reported elsewhere in this introduction, given the low average value of e-money transactions and the relatively small cap on the amounts that can be stored on cards, the e-money float is still very low. Losses on account of a decline in seigniorage revenues are also perceived to be negligible by the central banks and have so far evoked no specific policy responses from them. The central banks which responded to the survey questionnaire stated that they do not plan to issue e-money themselves.

4.3 General legal issues. The issuance of e-money raises questions about the supervision of issuers, the oversight of payment systems, the effect of the issuance of e-money on consumer and data protection as well as law enforcement issues. Within the Eurosystem, a comprehensive and harmonised regulatory framework for the issuance of e-money by deposit-taking institutions and the new class of credit institutions called electronic money institutions (ELMIs) is provided by two EU Directives: European Parliament and Council Directive 2000/46/EC on the taking-up, pursuit and prudential supervision of the business of electronic money institutions and European Parliament and Council Directive 2000/28/EC amending Directive 2000/12/EC relating to the taking-up and pursuit of the business of credit institutions. EU national central banks report that their national legislation has been harmonised with the two EU directives. The Czech Republic, Estonia, Hungary, Lithuania, Slovakia and Slovenia have also made or are considering changes to existing legislation in line with the two directives. Amendments to the legislation related to electronic money issues have recently been adopted in Hong Kong and Malaysia and are being considered in Korea, Malawi and Russia. In some countries specific legislation is being contemplated for regulating the issuance of e-money.¹⁶

4.4 Relevant security issues. Several measures are commonly taken to address security issues. These include tamper-resistant chips on cards and the use of sophisticated encryption techniques. Further, limits on the amount of value that can be stored on consumers' and merchants' electronic devices, limits on the value for individual transactions, and the use of a PIN for authorising loading and/or transfer instructions are also widely adopted to limit potential losses on account of a breach in security.

4.4.1 The BIS report *Security of electronic money*, published in August 1996, highlights the main design features and functional aspects of electronic money products and analyses the technical risks specific to these products. The ECB's *Electronic money system security objectives* report of May 2003 provides a risk/threat analysis, and a list of security objectives that should be met by e-money schemes, in order to cover these risks/threats. The report serves as a reference for the oversight of e-money schemes by national central banks in the Eurosystem. The criteria which the Hong Kong Monetary Authority (HKMA) requires to be satisfied in respect of security are set out in a questionnaire to be completed by scheme operators when applying for authorisation to issue multipurpose stored value cards (MPCs). A similar approach is followed in Singapore, where the monetary authority assesses whether the issuing bank has put in place a robust security system to prevent counterfeiting and fraud. In the assessment of the payment system's operational and technical security features, the central bank in Austria is assisted by a relevant technical organisation, while in Mexico a special task force has been constituted.

4.5 Issuer details. The EU regulatory framework allows only deposit-taking institutions and authorised electronic money institutions to issue e-money.¹⁷ All EU member countries have transposed the two relevant directives (see Section 4.3 above) into their national legislation. Similarly, in Australia, the Czech Republic and Lithuania providers of payment facilities are required to be licensed or exempted from this requirement. In Hong Kong the special purpose vehicles whose principal business is to issue MPCs may be authorised as deposit-taking companies under the Banking Ordinance for the purpose of issuing MPCs along with fully licensed banks. In India, Mexico, Nigeria, Singapore and Taiwan e-money can be issued only by banks, whereas in Canada, Malaysia,

¹⁵ The requirements set out in the *Report on electronic money* published in August 1998 by the ECB serve as guidelines for the public authorities in the euro area countries in the conduct of their policies in this area. In line with the guidelines, e-money value is reported in the balance sheet position "overnight deposits" and, as such, is subject to minimum reserve requirements and is counted in the monetary aggregates.

¹⁶ For example, in Taiwan.

¹⁷ For details, see the ECB chapter.

Switzerland and the United States there are no restrictions on issuance of e-money by a particular type of institution. In several other countries, such as Bolivia, Thailand and Venezuela, policy guidelines on the subject are either under review or are being framed.

4.6 **Oversight issues.** Most central banks¹⁸ performing an oversight function on the payment system also monitor and analyse developments with regard to e-money. This includes collection of data and periodic meetings with the issuers. In other instances a wider range of activities are undertaken to study the organisational, legal, administrative, technical and security features of the product and the operator. The Eurosystem, as part of its oversight role with regard to e-money schemes, has established a harmonised approach in the areas of standard setting and assessment methodology relating to the technical security of the e-money schemes.¹⁹ In Hong Kong it was recommended to introduce a self-regulatory approach, under which the industry would draw up codes of practice and also monitor compliance with such codes, while the HKMA would oversee the overall implementation of such an approach.

4.7 **Supervisory issues.** The two EU directives referred to above provide a comprehensive regulatory framework for the prudential supervision of the business of electronic money institutions within the European Union.²⁰ The issuers of e-money are supervised in the Czech Republic, Estonia, Hungary, Lithuania, Malaysia, Slovakia and Slovenia. In India, Nigeria and Singapore guidelines have been framed or vested in the central bank through legislation for the issue of e-money by banks. Federal banking authorities in the United States are updating bank examination procedures to encompass e-money developments and their associated risks. In Ghana, Korea and Thailand an amendment to the existing legislation is being proposed by the central bank to vest it with explicit supervisory capabilities. In other countries the supervisory role is performed by other bodies.²¹ In still other countries, such as Mexico and Switzerland, specific regulations on the issuance of e-money have not been issued.

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

4.9 **Cross-border issues.** The use of cross-border facilities is not widespread in the reporting e-money schemes. Although the EU "single passport" (mutual recognition arrangements) under the EU directive on the prudential supervision of the business of electronic money institutions allows any authorised and supervised institution to provide services in other EU countries, including the issuance of e-money, the existing e-money products still do not operate on a cross-border level.

4.10 **Other issues.** Many central banks place special emphasis on the interoperability of systems on a nationwide basis and across national borders. The adoption of common standards and the building-up of a common technical infrastructure such as card readers and terminals could increase availability and reduce operational costs.²² Consumer protection issues related to e-money are being addressed within the EU regulatory framework,²³ and also in the Czech Republic and South Africa.

¹⁸ The central banks of Belgium, Estonia, Finland, France, Germany, Italy, Lithuania, the Netherlands, Singapore, Spain, Sweden and Thailand include e-money schemes in the exercise of their oversight functions.

¹⁹ See *Report on electronic money*, ECB, August 1998 and *Electronic money system security objectives*, ECB, May 2003.

²⁰ The legal framework establishes certain requirements on initial capital, own funds, limitations on investments and allowed business activities.

²¹ Australia (Australian Prudential Regulation Authority), Austria (Federal Minister of Finance), Finland (Financial Supervision Authority), Sweden (Swedish Financial Supervisory Authority, Finansinspektionen) and the United Kingdom (Financial Services Authority).

²² At present, the Common Electronic Purse Specifications (CEPS) and the EMV projects are considered to be the most feasible initiatives in this field.

²³ Recommendation 97/489/EC on the transparency of electronic payment instruments (OJ L 208 of 2 August 1997, pp 52-8).

5. Policy issues related to internet and mobile payments

5.1 The growth of internet and mobile payments as innovative methods of making retail payments raises policy issues with regard to the legal framework, security concerns, the oversight and/or supervisory function of central banks, questions with regard to access to payment systems, and the consequences, if any, for central banks' balance sheets and the implementation of monetary policy (although the latter issues have relevance mostly for the issuance of e-money).

5.2 Responses to the survey indicate a general consensus that the volume and value of internet and mobile payments are still insignificant in terms of the retail payments market as a whole and as such do not pose major policy issues for the central banks. Nevertheless, legal, oversight and security aspects are some of the areas being examined by central banks in this regard.

5.3 **Legal issues.** In several countries legislation exists which provides the legal context for internet and mobile payments.²⁴ Where specific statutes do not exist, provisions of existing legislation are used. The EU legislative framework for internet and mobile payments, and for e-commerce in general, consists of several directives.²⁵ The legal framework generally speaking deals with the rights and responsibilities of the user and the issuer, the provisions for consumer protection and recognition of digital signatures, and in some cases sets penalties for fraud.

5.4 **Oversight issues.** Given the low volumes and values of payment transactions in internet and mobile payments, no specific issues regarding oversight of such systems arise for central banks. But given their significance for the safety and efficiency of payments, the central banks keep abreast of the developments in this field as part of their overall oversight responsibilities.

5.5 **Security issues.** Security in both internet and mobile payment schemes is concerned with preventing misuse and eliminating fraud by unauthorised users. In cases of direct access to the bank account through either the internet or the mobile channel, a high level of security is required. There are various measures, including the use of encryption technologies²⁶ in internet-based schemes and the use of PINs in mobile schemes. With the envisaged worldwide introduction of the EMV standard (Eurocard, MasterCard, Visa) by the end of 2005, credit and debit cards will be equipped with a chip in addition to the magnetic stripe. This, too, will considerably increase the security of using credit cards on the internet since the chip can effectively be protected against duplication or changes by means of cryptographic procedures. However, some of the participants in the survey note that the development and use of international security standards for electronic payments have room for further improvement.

5.5.1 The Eurosystem central banks consider several components when assessing the overall security of electronic payments and online transactions, such as availability, authenticity/authorisation, integrity, non-repudiation and confidentiality. EU banks and card scheme providers have recently started to actively work towards fraud prevention under the European Payments Council.

5.6 **Law enforcement issues.** At present, the features of internet and mobile payment products are not perceived as making them particularly attractive for money laundering or other criminal abuse. Laws combating money laundering are applicable in general to internet and mobile payments.

5.7 **Payment system issues.** No particular problems have arisen relating to the clearing and settlement arrangements for internet and mobile payment schemes. The clearing and settlement of internet and mobile payment transactions generally take place through the same regular channels and procedures as other retail payments.

5.8 **Supervisory issues.** See Section 5.3 above.

²⁴ New legislation or amendments to the existing legislation concerning internet and mobile payments have been adopted in recent years in Australia, Bolivia, Bulgaria, the Czech Republic, Greece, India, Japan, Lithuania, the Philippines, South Africa, Taiwan and Venezuela.

²⁵ The E-commerce Directive (Directive 2000/31/EC on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market), the E-money Directive (Directive 2000/46/EC on the taking-up, pursuit and prudential supervision of the business of electronic money institutions) and the E-signatures Directive (Directive 1999/93/EC on a Community framework for electronic signatures). For more details, see the ECB chapter.

²⁶ In order to secure the transfers, public key infrastructure (PKI) is used in accordance with the Secure Electronic Transaction (SET) standards. Secure Socket Layer (SSL) is a widely used encryption technology to ensure a secure connection between the customer and merchant server during the session.

5.9 **Cross-border issues.** At present most of the products are used on a national level. If schemes are located in the European Union, the principle of free movement of services applies. Internet-based global payment services like PayPal via the internet allow cross-border payments. Most of the reporting countries do not raise specific cross-border policy issues, while some others²⁷ note the need for international cooperation among the competent authorities.

²⁷ For instance, Germany.

Abbreviations

B2B	business-to-business
B2C	business-to-customer
EBPP	electronic bill presentment and payment
EFT	electronic funds transfer
ELMI	electronic money institution
P2P	person-to-person
PIN	personal identification number
PKI	public key infrastructure
SET	Secure Electronic Transaction
SMS	short messaging service
SSL	Secure Socket Layer
WAP	wireless application protocol

Albania

1. Card-based products

There have been no major developments in the introduction of card-based schemes in Albania since the last survey. Certain commercial banks are attempting to introduce prepaid multipurpose cards, part of an American Express initiative, but only at an intermediary level, ie they are offering prepaid cards in foreign currencies for customers travelling abroad. No part of their clearing process takes place in Albania.

2. Network-/software-based products

There are no reports of any schemes under consideration, being piloted or implemented in Albania.

3. Internet and mobile payments

There are no reports of innovations in this area. A few banks offer home banking services to their customers, giving them the possibility to carry out their transactions online.

4. Policy responses

The Bank of Albania continues to closely monitor developments in electronic means of payment. There is, however, a general acceptance that the current level of e-money usage does not necessitate a policy reaction on the part of the Bank of Albania.

Armenia

1. Card-based products

No major developments have been reported to date with respect to e-money products. According to the latest e-money survey conducted by the Central Bank of Armenia, there are neither multipurpose prepaid cards nor network-/software-based products in Armenia at the moment. Most of the cards used are magnetic strip debit and credit cards or single purpose stored value cards, ie telephone cards, etc.

2. Network-/software-based products

There are no projects regarding software-based products under consideration at the moment.

3. Internet and mobile payments

There are no developed internet and mobile schemes in Armenia at the moment. The internet is still not sufficiently widespread among households to stimulate the development of such projects, but rapid growth in the use of the internet will probably lead financial institutions to offer additional services, such as internet banking, mobile banking, etc. In 1995, Arminco Global Telecommunications had some 300 users in Armenia, among which the offices of international organisations (the UN, Peace Corps and others) and state organisations. By 2001 there were up to 30,000 internet users in the country. Nevertheless, internet access in Armenia is not a cheap or widely available service, due inter alia to high tariffs for ISP first level. The reality is that the weak telecommunications infrastructure in Armenia is a serious impediment to internet development.

4. Policy responses

The Central Bank of Armenia has studied policy approaches concerning e-money, internet and mobile payments but has not yet formulated a policy approach to this matter, as there are presently no significant developments in Armenia. It should be mentioned that several commercial banks have already conducted research on these matters and are now investigating the internal market to introduce new bank technologies.

Australia

1. Card-based products

Australia's smartcard industry is continuing to develop. To date, the focus has mainly been on electronic transport ticketing and road tollways. Australian firms are involved in the design, manufacture and management of several transport ticketing projects in cities in Australia and around the world.

Other card-based products are in limited use in Australia. Unlike in transport ticketing, suppliers of such products are generally aiming to leverage off existing systems and infrastructure, as opposed to providing complete end-to-end solutions. For example, the **Real Rewards** scheme operates a customer loyalty programme for participating merchants, using proprietary, EMV-compliant smartcards and card readers. Merchants are required to contribute to the scheme according to a formula based on eligible sales. This product also allows customers to top up their loyalty points with cash. Direct credit payments are utilised for settlement between merchants and the central account. Another scheme, operated by **E Com** Industries, uses the existing EFT network to provide gift vouchers. The initial customer payment for the smartcard voucher, and the subsequent redemption, both utilise the EFT network to transfer the necessary funds. Another system, known as **Flurosolutions**, offers payment services between manufacturers and retailers. This system utilises proprietary cards and card readers to capture invoice information prior to settlement between the manufacturer and retailer via direct debit payment.

Standards Australia, a cooperative (non-government) organisation, has announced that a new national standard on smartcards is likely to be released in 2004. The standard is expected to be adopted initially in transport ticketing systems, but should also be applied to financial and retailing systems in time. Adoption of the standard will allow smartcards to be used across different systems.

2. Network-/software-based products

Network- and software-based payment products have very limited usage in Australia. Products which were in existence at the time of the previous survey are no longer available.

3. Internet and mobile payments

Internet payments are becoming more widely used in Australia. In particular, the number of direct credit payments initiated over the internet has increased significantly over the past year. This growth is in line with the increasing use of internet banking services in Australia.

Various **EBPP** systems, which allow customers to pay their bills after viewing them online, have been launched in Australia in recent times. These systems utilise existing remote payment options, such as direct debit and direct credit payments, and payment via credit card. Some larger billers offer EBPP services to their customers. Third-party bill payment providers also offer EBPP services in addition to providing for payments of paper-based bills.

Internet payments which rely on an "electronic purse" are provided by international as well as domestic service providers. These systems are characterised not only by the ability to make credit payments between users of the system, but also by the ability of online merchants to use the system to receive payments for goods and services. A domestic example is the **PAYbySNAP** service, which is being

aimed at online merchants and financial institutions. Another domestic provider, known as TECHNOCASH, has broadened its internet-based product to allow payments from mobile phones, utilising user identification information and SMS messages. Some limited mobile phone payment products have been trialled, including a trial by a mobile phone network provider in the use of mobile phones for purchases from vending machines in Sydney.

4. Policy responses

In 1998 the Reserve Bank of Australia (RBA) was given very broad and wide-ranging powers for the regulation of “purchased payment facilities” under the Payment Systems (Regulation) Act 1998 (the Act). Where the holder of the stored value with respect to a purchased payment facility is not an authorised deposit-taking institution supervised by the Australian Prudential Regulation Authority (APRA), the Act requires that the holder be authorised or exempted by the RBA. To date, however, no purchased payment facilities have been authorised by APRA or by the RBA. The RBA anticipates that any purchased payment facility that ultimately achieves widespread usage in Australia will fall under APRA supervision.

More recently, the Corporations Act 2001 established, under the responsibility of the Australian Securities and Investments Commission (ASIC), a broad new licensing regime for all types of providers of financial services, including providers of non-cash payment instruments. Providers of purchased payment facilities as defined under the Act are explicitly covered and required to be licensed, or exempted from this requirement, by ASIC.

The RBA has determined that there is no justification for it to establish a full-scale licensing regime for the few purchased payment facilities that may arise that are not subject to APRA jurisdiction. In particular, given market and regulatory developments to date, the risk of overregulation, through a duplicative regulatory structure with multiple regulators, appears a greater risk than the prudential risks posed by purchased payment facilities.

Consistent with its powers under the Act, the RBA is proposing to exempt purchased payment facilities on two criteria: limited facilities and guaranteed facilities. The exemption with respect to limited facilities will apply to small-scale facilities: as currently formulated, these facilities are defined as those with AUD 1 million or less in outstanding payment value issued (such as those in a trial phase) and facilities operating in a relatively closed environment with 50 or fewer payees. The proposed exemptions will cover most of the products being marketed to date for internet payments, as well as closed-system stored value products, such as cards used on university campuses and transit systems, in telephones, and for store gift voucher arrangements. The RBA believes that such exemptions are appropriate in the light of the small and limited nature of these facilities and the limited risk to users and the payment system.

The RBA also proposes to issue a class exemption with respect to purchased payment facilities that are guaranteed by an authorised deposit-taking institution which is itself already subject to prudential supervision, or overseen by a Commonwealth, state or local government authority. It is intended that privately operated purchased payment facilities should be able to obtain a financial guarantee (a function which financial institutions commonly provide) from a supervised financial institution to provide equivalent financial protection for users while avoiding direct regulation under the Act.

It is possible that a small number of purchased payment facilities may still fall outside APRA’s supervision and outside the RBA’s class exemptions. The RBA will be looking at these facilities on a case by case basis, taking into account whether or not they have a financial services licence, or an appropriate exemption, from ASIC. On this basis, the RBA will then determine whether any additional requirements are needed to satisfy any prudential concerns.

1. Card-based products

Today there is only one multipurpose prepaid card scheme in Austria, called **Quick**. So far, the infrastructure provided (loading devices, terminals) does not take into account the design of any foreign systems (eg Visa Cash, Mondex). It was planned to introduce a CEPS¹-based e-purse in 2004. However, due to the fact that at the time of writing there was no issuer and no acquirer running a CEPS-based e-purse worldwide, the provider of Quick, Europay Austria Zahlungsverkehrssysteme GmbH, decided to postpone the introduction of CEPS to 2007.

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

Distribution and operation. The Quick purse can be loaded up to an amount of EUR 400 at 2,699 ATM terminals, 1,554 teller terminals and 1,522 self-service terminals, making a total of 5,775 loading terminals (as at end-December 2002). Quick is distributed to customers via commercial banks as a chip contained on combined Maestro cards (5.3 million) or as "pure" electronic purse cards ("Wertkarte", sold mainly to tourists) without relation to a bank account (about 0.2 million). Value can only be loaded in euros; to date, the system has no multicurrency features. All necessary security features are provided for (safe authentication, encryption, tamper-resistance, control of payment flows).

Payments. Payments can be made at a number of retailer terminals, most of them in supermarkets, petrol stations, drugstores, grocers, etc. The installation of Quick terminals in vending and ticket-selling machines was successfully started in 1997. Purse-to-purse transactions are not provided for. The value stored on the cards is posted on (collective) sight deposits. At the end of December 2002, 74,657 Quick POS terminals had been installed; 17.2 million Quick card POS transactions were carried out between January and December 2002 with an amount of EUR 132.5 million.

Costs and fees. A "pure" Quick card ("Wertkarte") costs EUR 7.27. If the Quick purse is contained on other multifunctional chipcards (ie Maestro 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% turnover fee and a collection charge of EUR 0.44 (charged when accumulated electronic values are posted on the retailer's bank account).

Suppliers. While the chips embedded in cards are provided by Philips and Infineon, the card manufacturer is Austria Card Plastikkarten und Ausweissysteme GmbH, which is wholly owned by the Austrian National Bank (ANB). Terminals (eg ATM, POS, teller and self-service terminals) are supplied by Bull, Diebold, Inform, NCR, PDTs, Intellect-Prodada and Siemens.

2. Network-/software-based products

Today there are no software-based e-money products (ie where the monetary value is stored on the customer's electronic device) in the Austrian market. However, there is one network-based payment product, called paysafecard.

Paysafecard is a multifunctional internet payment solution operated by paysafecard.com Wertkarten AG. The system is based on a prepaid scratch card similar to a prepaid telephone value card. The cards are distributed through almost the same distribution channels as traditional prepaid telephone cards. These distribution channels include various kinds of retailers, petrol stations, bank branches of BAWAG/PSK and post offices. Since June 2001, paysafecards have also been available in Germany.

Currently paysafecards are denominated at face values of EUR 7, 25, 50 and 100. Moreover, they are available in two different variations: first, the so-called adult paysafecard in blue and second, the

¹ Common Electronic Purse Specifications, as defined by the OmniPurse initiative (see www.omnipurse.com).

so-called <18 paysafecard in red. While the adult card allows the cardholder to purchase all products offered on the web, the red <18 card does not allow purchases from websites offering goods that require the purchaser to be of a minimum age. In addition, paysafecard enables the cardholder to make telephone calls. This function supports all domestic and international calls to both fixed-line and mobile networks.

The cards are equipped with a scratch field containing a 16 digit PIN code. The customer uncovers the PIN, which is then used for online payments. The customer authorises payment by clicking on the paysafecard button and typing in the PIN (and a password, if applicable). He/she does not need to disclose any private data such as a bank account or credit card number. For one payment up to 10 different paysafecards can be combined. The payment is processed - seamlessly for the customer - automatically in the background, whereby a check routine and data exchange session between the web shop and paysafecard.com is conducted. A shadow account maintained in the system allows the customer to view his/her current card balance at any point in time on the homepage of paysafecard.com. BAWAG/PSK provides for running paysafecard.com's account, on which the value stored on the cards is posted, as well as for the processing of the payments to the beneficiaries (ie web shops).

For the cardholder, the use of paysafecard as a means of payment is completely free of charge. Furthermore, the card is totally anonymous and fully transferable.

3. Internet and mobile payments

In Austria relevant payment innovations are taking place mainly in the areas of e-banking and mobile payments as well as electronic bill presentment schemes.

There are four major e-banking systems which also provide for e-commerce-related payments initiated via web shops:

- **ELBA-internet** (by Raiffeisen, see www.raiffeisen.at);
- **Direct Pay** (by BAWAG/PSK, see www.bawag.com);
- **Netpay** (by Erste Bank, see www.netpay.at);
- **POP** - PartnerOnlineP@ying (by Bank Austria Creditanstalt, see www.ba-ca.com).

These systems can use a common standard called eps (e-payment standard), which operates within the framework of STUZZA GmbH (Studiengesellschaft für Zusammenarbeit im Zahlungsverkehr), the standardisation platform for Austrian banks (see www.stuzza.at/eps.shtml). Furthermore, as from 2004 it is intended to have all standard bank card chips prepared to carry electronic signature keys, which then can also be used for e-banking purposes.

In Austria there is also one mobile payment system in the market, called **paybox**, which can be used with Austrian mobile phone networks. It is operated by paybox Austria (see www.paybox.at), a subsidiary of the largest Austrian mobile operator (Mobilkom Austria AG & Co KG) and provides inter alia for payments via mobile phones using an automated voice-call system for payment confirmation and PINs for payment authorisation.

Furthermore, there are two major electronic bill presentment schemes in Austria:

- **Bezahlen.at** (see www.bezahlen.at), launched by BAWAG/PSK, provides for the preauthorisation of customer payments to various kinds of participating businesses (insurance companies, telecommunication providers, etc) as well as tax payments. The authorised amounts are debited directly from the customer's account on the due date. The payments are processed via PSK.
- **EBPP** (see www.ebpp.at), launched by Bank Austria Creditanstalt, Raiffeisen and Erste Bank, is a bill presentment scheme which provides the customer - after authorisation - with a direct link to these banks' e-banking platforms. From there the customer can carry out the payment in the form of a credit transfer from his/her account to the merchant's account or he/she may authorise the merchant to collect the payment via direct debit.

4. Policy responses

Market developments at domestic level are closely monitored by the ANB and appropriate policy responses - so far primarily in the area of e-money - are commonly formulated within the framework of the European System of Central Banks (ESCB).

Monetary policy issues. Electronic value stored on customers' Quick cards and paysafecards is posted on sight deposits and, as such, subject to minimum reserve requirements and counted in the monetary aggregates. Detailed statistics on e-money instruments are to be collected and aggregated on a quarterly basis as part of the ANB's new payment statistics reporting scheme as from the beginning of 2004.

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

Legal issues. The Austrian Electronic Money Act (Bundesgesetz über die Aufnahme, Ausübung und Beaufsichtigung der Tätigkeit von E-Geld-Instituten [E-Geldgesetz], Article I in BGBl (Federal Law Gazette) Part I, no 45/2002), implementing Directive 2000/46/EC of the European Parliament and of the Council of 18 September 2000 on the taking-up, pursuit and prudential supervision of the business of electronic money institutions (E-money Directive), entered into force on 2 April 2002. An electronic money institution is defined as an institution which is authorised to issue electronic money (Article 1 paragraph 1 of the E-money Act). Pursuant to the Austrian Banking Act (Bankwesengesetz, BGBl (Federal Law Gazette), no 532/1993, as amended by BGBl Part I, no 80/2003), the issuing of electronic money is regarded as a banking activity (Article 1 paragraph 1 no 20 of the Banking Act) and therefore requires a banking licence from the Austrian Financial Market Authority (FMA) according to Article 4 paragraph 1 of the Banking Act. At the moment, it is being discussed at EU level whether prepaid value on mobile phones has to be considered as e-money and, if so, whether the current regulatory regime for e-money is also appropriate for this case.

Security issues. In the assessment of the payment system's operational and technical security features, the ANB is assisted by the Austrian Secure Information Technology Center (A-SIT, see www.a-sit.at), which is a joint effort of the Ministry of Finance (representing the Republic of Austria), the Graz University of Technology and the ANB. A-SIT is an independent technology assessment and evaluation management centre in the field of IT security. It is designed to fulfil tasks in the field of electronic signature, cryptography and electronic commerce, comparable to those of the BSI in Germany. This is done in close cooperation with international bodies. A-SIT has also contributed to the Austrian electronic signature legislation as well as to the European signature guidelines.

Provider issues. As stated above, in Austria the issuing of e-money is regarded as a banking activity and therefore only institutions which have been granted a banking licence ("credit institutions") are allowed to carry out this business. At the moment there are no "pure" e-money institutions (ie credit institutions which are only entitled to issue e-money) in Austria, only institutions which are also allowed to carry out other banking activities.

Oversight issues. According to the Maastricht Treaty and the Statutes of the ESCB/ECB, payment system oversight is a competence of the ESCB. The ANB's policy in this area is therefore also based on the respective ECB policy stance (for e-money stipulated in the ECB's 1998 *Report on electronic money* as well as its 2003 report on *Electronic money system security objectives - EMSSO*). As from 1 April 2002 the ANB has carried out payment system oversight on the basis of Articles 44a and 82a of the Nationalbank Act (see www2.oenb.at/english/bank/nbg_e.htm##8). The ANB has developed oversight principles regarding the legal, financial, organisational and technical system security for the different types of payment systems, which spell out the security principles on which the assessments are based. These principles are respectively complemented by standardised questionnaires (see www2.oenb.at/rel/zsa_p.htm).

Supervisory issues. E-money issuers are supervised by the Austrian Financial Market Authority (FMA).

Law enforcement and cross-border issues. In Austria, the e-money value stored on electronic data devices must not exceed EUR 2,000 per customer and per e-money institution (Article 2 no 58 of the Banking Act). Thus, e-money is used mainly for small-value transactions and might not be a subject of particular interest for money launderers.

However, e-money institutions must comply fully with the anti-money laundering and anti-terrorism financing provisions of the Banking Act (Article 40 f). In addition, the fourth requirement of the ECB's *Report on electronic money*, serving as a basis for the oversight of e-money schemes by all national central banks of the euro area, states that: "Protection against criminal abuse, such as money laundering, must be taken into account when designing and implementing electronic money schemes". In line with these requirements, the ANB in its capacity as Austrian payment system overseer has also set up special oversight principles for e-money systems, inter alia requiring that e-money systems have to be designed in a way which does not attract criminal abuse of the system (eg money laundering). Moreover, all developments with respect to potentially increased possibilities for money laundering through electronic retail payment schemes are closely followed.

E-money institutions benefit from the "EU passport" and can provide their services in all EU member states. As regards e-money institutions/credit institutions of third countries which want to issue e-money in Austria, they require an Austrian banking licence (Article 1 paragraph 1 no 20 in conjunction with Article 4 paragraphs 1 and 4 of the Austrian Banking Act).

Azerbaijan

There are at present no electronic money products in Azerbaijan. The country has one processing centre, Azericard, which issues mainly magnetic stripe cards (Visa, Eurocard/MasterCard, etc), the issuers being the commercial banks. The only chip-based e-money project currently under way was scheduled to launch a pilot at the beginning of 2004, operated by Azericard. This project is local.

The National Bank of Azerbaijan (NBA) is currently working on the establishment of a national processing centre. This processing centre will issue mostly chip-based cards. The project is due to be finished at the end of 2004. After the processing centre is established, the NBA plans to begin active work on the development of e-money products.

Bahamas

E-money or stored value products as defined in the BIS survey have not yet been introduced in The Bahamas. Nevertheless, important new developments in the modernisation of the payment system are expected to stimulate such innovations.

Payment system modernisation

Under the leadership of the central bank, The Bahamas launched a payment system modernisation initiative in 2000. The end results will include the establishment of a real-time gross settlement (RTGS) system for large-value transactions among domestic clearing banks and an automated clearing house (ACH) for small-value transactions. Now into its implementation phase, the modernisation initiative is being overseen by the National Payments Council (NPC), formed in May 2003, comprising the heads of the local clearing banks and the central bank. The objective is to have RTGS in operation by April 2004 and to have the ACH system functioning shortly afterwards.

Internet and mobile payments

While internet and mobile payment systems are available on a real-time basis in The Bahamas' retail banking sector, real-time value transfers are only possible among accounts held at the same institution. These services, which are typically fee-based, permit funds transfers for, among other things, loan payments and settlement of utility bills (water, electricity, telephone and cable television). Point of sale transactions using ATM cards for direct debits from banks' accounts are also becoming

more common, with retail consumer businesses clearing their transactions through international networks such as Interac and Cirrus.

Bahrain

1. Card-based products

At the moment there are no card-based e-money products in Bahrain. There is a government initiative to implement a national chip-based card, which will include personal data, a PKI identification and authentication application (authentication and digital signature) and an e-purse.

2. Network-/software-based products

At the moment there are no network-/software-based e-money products in Bahrain.

3. Internet and mobile payments

Internet banking. Most of the major banks have developed internet services for both corporate and retail banking. Several more are expected to implement such services in the current year.

Mobile banking. Efforts are already under way to implement mobile banking schemes in Bahrain. An independent organisation is being proposed which would handle mobile banking as one of its tasks.

It may also be noted that payment gateways have already been established to cater for internet-based payments.

4. Policy responses

The Bahrain Monetary Agency is committed to the continued development of electronic payment schemes in ensuring that Bahrain retains its reputation as the region's pre-eminent international financial centre. However, the Agency, furthering its role as primary regulator of the banking and financial sector in Bahrain, is aware of banks' activities in electronic media and is keen to support the growing momentum in the field of electronic payments whilst also preserving the safety and soundness of the financial system. Major initiatives are being planned towards this end, and these will figure importantly in the development of electronic commerce and retail banking services and provide significant new opportunities for banks. Almost all major commercial banks in Bahrain now offer internet banking services.

Electronic banking is resulting in the expansion of market development beyond the traditional deposit-taking and credit extension activities and the creation of new products and services at an efficient cost base. More broadly, the continued development of electronic banking and e-money may contribute to improving the efficiency of the banking and payment system and assist in reducing the cost of retail transactions within and outside the borders of the country.

BCEAO

In order to reduce the amount of cash in circulation and increase the effectiveness and efficiency of payments, the central bank together with the banking community is implementing a regional interbank and interoperable banking card system. In the medium term, circulation of notes and coins is expected to be substantially reduced by the development of debit and credit cards. The central bank hopes that the card system will soon be operating successfully and will represent the more used payment

instrument in the West African Monetary Union countries. This regional banking card system will be linked to international card payment networks (Visa, MasterCard, American Express, JCB, etc) in order to allow international use of the regional card.

In terms of security, the banking community has decided to adopt EMV (Europay, MasterCard, Visa) standards, which recommend the inclusion of resistant chips on cards and the use of sophisticated encryption techniques. Use of the PIN for authorising requests will be adopted to prevent counterfeiting and fraud.

1. Card-based products

Electronic purse projects are being trialled in the region by some companies for retail payments. E-purses named "Nafa" and "Kalpe" are being examined by the Senegalese Postal Service and an electronic products provider respectively. It is hoped that these products will be operational by 2004.

2. Network-/software-based products

Many e-purses are designed to be used for small-value payments on the internet. Thus, from June to December 2003, the national telecommunications operator in Senegal trialled an electronic payment platform with banks based on the utilisation of an electronic card, named "ticket surf". This card is especially used for buying "immaterial services" over the internet. During the first stage, only 6,000 cards were launched by this company. Each card can store up to EUR 4.

3. Internet and mobile payments

In Côte d'Ivoire, Mali and Togo, electronic commerce is being developed by the TRADE POINT Network in order to develop African businesses and connect them to those of other areas such as Europe, Latin America and North America.

4. Policy responses

On the supervisory side, a comprehensive regulatory framework for the prudential supervision of e-money business is being validated by the central bank. This prudential supervision is based on the Core Principles established by the Committee on Payment and Settlement Systems. The regulatory framework covers inter alia limits on the value that can be stored on the cards, money laundering and other criminal abuses.

Belarus

Some e-money schemes are currently under development in Belarus, managed by commercial banks. But no products have been issued as yet.

The legal basis for e-money products comprises regulation no 151, "Minimum requirements for issuing and conducting transactions with electronic money", dated 26 July 2002.

1. Card-based products

Proton is a multipurpose prepaid card (or electronic money) scheme which was launched by Banksys in February 1995. Banksys is a Belgian, bank-owned company that runs the national debit card scheme called "Bancontact/Mister Cash" and operates the ATM and POS networks. Nationwide expansion of Proton was achieved at the beginning of 1998. Proton is now present on all "Bancontact/Mister Cash" debit cards.

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 substitute for cash and is targeted at payments below EUR 15 at local retail outlets, vending machines, car parks, ticket machines, payphones and on public transport. It can be loaded with amounts ranging from EUR 5 to EUR 125. Card-to-card payments are not possible. Proton is a domestic monocurrency scheme, with payments being made in euros.

The loading transaction is processed with verification of a PIN code and of the funds available on the bank account of the cardholder. The cards are reloadable at ATMs or at public telephone booths. A "smartphone", which enables the user to reload the card at home and to use it to make payments to a service provider over the telephone, has also been available since the end of 1997.

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

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

At the end of February 2003, the total amount outstanding was around EUR 111 million. A daily average of 300,445 purchase transactions were made in February 2003 for an average amount of EUR 5.10.

The Proton technology has already been adopted in a large number of countries, making it a de facto international standard (however, this does not entail interoperability of e-money schemes at international level). The technology is the property of Proton World, a Belgian company which was originally a spin-off of Banksys, but which is now owned by STMicroelectronics, a French-Italian group.

2. Network-/software-based products

No such products exist at present in Belgium.

3. Internet and mobile payments

3.1 Internet payments

Banxafe. Banxafe is a scheme run by Banksys, the Belgian operator of payment card schemes (cf Section 1). It is a security label associated with the existing "Bancontact/Mister Cash" debit card and Visa cards used in SET mode, and for which Belgian banks² guarantee payment. The idea is to

² Six Belgian banks are promoting banxafe.

enable business-to-customer payments. Banxafe points of sale also support SSL credit card payments and in the future will support 3-D Secure payments.

In order to secure the transfers, PKI is used in accordance with the SET standards. Therefore, each participant in the process (consumer, merchant, bank) has a certificate identifying him/her. The certificates are distributed by Banksys.

The architecture of the system is based on four pillars:

- an authentication module (PC, chipcard reader and PC application) at the consumer's end;
- an "authentication server" with the consumer's bank or with Banksys (ACS);
- a "POS server" at the merchant's, which is a virtual terminal that sends the payment requests to the banks and redirects the authentication request;
- a "payment gateway" installed at Banksys, which makes the link between the security protocols used for the internet and for the classic transaction systems.

All payment-related data is invisible for the merchant, whereas the commercial data is invisible for the bank. Up until now, around 70 merchants have registered.

The scheme is a way of transferring payment instructions in a safe manner over the internet. The settlement of the payment is executed in the same way as payments made through eg POS terminals.

The costs for the merchant of using banxafe have the following structure:

- activation costs;
- monthly charge;
- charge per transaction.

The consumer has to buy the chipcard reader.

Ogone. Ogone is the name of a range of payment services, proposed by a company called Abssys Consulting. Abssys Consulting has its headquarters in Belgium and has opened offices in the Netherlands and in France.

Ogone started out with server software allowing real-time credit card payments, which were easy to integrate into merchant's IT processes. To address the merchant's need for payment services offered in ASP³ mode, Ogone launched a secure internet platform allowing electronic payments for businesses such as call centres (Ogone e-Terminal) or electronic commerce shops (Ogone e-Commerce) that need to integrate secure online payments into their sales applications or website. Ogone's products are aimed at the business-to-customer market.

The merchant has the choice between online and offline payments. For online payments, the payment request is immediately sent to the financial institution concerned. The latter immediately authorises or rejects the payment request. For offline payments, the payment requests are checked for completeness and processed later (maximum four hours).

Furthermore, the merchant has the choice between having the money transferred in real time from the buyer's account to his/her account, or to have a deferred payment (the money, however, will be blocked on the buyer's account).

For encryption purposes, Ogone uses SSL encryption techniques and is compatible with the SET standards.

The costs of using Ogone can be broken down into:

- an activation charge;
- a monthly subscription charge;

³ Application service provider: third party offering front-end, data centre, or transaction processing capabilities for either a buyer or a seller.

- a charge per successful transaction.

Depending on the options taken, the charges can vary.

Isabel. Isabel is a service provider owned by the four biggest Belgian banks, namely Fortis Bank, KBC, ING Belgium and Dexia. Isabel specialises in business-to-business payments over the web, with the traditional banking sector as its backbone, and offers three different services to its customers:

- “eBanking” enables customers to consult bank statements, to make domestic transfers and to access services offered by their bank;
- “eInvoice” enables customers to electronically receive invoices, archive them and pay them (not yet operational - cf Section 3.3);
- “WebSign” permits the use of electronic signatures for transactions on those websites that use Isabel technology.

Isabel uses PKI for encryption. It distributes the certificates and is authorised to deliver certificates.

The keys are generated through the RSA algorithm. The secret private key is registered on a smartcard. The public key is kept in a central directory, which can be consulted by all participants of Isabel. In order to access the Isabel network, the user needs to introduce his/her card into a small terminal linked with his/her computer and enter a password.

The costs for the Isabel products are as follows:

- hardware (Isabel signing card plus terminal);
- connectivity charges;
- charges for standard package;
- charges for extra options.

All charges are monthly, except those for the hardware, which only have to be paid once.

Bibit. Bibit is a Dutch company specialised in remote sales (eg internet, telephone, mailings) and active in Belgium. It offers a secure way of effecting payments via credit card, direct debit, bank transfer, etc (in total 60 different payment methods are accepted). All payment information is stored on Bibit's servers and not on the shop's. The shops have no access to the data submitted on the Bibit server. Amongst other services, Bibit offers the opportunity to install a risk management module enabling identification of possibly fraudulent payments even before they are sent for authorisation.

All communication to and from the Bibit server is conducted over SSL connections.

MasterCard SecureCode. In order to secure payments over the internet, MasterCard International has developed UCAF⁴ in combination with SPA.⁵ UCAF provides a standard, interoperable method of passing account holder authentication data among issuers, merchants and acquirers. SPA leverages UCAF data transport infrastructure to provide explicit evidence that a transaction was originated by the authorised party (hence increasing non-repudiation). SPA generates a unique account holder authentication value for each transaction that is verified by the issuer during payment authorisation. Merchants and acquirers are simply responsible for collecting and passing this account holder authentication value and including it, along with other payment information, at the time of authorisation. SPA does not require the use of PKI.

A new product using a combination of UCAF and SPA is commercialised under the name MasterCard SecureCode. The SecureCode solution is valid for debit as well as credit cards and permits safe payments over the internet. In order to make a payment, the cardholder has to confirm his/her card number with the help of a specific code. The merchant does not get any information concerning the card number.

The issuers (which are MasterCard's member banks) have three options for deployment:

⁴ Universal Cardholder Authentication Field.

⁵ Secure Payment Application.

- EMV UCAF Chip Authentication (a small terminal is put up at home);
- SPA applet with UCAF (software is added on the PC of the cardholder);
- “Client-less” (no extra software is installed on the PC of the cardholder).

The SecureCode solution is compatible with Visa’s “Verified by Visa” solution.

In Europe, the first rollouts of this application (which is meant for business-to-customer) were launched in 2003, with 14 issuers and 21 acquirers.

MasterCard International. MasterCard International has developed a person-to-person cross-border funds transfer service called MasterCard MoneySend. This new service uses card-to-card transfers instead of account-to-account transfers.

MoneySend is based on a bank-centric business model (funds are transferred from bank to bank) and not on a payment system provider model. MoneySend uses preauthorised transactions, meaning that there is a control on the existence of sufficient funds on the payer’s account and the existence of the payee’s card. In the initial development stage, it will work through electronic channels, like the internet or mobile phones. Two options will be offered: end-to-end service for the member bank or integration with the electronic channels of the member bank.

In Europe, MoneySend was piloted in three countries (Germany, Italy and the United Kingdom) until the end of 2003. It is seen as a replacement for the Eurocheque and as a payment instrument for personal auction sites.

Anybody who wants to pay with MasterCard MoneySend first has to register with the service; then, he/she can send money to any MasterCard or Maestro cardholder. In 2004, the service should be extended to cardholders from competitors.

3.2 *Mobile payments*

Mobile banxafe. Banksys is offering a mobile version of its internet-based banxafe (cf Section 3.1) called mobile banxafe. The activation of this service is comprised of three different phases:

- fabrication and personalisation of the SIM card (loading of the mobile banxafe application and DES keys onto the SIM card);
- SIM issuance by the telephone company;
- enrolment of the user (the SIM card is linked to a bank account and a BPIN⁶ is set).

Since April 2003, Banksys has offered a first application of this mobile banxafe concept in the form of a scheme for prepaying phone credits from the mobile phone itself. Currently, this first application is only being offered to the customers of one of the three mobile operators active in Belgium, namely Mobistar.

The mobile banxafe scheme is meant for the business-to-customer market.

Pay&Go reload. Since February 2002, Proximus, one of the three mobile operators active in Belgium, has been developing a scheme for reloading a prepaid Pay&Go card with a mobile for customers of Fortis Bank who want to link their mobile’s card with a Fortis Bank account.

3.3 *Other electronic business initiatives*

Certipost and Isabel. Certipost is a joint venture of Belgacom, the Belgian telecommunications operator, and the Belgian Post Group. Certipost provides services in the field of electronic communications. Certipost’s solutions include electronic counters, electronic invoicing, business-to-business exchange hubs and the infrastructure for digital certificates.

⁶ Bank personal identification number.

In September 2003, Certipost and Isabel (cf Section 3.1) reached an interoperability agreement whereby they decided to join forces for offering a common electronic invoicing platform for their customers, ie 47,000 businesses.

In the future, it is the intention of Certipost and Isabel to continue to offer other joint e-business services, both business-to-business and business-to-customer. One example could be an electronic invoicing platform for Belgacom customers.

4. Policy responses

4.1 Policy responses relating to e-money developments

General remark. The requirements set out in the *Report on electronic money* published in August 1998 by the European Central Bank (ECB) serve as guidelines for the public authorities in the conduct of their policies in this area. They were complemented in May 2003 by the report *Electronic money system security objectives*, which presents the expectations of the Eurosystem with regard to the technical security of e-money schemes.

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 e-money report, the possibility would exist for national central banks to impose reserve requirements on all issuers of e-money for monetary policy reasons. In the same way, the redeemability requirement for e-money contained in the report is intended to guarantee that central banks continue to issue the final settlement medium in the interbank market.

General legal issues (see above). 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. 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, namely Proton, is managed by the banking sector, the issuers of the electronic value on the cards being exclusively credit institutions under the prudential control of the Banking and Finance Commission. The de facto restriction of this type of activity to credit institutions is in line with the recommendation of the ECB stipulating that the issuers must be subject to prudential supervision. In the same context, two directives relating to the taking-up, pursuit and prudential supervision of the business of electronic money institutions were adopted in September 2000 by the EU's Council of Ministers and the European Parliament. Both directives have been transposed into the Belgian banking law (law of 25 February 2003 that modifies the law of 22 March 1993 on the legal status and supervision of credit institutions).
- (b) *Oversight of payment systems:* the organic law of the National Bank of Belgium (NBB) explicitly entrusts the central bank with the task of overseeing payment and securities settlement systems. The NBB has conducted two assessments of the Proton scheme that covered technical, operational and legal aspects: the first in 1996, the second in 1999-2000. The last exercise evaluated the conformity of the system to the minimum requirements contained in the 1998 ECB *Report on electronic money*.
- (c) *Consumer protection:* the electronic units stored on prepaid cards are now considered equivalent to deposits as regards the enforcement of the legal scheme for the protection of the cardholder's interests. That has made them eligible for protection under deposit insurance since February 1999. This eligibility is, however, not extended to the funds incorporated into the merchant's terminal that are not yet credited to the merchant's account.

A law transposing the European Commission Recommendation concerning transactions effected by means of an electronic payment instrument, and in particular the relationship between issuer and holder, has been adopted. It covers the minimum information to be addressed to the consumer as well as the respective rights and obligations of the parties involved. Another law concerning the use of electronic signatures has also been adopted.

Even though Belgium does not yet have specific legislation on computer crime, a 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 anti-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. Until 2003, the 1996 BIS report on security issues was the basis for technical security matters. The ECB's report *Electronic money system security objectives* constitutes an additional security standard.

Issuer details. See above under *Supervision of issuers*.

Payment system issues. There are no particular problems concerning the clearing and settlement arrangements for e-money schemes. The NBB has not taken any specific steps to influence the design and operation of e-money schemes. The only thing to mention here is that all the transactions relating to the Proton scheme (loads, collects of purchases) flow into the CEC, the domestic automated clearing house, which is subject to oversight.

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

Supervisory issues. The new law of 25 February 2003 on electronic money institutions (see above under *General legal issues*) makes it possible for non-bank institutions also to issue e-money, under specific conditions. The prudential supervision of these e-money institutions is based on that for classic credit institutions, but adapted to their limited activities. E-money institutions for which the total amount of the float is less than EUR 5 million or for which the e-money is only used at group level or within a limited area, are exempted from supervision.

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 traceable. Laws combating money laundering are applicable to credit institutions, which are, to date, the only issuers of e-money, and to e-money institutions.

Cross-border issues. No cross-border scheme is currently operational in, or operating out of, Belgium.

4.2 Policy responses relating to internet and mobile payments

General legal issues. The legal context in which internet and mobile payments are embedded is the law of 17 July 2002 concerning transactions executed with instruments for the electronic transfer of funds. This law governs the responsibilities of the user and issuer of electronic instruments for the transfer of funds. The additional law of 25 February 2003 based on Directive 2000/46/EC concerning access to, exercise of and business economic supervision of the activities of electronic money institutions could also be applicable here, even if it is more focused on e-money.

Relevant security issues. Since developments at the level of internet and mobile payments are quite recent, most of the security problems are not solved yet. The industry has, for instance, not developed any security standard yet.

Issuer details. Most of the Belgian companies active in the domain of internet and mobile payments are non-bank institutions (Banksys, MasterCard Europe, Belgian Post Group, Isabel, Ogone, Bibit, etc). These institutions only operate the systems, the actual issuing is done by banks. Banksys and MasterCard Europe do offer clearing services and MasterCard Europe also offers settlement services. The other companies provide for safe transmission of payment instructions.

Payment system issues. The clearing and settlement of internet and mobile payment transactions generally take place through normal procedures, which do not raise specific problems.

Oversight issues. Within the scope of Article 8 of the organic law governing the functioning of the National Bank of Belgium, the NBB oversees the smooth functioning of payment systems. It therefore has an instrument at its disposal for overseeing internet or mobile payment schemes. Currently, the NBB monitors developments relating to these schemes through its contacts with stakeholders (Proton World) and through its oversight relationships (among others, with Banksys and MasterCard Europe).

Supervisory issues. Cf Section 4.1.

Law enforcement issues. The systems described in Section 3 boil down to new ways of transferring money from a traditional account with a credit institution to another account with a credit institution. It is up to the credit institutions to report suspect transactions. Directive 2001/97/EC, which amends Directive 91/308/EEC on prevention of the use of the financial system for the purpose of money laundering, enlarges this responsibility to other market players.

Cross-border issues. The relevant currency for Belgium is the euro. Companies being licensed in one country of the European Union can automatically become active on the Belgian market, and vice versa.

Bermuda

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

Bolivia

1. Card-based products

Over the past two years, the PRODEM Private Financial Fund, a non-bank institution whose branches are located mainly in rural areas, has brought onto the market a stored value card that can be loaded according to the balances maintained by customers on their current accounts with the Fund. To accommodate PRODEM'S rural customers, the service is not only provided in various native languages and backed by visual aids but also uses fingerprints as the means of authentication.

The card came into use at the beginning of April 2001 in a pilot scheme, during which a total of 10,188 cards were authorised, generating 978 transactions for a total amount of BOB 314 million.

In 2002, once the system entered production, the number of cards issued rose to 22,617, generating a total of 22,809 transactions and an operational volume of BOB 3,301 million, which represents an increase of approximately 1,000% since the card's launch.

To date, no related regulations have been issued.

2. Network-/software-based products

Following the approval of the amendments to Law 1488, and given the new IT security regulations issued by the Superintendency of Banks and Financial Entities, some private banks in the system have started providing online services via the internet, initially only to selected customers. Because this is a recent innovation, there are as yet no statistics on the volume of operations.

3. Policy responses

Since late 2001, Law 1488⁷ (the Law on Banks and Financial Entities) has authorised the execution of transactions via electronic media, conferring on such transactions the same legal validity and

⁷ Amended by Law 2297 of 20 December 2001 on the Strengthening of Financial Standards and Supervision.

effectiveness as on paper-based transactions. To that end, the Central Bank of Bolivia needs to issue standards so that digital signatures can be used to improve the security of electronic transfers.

Botswana

1. Card-based products

There are no e-money card-based products in Botswana.

2. Network-/software-based products

There is no intention to introduce any products of this nature in the near future.

3. Internet and mobile payments

Some commercial banks provide for remote electronic payments. FNB (First National Bank of Botswana) internet banking allows online credit transfers and payments to predefined recipients on the bank's host systems as well as to non-predefined recipients on the bank's host systems where the account details can be verified online. The bank also provides certain corporate customers with a proprietary PC application (PACS - Payments and Collections System), which allows customers to make collections (debits) from their customers and payments (credits) to their beneficiaries in real time or batch mode on the bank's mainframe.

The mobile phone service provider Mascom has appointed a technology partner, JHI, which has been approved and confirmed as a Visa partner to provide m-commerce functionality for Mascom's customers for airtime replenishment via mobile phone. All bank customers in Botswana who hold Visa branded cards will be able to make use of the service. Mascom will be reissuing its customers with new SIM cards with 32-bit technology to allow top-up. Bank customers will have to register at their banks for m-commerce transactions and select a PIN for use when executing transactions on their mobile phones. This is for domestic use only. There are no multicurrency or cross-border features provided. The transactions are dealt with online and submitted through VisaNet, where posting is not in real time.

The merchant will be charged the usual merchant acquiring fee by the acquirer for all purchases, and cardholders will be charged the usual transaction fee on their account by the respective issuing banks.

Brazil

1. Card-based products

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

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

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

Visa Cash. Visa Cash is an electronic purse based on the TIBC (Tarjeta Inteligente 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.

Loading is done online, using attended load terminals at the banks. Payment transactions, on the other hand, are performed offline. Since purse-to-purse transfers are not permitted, auditing is

possible at any time. Moreover, the system has multi-application capability. These applications can be dynamically loaded.

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

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

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

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

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

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

The Visa Cash card loads only domestic currency. Visa has started to issue cards with Visa Cash functionality in a city in Brazil as a pilot project, but the volume and value of these operations are still negligible.

2. Network-/software-based products

No products have been adopted to date.

3. Policy responses

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

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

Bulgaria

1. Card-based products

Currently there are no card-based e-money schemes in Bulgaria.

2. Network-/software-based products

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

3. Internet and mobile payments

The system **ePay.bg** is designed to facilitate payments over the internet using debit cards with the logo of the national card operator BORICA and/or international credit cards.

The developer and operator of the scheme ePay.bg is DataMax Ltd, a local software company. Most of the banks issuing debit cards are participating in the system. The biggest firms participating in the scheme are electricity companies, telecommunications companies, mobile phone operators, water supply companies, etc. The scheme is an alternative means of submitting payment instructions. Authentication of the users is effected by a single registration in the system. Then a unique number is given to each user, connected to his/her card. The SSL protocol is used for encryption. The scheme is used only for domestic payments in Bulgarian leva. The customers are not charged. The merchants are charged an installation fee of USD 60, and they can choose between two alternatives: USD 300 yearly and 1% of transaction value, or USD 120 yearly and 2% of transaction value.

The security level of the system was improved after the introduction of individual digital certificates for access control.

4. Policy responses

Policy responses relating to e-money developments

Monetary policy and seigniorage. The volumes transferred via the described schemes are currently small. The existing payment schemes are in fact using debit cards and they have no impact on seigniorage. The central bank is collecting statistical data and plans to start overseeing schemes if their volumes and values become significant. According to the statistical data the internet and mobile payments have no influence over the amount of notes and coin in circulation.

General legal issues. According to the Law on the Bulgarian National Bank (BNB) one of the main tasks of the central bank shall be to assist in the establishment and functioning of efficient payment mechanisms. The Law on Banks empowers the BNB to issue regulations concerning the execution of payments and the procedure for issuance of and payment with bank cards. In 2001 the basic requirements of Recommendation 97/489/EC concerning transactions carried out by electronic payment instruments and in particular the relationship between holder and issuer were introduced through amendments to Regulation No 16 of the BNB on the Payments Initiated by Bank Cards.

The Law on the Electronic Document and Electronic Signature was accepted in 2001. It is in compliance with the EC directives in this area.

Relevant security issues. In accordance with the Law on the Electronic Document and Electronic Signature, the Communications Regulation Commission is responsible for the reliability and security of certification services and oversight of certification authorities.

Issuer details. Currently the types of institutions that would be allowed to issue e-money value are not regulated in any legal act.

Payment system issues. The clearing and settlement of internet and mobile payment transactions generally takes place through normal settlement procedures, which do not raise specific problems.

Oversight issues. The Law on the Bulgarian National Bank entrusts it with the task of assisting in the establishment and functioning of efficient payment mechanisms.

Taking into account this key objective as well as the central bank's responsibility for payment system oversight, as stated in Regulation 3 on Noncash Payments and the National Payment System, the BNB is of the view that payment instrument oversight, including electronic payment scheme oversight, is essential for elimination of the risk inherent in such systems and for maintaining public confidence.

The position of the BNB is that any future e-money schemes in the country should be compliant with the requirements stated in the EC directives and recommendations in this area and should cover at least the minimum requirements stated in the ECB *Report on electronic money*.

The central bank is collecting statistical data and plans to start overseeing schemes if their volumes and values become significant.

Supervisory issues. Currently the types of institutions that would be allowed to issue e-money value are not regulated in any legal act.

Law enforcement issues. The legal framework on the prevention of money laundering comprises the Law on Measures against Money Laundering and the Law on Banks. As the existing internet payment products are based on existing well known instruments (debit cards) they are not seen as being vulnerable to money laundering.

Cambodia

1. Card-based products

Currently there are no e-money schemes in Cambodia.

To accommodate retail activity, bankers have planned to install ATM units for cash withdrawals and to expand plastic card services, rather than offer paper cheques with current accounts. At present four banks have agreed to use Visa card: Cambodia Mekong Bank (in alliance with Visa Japan), the Union Commercial Bank (in alliance with Visa USA), Canadia Bank Ltd (CNB, in alliance with Hong Kong Shanghai Banking Corporation) and Singapore Banking Corporation (SBC, in alliance with Visa Singapore). One of these banks, Canadia Bank Ltd, has introduced ATMs to serve the public need.

MasterCards, Visa cards and Visa Smartcards are used in Cambodia.

2. Network-/software-based products

Currently there are no network- or software-based products in Cambodia.

3. Internet and mobile payments

Issuers have no plans to set up any mobile payment systems at present.

4. Policy responses

The National Bank of Cambodia (NBC) does not have regulations covering e-money transactions. The issuers are independent businesses. Currently, the NBC has oversight only in the area of cheque payments, so it cannot gather information from the issuers. The NBC does not include MasterCard and Visa card transactions in its balance of payments and monetary statistics.

Based on the immediate need to develop the banking system with a view to improving payment and settlement activities, a Negotiable Instruments and Payment Transaction Law has been drafted and sent to parliament for adoption.

Canada

1. Card-based products

There are currently no major e-money card schemes operating actively in Canada. The last project was Visa Cash, which was terminated in September 2002. The project, launched in 1997, involved reloadable cards with multiple payment features that were issued by the Bank of Nova Scotia. The card's chip was equipped with a variety of features: stored e-money value, customer loyalty plans and an automated transit fare collection function for Barrie Transit. The cards also included a traditional debit function via a magnetic stripe. Stored value on the cards was loaded in one of two ways: through specialised units that transfer value from the user's bank account to the card through a network operated by the Interac Association, and through the internet via the Bank of Nova Scotia computer banking site.

2. Network-/software-based products

No specific developments at the moment.

3. Internet and mobile payments

Bill payment schemes over the internet, particularly those through the website of a financial service provider, are established and growing. There are also initiatives to deliver customers' bills electronically (electronic bill presentment and payment). There are two main developments in Canada (epost and e-route), neither of which has extensive reach as of yet.

A new initiative by the Acxsys Corporation is underway to facilitate electronic P2P payments. The Acxsys Corporation is owned by eight Canadian financial institutions. It owns and operates the major national debit interbank network, branded Interac, and since 23 October 2003 has also offered the Email Money Transfer (EMT) service.

EMT. The EMT service is a P2P electronic transfer of funds which is initiated by the sender from his/her online banking site. E-mail is used to notify the receiver of the funds. Currently the five largest deposit-taking institutions in Canada participate in the system, although it is open to all deposit-taking institutions.

To make an EMT, the sender goes to his/her participating bank's online banking website and initiates the EMT. The bank sends the request to the Acxsys network, currently called Certapay. Certapay sends an e-mail notice to the receiver advising them of the EMT. The receiver is directed to the Certapay website and provides a secret word previously agreed with the sender. The receiver is then directed to the website of his/her bank, where the funds are to be deposited. The receiver's bank then sends the approval to Certapay and Certapay sends the transaction confirmation to the sender and receiver banks.

Importantly, no financial information (such as account numbers, or indeed even the relevant banks) is exchanged between the sender and receiver. All the sender need know is the e-mail address of the receiver. If the receiver does not bank with a participating bank, he/she can still receive the funds by registering with Certapay and providing the relevant banking information.

The funds are settled at the end of the day with each bank making a payment through Canada's Large Value Transfer System to each of the other banks to which it owes funds. Because the service is so new, data on the volume and value of payments is not yet available.

To capitalise on the e-commerce opportunities presented by the internet, many different initiatives have been developed to facilitate internet payments. However, most continue to be in a developmental stage, or are offered on a limited basis only.

4. Policy responses

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

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

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

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

Supervisory issues. There is no direct supervision of stored value, e-money, or internet payment schemes. The pilot projects in Canada thus far have involved regulated financial deposit-taking institutions alone or in partnership with unregulated technology providers.

Consumer protection issues. With regard to fraud, loss, theft and disputes, civil codes and rules for credit institutions are generally applicable. Deposit insurance is not applicable to stored value or e-money deposits. The Financial Consumer Agency of Canada oversees consumer issues with respect to financial services provided by federally incorporated financial institutions.

Chile

1. Card-based products

Currently, there are no card-based schemes under consideration, being piloted or being implemented in Chile. Nonetheless, there are some regulatory considerations that concern the central bank.

2. Network-/software-based products

No network-/software-based schemes are under consideration, being piloted or being implemented.

3. Internet and mobile payments

Internet payment arrangements have experienced remarkable development in the last few years. Mobile payment schemes are less significant. The only mobile payment scheme tried so far involves the possibility of buying a very restricted set of products from vending machines. However, no specific regulation is being considered for these lines of business, nor are they under the regulatory scope of the central bank or the Superintendency of Banks and Financial Institutions.

There are no developments yet on innovations such as 3-D Secure systems or e-cheques. Online credit transfers and direct debits take place in the context of the internet access of bank customers to current accounts. These transactions take the form of simple payment instructions, manually handled afterwards by the bank operational staff. No online transactions are possible, since legislation to authorise the use of electronic signatures has not yet been approved. The legislation that addresses this subject is being discussed in Congress. It is not possible to make real-time payments. There has, however, been an explosive increase in debit card payment systems.

The Superintendency of Banks and Financial Institutions has introduced some regulatory considerations regarding the operations performed through message transmissions or computer instructions involving ATM machines, pinpads, etc. Some of these requirements are:

- To offer these services there must be a contract between the bank and its customer, clearly defining the rights and duties of each party.
- The systems used must provide the record, follow-up, and backup files for each operation such that operations can be verified at a later date. Minimum information required is the following: date, time, content of the message, identification of operators, issuers, etc.
- A security profile must be provided by the system to assure privacy and confidentiality, and to ensure that operations can be carried out by authorised people only.

4. Policy responses

Monetary policy and seigniorage. Since there have been no developments in the field of e-money, no statistics are available. No studies are available regarding the impact of e-money products on seigniorage.

General legal issues. The following gives a brief summary of current regulations:

Issuer of value. Only banks are allowed to issue card-based products. This requires previous authorisation from the central bank. The central bank regulations cover all multipurpose card-based schemes. The issuer of the card is responsible for establishing the legal relationship with merchants.

Operator. Banks and companies with the sole purpose of operating card-based products are authorised to provide this service, subject to approval by the central bank. Firms other than banks are required to maintain a minimum capital requirement of approximately USD 650,000.

Scope. These card-based products can only be used within the country.

Some additional regulatory aspects are:

- The merchants belonging to the system must have electronic devices that allow them to operate online.
- The central bank regulations cover all prepaid card systems.
- Issuers of prepaid cards must sign a contract with their customers. The owner of the card cannot revoke a payment order while using the card.
- The contract must guarantee the conditions for maintaining privacy and safety of access to the system.
- Any change in the contract must be communicated to the card owner 30 days ahead.
- The administrator of the system can provide services to more than one prepaid card issuer.
- For prepaid cards issued with an approximate value of up to USD 80, the owner of the card does not need to be identified.
- Disposable cards do not require a contract between the issuer and the customer.
- Issuers and system administrators must report their activities to the central bank.
- The Superintendency, on the basis of a report from the central bank, could adopt a variety of punitive measures, including suspension or removal of authorisation to issue cards.

Relevant security issues. See Section 3 above.

Issuer details. Only banks are allowed to issue card-based products. This requires previous authorisation from the central bank.

Oversight issues. Oversight of these products would be the responsibility of the Superintendency. The supervisory framework is the following: the central bank sets general guidelines and the Superintendency creates more specific norms and is responsible for the supervision of the operational and other risks involved.

Supervisory issues. The Superintendency has prescribed some risk management practices, particularly related to operational and technological risk, as part of a more general management evaluation of bank practices. Factors evaluated are those that threaten operational continuity, safety of procedures, and the quality of the information required for normal development of their activities.

China

Generally speaking, card-based e-money and mobile payment schemes in China, in contrast to internet payment schemes, have come into use only recently and within specific areas, and laws and regulations related to e-money developments are still in the process of being formulated.

1. Card-based products

Most issuers of card-based e-money are non-financial institutions. Card-based products introduced in some cities, such as Shanghai and Xiamen, are used for public transport, restaurant chains and so on. It is expected that card-based e-money will be increasingly used for road toll stations, car rental, travel

agencies, car parks, petrol stations and supermarkets, and use might be extended to paying utility bills. The issuers provide transaction data processing for their merchants, and effect funds transfers between themselves and merchants via settlement banks.

Pricing policy for card-based e-money has not been unified. By and large, cardholders do not pay any commission; merchants may pay issuers in terms of transaction volume or as a proportion of transaction value; and issuers may pay settlement banks a proportion of settlement amounts.

2. Internet and mobile payments

Internet payment services are mainly provided by banks. There are currently 12 domestic banks, including state-owned and corporate banks, allowed to engage in internet banking. About four million customers are using internet banking, and the transaction value of their internet payments was about CNY 5 trillion last year. Internet banking users may make business to business and business to customer transactions and related enquiries 24 hours a day via the internet. Internet payment users pay their banks in accordance with relevant regulations. Most banks have adopted the certificate system of the China Financial Certification Authority (CFCA) to encrypt their internet banking systems. High-class certificates issued by the CFCA can encrypt data with a 1,024 bit key.

Most mobile payment services are jointly provided by banks, mobile phone operators and merchants. There are about 300 million mobile phone users in mainland China, forming a good market foundation. Mobile phone users may pay telephone fees, book tickets and purchase goods and services by mobile. Nowadays, funds settlement for mobile payments between mobile phone operators and merchants is effected by banks. Merchants may pay mobile phone operators in terms of transaction volume or as a proportion of transaction value, and mobile phone operators and merchants may pay settlement banks a proportion of settlement amounts. As regards security, mobile phone operators are generally responsible for encryption of payment instructions in the process of transmission.

3. Policy responses

General legal issues. At present, there are no laws or regulations in mainland China to define the legal status of e-money clearly. However, The People's Bank of China (The PBOC) has been paying close attention to e-money developments. The PBOC is studying and setting up regulations on card-based e-money, mobile payments, and especially internet payments. Some relevant authorities are also stipulating rules governing applications of electronic signature technology.

Issuer details. Issuers of e-money are basically non-financial institutions. These issuers generally get a great deal of support from local governments. However, they face some problems in the area of fund management and application. Therefore, The PBOC is studying the access criteria of e-money issuers, their best practices, and so on.

Oversight issues. According to Law of the People's Republic of China on The People's Bank of China, The PBOC is responsible for maintaining the smooth operation of payment systems, and one of its major roles is payment system oversight. On this account, The PBOC has set up a payment and settlement department that governs matters related to payments and other areas, especially those concerning oversight and supervision of payment instruments, systems and related risks. Recently, The PBOC has especially focused on innovations in payment methods, supervision of clearing institutions and risk related to payment and settlement systems. It is now planning to regulate issuance of card-based e-money, business activities of issuers, and risk guarantee funds to be reserved as a proportion of issuing value.

Law enforcement issues. Card-based e-money and mobile payments mainly used for retail business have the features of anonymity and ease of use, and could thus be targets for money laundering, tax evasion and corruption. Therefore, The PBOC is currently considering strengthening management of stored value card ceilings, and ID checks on cardholders as they reload stored value.

E-money development in Colombia continues to be relatively slow. There are no card-based products in the production phase but there have been some new pilots in the last few years. In contrast, the network-based product market has been growing and providing more choices to the end user. The latter comprises mostly intrabank products.

Regarding mobile and internet payments, the field of EB(P)⁸ internet payments is developing rapidly, although there are currently no products in the mobile arena.

1. Card-based products

Most of the e-money pilots involving card-based products that have been undertaken in Colombia in previous years have now been suspended. For the time being, there is information available on the following products:

Visa. One of the largest banks in the country is working on a project to deliver a smartcard to make payments in a university in Bogotá, and has issued 8,000 Visa smartcards to be used in payments for university services and products. The cards can be loaded from a cashier, in exchange for cash deposits, or at an ATM, which automatically loads the card after debiting the savings/current account.

MasterCard. MasterCard has delayed the introduction of Mondex in Colombia but it is now working on the replacement of all credit and debit card terminals in favour of smartcard readers and the delivery of new cards which have both a magnetic stripe and a smartcard chip built in.

2. Network-/software-based products

E-Prepay. There are only a few e-money network products in the country. One of them is called "e-prepago" (E-Prepay) and is provided by one leading bank. The product is a virtual card which can be loaded from current or savings accounts. It works on the MasterCard network and can be used in any virtual store where a MasterCard payment is permitted.

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

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

A second e-money project, designed to be used in virtual purchases, is provided by another bank which also provides a virtual card to its account holders. It can be loaded from a credit card or from a current/savings account. In the first case, payment can be deferred for up to 12 months. The customer can choose in which franchise, Visa or MasterCard, the card will work.

The card has a limit of USD 860 and can be reloaded as required by the user. Any money remaining can be transferred back to the current/savings account within a specified term. There is an administration fee of USD 2 every three months.

⁸ EBPP stands for electronic bill presentment and payment: here, the intermediate P (presentment) is in parentheses since most of the products do not graphically present the bill, just the basic data in the standard fields.

3. Internet and mobile payments

Currently, the leading banking institutions in the country all use **EBP** products of some kind. All of them are intrabank products since the funds are taken from customers' savings/current accounts and transferred to the biller current account in the same bank via the institution's website.

These systems rely on a centralised bills database from utility companies and other billers on the ATM networks Servibanca and Red Multicolor. The internet bank systems obtain the bills from these networks and enable the payment using debit card PINs and ID combinations as authentication mechanisms and SSL or SET security technologies. After the user's debit is authorised, the money is transferred from the current or savings account to the account that the biller holds at the institution.

Another system is based on EBPP, a classification of person to business payments. This initiative is called "**Mispagosaldia.com**" (my payments on date) and is sponsored by an international bank. It is basically a website where the user, after registering his/her information and the ID of the payee utility companies, can pay utility bills on an ad hoc or scheduled basis. The user is required to hold a current or savings account with any bank connected to the ATM network Servibanca and a debit card for use with that network. Once the user decides to pay the bill, the transaction is directed to Servibanca as if it were a debit card transaction. The system can alert the user via e-mail of the immediate expiration of a bill. The system works on SSL 128 bit security and is protected by firewalls in its main installations.

Another kind of internet payments are the virtual purchases carried out by providing a link from the merchant's site to the virtual branch of the financial institution when the customer decides to make the payment. This is achieved via a hyperlink that directs the customer to the bank's site, where he or she finally decides to pay using his/her debit card. Consequently, the transaction is like a virtual POS purchase.

Currently, banks are developing a project aimed at speeding up payments for private and government services. The payment engine will be accessed by users from private merchants' or government institutions' websites. This mechanism will use its own network to provide the online debit and authorisation from the user and the ACH network to credit the private merchant or government institution at the end of the day. The mechanism is designed to be an e-commerce interbank channel of payment. It is being developed by ACH Colombia.

In the business to person payment area there are various initiatives, all based on the ACH network and designed as credit applications that compress payrolls and providers' (including government providers') payments. Transactions channelled through this mechanism are growing slowly, and have reached 390,000 payments monthly. Both ACHs operating in Colombia (CENIT and ACH Colombia) are developing the direct debit facility so that person to business payments can be used to pay utility bills and for debt collecting.

4. Policy responses

Due to the fact that the total amount of e-money is minimal, the central bank has neither included e-money statistics in the monetary aggregates nor deemed it necessary to revise the paper money issuing policies.

As of yet there are no regulations specifically applicable to e-money systems. Since the projects operate on credit card networks, clearing and settlement is performed under the regulatory and operational framework of those networks. The central bank does not have legal empowerment to oversee either these networks or e-money providers.

The internet payments are all intrabank so there is no need for interbank clearing or settlement.

The Banking Superintendency has regulated the security characteristics of magnetic and smartcards, as well as of networks and terminals and their respective operational requirements.

1. Card-based products

Currently, there are no card-based e-money schemes being piloted or implemented in Croatia, and to the Croatian National Bank's best knowledge, there are no card-based e-money schemes under consideration in the country.

2. Network-/software-based products

There are no network-/software-based e-money schemes being piloted or implemented in Croatia and the Croatian National Bank is not aware of any plans to introduce such schemes.

3. Internet and mobile payments

3.1 *Definitions and scope*

Internet payments and mobile payments as a new channel through which payment instructions are entered into the payment system is developing fast and gaining in significance.

The most common internet payments are those carried out via online banking, which is rapidly replacing traditional payment instructions in the private and business sectors. Online banking in Croatia is aiming towards implementing the new security standards and technologies, including PKI technology and digital signing of payment orders using smartcards.

Using the internet in e-commerce in the form of e-shopping is becoming more popular, but its growth is less significant than that of e-banking. E-shops are currently being developed by the merchants that are offering their customers e-shopping to supplement the traditional means of shopping, but there are also completely new merchants that are offering internet ordering as the only means of shopping. The internet is used for placing orders and payments are made using debit or credit card, or upon delivery. If an e-shop is organised by the internet provider, there is also a possibility for customers to make payments by debiting the customer's user account with the internet provider.

Using mobile phones for giving payment instructions in Croatia is possible for small-value payments such as for parking, theatre and cinema tickets, flowers, etc, in which case payment is effected by debiting the mobile phone account or the prepaid account.

Mobile phone companies are piloting a project that would enable users to give payment instructions by mobile phone and would be paid for by debit or credit card. This is already possible with regard to payment of invoices for mobile phone use.

Concerning debit and credit card innovations, American Express has launched the new American Express blue card with built-in smart chip in Croatia. Croatian Telecom is providing a new service for secure online authorisation of payments made over the internet using debit and credit cards.

3.2 *Issues to be addressed*

Some major domestic internet providers and merchants have implemented e-shops and almost all banks are offering their customers e-banking facilities.

Payments using mobile phones are either already implemented, being piloted or in the development phase in the case of two Croatian mobile phone companies.

Schemes are based on the domestic currency, the Croatian kuna, and have no cross-border features.

4. Policy responses

4.1 Policy responses relating to e-money developments

Since e-money is not in use in Croatia, e-money issues are yet to be addressed at the Croatian National Bank. Information on e-money will be included in payment statistics.

Some steps have been taken in Croatia with reference to e-money issues. In the legislative arena, for instance, a law on digital signatures was introduced in January 2002.

4.2 Policy responses relating to internet and mobile payments

Since these issues are relatively new and less significant than those affecting traditional payments, internet and mobile issues are yet to be considered by the Croatian National Bank.

Information on internet and mobile payments will be included in payment statistics under the central bank's new statistics plan.

There are no statistical data available on e-money payments or internet and mobile payments for Croatia.

Cyprus

1. Card-based products

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

2. Network-/software-based products

There are no such schemes currently in operation in Cyprus in the strict sense of the term. However, a few local banks have recently launched virtual credit cards. These are used exclusively for purchases from the internet and do not have POS functionality.

3. Internet and mobile payments

Internet banking facilities are at a very early stage of development in Cyprus. Such facilities are limited to account information and transfer of funds and are not widely used.

4. Policy responses

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

A draft bill on e-money has been prepared by the Central Bank of Cyprus and submitted to the Law Office of the Republic for legal vetting. The bill was expected to be approved by Parliament by 31 December 2003 at the latest. Following enactment, the legal framework governing the operation of e-money institutions will be in full conformity with the EU E-money Directive (2000/46/EC).

Czech Republic

1. Card-based products

In the Czech Republic, there is one card-based scheme operated by a bank - **FUNCHIP** - with 800,000 active cards. Non-bank issuers are planning some other card-based schemes, eg e-tickets for public transport or e-purses for use by students on their university campus.

2. Network-/software-based products

There are no network-/software-based e-money systems in the Czech Republic.

3. Internet and mobile payments

Some banks in the Czech Republic offer various remote banking services to their customers. These schemes operate via remote access to the customer's account. At this time the central bank has no details about these many different schemes.

Three "micro payment" systems on the internet were operated in the Czech Republic till the end of 2002. They were based on payments to retailers through their websites or to virtual department stores. The providers offered a so-called "virtual purse" loaded with a value of money received in advance. At the end of last year the providers stopped their activity due to a new law which came into effect as from January 2003.

There are also three mobile phone operators, which offer:

- channels for data transfer to banks called GSM banking (a banking application is installed on the phone's SIM card);
- the possibility for their customers to choose, by mobile phone, goods or services offered by the operator's contractual partners. The mobile phone operators pay the partners for these goods or services (maybe once a month) and settles with its own customers (in the case of a prepaid phone the value is subtracted, in the case of a tariff phone the value is included in the regular statement).

4. Policy responses

The new Act No 124/2002 on Transfers of Funds, Electronic Payment Instruments and Payment Systems (the Payment System Act) became effective as from 1 January 2003. This Act implements several EU legal norms.

The Act states that undertakings other than banks may only issue e-money instruments subject to prior consent by the Czech National Bank. For the purposes of management of monetary policy and for statistical purposes, undertakings issuing e-money instruments must notify the Czech National Bank of the volume of e-money issued during the previous six months and the number of e-money instruments issued as of 30 June and 31 December of each calendar year.

Further, the Czech National Bank has issued Model General Terms and Conditions for the Issuing and Use of Electronic Payment Instruments. These conditions do not constitute a legal rule, but rather recommendations designed to protect holders of electronic payment instruments (implementation of EU Recommendation 97/489).

All activities in electronic payments are still at an early stage and the volume of the payments is not large enough to present problems relating to monetary policy and seigniorage or to the clearing and settlement systems.

1. Card-based products

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

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

There are no fees as far as consumers and participating banks are concerned. On the merchant side the following fees apply:

- (a) DKK 0.18 per transaction;
- (b) DKK 10 per batch delivery from CADs;
- (c) DKK 5 per posting on the account statement (if the merchant wants a posting per CAD per period, it will be more expensive than if the merchant can accept just a total per period);
- (d) DKK 1,250 as an annual fee per SAM (ie not necessarily per CAD, as one SAM may cover several terminals, which then cannot accept payments simultaneously).

The scheme does not have any multicurrency or cross-border features and is not part of a multifunctional instrument. Three computer centres support the recharging of Danmønt cards, which until now have been disposable. Recharging will be carried out at ATMs.

2. Network-/software-based products

No such systems are in operation in Denmark.

3. Internet and mobile payments

Debit cards and credit cards on the internet. The common Danish debit cards, Dankort, Eurocard, Visa, MasterCard, JCB, American Express and Diners Club, can be used as payment instruments on the internet using SSL. By use of encryption and decryption, SSL makes it possible to:

- ensure a secure communication between an internet browser (the cardholder) and an internet server (the merchant);
- verify the identity of the server;
- keep data secret between browser and server;
- make sure that data cannot be changed between browser and server;

There is no need to install any software on the browser in advance. The merchant makes a merchant agreement with PBS.

eDankort is a new way of making internet payments through the customer's internet bank. eDankort is a virtual Dankort and exists only on the internet.

Internet merchants accepting eDankort have to make a merchant agreement with PBS, after which they can set up the eDankort payment option on their website. The eDankort payment option can be used in parallel with other payment instruments on the site.

When the customer clicks on the eDankort logo on the merchant's website the connection to the customer's internet bank is established and the payment transaction can be processed. The customer confirms his identity with the internet bank and accepts the payment by use of a password. Card numbers are not used since the eDankort payment is processed as an ordinary internet banking transaction.

eDankort can be compared with PIN-based solutions since communication between the merchant and the internet bank is encrypted. SSL is used in the same way as for ordinary Dankort payments on the internet. The merchant sends encrypted payment information to PBS. PBS checks the received information, the internet bank's acceptance of the customer, the merchant and finally the eDankort payment itself.

mPay is a card-based payment solution for remote sales, using the mobile phone as a payment terminal. mPay is operated by a phone company and PBS.

mPay can be used:

- by phone (phone order);
- by PC (internet shopping);
- by WAP facilities.

The cardholder makes an agreement with the phone company and the merchant makes an agreement with PBS.

The merchant receives information about the cardholder's mobile phone number instead of a card number. The mobile phone number is related to the cardholder's payment card and payments are accepted by using a PIN code on the phone. PBS transfers the mobile phone number to a valid card number and processes the payment.

The security features are based on the same principles as for Dankort. Furthermore, there are security elements built into the SIM card:

- PIN code;
- encryption;
- transaction certificate.

Payments by phone are very secure, since no sensitive information is sent through the air or through the internet.

Information regarding relations between the customer, the mobile phone number and the card number is stored at PBS.

Micropayments. PBS is service provider for three systems which are operators of micropayments:

- **Valus;**
- **eWIRE;**
- **CoinClick.**

Internet merchants wanting to accept one of the above-mentioned micropayment solutions have to make an agreement with one of the operators. Thereafter the merchant can establish the payment option on its website. The micropayment option can be used in parallel with other payment instruments on the site.

A customer wanting to make use of micropayments pays a relatively small amount in advance to the operator, typically up to DKK 500, using ordinary payment solutions like debit or credit cards. When the customer wants to make a payment he/she clicks on a button on the merchant's website (some solutions require the use of a PIN code). The website connects to the server of the operator and the amount is transferred from the customer's account to the merchant's account.

The product has no multicurrency function, but can be handled cross-border.

All solutions are encrypted using SSL.

4. Policy responses

As the amount of e-money outstanding has not yet reached 0.1% of notes and coin in circulation, not to mention M3, the National Bank of Denmark has not found it relevant to include e-money in monetary statistics so far. Moreover, even in the long term, the central bank regards the risk of e-money replacing coins to be rather remote and not something that will significantly affect seigniorage.

Egypt

The board of the Central Bank of Egypt (CBE) approved on 28 February 2002 supervisory regulations to be applied in all banks operating in Egypt when offering electronic banking services and issuing e-money payment instruments.

In this regard seven banks acquired the approval of the CBE to offer different electronic banking services.

As from 25 June 2002, all banks have been required to submit every six months detailed data about credit cards (in order to establish a database). These data must include the following: number of debit and credit cards, number of ATMs, number of POSs, total loans offered by credit cards, total invested assets, percentage of bad debts to total loans, total provisions for bad debts, net income.

Concerning anti-money laundering, Law No 80 (2002) and its executive regulations were issued in Egypt in 2002, and in 2003 the board of the CBE approved supervisory regulations applicable to all banks.

El Salvador

1. Card-based products

The use of single purpose prepaid card schemes is quite common in El Salvador, particularly in the telecommunications sector for services like public phones, in which most of the cards have electronic chips to store value and identification features of the different companies/networks providing those services; also, for long distance calls, there are prepaid cards that provide access to these services using a code number. In the banking sector, one financial institution is currently in the early stages of developing an initiative to introduce a prepaid card that can be reloaded from a bank account.

2. Policy responses

Since the fourth quarter of 2001, the Central Reserve Bank of El Salvador has undertaken an extensive effort to modernise the country's payment system. The new financial architecture is intended to rely more intensively on electronic platforms and includes the launching of an RTGS system as a hub to settle interbank transactions, improved processes and regulatory framework in the area of cheque clearing and settlement, definition of a regulatory framework in order to implement an ACH network for electronic credit and debit transactions between bank customers, improvements in the securities clearing and settlement system and strengthened links with international markets. Implementation of initiatives aiming to use e-money as a general, multipurpose means of payment (BIS definition), have not been considered so far by the central bank.

1. Card-based products

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

2. Network-/software-based products

No such projects are under way at the moment.

3. Internet and mobile payments

3.1 Internet payments

Internet banking. The first internet payment facility (internet banking) was launched in Estonia at the beginning of 1996. Today all seven commercial banks offering banking services in Estonia have their own internet banking facility, and the use of internet banking has increased year by year and reached 23% in terms of volume of all non-cash credit transfers after the first half of 2003. The main reason for the popularity of internet banking is its convenience and low cost compared to other services offered by banks. Today it is possible to perform almost all operations through internet banking. Three different types of codes are used for customer identification. For data transmission between a customer and a commercial bank, the SSL secured protocol is used.

Internet merchants. There are a number of internet merchants in Estonia. Internet merchants give customers the opportunity to buy goods via the internet. The procedure itself operates as follows:

- the customer selects goods he/she wants to buy from the merchant's website, which also includes a link to different commercial banks' internet banks;
- the merchant compiles a bill based on the selected goods;
- the customer selects the link to the internet bank with which he/she has an account and executes the payment;
- the customer settlement account is debited immediately (the merchant receives the funds at latest the next banking day; the speed depends on whether the merchant is with the same commercial bank as the customer).

Customer authentication and data transmission take place in a way similar to that used for internet banking. For data transmission between a commercial bank and a merchant, digital signature is used.

3.2 Mobile payments

Mobile payment. The first mobile payment facility was launched in Estonia in 2003 and is operated by the Card Centre of Banks, a company which is owned by the three largest banks and which already operates a payment card scheme.

The mobile payment scheme was launched with the main objective of providing smaller merchants (which do not have the classical EFTPOS terminal for economic reasons) and merchants without fixed premises with the possibility to receive non-cash payments as well.

In order to execute a mobile payment both the customer and the merchant must have concluded a mobile payment contract (the customer must have a mobile phone as well) with the commercial bank (the customer and the merchant do not need to have concluded a contract with the same commercial bank). Although it is possible to use the mobile payment scheme with all commercial banks, three major banks had joined the scheme at the time of writing (of which two banks provide both customers and merchants, and one merchants only, with the mobile payment facility). At the end of September 2003 there were more than 600 merchants and 11,000 customers using the mobile payment scheme.

Payer (customer) and payee (merchant) identification is carried out as follows - the customer is identified via his/her mobile phone number and the merchant via its merchant code. In the case of mobile payment the customer covers only communication fees (to a mobile operator); all other fees are covered by the merchant (EEK 1 + 2.5% commission charge per transaction). In the mobile payment scheme, payments can only be made in Estonian kroons. Cross usage is also possible (the customer and the merchant do not have to be customers of the same commercial bank).

If the customer and the merchant are customers of the same commercial bank (both have a settlement account with the same commercial bank), settlement takes place shortly after the payment is initiated; in other cases payment instructions are sent for settlement into the settlement system of interbank payments managed by the central bank.

Mobile parking. The mobile parking scheme was developed by mobile operators and is based on credit lines provided by mobile operators. The mobile operator adds a fee for the parking services used into the regular bill sent to the customer.

M-account. The m-account scheme was developed by the biggest Estonian mobile operator (EMT) in cooperation with the biggest commercial bank (Hansapank). The main objective of m-account is to provide mobile-based payment services to private individuals who use a mobile phone provided by their employer (who are not themselves customers of a mobile operator). The idea of m-account is that the phone user may relate his/her mobile number with his/her settlement account. In this case the mobile user has the possibility to transfer the desired amount of money from the settlement account to the mobile account via mobile phone. Later on, when paying for goods or services by the mobile phone, the respective amount of money is debited from the m-account (not added to the employer's regular invoice for the mobile phone services).

4. Policy responses

Policy responses relating to e-money. There is no special e-money legislation in force in Estonia today, because due to lack of development it has not been necessary. The principles of Directive 2000/46/EC of the European Parliament and the Council of 18 September 2000 on the taking-up, pursuit and prudential supervision of the business of electronic money institutions will be enforced by 1 May 2004 in Estonia in order to support further progress in this field.

Payment system issues. No particular problems relating to internet and mobile payments have arisen.

Oversight issues. Although there was no formal oversight framework in place at the time of writing (one was due to be implemented before the end of 2003), the Bank of Estonia has always performed informal payment system oversight, which includes monitoring of internet and mobile payment schemes as well as all other payment systems.

Supervisory issues. The Estonian Financial Supervision Authority follows e-money, internet and mobile payment developments at domestic and international level. The supervisors draw the attention of the relevant financial institution to the internet and mobile payment-related risks that have arisen during regular on-site inspections (also covering a general evaluation of anti-money laundering issues) carried out on an ad hoc basis.

Law enforcement issues. Despite the fact that the majority of interbank and intrabank payments are executed electronically, all customer relationships of a credit institution are governed by unattested agreements, which means that, upon establishing a customer relationship, the customer or his/her representative must be personally present to sign the agreement. It is not possible to open accounts in banks over the internet. The electronic banking facilities offered by banks are meant for their existing customers.

Additionally, in the case of financial services provided via electronic banking facilities, the compliance of the customer's behaviour with his/her activity profile and payment habits is assessed in a way similar to that of a customer who has a direct contact with the financial institution (eg according to the Money Laundering Prevention Act, in case of payments exceeding EEK 200,000, or EUR 15,000, the general customer identification procedure is applicable).

1. Introduction

The Eurosystem's⁹ main task in the field of payment systems and payment instruments is "to promote the smooth operation of payments". This includes the promotion of the sound and efficient operation of payment systems and confidence in payment instruments, the stability of financial markets, the protection of customers and merchants, and the prevention of criminal abuse.

In pursuing its tasks, the Eurosystem seeks to ensure that new payment systems and instruments come under a clear regulatory regime comparable to that of other existing systems and instruments to the extent relevant. The Eurosystem believes that it is crucial that the development of new initiatives take place within a regulatory framework which takes into account the public interest pursued by central banks. In fact, the Eurosystem's view is that a clear and prudent regulatory framework for new initiatives will actually promote its acceptance by the general public and its development. Indeed, a level playing field between comparable payment initiatives is sought.

2. E-money products

Electronic money (e-money) schemes are currently relatively small-scale in most EU member states. Indeed, in most member states, e-money is still at an early stage compared with cash or traditional non-cash payment instruments.

2.1 Diffusion of e-money

For the moment, only card-based e-money has any significance, whereas the use of software-based e-money is marginal. Most developments are taking place in a national context, as explained in the individual country reports. Hence, this section will focus exclusively on general patterns for the euro area, and should be seen as a complement to the more detailed descriptions provided by Eurosystem NCBs.

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

In addition, almost all euro area NCBs and the central banks of the non-participating EU member states collect separate data on the outstanding amounts of e-money issued by MFIs. Since April 2002, all e-money institutions have fallen under the revised definition of credit institutions (see subsection on regulatory framework). Thus, the existing statistical requirements for credit institutions under the Eurosystem's legal framework also apply to e-money institutions.

The ECB receives data from the NCBs on amounts outstanding of e-money issued by MFIs broken down into hardware-based and software-based e-money.¹⁰ Data are compiled by NCBs at the available frequency, monthly in many cases, and submitted to the ECB at least twice a year. The ECB has published these data regularly on its website (www.ecb.int) since autumn 2001.

Starting from a negligible level in 1994, the total amount outstanding of e-money in circulation has increased over recent years, to reach a level of EUR 282 million at the end of June 2003 (see Table 1). The largest contributions to this amount came from Germany, Italy and Belgium. In this respect, it could be noted that the statistics mainly include hardware-based e-money, as the use of software-based e-money remains marginal. As at the end of June 2003, e-money still represented a

⁹ The Eurosystem comprises the national central banks (NCBs) of the member states of the euro area and the European Central Bank (ECB).

¹⁰ The data could also be broken down by currency, with a split between balances in euros (including the legacy currencies) and other currencies. However, MFIs located in the euro area have only issued euro-denominated e-money so far.

very small fraction of total money, ie 0.08% of notes and coin in circulation (compared with 0.04% in 2001) and 0.004% of the monetary aggregate M3 (compared with 0.003% in 2001). Hence, the practical relevance of e-money for current economic analysis is increasing but remains limited.

According to the most recent Blue Book¹¹ statistics, which refer to 2001, there are in the euro area 508 cards with an e-money function per 1,000 inhabitants (compared with 454 in 1999), initiating 104 million transactions during the year (compared with 77 million in 1999). However, this represents only 0.40% of all cashless payment transactions (compared with 0.30% in 1999).¹² The still marginal use is also exemplified by the low volume of 0.58 transactions per inhabitant (compared with 0.36 in 1999), corresponding to 4.68 payments a year per card with an e-money function (3.7 in 1999). The average value per transaction was EUR 3.0 in 2001 (EUR 3.1 in 1999).

Table 1

Euro-denominated electronic money in circulation in the euro area

Amount outstanding, end-of-period data, EUR millions

	1994	1995	1996	1997	1998	1999	2000	2001	2002	June 2003
Hardware-based	0	2	9	75	116	135	139	208	253	282
Software-based	0	0	0	0	0	0	0	0	0	2

Source: ECB.

At present, there are only small-scale euro area software-based e-money schemes. At the national level there is little statistical evidence, as this kind of payment infrastructure currently only exists in relatively small projects. Moreover, software-based e-money schemes often struggle to survive beyond the initial phase, further limiting the potential for future cross-border establishment.

2.2 **Electronic money policy issues and regulatory framework**

2.2.1 *The Eurosystem's interest in e-money*

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

The importance of e-money for monetary policy¹³ stems from the fact that it may become a very close substitute for notes and coin. If e-money were to be remunerated, it might also become an attractive alternative to holding short-term bank deposits. Over the long run, developments in consumer prices are closely related to developments in money. The primary objective of monetary policy as assigned to the ECB is to maintain price stability. With regard to this objective, the development of e-money raises three different issues:

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

¹¹ See ECB, *Payment and securities settlement systems in the European Union - Addendum incorporating the 2001 figures*, September 2003.

¹² Other cashless payment instruments used in 2001 were: credit transfers (32.1%), direct debits (27.3%), debit/credit cards (26.3%) and cheques (14%).

¹³ For a more detailed discussion of this subject, see the article "Issues arising from the emergence of electronic money" in the November 2000 issue of the *ECB Monthly Bulletin*.

money. Thus, privately issued e-money always has to be redeemed at par value with central bank money.

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

Third, the emergence of e-money might have repercussions for the information content of monetary indicator variables with regard to the primary objective of price stability. In this regard, as explained above, the ECB is equipped to take into account any potential increase in e-money in circulation. E-money forms part of the monetary aggregates, which are the focus of analysis under the first pillar¹⁴ of the ECB's monetary policy strategy.

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

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

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

2.2.2 *The Eurosystem's policy on e-money*

Based on the concerns outlined above, clear rules on the conditions under which e-money can be issued must be established. The Eurosystem's policy is explained in the *Report on electronic money* published by the ECB (August 1998) and further elaborated in the Opinion of the ECB¹⁵ on the draft Community legislation on e-money.¹⁶ In the Report, the Eurosystem places particular importance on the following seven minimum requirements for the framework for the issuance of e-money:

¹⁴ The first pillar assigns a prominent role to money in explaining the future evolution of price developments.

¹⁵ 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 European Commission proposal for a European Parliament and Council directive on the taking-up, pursuit and prudential supervision of the business of electronic money institutions, and (2) a European Commission proposal for a European Parliament and Council directive amending Directive 77/780/EEC on the coordination of laws, regulations and administrative provisions relating to the taking-up and pursuit of the business of credit institutions (ECB/1999/1, published in the *Official Journal of the European Communities*, OJC 189, 6 July 1999, pp 7-10).

¹⁶ Both the Report and the ECB Opinion are available on the ECB's website at www.ecb.int.

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

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

New developments in e-money schemes and internet payments, along with the emergence of market initiatives in the field of technical security of e-money schemes, are leading to a further review of oversight standards. As part of its oversight duties regarding e-money schemes, the Eurosystem has investigated how to ensure a harmonised oversight approach in the field of standard-setting and assessment methodology related to the technical security of e-money schemes. Technical security is important for the reliable functioning of systems and for protection against criminal abuse. Adequate security would also contribute to the achievement of interoperability, thus promoting efficiency. After a public consultation period of six months, the Eurosystem published in May 2003 its expectations concerning the technical security approaches adopted by e-money schemes and market initiatives in the *Electronic money systems security objectives* (EMSSO) report.

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

2.2.3 *The regulatory framework for e-money institutions*

The Community legislation on e-money provides a comprehensive and harmonised regulatory framework for the issuance of e-money which is confined to traditional credit institutions and to ELMIs.

The framework is defined in two directives: the European Parliament and Council Directive 2000/46/EC on the taking-up, pursuit and prudential supervision of the business of electronic money institutions and the European Parliament and Council Directive 2000/28/EC amending Directive 2000/12/EC relating to the taking-up and pursuit of the business of credit institutions.

Directive 2000/46/EC on the taking-up, pursuit and prudential supervision of the business of e-money institutions. The regulatory framework allows the ELMIs to benefit from a European passport, which enables them to carry out their activities throughout the European Union. The main elements of the framework include:

- (i) Limitation of activities. Article 1 limits the business activities of ELMIs to the issuance of e-money, the provision of closely related financial and non-financial services and the issuance and administration of other means of payment, excluding the granting of any form of credit. The ELMIs' business activities also include the storage of data on electronic devices on behalf of other undertakings or public institutions.
- (ii) Scope of application of banking directives. Article 2 stipulates that only two EU directives, if not otherwise expressly provided for, will apply to ELMIs, namely a number of provisions of

Directive 2000/12/EC relating to the taking-up and pursuit of the business of credit institutions and Directive 91/308/EEC on money laundering.

- (iii) Redeemability. Article 3 stipulates that the bearer of e-money may, during the period of validity, ask the issuer to redeem it at par value in notes and coin or by a transfer to an account free of charges other than those strictly necessary to carry out that operation. The contract between the issuer and the bearer must clearly state the conditions of redemption and may stipulate a minimum threshold. This threshold may not exceed EUR 10.
- (iv) Initial capital and ongoing own funds requirements. The initial capital and minimum ongoing capital requirement for ELMIs is EUR 1,000,000, while capital requirements are also set on an ongoing basis (Article 4).
- (v) Limitation of investments. Article 5 requires that ELMIs invest an amount not less than their outstanding financial liabilities related to e-money in highly liquid assets which attract a 0% or, subject to quantitative limitations, a 20% credit risk weighting. Limitations also apply to ELMIs' activities in derivatives. These activities can only be undertaken for the purpose of hedging market risks. The imposition of appropriate limitations on market risks inherent in e-money activities is left to the member states.
- (vi) Verification of the specific prudential requirements for initial and ongoing capital, limitations on investments and market risks by the competent authorities not less than twice a year (Article 6).
- (vii) Sound and prudent operation in respect of management, administrative and accounting procedures and adequate internal control mechanisms (Article 7).
- (viii) Application of a waiver of the provisions of the E-money Directives 2000/46/EC and 2000/28/EC (Article 8). National authorities may grant a waiver if the storage device cannot hold more than EUR 150 and one of the following conditions is fulfilled: (a) the total amount of financial liabilities related to outstanding e-money does not normally exceed EUR 5 million and never exceeds EUR 6 million; (b) the exchange of e-money takes place solely within the group to which the ELMI belongs; or (c) the e-money business is limited to local areas or it is accepted only by undertakings that have a close financial or business relationship with the ELMI, such as a common marketing or distribution scheme. The ELMIs eligible for the waiver will not benefit from the EU passport provisions.

The Directive recognises that there may be a need for a revision of the waiver. Other envisaged revisions concern, for example, measures to protect the bearers of e-money, such as the introduction of a guarantee scheme. The Directive stipulates that the Commission should present a report on these issues to the European Parliament and the European Council, together with a proposal for any necessary revisions, no later than 27 April 2005.

European Parliament and Council Directive 2000/28/EC amending Directive 2000/12/EC relating to the taking-up and pursuit of the business of credit institutions. This provision:

- (i) amends the definition of a credit institution by including the ELMIs (this provision implies, in conjunction with Article 19.1 of the Statute of the ESCB and the ECB, which entitles the ECB to require "credit institutions" established in member states to hold minimum reserves, and with the restriction of issuance of e-money to credit institutions as stipulated by Article 1 of the above-mentioned Directive 2000/46/EC, that the ECB can impose minimum reserves on all issuers of e-money);
- (ii) stipulates that the redeemability requirement will also apply to traditional credit institutions issuing e-money.

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

3. Internet and mobile payments

A wide range of new initiatives to effect payments via the internet and mobile networks have been undertaken in the European Union. Most of these initiatives are at an early stage of development; some have been successful, but many have had to close down.

3.1 Scope

As regards the types of such initiatives, a distinction can be made between traditional payment instruments that have been adapted to e-commerce and new payment instruments that have been specifically developed to serve it. The first group consists of initiatives that have leveraged existing instruments to serve new markets with no, or only minor, changes to the logic of the instruments. The familiarity of the products has led to wide and easy acceptance by the public. The second group consists of arrangements that try to provide additional benefits or focus on specific parts of the payment cycle or on niches in the market (such as internet auction sites).

Traditional payment instruments. The main traditional payment instruments in the European Union which are currently being adapted to the internet and mobile networks are credit cards, credit transfers and debit instruments (such as direct debits, debit cards and cheques).

Credit cards¹⁷ are currently the most widely used payment instruments in the European Union for making payments over the internet. The high online usage of credit cards could be explained by the fact that they are internationally known to customers and widely accepted by merchants. In many EU countries, the liability for a fraudulent transaction lies either with the merchant or with the bank/credit card company. This makes credit cards especially attractive for the payer. The payer can be sure that he/she will not lose money as a result of fraud as long as he/she has complied with his/her obligations.

Most banks in Europe already provide their customers with e-banking applications through which online credit transfers¹⁸ can be initiated. E-banking is becoming very popular, and common standards are being developed in the European Union. However, the use of credit transfers for buying on the internet has not yet taken off on a large scale, although some schemes have been implemented successfully in the Nordic countries.

In some EU countries, direct debits¹⁹ can also be used for payments over the internet. The procedures are comparable to those for an online payment by credit card. The payer sends his/her bank details (account number and any routing information) to the beneficiary or beneficiary's bank, and the funds are debited from the account individually. These schemes are usually restricted to use within a specific country, which makes direct debits less suitable for cross-border e-commerce.

In some EU countries, debit cards²⁰ can be used in internet shops. Internet usage operates similarly to the direct debit system, but offers additional security features for payments owing to the presence of the card. The cardholder authenticates his/her identity with the help of a card reader connected to the PC. The use of debit cards for purchases on the internet is still relatively limited in the European Union.

¹⁷ Credit cards allow customers to make purchases and/or withdraw cash as credit from the issuing credit card company. The credit granted by the issuing credit card company is either settled in full by the end of a specified period, generally a month, or in part, with the remaining balance extended as credit. The former arrangements are sometimes called delayed debit cards, but - for the sake of simplicity - both variations are called credit cards in this paper. Credit cards are used for between 5 and 6% of all non-cash transactions in the European Union.

¹⁸ A credit transfer is an instruction from the payer to his/her bank to debit his/her bank account and to credit the beneficiary's bank account. Credit transfers are the most widely used payment instruments in the European Union. Around one third of all non-cash payments are credit transfers.

¹⁹ Direct debits are preauthorised debits on the payer's bank account that are initiated by the beneficiary. Direct debits are currently often used for recurring payments, such as utility bill payments (eg for water, electricity and telephone usage), or for one-off payments where there is no direct contact between the payer and beneficiary. The second highest number of payments (one quarter) are effected as direct debits.

²⁰ Debit cards provide a convenient way to present the cardholder information needed to initiate a direct debit. This information is embedded in the magnetic stripe (or chip) on the card. A dedicated terminal is required to read the information on the debit card, and possibly to verify whether the debit card is still valid and whether the transaction would exceed any usage limits set for the card. Debit cards are the most widely used instrument at points of sale. Around one fifth of all payments are made by using debit cards.

The “electronic cheque”²¹ mimics the paper cheque, except that the order is in electronic format, rather than in writing. In some jurisdictions, the absence of the written form may lead to a different legal classification of these instruments. In most EU countries, cheques play only a minor role, and other payment instruments and services have been developed for e-commerce in countries where they are used more widely.

New payment instruments and services. While the examples in the previous section were mainly about the presentation and transmission of payment information electronically using traditional payment instruments (eg credit cards, credit transfers, etc) and existing means of payment (commercial bank money and cash), the examples discussed in this section are newly developed payment instruments and related services. They use either existing means of payment or another means of payment such as e-money or liabilities issued by other companies. Common to these new initiatives is the use of information and telecommunications technologies that were previously not available for payment purposes.

The growing success of auction sites on the internet has led to the emergence of payment service providers which allow person-to-person payments over the internet. These initiatives have generally been termed personal online payments. The schemes operate similarly to bank deposits, ie customers open dedicated accounts with the payment service provider, and funds on these accounts can be used to make payments over the internet. They build upon existing payment instruments (eg credit card payments or credit transfers) to fund the dedicated accounts. The main innovation common to these initiatives is the use of e-mail and the payment provider’s website for communications between the payment provider and the users, and the ease with which new accounts are created in these schemes. Due to banking regulations, the means of payment in these initiatives in the European Union must be commercial bank money or e-money. This means that a banking licence or licence from an ELMI is required in the European Union.

A similar approach is applied in the case of scratch cards. In these schemes, the payer’s prepaid accounts are funded through cards that are sold in kiosks and shops. The prepaid accounts are held in remote servers, instead of being stored on the user’s PC or smartcard. The schemes also allow anonymous payments because no registration is needed and no bank connection or credit card details have to be sent over the internet.

In order to address the need to effect small-value payments on the internet, initiatives that are referred to here as cumulative collection services have emerged. Common to these is the accumulation of several smaller payments into a single transaction that is settled periodically (eg at the end of each month) as a single charge to the customer. The collection procedures could be compared with delayed payments for settling credit card bills. Two types of charge options can be distinguished: first, schemes in which the transactions are settled periodically by means of existing payment instruments, eg through a direct debit from the customer’s bank account or via the credit card bill and, second, schemes in which the transactions are added to the customer’s bill from a company with which he/she already has a relationship (eg the telephone company or the internet service provider). Cumulative collection services are not a new means of payment, but rather an added layer on top of existing products to save transaction costs. In cases where the service is aimed at making micropayments, the processing of these amounts with traditional payment instruments could be very expensive for both the customer and the merchant. The use of cumulative collection services has, however, remained quite limited.

Several initiatives have emerged for initiating payments from mobile telephones. These have also been referred to as m-payments. Current m-payment solutions mainly offer a new payment instrument to effect a credit transfer or a direct debit of funds (commercial bank money) at a financial institution. Some schemes also offer prepayment solutions with accounts that are accessible via mobile telephones. The funds on such accounts (e-money or company money) are used to pay for products and services. Mobile devices are well positioned for this, as they are personalised, permanently carried around, designed to be connected, and the penetration level of digital mobile telephones is

²¹ A cheque is a written order from one party (the drawer) to another (the drawee, normally a bank), requiring the drawee to pay a specified sum on demand to the drawer or to a third party specified by the drawer. Usage of cheques is still high in some countries, and cheque payments therefore account for between 19 and 20% of all payments effected in the European Union. In many countries, however, they are virtually non-existent.

higher than that of personal computers in the European Union. It is also possible to use mobile telephones for all types of payments, at both manned and unmanned payment terminals, for internet payments and, in some initiatives, also for payments between individuals. Several global initiatives have been launched to promote the interoperability of different m-payment solutions. These include the Mobey Forum, the Mobile electronic Transactions (MeT) initiative, the Mobile Payment Forum and PayCircle. These forums encourage the use of mobile technology in financial services and act as a link between the various standardisation bodies in the mobile telecommunications and financial industries.

3.2 Regulatory aspects of internet and mobile payments

Technological innovations can increase the efficiency of payments by reducing costs and thereby increasing general welfare. There are, however, many new challenges confronting the emergence of a safe and efficient electronic payment infrastructure.

3.2.1 The Eurosystem's interest in internet and mobile payments

A major challenge complicating the introduction of new payment services is their dependence on a sufficiently large network. Payment instruments derive their value from the number of acceptance points where they can be used, and are therefore also called network goods. For example, the more terminals that accept a certain type of payment card, the more valuable the card will be for the user and the greater the incentive for others to join this network. A major difficulty of new network products or systems is the need to create a critical mass before attracting other users. Customers will only join the network if enough acceptance points are available, and merchants will only offer acceptance points if enough customers will use it. This "chicken and egg" problem creates high startup costs for all types of new payment instruments and services.

Further challenges to successful electronic payments concern some aspects related to standardisation, as well as to the security of these instruments and means of payment. Only through the use of common standards can the full benefits of electrification across the payment cycle be achieved. The security of the services is also of utmost importance both from the perspective of the payment provider and that of the public. In these areas, benefits from increased cooperation between the stakeholders involved would be most evident.

Standardisation aspects. It is important that common standards and message formats that allow straight through processing (STP) without manual interventions be agreed upon. Traditionally, standardisation in the payment business has been organised by a rather closed group of participants from the financial sector and has not been extended across national borders. The altered environment, ie the global reach brought about by the internet and mobile networks and the introduction of the euro, has increased the complexity of cooperation and standard-setting in several ways.

One aspect complicating standard-setting is the increased number of stakeholders in the payment cycle, increasingly involving non-financial organisations. The full chain of electronic payments includes invoicing by the biller, payment initiation by the payer, payment processing and settlement by the financial institutions as well as, finally, payment reconciliation by the beneficiary. In order to arrive at solutions that can be accepted by all stakeholders concerned, they should ideally be involved in the development and implementation of the standards relevant to their place in the payment cycle.

Technological developments and the entry of new providers into the market, as well as rapid developments in other fields where communications are a major element, have raised customer expectations. Customers expect faster and cheaper payments, which means that the existing interbank infrastructure, which is based traditionally on the notion of value dates and daily settlements, will need to adapt to the new environment. Current changes in payment systems include the introduction of direct and easy access (eg using internet technologies), tools for managing security risks (eg public key infrastructure), timing and finality (eg multiple interbank settlement per day), capability to carry extended information (to allow automatic reconciliation, for instance) and variable message formats (eg XML).

The consolidation and integration processes in the European Union and the creation of cross-border payment systems further increase the complexity of the area, but also make the rewards higher. National standards within the European Union differ considerably from one another, and the moves towards EU, or global, standards are costly.

Security aspects. Security concerns regarding electronic payments are one of the most commonly cited reasons by the public not to use electronic payment instruments. Moreover, the failure of some initiatives can be attributed to the lack of security in payment providers' services. Different security initiatives have been developed for payments over the internet, but not all have been adopted on a large scale.

Several components have to be taken into account when assessing the overall security of electronic payments and online transactions, such as availability, authenticity/authorisation, integrity, non-repudiation and confidentiality.²²

Many of the above-mentioned security aspects can only be achieved by combining different techniques, typically by using encryption technologies with proper organisational measures. So far, organisational measures have been an obstacle to initiatives being successfully implemented on a large scale, while the technologies necessary to meet these requirements have been available for some time. Providing security in electronic payments is not only an issue of technology, but also of a valid business model that is accepted by customers and not too costly for its users.

Several encryption standards have been developed and initiatives launched to allow safer transmission and storage of payment information. SSL is the most widely used encryption technology to ensure a secure connection between the customer and merchant server during the session. SSL provides a secure exchange of data between the customer's PC and the merchant's website, and is indicated by a yellow padlock on the screen. Usually an additional password is required to authenticate the participants. Holders of credit cards, the most widely used payment instrument over the internet, have experienced an increase in online fraud, which raised security concerns for credit card companies, merchants and consumers. EU banks and card schemes have recently started to actively work towards fraud prevention under the newly established European Payments Council (EPC).

At a more general level, whenever security features are discussed, the structure of incentives has to be borne in mind. The risk of being liable for a breakdown of a security feature provides a strong, if not the strongest, incentive to develop adequate security features. In the case of electronic payments, the distribution of risks and liabilities between the parties involved is therefore a key element in the development of secure payments. The obligations and liabilities of all parties involved in a payment cycle need to be clearly allocated and legally documented. Those parties who carry a potential risk and cost as a result of an obligation (eg to maintain confidentiality or to repair false/fraudulent payments) will have a strong incentive to take the respective security measures.

Finally, there must be awareness that the electrification of payments brings a new quality of information generated by the use of the electronic payment instruments and means of payment. Owing to the features of information technology, electronic payments generate information that goes beyond the payment purpose (eg on the behavioural patterns of payers, payees, on the velocity of circulation of the means of payment, etc). Aspects of data protection and the protection of the private sphere as well as the allocation and proper use of valuable information are far-reaching matters that need to be discussed and addressed.

3.2.2 *The Eurosystem's policy on internet and mobile payments*

In autumn 2002, the ECB published an issues paper, *E-payments in Europe - the Eurosystem's perspective*, and organised a conference to discuss the future of electronic payments and the role of the Eurosystem in this area. On the basis of these discussions with the market participants, the

²² Availability: the instrument provides efficient and timely response, has adequate capacity to support acceptable performance, and is able to recover quickly from disruptions. Authenticity and authorisation: the instrument has appropriate measures to authenticate the correct identity and authorisation of customers using the service, and to make sure that all transactions are legitimate. Integrity: the instrument has the appropriate measures to protect the integrity of the data in e-payment transactions. This means that e-payment-related information in transit or in storage cannot be altered or deleted without authorisation. Non-repudiation: the instrument uses transaction authentication methods that promote non-repudiation and establish accountability for e-payment transactions. Proof that a message has been sent and received is provided to protect the sender against false denial of receipt by the recipient, and to protect the recipient against a false claim by the sender that the data have or have not been sent. Confidentiality: the instrument takes the appropriate measures to preserve the confidentiality of relevant e-payment information. Key information should not be disclosed in such a way that it can be viewed or used by those unauthorised to do so.

Eurosystem sees mainly two roles for itself - a catalyst function and the oversight function. With a view to ensuring efficiency and security, the Eurosystem's initial emphasis - as long as the market is still in a phase of development - will be on the former function.

Catalyst. The general public reaps the greatest benefits from electronic payments whenever the various parties in the payment process operate seamlessly together. The Eurosystem, by acting as a catalyst for developments in the field, aims to provide a forum for cooperation between the stakeholders, and to provide analyses and statistics to support the work towards integration.

In 2003, the ECB decided to continue the operation of the electronic Payment Systems Observatory (ePSO), initially launched by the European Commission in 2000. ePSO is an open information-sharing infrastructure on electronic payments. Its aim is to foster an exchange of views between market participants and to serve as a source of information. The ePSO website can be accessed via www.e-psy.info.

Adequate statistics are vital for the business decisions of the companies providing payment services, for analysts and financiers thereof and for the public authorities setting the underlying policies. The ECB initiated work in 2002 to improve the quality and availability of aggregate payment statistics for the European Union, the euro area and the acceding countries. The initial results of this work are envisaged to become available in the course of 2004.

The Eurosystem places a special emphasis on the interoperability of standards across national borders. However, standards are difficult to agree upon in the payments area, because of the different national and international players involved, because of the particularities of network goods and also because of both changing customer demands and the restructuring of processing in the payment sector.

The Eurosystem's contribution to the adoption of standards focuses on different parts of the payment cycle: the initiation of payments, the interbank leg of payments and reconciliation. With regard to the initiation of payments or communications between the payer and his/her bank or the payment service provider, some elements already exist, such as the International Bank Account Number (IBAN), the Bank Identifier Code (BIC), and the electronic Payment Initiator (ePI).²³ The ECB encourages the use and dissemination of these existing standards for the electronic presentation of payments.

With respect to the interbank leg of payments, the ECB has carried out several analyses on interbank retail infrastructures and has formulated recommendations to improve the situation.²⁴ Central banks are often providers of interbank payment services and can therefore play a role in adapting these systems to the needs of retail payments. Special requirements with regard to the development of interbank settlement and clearing infrastructures set by the electrification of payments will be investigated in more detail.

Most of the new initiatives seen at present do not change the interbank settlement process, but use current systems where settlement is effected through banks in interbank payment systems. However, the implications of the increased use of innovative technologies for the interbank payment process could result in a push towards real-time settlement, as the expectations of the general public for real-time payments are growing and as information technology and telecommunications costs are decreasing, while their capacities and capabilities are simultaneously increasing.

There are no standards at European level for the final leg in the payment cycle between the beneficiary and his/her bank or payment service provider, concerning the synchronisation of invoice and account information ("reconciliation") at the biller's level. In online business, where full benefits are realised in end-to-end STP, this is clearly a shortcoming that increases the costs of e-commerce unnecessarily. The Eurosystem will continue to monitor both the implementation of existing standards and the development of standards to enable full STP, from payment presentment up to payment reconciliation.

²³ For details, see the website of the European Committee for Banking Standards (www.ecbs.org).

²⁴ See eg ECB, *Towards an integrated infrastructure for credit transfers in euro*, November 2001; ECB, *Improving cross-border retail payment services - Progress report*, September 2000; and ECB, *Improving cross-border retail payment services in the euro area - the Eurosystem's view*, September 1999.

Oversight. Within the scope of its oversight activities, the Eurosystem is concerned about the security of all means of payment and payment instruments used by the public. A perceived or real lack of security of specific payment instruments or systems might lead to a loss of confidence in that instrument or system and could, in extreme cases, have a negative effect on the functioning of the monetary systems, eg if reverting to other means of payment is difficult or if the loss of confidence spills over to other instruments as well. This holds equally true of the security of the means of payment. This has so far been assured by the rule that payment services based on deposits can be provided by any supervised financial institution (including ELMIs).

While the security of electronic payment instruments can be improved by more stringent security requirements, these can also make the system more costly for consumers, merchants and service providers, thereby diminishing the acceptance and efficiency of the service. Because of this possible trade-off between security and efficiency, the right balance between these two must be found.

The Eurosystem has started to investigate the security of specific retail payment instruments. The common approach of the Eurosystem concerning e-money contains a list of more specific security objectives for e-money schemes. These security objectives should ensure the overall reliability and technical security of the schemes, and should increase public confidence in these systems.

In July 2002, the Eurosystem issued for public consultation a set of oversight standards that retail payment systems operating in euros should fulfil.²⁵ The Eurosystem will soon publish the final set of standards and explain any changes made. The Eurosystem issued these standards to ensure the smooth operation of retail payment systems that are of major importance to the economy, to ensure efficiency and security on a level playing field for the participants of different systems and, ultimately, to foster public confidence in the euro.

3.2.3 *The regulatory framework for internet and mobile payments*

The EU legislative framework for internet and mobile payments, and for e-commerce in general, consists of several directives that address problems that could arise from online trade and payments in different legal, contractual and judicial systems across the European Union.

A number of directives have been adopted to increase confidence in e-commerce and to promote the development of online/remote provision of services and products. The three most important directives related to electronic payments are:

- the E-commerce Directive (Directive 2000/31/EC on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market) is aimed at ensuring the “free movement of information society services between Member States”. The Directive ensures the free movement of online services through the supervision of service operators in the member state in which they are established (“country of origin” principle). It also sets up transparency measures for commercial communications and “electronic contracting”, and ensures recognition of the legal validity of electronic contracts;
- the E-money Directive (Directive 2000/46/EC on the taking-up, pursuit and prudential supervision of the business of electronic money institutions) introduces a minimum set of harmonised prudential rules for e-money issuance and applies the arrangements for the mutual recognition of home supervision (provided for in Directive 2000/12/EC) to e-money institutions (see previous section);
- the E-signatures Directive (Directive 1999/93/EC on a Community framework for electronic signatures) sets the framework regarding the conditions applying to electronic signatures. The Directive ensures that all member states accept the legal validity of electronic signatures and that all services relating to electronic signatures can be provided on the EU market without national obstacles.

Other related legislation includes the following:

- The Banking Directive (2000/12/EC) of 20 March 2000 provides for a European passport for credit institutions to offer services and to set up branches in other member states. It also

²⁵ See ECB, *Oversight standards for euro retail payment systems*, 8 July 2002.

enables credit institutions to access foreign payment systems located in the European Union not only through branches established in the country, but also by remote access without physical presence, provided they accept the conditions of the respective systems.

- The Regulation on cross-border payments in euro (2560/2001/EC) lays down the rules on cross-border payments in euros in order to ensure that charges for those payments are the same as those for payments in euros within the member state (for cross-border payments up to (ultimately) EUR 50,000).
- The Recommendation concerning transactions by electronic payment instruments and in particular the relationship between issuer and holder (97/489/EC) includes a description of the appropriate division of liability between the consumer, the merchant and the payment service provider.

The Commission is also working on a “New legal framework for payments in the Internal Market”.²⁶ The framework envisages a codification of various legal instruments adopted by the European Parliament, the European Commission and the European Council in one comprehensive, coherent and modern legal framework.

Given the rapid technological developments, it could become difficult for legislators to provide appropriate and up-to-date legislation. Any additional legislative requirement related to innovative payment arrangements should therefore be assessed thoroughly in respect of its necessity, should be defined broadly enough, or as broad principles to cover later technological developments, and should be developed in dialogue with market participants.

4. Conclusions

In recent years, a large number of new payment services have emerged, and many have already vanished again. To date, e-money schemes are still relatively small in most EU countries. The development of e-money showed an increase in volume and value between 2001 and 2003, especially after the introduction of the euro banknotes and coins. New services for payments over the internet and mobile networks have mainly consisted of old payment instruments adapted to electronic use.

The Eurosystem sees its role in the field as that of a catalyst and an overseer. Both functions are aimed at promoting the security and efficiency of electronic payment systems and payment instruments. The Eurosystem will endeavour to improve coordination in the market, to disseminate statistics to support business decisions and the relevant authorities' policies, to engage in analysis concerning standards that would allow full automation through the payment cycle and to promote the existence of a solid legal environment for the provision of new payment services. The electronic Payment Systems Observatory website (www.e-pso.info) was set up to facilitate discussions on innovations and changes in the retail payment area and to contribute to the achievement of a common payment market in the European Union.

Moreover, the Eurosystem has established an oversight framework for e-money, facilitating its development and its acceptance by the general public. The oversight function of the ECB as regards electronic payments could become more important than the catalyst role once the use of electronic payments has moved beyond its early development phase.

Fiji

1. Card-based products

Card- and software-based e-money schemes have not yet been developed in Fiji.

²⁶ http://europa.eu.int/comm/internal_market/payments/framework/index_en.htm

Out of the five banks in the country, three issue credit cards and debit cards.

2. Internet and mobile payments

ANZ Banking Group Limited offers internet banking in Fiji. The two large banks in the country, ANZ and Westpac, offer telephone banking.

Finland

1. Card-based products

Avant. The present, multipurpose Avant e-money scheme was launched in March 1997. The three biggest Finnish banks, Nordea, Okobank Group and Sampo Bank, issue reloadable cards and the value on them. Automatia Rahakortit Oy (Automatia Electronic Purse Ltd) is the system operator and issuer of value on a minor number of non-bank reloadable Avant cards. Avant electronic cash can be loaded into the banks' chipcards at "Otto" ATMs or over the internet using a card reader and suitable software. Avant electronic cash is used in payment for a number of services, eg parking, public transport, kiosks and shops. At the end of 2002 the total amount of cards in circulation was around 900,000 and the number of terminals accepting Avant e-purses totalled around 6,000. Nowadays, all Avant cards are reloadable since disposable cards were withdrawn from circulation at the end of 2000. The total number of payment transactions during 2002 was around 800,000.

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

Citycards. Three local multipurpose prepaid card schemes, called Citycard schemes, have been implemented in Vaasa (Waasa Card), Rovaniemi and Seinäjoki. Citycards can be used for paying eg bus fares and some communal fees.

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

2. Network-/software-based products

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

3. Internet and mobile payments

There was a severe banking crisis in Finland at the beginning of the 1990s. A number of bank branches collapsed and, at the same time, banks encouraged customers to use self-service, eg by pricing. At first, people made credit transfers at giro ATMs. However, the use of internet banking services in particular has increased remarkably during the past few years. Almost all banking services are available via the internet. The number of telebanking and internet banking agreements totalled around 2.8 million at the end of 2002. The number of telebanking and internet banking transactions was around 145 million in 2002 compared to around 38 million transactions in 1998. Internet-based banking transactions made up about 25% of all credit transactions. Less than 15% of credit transfers were paper-based and the rest were transmitted electronically in batches. People can also use banking services by sending SMS text messages or by WAP phone.

Finnish banks have developed a secure payment solution for e-commerce based on an internet banking solution. When a customer is at an e-store site and wants to buy something, he/she clicks on the internet payment button of his/her bank and is transferred to the bank's website, where he/she accepts the bill, after which the bank account is debited in real time. The funds are also credited to the merchant in real time. Furthermore, customers can pay eg by credit card over the internet. In order to make these transactions more secure, Verified by Visa was launched in Finland in autumn 2003 and is available for Visa and Visa Electron customers.

The penetration of the internet and mobile phones is high in Finland. Thus, it is natural that many payment solutions have been developed based on these channels. Mobile payment solutions, however, are not yet widely used. In addition to banking services, non-banks have also started to provide payment services. In some solutions the customer opens a customer account and transfers money to this account from his/her bank account. Having done so, he/she can pay for purchases eg by sending an SMS text message or calling a service number. Another possibility is to pay for purchases via mobile phone bill or separate bill. In some applications, customers can also make payments by debit or credit card. At the moment, the mobile phone payment sector is developing rapidly and it is difficult to say which solutions will survive.

4. Policy responses

4.1 Policy responses relating to e-money developments

Monetary policy and seigniorage. The outstanding value of Avant e-money is at a very low level. However, the value of outstanding Avant e-money issued by banks is included in the monetary aggregates. Furthermore, other reporting requirements have been placed on the Avant e-money scheme, and Automatia started reporting relevant figures on a monthly basis at the beginning of 1998. However, it is very unlikely that cash will be replaced by e-money to any large extent, at least in the foreseeable future. Thus, the impact of e-money on seigniorage is not expected to be significant.

General legal issues. The E-money Directives 2000/46/EC (on the taking-up, pursuit and prudential supervision of the business of electronic money institutions) and 2000/12/EC (relating to the taking-up and pursuit of the business of credit institutions) were implemented in Finland in February 2003 by the revised Credit Institutions Act (69/2003).

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

Relevant security issues. The authorities have not laid down special criteria for evaluating the security features of e-money schemes in Finland. Furthermore, security features of the Finnish payment systems have been developed by participating banks, not set by the authorities.

In May 2003, the ECB published the EMSSO report, which includes security objectives for e-money schemes based on common criteria methodology. This may have some impact on oversight work in Finland in the future.

Issuer details. The issuance of e-money has been limited to supervised institutions by the implementation of the E-money Directive into Finnish legislation, as discussed above. The revised Credit Institutions Act creates the regulatory framework for a new type of credit institution, the payment organisation, which is entitled to issue e-money and provide payment services.

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

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

Supervisory issues. According to the revised Credit Institutions Act, the Financial Supervision Authority has the authority to supervise all e-money issuers.

Law enforcement issues. The Finnish Penal Code contains provisions on fraud involving payment media and money laundering (769/1990, chapters 32 and 37). In addition, there are two separate legal acts on money laundering alone (583/1994 and 68/1998). EU legislation is also applicable in Finland.

Cross-border issues. At present, no foreign e-money schemes are used in Finland and no Finnish e-money schemes are used abroad.

4.2 Policy responses relating to internet and mobile payments

General legal issues. The revised Credit Institutions Act includes the definition of a payment organisation as discussed in the previous section. Institutions that provide payment services, eg internet or mobile payments, are considered to be payment organisations.

Relevant security issues. The authorities have not laid down special criteria for the evaluation of security features of internet or mobile payment schemes in Finland. As stated in the previous section, security features of the Finnish payment systems have been developed by service providers, not set by the authorities. However, the Financial Supervision Authority has issued guidance and standards on eg IT security and continuity plans, and these are also applied to payment organisations because they are credit institutions.

Payment system issues. There have been no particular problems concerning clearing and settlement arrangements of internet and mobile payments.

Statistical information about the use of internet and mobile payment solutions is not available for most schemes.

Oversight and supervisory issues. The Bank of Finland is responsible for the oversight of the Finnish payment system and the Financial Supervision Authority is responsible for the supervision of individual service providers.

Law enforcement issues. The Finnish Penal Code contains provisions on fraud involving payment media and money laundering (769/1990, Chapters 32 and 37). In addition, there are two separate legal acts on money laundering alone (583/1994 and 68/1998). EU legislation is also applicable in Finland.

Cross-border issues. If schemes are located in the European Union, the principle of free movement of services applies. People can also, of course, use internet-based global payment services like PayPal via the internet in Finland.

France

1. Card-based products

Among the three competing schemes launched in 1997 (Moneo, Modeus and Mondex), Moneo is the only remaining card-based scheme of any real importance in France.

Moneo is promoted by BMS (Billétique Monétique Services), whose shareholders are the country's main credit institutions, transport companies and technological firms. BMS is in charge of the conception, commercial development and operation of Moneo and works in cooperation with SFPMEI (Société financière du porte-monnaie électronique interbancaire), which issues e-money and collects as well as manages the funds received as a counterpart of the issuing process. SFPMEI also defines security regulations (technical and organisational) for the scheme and makes sure that it complies with these regulations on an ongoing basis. It guarantees to all e-money holders the redemption of their electronic value. SFPMEI was licensed as a credit institution in September 1999.

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

Moneo is based on the GeldKarte technology as a result of the ongoing partnership of Groupement des cartes bancaires "CB" (the interbank body responsible for the French card payment scheme) and its counterpart ZKA (Zentraler Kreditausschuss) in the field of interoperable electronic purses.

However, Moneo has some specific features, including an offline loading facility for use at POS terminals. Most of the time, Moneo is issued in the form of a card containing both the traditional chip-based French debit card application and the electronic purse application; both payment instruments are used in their respective domains. But e-purses may also be issued on a card which does not include the debit card application: in this case, the card may be attached to the bank account of the cardholder (Moneo bleu) or not (Moneo vert). In this latter case, the e-purse is billed as “anonymous”. Customers targeted by BMS are mainly bank cardholders.

Moneo was first launched in major provincial cities. It was implemented in Paris in November 2002, and the full rollout was planned for the end of 2003. BMS is focusing on supplying equipment to merchants who use small change, as well as parking meters, vending machines and ticket machines. In the medium term, BMS will consider implementing the CEPS (Common Electronic Purse Specifications) and enabling customers to carry out internet transactions with Moneo.

In June 2003, more than 1.1 million electronic purses were in use and around three transactions per purse per month were performed with an average amount of EUR 3.7, at 95,000 points of sale.

2. Network-/software-based products

As these schemes are mostly designed for internet or mobile payments, this area will be dealt with in the following section.

3. Internet and mobile payments

Internet payments. Given that the market is still taking off, that its potential size is still highly uncertain and that a number of solutions have failed in the recent period, developers of payment instruments associated with e-commerce are proceeding with caution. Until now, most of them have used existing payment instruments and the existing interbank settlement infrastructure, opting for software-based solutions to minimise their investment outlays.

Nevertheless, several solutions designed for remote payments have emerged alongside the development of e-commerce. These solutions try to balance convenience, cost and security for the customers. On a technical level, a distinction can be made between payment instruments that are entirely software-based and those that also involve hardware.

Software-based schemes. Among the software-based solutions are those that consist in online transmission of either a debit card number or the number of a “virtual” card, which is generally limited to a single transaction. The first option is the most widely used at the moment, but the “e-Carte Bleue” project promoted by Groupement Carte Bleue has increased the availability of the second option (85,000 users at end-June 2003).

The software-based solutions also include payment instruments based on:

- Virtual purses (eg Moneytronic, promoted by Caisse d’Epargne). These take the form of a meter display on an internet server that tallies the user’s store of loyalty points or e-money. The purse may be credited using traditional payment instruments (eg credit transfer).
- Aggregators/intermediaries (eg w-HA, promoted by France Télécom). This is a “kiosk” type solution in which an internet access provider or a telecoms operator charges internet users for goods or services bought over the internet.

These payment instruments are specifically designed for micropayments.

Hardware-based schemes. Among these are payment instruments using smartcard technology in order to protect, through a secure hardware environment, sensitive data transmitted over the internet (card number, cardholder information, etc). This environment can take various forms. In France, examples include:

- Authentication devices based on smartcard readers, such as those offered by Xiring, which allow verification of the cardholder’s identity before payment. Groupement des cartes bancaires is involved in the European FINREAD project (specification for a secure smartcard reader connected to a PC). These solutions are not implemented in France yet, except for B2B applications.

- Authentication devices based on the use of a mobile phone (the cardholder receives an SMS on his/her mobile phone and is asked to reply to it to confirm the payment order). Caisse d'Épargne's Id-tronic is based on this principle, in the context of the Verified by Visa scheme.

Mobile payments. The French m-payment market is likely to grow steadily in the next few years, but its development is slower than expected.

Micropayments: kiosks. Globally, three types of m-payment solutions seem to stand out, all based on the kiosk principle: vocal, SMS and WAP/internet kiosks. They are designed for micropayments and do not require any equipment other than the conventional GSM phone.

In the "kiosk" model, the mobile operator provides access to services conceived by service providers, aggregates funds it receives from the customer in payment for the access and transfers a part of these funds to service providers, keeping the balance in remuneration of its services.

Vocal kiosks. The customer has vocal access to services, after dialling a short phone number. Vocal kiosks give access to a wide range of services like weather forecasts, but also to home banking and broker services. The operator charges the cost of the communication to the customer's bill (Audiotel).

SMS. Services may be offered in the form of SMS. They are based on a question/answer relationship between the consumer and the service provider (eg stock exchange quotation). Some of these SMS services can include an extra fee, which is collected by the operator with the phone billing. A common platform for all operators, SMS+, exists in France.

The usage of SMS has developed unexpectedly in the last few years, especially for certain types of micropayments.

WAP, i-mode kiosks. The services accessible via WAP may also be remunerated according to a kiosk process. In this case, service providers try to take advantage of the interactivity allowed by this technology. The operator, as access provider, and the service provider share the revenues.

Bouygues, SFR and Orange have implemented such solutions. Orange has created a WAP kiosk in association with w-HA, which has received a licence as a financial institution.

Macropayments. In the field of macropayments some solutions, based on more complex technologies, have failed (dual slot mobile phones: "Paiement CB sur mobile") or seem doomed to fail (dual-chip technology, etc).

WPKI solutions are expected to have multiple applications in the years to come, in the domain of m-payments and elsewhere. In fact, some payment instruments such as credit transfers or direct debits could be dematerialised in such a PKI. Orange and SFR are working on experimental WPK solutions.

4. Policy responses

4.1 Policy responses relating to e-money developments

Monetary policy and seigniorage. For the moment, the development of e-money is not expected to have strong implications for monetary policy implementation. It will need to be closely monitored if 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 monetary base and the size of liquidity-providing operations. However, the redeemability of e-money, a principle laid down by Directive 2000/46/EC on the taking-up, pursuit and prudential supervision of the business of electronic money institutions, will ensure that a demand for central bank money as a medium for interbank final settlements continues to exist.

In this context, and in order to maintain a level playing field, the Bank of France holds the view that the issuance of e-money has to be restricted to credit institutions, in line with the recommendations presented by the ECB in its 1998 *Report on electronic money*. This seems to be the most appropriate solution since only credit institutions are subject to reserve requirements and, as eligible counterparties of the central bank, have direct access to marginal lending facilities in central bank money. Directive 2000/46/EC accommodates the Bank of France's concerns, creating a specific category of credit institutions with a dedicated activity and a specific prudential framework.

General legal issues. The EU Directives 2000/28/EC and 2000/46/EC, which set a framework for the issuance of e-money, were adapted to French law through the implementation of CRBF (Comité de la réglementation bancaire et financière) Regulation no 2002-13 in November 2002.

This regulation sets general provisions applicable to e-money issuers: it defines the notion of e-money, the conditions of its use and reimbursement, and the specific requirements to prevent money laundering and fraud. Furthermore, it sets a prudential framework for e-money issuers.

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

In this process, the policy of the Bank of France was to ensure a level playing field between the various projects, to achieve mutual recognition of the evaluation process and to require that skilled and independent laboratories carry out the evaluation. To match those constraints, the requirements were written in the language of the ISO 15408 standard, usually referred to as the "Common Criteria".

Concerning Moneo, two protection profiles have been published; they set security requirements for the trial as well as the rollout phase. Security requirements have also been defined for the system as a whole. These inspired the Eurosystem's EMSSO initiative (Electronic money systems security objectives), released by the European Central Bank in May 2003. The EMSSO report serves as a reference for the oversight of e-money schemes by national central banks of the Eurosystem.

Issuer details. The status of ELMIs is defined by EU Directives 2000/28/EC and 2000/46/EC, which were adapted to French law through the implementation of CRBF Regulation no 2002-13 in November 2002.

4.2 Policy responses relating to internet and mobile payments

Strengthening user protection and means of combating fraud. The Everyday Security Act, which entered into force on 15 November 2001, aims at achieving the best possible balance in the sharing of the cost of fraud between card issuers and cardholders. It has implications for online payments effected by communication of the card number: in fact, the Act establishes the principle that the cardholder is not liable for fraudulent use of a payment card by another party without physical use of the payment card.

The Act also sets steeper penalties for fraud involving payment instruments, in particular disclosure of confidential information, notably on the internet, and equipment enabling the commission of an infraction on a payment card or any other payment instrument. Article 40 of the Act specifies that such infractions are punishable by seven years' imprisonment and a fine of EUR 750,000.

Strengthening the role of the Bank of France. The Everyday Security Act also specifies the oversight role of the Bank of France in matters of payment instrument security and grants it greater means of action with the following amendment:

"The Banque de France shall ensure the security of means of payment, other than banknotes and coins, as defined in Article L311-3, and the relevance of the standards applicable thereto. If it deems that any such means of payment is insufficiently secure, it may recommend that the issuer take all necessary measures to remedy such insufficiency. If its recommendations are to no avail, it may, after having solicited the observations of the issuer, hand down a negative opinion published in the Official Journal." This oversight mission of the Bank of France also applies to internet and mobile payments.

In the performance of its duties, the Bank of France conducts expert analyses and asks the issuer or other responsible party for all relevant information concerning payment instruments and the terminals or technical facilities associated therewith.

Issuer details. Cashless payment instruments enjoy a highly secure legal framework in France. Notably, credit institutions alone are entitled to issue and manage means of payment, which are considered as bank operations.

The issue has been raised at EU level as to whether prepaid cards offered by telecommunications operators, which are likely to be used to buy goods and services provided by third parties, should be billed as "e-money" and therefore require credit institution status as defined in Directive 2000/46/EC.

Oversight issues. As part of its oversight role, the Bank of France ensures the security of electronic payment instruments. As regards other payment instruments, it will proceed as follows for each internet or mobile means of payment:

- Analysis of relevant threats to the system;
- Definition of the minimum security objectives to which it must conform (one approach that might be taken is to draw up a “protection profile” as defined by the Common Criteria, based on an analysis of threats to users and to the service);
- Monitoring to ensure that the implementation satisfies the foregoing minimum security objectives. This aspect requires, among other elements, statistical reporting.

Naturally, as it performs its extended duties, the Bank of France relies on the support of interbank bodies. These bodies play a pivotal role in defining technical standards, ensuring that these standards are correctly applied, and promoting the security offered by each payment instrument. Banks are, for instance, defining a protection profile for internet banking websites.

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 major prepaid card projects, GeldKarte and PayCard, are described below.

GeldKarte. In a joint initiative, the German banking industry has developed a prepaid rechargeable electronic purse called GeldKarte, usable for a variety of payment operations, in particular for small amounts. The operator of the scheme is the Central Credit Committee (Zentraler Kreditausschuss), although the issuers (of both the cards themselves and the value on them) are exclusively banks and savings banks. A GeldKarte can be loaded with up to EUR 200 per card. As a rule, this will come either from the cardholder’s account by means of online authorisation using a PIN, or against cash for customers without an account. The value loaded is credited to an e-purse clearing account. The function of an EC or bank customer card can be embedded in the same card. Payment by GeldKarte takes place offline and without the use of a PIN. The value of the transaction is transferred from the customer card to the retailer card within the transaction terminal. The value received is then generally transferred once a day by the retailer to the relevant recording centre (Evidenzzentrale) for settlement.

With regard to fee structures, the price of cards for consumers varies from bank to bank, but is commonly EUR 5 for one year. The charge for loading is roughly EUR 0.08-0.30 with the consumer’s bank (otherwise, EUR 1). For retailers, the unloading fee is 0.3% of turnover (at least EUR 0.01 per transaction).

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

PayCard. This is a prepaid rechargeable chipcard developed by German Railways (Deutsche Bahn AG), the Association of German Transport Operators (VDV) and Deutsche 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 EUR 10 to a maximum of EUR 200. The PayCard was trialled 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, Deutsche Bank in partnership with DigiCash successfully tested the e-cash system on an internal basis. In October 1997, Deutsche Bank started rollout with roughly 1,500 of its

customers, who were able to buy directly goods and services provided by 35 retailers. From mid-1999 the system gradually left the pilot stage. Operation of the system was discontinued in mid-2001.

Dresdner Bank together with Landesbank Sachsen and CyberCash started a pilot project at the end of 1997. About 10 retailers and up to 5,000 customers and employees of Dresdner Bank and Landesbank Sachsen participated in the project. After the end of the test phase, payment systems on the internet for CyberCoin (a system for small-value payments) and others were to be offered. Operation of the system was discontinued at the end of 2000.

3. Internet and mobile payments

3.1 Introduction

Recently, the volumes and rates of growth of e-commerce and m-commerce have been neither as large nor as high as had previously been forecast and expected. Moreover, there is a lot of fluctuation in the market for internet and mobile payments. Whereas some newcomers have been successful over the past few years, others have had to discontinue their business after a short time. An example of the latter category is the relatively well known company Payitmobile, which went bankrupt in spring 2002. Accordingly, the survey has to be restricted to major innovative schemes which have already established themselves in the market to some extent and does not include systems which are still in development or which are running as a very limited pilot project, the majority of which are likely to be discontinued sooner or later. Despite that qualification, all significant innovations in e- and m-payments are covered by the instruments and schemes described in the following sections. Given that situation, it should be borne in mind that the volume and value of e- and m-payments via the internet based on innovative procedures are still insignificant in terms of payments as a whole. This has been taken into consideration for the section on policy responses.

Moreover, it has to be stressed that the survey includes a large number of very detailed questions which cannot be answered owing to the unavailability of relevant information. This is especially true of the statistical data in Table D, which are not published in most cases. However, even if there are data, for example, on the number of users of a scheme, these figures are often of little informative value since they include, in addition to active participants, the large number of customers who have used the system only once and never again.

As regards innovative internet and mobile payment schemes, the following statements apply to all schemes and can therefore be summarised by way of an introduction:

- All schemes have detailed general terms and conditions which are disclosed to the parties involved.
- There are some indications of fees by the payment service providers, but generally it is up to the users of the schemes to agree individually on the structure and amount of the fees.
- Clearing and settlement of payments is performed through the banking sector in all cases.

In the following sections information with reference to instruments and schemes is provided on the basis of a detailed description of the relevant instruments and schemes relying on the information given by the respective companies/scheme operators.

3.2 Innovative services related to traditional payment instruments on the internet

3.2.1 Credit cards

At present, most credit card transactions via the internet are performed on the basis of the SSL encryption standard as the SET standard could not establish itself. In the case of the former, the customer's credit card data are encrypted by means of the SSL standard and transmitted to the retailer via the internet. In the context of an SET transaction, the customer, retailer and bank mutually prove their identity by means of digital certificates and digital signatures and all security-relevant transaction data are secured by cryptographic procedures against unauthorised access. It is true that SET is very secure but, on the other hand, it is also characterised by a high degree of complexity.

New and different technical procedures without a uniform standard have been developed and introduced in some cases. The most important of these procedures are:

- Verified by Visa (also called Visa 3-D Secure or Payer Authentication);
- SPA (Secure Payment Application) in combination with UCAF (Universal Cardholder Authentication Field) - also called SecureCode - from MasterCard/Europay.

Retailers using the above-mentioned procedures of Visa and/or MasterCard/Europay are protected against losses due to credit card fraud as the card-issuing banks are able to check the identity of the cardholder for all his/her transactions by means of his/her individual password.

An agreement between Visa and MasterCard was achieved in order to enable MasterCard to support 3-D Secure as well, under the name SecureCode. This will improve acceptance and contribute to a widespread market base in the near future.

Moreover, with the envisaged worldwide introduction of the EMV standard (Eurocard, MasterCard, Visa) by the end of 2005, credit and debit cards will be equipped with a chip in addition to the magnetic stripe. This, too, will considerably increase the security of using credit cards on the internet since, in contrast to the magnetic stripe, the chip can effectively be protected against duplication or changes by means of cryptographic procedures.

Furthermore, P2P funds transfer services have been developed by Visa (Visa Direct) and MasterCard (MoneySend) by means of which money transfers can be effected from one card to another and which will soon be introduced area-wide.

As all these standards/procedures have been developed and introduced on an international basis, the central bank refers in this context to the relevant international in-depth studies and assessments.

3.2.2 *Credit transfers*

In internet banking, customers access the internet homepage of their credit institution and the Homebanking Computer Interface (HBCI) standard is applied. This is the German banking industry's common internet message standard for information exchange between banks and their customers. A new release, HBCI 3.0, has now been introduced under the designation FinTS (Financial Transaction Services). This standard includes new business cases and supports different classes of digital signatures as well as the present PIN/TAN (transaction number) procedure which is based on a special TAN for each credit transfer. HBCI 3.0 is likely to be accepted on a broad basis in the future.

3.3 ***Innovative internet and mobile payment schemes***

The schemes can be subdivided into cumulative collection procedures, prepaid payment services and mobile phone procedures.

3.3.1 *Cumulative collection procedures*

FIRSTGATE click&buy. The system is run by FIRSTGATE Internet AG; shareholders are 3S Beteiligungs- und Vermögensverwaltungsgesellschaft mbH, Elton Participation Corporation and HBZ Prime Participation Holding AG. FIRSTGATE click&buy is a microbilling system (from around EUR 0.05) for digital content on the internet and mobile platforms and is operated nationwide.

A purchase on the internet is executed as follows. The user registers online, selects a password, is given a PIN and submits a preauthorised payment mandate to pay monthly by credit card or direct debit. If the customer wishes to buy content for which there is a liability to pay costs, he/she has to click the respective button of the retailer. After having fed in his/her username and PIN, the customer is presented with a page inserted by FIRSTGATE which again names the retailer, type and price of the ordered content. The customer has to accept this price by means of a click in order to be able to download the content. The accumulated costs are debited to the customer's account once a month and the proceeds are credited to the retailers' accounts.

The entire communication takes place via SSL-encoded connections. Restrictive firewalls and intrusion detection measures prevent unauthorised access to the system from outside. To exclude the possibility of an attack, personalised X.509 certificates and IP fingerprints can be used in addition to the traditional username/password authentication.

Click & Pay net900. net900 software is a product of the company in medias res GmbH. Using the name Click & Pay, this system is run by Deutsche Telekom AG as licensee. net900 is a microbilling solution for content purchased over the internet and offers two payment options:

- net900 Classic: payment through the monthly phone bill;
- net900 Kontopass: payment through a giro account.

net900 Classic. In order to participate in the system, the customer needs a giro account, a telephone connection in Germany, access to the internet by modem or ISDN card and net900 software. If the customer hits on an area for which there is a liability to pay costs, he/she has to acknowledge the change to that area and the cost by means of a click. Next, the software interrupts the connection to the internet provider and the customer is detoured onto the net900 network during the time of content transfer. The customer is always informed of the duration and cost of the connection. The amounts liable to be paid by the customer are accumulated and collected by means of the regular monthly phone bill.

net900 Kontopass. Name, account number and bank code are SSL-encoded and transmitted to net900. Next, net900 transfers a small amount to the specified account and simultaneously provides the customer with a PIN in the utilisation purpose field of the transfer. Entering this PIN opens the Kontopass session. The purchase transactions are SSL-encoded.

net900 makes it possible to identify users who are connected to the internet by modem/ISDN. The real phone number of the modem or ISDN card is determined by net900 and the security of the telephone network is used to identify the customer and facilitate the settlement of turnover of providers accepting net900.

3.3.2 Prepaid payment services

Paysafecard. The company paysafecard.com Wertkarten AG runs the system in Germany in cooperation with Commerzbank AG, which is also a shareholder of the company.

Paysafecard is a prepaid payment service suitable for micropayments on the internet. The cards are distinguished by the value attributed to them (between EUR 25 and EUR 100) and are purchased by local retailers who transfer the proceeds to a consolidated account kept at Commerzbank AG. The card is not reloadable and contains no information other than a 16 digit number (PIN), concealed under scratch foil. This is used for purchases on the internet and for accessing account information from the paysafecard payment server. At this location the card can also be protected by an additional password, preventing others from using it. No monetary value in the form of prepaid value units is exchanged. The only exchange between the buyer, retailer and payment service provider is of information, which is stored and updated in the database of paysafecard.com. The communication between the customer, retailer and paysafecard is encrypted by means of SSL. Settlement is carried out using the prepaid sight deposits on the consolidated bank account at Commerzbank AG.

Paysafecard started operations in Germany in summer 2001 and is now in use nationwide.

MicroMoney. MicroMoney is issued by Deutsche Telekom AG in cooperation with Postbank AG as part of its online shopping payment system T-Pay. Deutsche Telekom CardService GmbH (DeTeCardService) has been placed in charge of the distribution of the card, recruitment of accounts, technical realisation of the payment system and customer advisory services. MicroMoney is a microbilling payment solution and the cards are available for the denominations of EUR 15, EUR 30 and EUR 50. The system is in use nationwide.

The MicroMoney card is a non-reloadable prepaid scratch card for internet payment combined with a phonecard. This can be purchased from retail stores and the distribution network of DeTeCardService. By purchasing a MicroMoney card the customer receives a deposit at Postbank AG corresponding to the amount indicated on the card. The card contains two scratch surfaces concealing a 16 digit MicroMoney code for making online payments and a 12 digit CallingCard code for making national and international calls. By clicking "MicroMoney" at participating retailers the user is linked to the MicroMoney front-end, where the payment is transacted. The transaction data (eg retailer ID, type and value of goods, date, time) of the retailer are made available via the interface and are confirmed by the customer input of the 16 digit code. After the payment transaction has been completed, the online retailer receives a confirmation message together with the relevant transaction data record. Transactions are aggregated and credited to the retailer at regular payment intervals to be agreed upon.

Communication between the retailer's system and the MicroMoney system is based on HTML commands (post and get). Communication between the retailer's system, the MicroMoney system and the customer takes place at 128 bit (bank standard) and is SSL-encrypted.

3.3.3 *Mobile phone procedures*

Paybox. After having discontinued its mobile payment service “paybox” in Germany at the beginning of 2003, paybox solutions AG began to operate as an innovative service provider developing and supporting mobile services and payment applications for banks, telecommunications companies and local payment processors. The paybox system is described below as its basic approach is still of significance and because the discontinued business in Germany will be carried on by the mobile service provider Moxmo.

Paybox is a system for payment via mobile phone on the internet as well as at points of sale. Peer-to-peer payment between paybox users is also possible. In order to be able to participate in the system, the customer has to be registered with paybox (including the direct debit authorisation for the customer account) and possess a PIN provided by paybox.

For offline retail payments (when the retailer also uses a mobile phone to get paid), or for P2P transactions the procedure is as follows. The payer communicates his/her phone number to the retailer, who is also registered with paybox. The supplier transfers this phone number and the price to the paybox server. Paybox calls the payer and informs him/her of the amount and the name of the retailer. The payer authorises the payment by inputting his/her paybox PIN. After settlement of the payment, paybox sends an acknowledgement to the customer and gives a receipt of the success of authorisation to the retailer. Later on, the payer’s account is debited by direct debit and the amount is credited to the retailer’s bank account by paybox.

Moreover, paybox users can also transfer money to each other. The sender calls paybox, feeds in the receiver’s mobile phone number and the amount to be paid and acknowledges the payment using his/her paybox PIN.

For internet payments the procedure is the same as for offline payments except that the payer types the transaction data into the web page.

In the case of transfers, the payer fills in a transfer form on the paybox homepage and gives his/her mobile phone number. After completing the form, paybox calls the payer and requests transaction authorisation by means of the payer inputting his/her paybox PIN into the mobile phone. Next, the payer’s account is debited and the receiver’s account is credited. The receiver is informed of the payment by personal e-mail.

Registration with paybox is performed using an SSL-encoded data line. The paybox procedure uses the buyer’s mobile phone number. By means of the SIM chip inside the mobile phone, the customer can clearly be identified and communication is performed through a secure channel within the operator’s GSM mobile network.

STREET CASH. The mobile payment procedure STREET CASH provided by inatec in Leipzig is based on text messaging and can be operated with all SMS-compliant mobile phones. The use of the system is not yet widespread. In contrast to paybox, STREET CASH is not a separate mobile payment procedure but is integrated into the multipayment platform powercash21.

This scheme allows bills to be paid by SMS. After having successfully registered address and bank account details with STREET CASH, the customer is given a secret PIN. The bill is initiated by the retailer, ie an SMS including the price and the customer’s phone number is transferred to STREET CASH. Following this, STREET CASH sends an SMS to the customer, who has to confirm the price by inputting his/her PIN. Then, after the data have been verified, an SMS containing the confirmation is sent to the retailer. The money is debited to the giro or credit card account that has been indicated by the customer.

The SMS messages are encoded over the GSM network and securely dispatched. No personal data of the customer are transmitted during the underlying payment transaction.

4. Policy responses

4.1 *Policy responses relating to e-money developments*

Monetary policy and seigniorage. Since the beginning of 1996, the value of electronic money issued on cards has had to be reported by credit institutions as a special liability position in their monthly bank balance sheet (“stored value card loading countervalue”). Since January 1997, this countervalue has

been incorporated into the money stock M1 and thus also into M3. The amounts are still very low. With the amendment of the Banking Act, the issuance of e-money on stored value cards and in computer networks has been restricted to credit institutions since the beginning of 1998. The Bundesbank's view is that the linchpin of monetary policy monopoly on central bank money is not jeopardised by innovations in payment systems at the moment. The Eurosystem will probably remain in a position to set the conditions in the money market in such a way that they correspond to its objectives. Although e-money has a relatively large potential to displace currency in circulation, this assessment is supported by the total amount of banknotes in circulation, the structure of the denominations of banknotes, and the prevailing preference of the public for currency despite previous card-based innovations.

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

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

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

Relevant security issues. Both the report published in 1996 by the BIS on the security of electronic money and that on electronic money published by the European Central Bank in August 1998, supplemented by the *Electronic money system security objectives* (EMSSO) report in May 2003, are regarded by the Bundesbank as yardsticks against which e-money systems appearing on a national scale have to be assessed in terms of the extent to which they correspond to the state of the art. The Bundesbank's evaluation of e-money schemes is based on the requirements of these reports and additionally on its questionnaire on the evaluation of the security features of new electronic means of payment, which is mainly based on the above-mentioned reports of the BIS and ECB. In the field of security, the Bundesbank cooperates closely with the Federal Office for Security in Information Technology (Bundesamt für Sicherheit in der Informationstechnik) as the technically competent public authority.

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

Provider issues/supervisory issues. Any enterprise wishing to issue e-money should be subject to supervision by a competent 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.

The E-money Directive (2000/46/EC) and Directive 2000/28/EC amending Directive 2000/12/EC relating to the taking-up and pursuit of the business of credit institutions (the definition of electronic money institutions) were implemented in Germany with effect from 1 July 2002 by the Fourth Financial Market Promotion Act.

Prior to the adoption of the E-money Directive, key criteria had already been fulfilled by the Sixth Act Amending the Banking Act. Upon a recommendation by the European Monetary Institute, prepaid card business and network money business were made subject to prudential supervision in Germany (Section 1 (1) sentence 2 nos 11 and 12 of the old Banking Act). Formerly, concessions were made for enterprises operating prepaid card businesses only if the limited use and dissemination of prepaid cards indicated that they were unlikely to pose a threat to the payment system.

The E-money Directive has now led to the creation of a new type of credit institution which, under EU law, is subject to less stringent supervisory rules as long as that enterprise confines itself to issuing electronic payment units. In implementing the E-money Directive, what were previously known as "prepaid card business" and "network money business" have been combined and are now called

“e-money business” (Section 1 (1) sentence 2 no 11 of the Banking Act) since payment practice has shown that it is no longer possible to draw a clear line between the two formerly separate types of business. The new definition of e-money business is based on the definition contained in the E-money Directive; however, by including the term “administration”, it takes due account of the ancillary business that e-money institutions are permitted to engage in. In addition, all prepaid value units stored on electronic data media in the form of a claim against the issuing agency and which are accepted by third parties as a medium of payment without being legal tender are deemed to be e-money. A definition of the term e-money institution (Section 1 (3d) sentence 4 of the Banking Act) was necessary for legal reasons.

The provisions of the “European passport” apply to e-money institutions as well; ie e-money institutions based in the European Economic Area invoking their right to set up branches in other member states and the freedom to provide services throughout the European Union are only supervised by the supervisory authority in their home country (see the relevant amendments in Sections 24a and 53b of the Banking Act). Since that means German e-money institutions are in competition with other institutions of this kind based in the European Economic Area, it is now no longer possible to maintain the principle of full supervision over institutions even if they were to confine themselves to prepaid card business and network money business. Instead, prudential supervisory relief granted by the E-money Directive to institutions issuing only e-money had to be incorporated into the Banking Act.

The minimum initial capital was set at EUR 1 million by Section 33 (1) sentence 1 no 1 (e) of the Banking Act. The own funds requirements which e-money institutions are required to meet on an ongoing basis derive from Section 10 (10) of the Banking Act, pursuant to which own funds must make up at least 2% of the current amount or the average of the sum of its liabilities over the preceding six months on the basis of still unused e-money, whichever figure is higher.

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.

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

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

Cross-border issues. At the moment there is no promotion of e-money products or schemes in Germany by foreign vendors about which the authorities have concerns. However, it would be difficult, if not impossible, to apply or enforce regulatory measures relating to cross-border e-money products or payments, whether in national or foreign currency, offered in Germany if the issuer or the participants in the scheme were domiciled in one or more different countries or jurisdictions. Only if the operator is using a German agent might it be possible - under certain circumstances, depending on the individual case - to regard the agent conducting the banking business as being subject to supervision. Therefore, the resolution of this kind of problem is not possible at national level but requires international cooperation among the competent authorities. Nevertheless, the Federal Financial Supervisory Authority recently decided to demand an authorisation of foreign third-country institutions which intend to provide actively financial services to German customers from outside the country.

Legal issues. Information is available with regard to the GeldKarte system run by the German banking associations. This system is, in principle, based on a trilateral contractual structure - although the number of intermediaries involved and the combinations to be considered lead to a much greater number of contractual relationships than suggested by the trilateral architecture. All contractual

documentation concerning (a) the issuing bank/cardholder relationship, (b) the retailer/bank relationship and (c) the rights and duties between the banks involved are defined in a general agreement between the banking associations binding upon all individual banks that are members of those associations.

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

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

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

The legal analysis may, to a certain extent, be comparable to the analysis of 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-/software-based schemes, no information was available at the time of writing.

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

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

4.2 Policy responses relating to internet and mobile payments

General legal issues. The Law Governing Framework Conditions for Electronic Signatures and Amending Other Regulations entered into force on 22 May 2001 and implemented the EU Directive of 13 December 1999 on a Community framework for electronic signatures. The purpose of the law is to facilitate the use of electronic signatures and to contribute to their legal recognition. Moreover, the EU E-commerce Directive (2000/31/EC of 8 June 2000) was implemented in Germany in November 2001 with effect from 1 January 2002. The implementation of specific amendments to legal provisions is not envisaged in the near future.

Relevant security issues. In order to analyse specific systems, the payments department of the Bundesbank as overseer has developed a questionnaire on the evaluation of the security features of new electronic means of payment as a prelude to the security check. In the field of security, the Bundesbank cooperates closely with the Federal Office for Security in Information Technology (Bundesamt für Sicherheit in der Informationstechnik) as the technically competent public authority. The overseers are striving to achieve the aim of exercising influence on the operators of new payment systems so that the systems do not fall below the general level of security. Certifying the security of each scheme by employing a trusted third party is not envisaged.

In cooperation with the Federal Office for Security in Information Technology, the supervisory authorities analyse the security of internet banking platforms and the risk management structures of

internet banks. Exceeding pure supervisory monitoring, those consultations include a detailed assessment of the banks' IT infrastructure. However, the consultations are only of an informative nature, and their results have no banking supervisory implications yet. The banking supervisors do not undertake any specific security checks on new e-payment systems.

Issuer details. In Germany there is no general ruling on whether authorisation is required to operate payment systems via mobile telephones or the internet. Nevertheless, pursuant to Section 1 (1a) sentence 2 no 6 of the Banking Act, enterprises which provide money transmission services need authorisation for conducting this business. Therefore, the Federal Financial Supervisory Authority and the Bundesbank have to check every single system on a case-by-case basis to ascertain whether money transmission services are involved. If there is no apparent reason, pursuant to the Banking Act, for deeming the business to be one requiring authorisation, an enterprise may operate its system without banking supervisory regulation. In short, the operation of such payment systems does not a priori require authorisation.

Since the last amendment to the Banking Act, however, the issuance and administration of credit cards have been deemed to be financial services (Section 1 (1a) sentence 2 no 8 of the Banking Act) and therefore subject to prudential supervision.

Payment system issues. No particular problems have arisen relating to the clearing and settlement arrangements for internet and mobile payment schemes. Statistical data on internet and mobile payments are collected on the basis of the publications of the relevant companies and the specialised literature and trade press. The development of the internet and mobile payment market is unlikely to lead to a significant reduction in the amount of notes and coin in the immediate future because - to a large extent - the new systems perform micropayments and the innovative services related to traditional payment instruments are replacing other remote payments which have not been secured or have, up to now, been secured in another way. The new internet and mobile payment schemes will realise significant efficiency gains since, in the majority of cases, they adequately fulfil the needs of e- and m-commerce.

Oversight issues. Given their significance for the safety and efficiency of payments, the Bundesbank also includes internet and mobile payments in its oversight. The Bundesbank has not taken particular steps to influence the design and operation of internet and mobile payment schemes because it is up to the market participants to develop and offer solutions which best serve customer requirements in a process of mutual competition. See also the respective sections above.

Supervisory issues. The banking supervisory provisions contain no specific regulations governing risk management in the case of providers of e-payment systems. However, Section 25a of the Banking Act applies to institutions which are subject to the Act. This states, among other things, that an institution should have in place suitable arrangements for managing, monitoring and controlling risks and arrangements for compliance with the legal provisions. Pursuant to Section 25a of the Banking Act, the Federal Financial Supervisory Authority has issued, for example, a circular stipulating general regulations governing outsourcing.

Detailed regulations would probably also be counterproductive as the continual changes being made during the current ongoing development phase would render them obsolete far too quickly. The general approach that has been chosen means that the regulations remain sufficiently flexible to allow a response to future developments.

Law enforcement issues. At present, the features of internet and mobile payment products are not perceived to make them particularly attractive for money laundering (eg performance of micropayments, limitation of value of purchases, identification of the parties involved, clearing and settlement via the banking system, etc).

Cross-border issues. At the moment there is no promotion of internet and mobile payments 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 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. The solution to this kind of problem requires international cooperation among the competent authorities.

1. Card-based products

There are currently two major e-money schemes being operated in Ghana by three banks. SSB Bank Limited, a member of Société Générale Group, first introduced the concept of prepaid cards onto the Ghanaian market in 1997 with a product called Sika Card. Two other banks, namely Ghana Commercial Bank Ltd and the Agricultural Development Bank, followed suit with the introduction and operation of the Mondex card in 2003.

Sika card. SSB Bank's Sika Card is an offline chipcard scheme operated by a password. The Sika Card can be used by both account holders and non-account holders. It is a single purpose prepaid card that can load a limitless amount of local currency from SSB Bank premises only. The card is accepted at merchant points of sale or petrol stations and hotels for purchases or cash-back. It has no multicurrency or cross-border features. Settlements for Sika Card transactions with merchants are made monthly when SSB Bank downloads the total amount on the merchant's terminal into the merchant's account with the bank or issues a draft for the amount to the merchant for deposit into his/her account at another bank.

Mike Wolf and Associates of South Africa supplied the hardware, software and cards and are responsible for their maintenance.

Merchants pay nothing for the terminals while cardholders pay loading commission of GHC 500 per GHC 100,000 for reloading the card. The maximum loading fee that can be charged is GHC 50,000. Cash-back of up to GHC 10 million is free. Transactions with a value of more than GHC 10 million attracts commission of GHC 500 per GHC 100,000. In all these cases the minimum commission charged is GHC 50,000 whilst the maximum commission is GHC 500,000.

Mondex cards. The Mondex scheme was launched in Ghana by Mondex Ghana Limited, with a franchise from Mondex International. Mondex Ghana is jointly owned by Ghana Commercial Bank and Agricultural Development Bank. The Mondex card is a secure, flexible and convenient global payment mechanism based on smartcard technology. Value is stored on a microchip embedded on a card.

Dai Nippon Printing prints the Mondex cards for these two banks whilst personalisation is done locally by Mondex Ghana Limited. The merchant terminals and software are supplied by Hitachi International and NCR respectively. Its security programs include the value transfer protocol, which uses strong cryptography to protect value as it passes from one Mondex card to another.

The technological strength of the Mondex card is based on its operating system MULTOS - which is the de facto standard for the smartcard industry, and its application, which is an advanced cryptography that is embedded in a tamper-resistant chip known as Mondex purse.

Mondex cards can be loaded from ATMs or personal online transactors or at bank premises. Value can also be transferred from one customer to another, ie from card to card.

Merchants transfer value from the Mondex terminal to their bank account via cashless ATM or personal online transactor. At the moment the operators do not charge merchants and consumers any fees.

There are currently 3,637 Mondex cardholders and 283 acceptance points. The volume and value of purchase transactions per day are about GHC 70 and GHC 685,000 respectively. The value of Mondex cards issued since the inception of the scheme is about GHC 967 million.

2. Internet and mobile payments

Mobile banking schemes. Mobile banking schemes in Ghana are in their preparatory stages. SSB Bank Limited recently introduced a mobile banking scheme known as Sikatext. This facility can be used to check account balances and daily foreign exchange rates via mobile phone. Standard Chartered Bank has a similar phone banking product.

3. Policy issues

Until now, issuance of e-money has been limited to banks, which are subject to prudential banking supervision regimes, to reduce the risk of insolvency and liquidity problems. The Banking Supervision Department of the Bank of Ghana considers the security of e-money systems, the transparency of operations and the public interest before giving approval for any e-money scheme.

The central bank has not taken any steps so far to influence the design and operations of e-money schemes. As such, there are no regulatory oversight arrangements covering e-money schemes in Ghana.

There is currently no significant impact of these schemes on money supply. Hence the effect on seigniorage is negligible and it is expected to remain so for some time into the future.

Legal issues. Besides the general legal framework, there are no laws or regulations designed to guide the operations of e-money schemes in Ghana. A general payment systems bill was recently submitted to parliament which would empower the central bank to regulate the payment system, including electronic payment systems. That bill was due to be passed before the end of 2003. Issuers of any card scheme are, however, required to sign agreements with their customers and with merchants.

Greece

1. Card-based products

A new scheme, called **BALCARD**, is currently in the pilot phase and was due to commence trials before the end of 2003. This scheme presents the following characteristics.

BALCARD is an e-money payment instrument based on a reloadable prepaid chipcard for online purchases over the internet at a number of merchants joining the scheme. The e-money product has cross-border and multicurrency features. The project was initiated and is being partly financed by the European Union and has been undertaken by a consortium of banks, interbank entities and technology enterprises. Launched in January 2002 and having implemented the technical infrastructure, the scheme was due to start trials in the four participating countries, namely Greece, Cyprus, Bulgaria and Romania, at the end of 2003. The project is due to finish at the end of May 2004.

Functional aspects. Participants in the scheme are: Mellon Technologies (Greece) and Schlumberger (France) as technology providers and project coordinators; Borica (Bulgaria) as technology provider; and Eurobank Cards (a subsidiary of Eurobank), Bulgarian Post Bank and JCC Payment Systems (Cyprus) as users.

With reference to the infrastructure, electronic value is stored on an anonymous smartcard, available from the network of the issuer. A specific reader, equipped with a keyboard and screen and the appropriate software in the form of a compact disc, have to be installed in the personal computer of the user in order for the e-purse to be activated through the use of a username and a 4 digit password. The password is provided by the issuer of value, while the username is chosen by the customer. On the merchant's side, a chipcard for record-keeping of transactions accompanied by the appropriate reader and software are provided by the issuing entity, with which the vendor keeps an account.

The e-purse follows the Common Electronic Purse Specifications (CEPS) and the cryptographic protocol SSL (128 bit key) is used to assure the security of transmitted data.

A maximum storage capacity of EUR 300 on the chipcard and a maximum limit of purchases per day of EUR 100 are foreseen. Transferability between e-money cards is not allowed and the outstanding value can be redeemed at par, at the bearer's request.

2. Network-/software-based products

One e-money scheme, named **egnatiaPrepay**, has been in use since the beginning of 2002. The main characteristics of the scheme are presented below.

egnatiaPrepay is an e-money product launched by Egnatia Bank for online transactions over the internet, at a number of e-shops subscribed to the scheme. The scheme has been developed, operated, managed, technically supported and promoted by the bank, which also acts as issuer of value, clearing institution, developer and supplier of software to users and merchants. During its first year of operation, egnatiaPrepay recorded a customer base of 128 users, effecting 212 transactions with a value of EUR 7,250.

Functional aspects. Currently, the payment instrument has domestic, single currency (euro) functional features.

The electronic device on which the monetary value is stored is in the form of an anonymous reloadable "virtual" account that is set up in the information system of the bank when the user activates for the first time a unique random 16 digit secret code via the bank's website. The code is imprinted on a prepaid coated plastic scratch card with a value of EUR 100, valid for one year, available from the network of the bank. Following activation, the virtual account is credited with the equivalent of the prepaid amount. Connection to the scheme is effected either through the bank's or the merchant's website. Access to funds, ie online submission of a payment instruction, is possible via a username and password related to the account, both created by the user.

As a network-based scheme, a central server at the bank is used for the management of transactions and administrative information. Each electronic purchase is logged on the server and the bank's information system debits the customer's virtual account. The merchant's account held with the bank is credited at the end of each working day for the corresponding aggregate amount of transactions. Merchants are supplied with the appropriate software in order to monitor daily all purchases effected through the scheme. The maximum amount allowed per purchase is EUR 3,000. If the customer's credit limit is exceeded, the account is removed from the system. Any residual credit on the account can be redeemed at par at the bearer's request. Purse-to-purse transactions are not permitted.

With regard to the fee structure, only merchants are charged with an amount per transaction paid to the scheme operator. No fees are charged by the issuer to users.

Security is ensured by the cryptographic protocol SSL (128 bit key) with Verisign certification for the confidentiality and integrity of the transmitted data. The username and password of the customer univocally identify the single virtual account, thus ensuring authentication of the user. The record-keeping of transactions (audit trails) in the management system of the bank facilitates the resolution of any cases of repudiation on behalf of customers.

3. Internet and mobile payments

Overview. Due to the extensive use of internet and mobile services, traditional payment instruments like credit transfers, direct debit, payment cards and cheques now exist in electronic form. In the context of electronic banking, remote electronic payment instruments include online credit transfers and online direct debits.

During the last couple of years, a significant increase in transactions via e-banking has been observed. Based on the data available to the Bank of Greece, the number of subscribers of internet banking in 2002 increased by 46% compared with the respective number of subscribers in 2001. Moreover, users of mobile banking increased by 31% in the period 2001-02.

Internet banking. Currently, 12 credit institutions offer internet banking services in Greece. The payment instruments used are credit transfers and direct debits. Transactions include: (i) funds transfers to the same credit institution; (ii) funds transfers to other credit institutions; (iii) direct debits (for repayment of payment cards, public utility bills, etc); and (iv) standing orders (eg subscriptions).

Mobile banking. Among the 12 credit institutions that provide internet banking services, five offer mobile banking services too. All these five credit institutions offer SMS mobile banking that mainly operates as an information provider channel through short written messages that are transmitted over mobile telephony networks. Certain of these credit institutions also offer WAP mobile services and support credit transfers and direct debits.

In order to ensure the safety of remote transactions, credit institutions have invested in hardware and software security systems.

Security of transactions. The security of transactions in internet banking services is ensured with the following measures:

1. After signing the contract, the subscriber receives security codes for user identification. Most frequently two codes are used, namely user ID and PIN.
2. The user is required to change his/her PIN periodically.
3. The system locks the PIN and denies access to internet services if the user repeatedly enters the wrong PIN code.
4. If the connection remains idle for more than a predefined time period, the system automatically logs the user off.
5. A transaction authorisation number (TAN) is used.
6. The websites of credit institutions are verified with digital certificates.
7. Data are encrypted with the SSL 128 bit protocol.
8. Access to servers is controlled by routers and firewalls that restrict external access to specific services and information. In addition, some credit institutions take extra precautions such as using intrusion detection system (IDSs) and setting demilitarised zones (DMZs) in their network configuration.

Based on the information available, all credit institutions provide security methods 1-4 from the above list. Moreover, six credit institutions use digital certificates to verify their websites; 10 credit institutions use the SSL 128 bit protocol to encrypt the transported data. In addition, 10 credit institutions use firewalls to monitor and filter incoming and outgoing communications, three have installed intrusion detection systems (IDSs), one credit institution uses a demilitarised zone (DMZ) and finally two credit institutions use the transaction authorisation number (TAN).

As far as WAP mobile services are concerned, the following security measures are taken:

1. After signing the contract, the subscriber receives security codes for user identification. Most frequently two codes are used, namely user ID and PIN.
2. The user is required to change his/her PIN periodically.
3. Data are encrypted with the WTLS 128 bit protocol.
4. If the connection remains idle for more than a predefined time period, the system automatically logs the user off.
5. Transactions are carried out only through the mobile phone number that has been specified in the contract.

For SMS mobile, security is limited to the security measures for SMS transmission provided by the mobile networks.

Fee structure. The fee structure depends on the policy adopted by each credit institution. For promotional reasons, some institutions provide internet and mobile banking services without charging their subscribers any fees or commission; others make use of discount rates or follow a uniform pricing policy independent of the channel used for payment submission.

Legal arrangements. In order to subscribe to e-banking services and execute transactions, potential users need to sign and submit (in paper or electronically) an application form or contract. The contract defines all terms and conditions governing access to these services, the settlement of transactions, the commitments and liabilities of both the subscriber and credit institution, the contract duration, protection of private data, cost of transactions, intellectual rights, and communication between parties.

Multicurrency and cross-border features. Seven out of the 12 credit institutions that offer internet banking and four out of the five credit institutions that provide mobile banking offer the possibility to effect cross-border transactions.

Impact of innovations on the payment processing channel. Regarding the payment cycle, both internet and mobile banking services are limited to the remote submission of payment instructions. The clearing and settlement of payments are effected through the traditional payment processing channel of the Greek market, namely via the existing payment systems and other payment arrangements.

Support of real-time payment processing. Funds transfers between accounts held within the same credit institution can be executed in real time. The time span for the execution of interbank payments depends on the payment arrangement used for the clearing and settlement.

Electronic commerce (business-to-customer and business-to-business services)

Overview. E-commerce transactions are effected through the use of credit transfers, payment cards and e-money products. Currently three credit institutions offer B2C services, mainly supporting electronic shops.

Typical security features include: (i) the use of digital certificates that verify the safety of e-shop websites; (ii) encryption protocols to transfer transaction data over the internet. The SET protocol, supported by Visa and MasterCard, is supported by some of these credit institutions.

Three credit institutions offer a limited range of B2B services. Two of them are still in the design/implementation phase and details of their services are expected to become available soon. The third one is in a pilot phase providing the following B2B services: (i) submission of debit instructions; (ii) reversal instructions; and (iii) notification to supplier/buyer.

4. Policy responses

Monetary policy and seigniorage. The Bank of Greece's policy concerns are based on the prospect of the gradual growth of e-money. In line with current and anticipated developments, any possible policy issues and concerns relating to monetary policy effectiveness are considered in the context of the Eurosystem. To this end, subject to the payment system oversight framework of the central bank, e-money operators submit monetary statistical data on loadings, payments, redemptions and outstanding value (float).

The stance of the central bank as regards the possibility of issuing e-money itself will be in compliance with Eurosystem policy decisions.

General legal issues. The legal framework applying to e-money schemes and e-payments is as follows:

- (i) The Bank of Greece's Statutes, under which the central bank is entrusted with the task of promoting and overseeing the smooth operation of payment systems and instruments and supervising credit institutions incorporated in Greece;
- (ii) Law 3148/5.6.2003 incorporating into Greek legislation Directives 2000/12/EC, relating to the taking-up and pursuit of the business of credit institutions as amended by Directive 2000/28/EC, and 2000/46/EC on the taking-up, pursuit and prudential supervision of the business of electronic money institutions;
- (iii) Bank of Greece Governor's Act 2366/3.8.1995, limiting the issuance of e-money in the form of multipurpose prepaid cards exclusively to institutions entitled to receive deposits or other repayable funds;
- (iv) Monetary Policy Council Act 50/31.7.2003 on the establishment of a framework for the oversight of payment systems;
- (v) Bank of Greece Governor's Act 2501/31.10.2002 on the information provided to customers by credit institutions, inter alia with regard to transactions through the internet;
- (vi) Law 2331/1995 on the prevention and repression of money laundering;
- (vii) Presidential Decree 150/2001 incorporating Directive 99/93/EC on electronic signatures.

Relevant security issues. E-money schemes fall within the scope of assessment of the Bank of Greece. In particular, the Eurosystem's *Electronic money system security objectives* report provides the framework for the assessment of e-money schemes' operational reliability. The central bank evaluates whether the implemented technical, organisational and procedural infrastructure effectively safeguards the authenticity of transactions and prevents or promptly detects counterfeiting, fraud and money laundering.

In addition, the adequacy of internal audit procedures of the issuer relating to the control and management of technical and procedural risk is appraised by the central bank.

According to Presidential Decree 150/2001, the National Telecommunications and Post Commission (NTPC) is the authority responsible for:

- providing qualified certificates;
- ascertaining compliance of secure signature creation devices;
- supervision and control of electronic signature certification service providers that are established in Greece and are entitled to issue qualified or non-qualified certificates or to provide other certification services related to electronic signatures.

Additionally, under Regulation 248/71/2002, issues referring to provision of electronic signature certification services are subject to NTPC's authority. NTPC also maintains a registry of the certification service providers established in Greece. So far, six such providers have been certified; one of them is a credit institution. NTPC is in the process of further elaborating the framework under which such services are provided.

Issuer details. The issuance of e-money in any form is limited to credit institutions by law. Electronic money institutions are defined as such.

Payment system issues. Clearing and settlement arrangements for e-payments follow the traditional payment processing channel and therefore no particular issues have arisen so far in this area.

Oversight issues. Monetary Policy Council Act No 50/31.7.2002 establishes the framework of general principles and procedures which enables the Bank of Greece to perform its tasks relating to the oversight of payment systems, which include e-money schemes and payment instruments. In addition, regarding electronic payments, oversight also applies to any supporting products and services.

The Bank of Greece may, where necessary, propose to the managers of payment systems or e-money schemes modifications regarding the operating rules and/or the design of such systems with a view to mitigating risks.

Supervisory issues. As e-money issuers are exclusively credit institutions, they are subject to prudential supervision, which is performed by the Bank of Greece, while e-payments as a banking activity fall within the central bank supervisory framework, with an emphasis on security and operational reliability issues.

Law enforcement issues. Law 3148/2003 stipulates a limited storage capacity of e-money devices, reducing the risks related to money laundering activities and the impact of fraud or failure of the issuer.

Cross-border issues. Presidential Decree 116/2003 regulates legal issues relating to services provided by the information society and particularly e-commerce services.

Hong Kong SAR

1. Card-based products

Octopus Card. Octopus is a stored value card scheme using contactless smartcard technology, developed and issued by Octopus Card Limited ("OCL", formerly known as Creative Star Limited), a special purpose deposit-taking company authorised by the Hong Kong Monetary Authority (HKMA) and jointly owned by six transport operators. As OCL is a deposit-taking company rather than a fully licensed bank, Octopus needs to have a core use which is related to the business of the owners of OCL. Based on regulatory considerations, the HKMA restricts Octopus' non-core uses to 50% of the value of total uses. Octopus may also have a number of ancillary or incidental uses which are intended to increase convenience for cardholders. These uses are subject to a limit of 25% of the value of total uses. Octopus cards can be used in virtually all of the local transportation systems. Non-core uses are possible at outlets including car parks, fast food chains, cake shops, convenience stores, supermarkets, personal care stores, vending machines, photo booths, payphones, photocopiers, cinemas, leisure facilities, schools, etc. Octopus cards can be reloaded at designated terminals on the premises of the transport stations, convenience stores and some other retail outlets. The feature of auto-reloading from cardholders' bank accounts or credit cards is also available.

Octopus Card has been well received by the general public. As at end-August 2003, the number of cards in circulation reached 9 million (29% more than in March 2001) among around 6.8 million residents in Hong Kong. The value of daily transactions was high at USD 6 million (11% more than in March 2001). The number of merchant terminals for Octopus increased to 23,000 (44% more than in March 2001).

2. Network-/software-based products

Yahoo!PayDirect with HSBC. This is primarily a person-to-person payment scheme launched in 2002 by HSBC in alliance with Yahoo! Inc. It enables users to send and receive money via e-mail. Money can be transferred in and out of the online account by linking it to a user's actual bank account, which is not restricted to HSBC accounts. Users may use the online accounts for person-to-person payments, and also for services such as auctions and shopping on the Yahoo! network, and HSBC's websites.

Apart from this scheme, the HKMA is not aware of any other network-/software-based schemes in Hong Kong to date. However, the increasing popularity of the internet and evolving mobile phone services²⁷ in Hong Kong are conducive to the development of such schemes in the future.

3. Internet and mobile payments

Online payment portal. PPS (Payment by Phone Service) is a widely used bill payment service that allows customers to pay their bills over a telephone or through the internet. The service is jointly offered by EPS Company (HK) Limited, a bank consortium, and PCCW, a telecommunications company. The phone channel and the online channel were introduced in 1993 and 1999 respectively. Bill payments can be made to preregistered merchants from the customers' preregistered bank accounts. PPS currently handles millions of transactions monthly for a wide variety of merchants such as public utilities, government/statutory organisations, banks, telecommunications companies, educational institutions, and charity organisations. As of September 2003, there were around 1.5 million PPS accounts.

Internet banking. Internet banking services are increasingly popular²⁸ in Hong Kong and most of them allow their customers to pay bills (eg government, utilities and other merchants) and transfer funds to third parties. Around 35 banks (including all major banks and the vast majority of retail banks) in Hong Kong are offering internet banking services through different electronic channels such as the internet, mobile phones, personal digital assistants and electronic kiosks.

E-mail-based internet payment schemes. In addition to Yahoo! PayDirect with HSBC, the HKMA is aware of e-mail-based internet payment scheme in Hong Kong. Started in 2000, PayDollar (a service provided by a non-bank entity) offers online payment services to individuals and to small and medium-sized enterprises. Customers, after registration with the scheme, can make payments online by providing an e-mail address of the recipient and the payment amount. The funds will be debited from the payer's bank account or credit card. Upon receiving an e-mail from PayDollar, the recipient can choose to obtain the funds in the form of a cheque or a direct credit to his or her bank account. PayDollar does not store any value for its users.

4. Policy responses

Implications for monetary policy and seigniorage. Octopus is required to submit periodic returns to the HKMA on the amount of electronic value issued and outstanding, the aggregate transaction values and the average value of transactions. This information helps the HKMA to monitor the implications of e-money for monetary policy and seigniorage.

²⁷ As of June 2003, there were over 6.4 million mobile phone users out of a population of 6.8 million.

²⁸ There were about 1.8 million internet banking accounts for retail customers at the end of June 2003.

Given the present monetary arrangements in Hong Kong and the importance of the aggregate balance, rather than cash, in the operation of the currency board system, it appears unlikely that growth of e-money in Hong Kong would undermine monetary control.

As for the implications of growth of e-money on seigniorage, the potential loss of seigniorage under current conditions is not particularly large.

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

- (a) fully licensed banks will be deemed to be approved to issue MPCs which have the characteristics of “generally accepted purchasing power”;
- (b) special purpose vehicles whose principal business is to issue MPCs may be authorised as deposit-taking companies under the Banking Ordinance for the principal purpose of issuing MPCs. It is envisaged that service providers which wish to issue more limited purpose MPCs for the main purpose of charging for the services they provide, or originators of electronic value, would be authorised under this category;
- (c) the HKMA may declare a stored value card not to be an MPC where the usage of the card is very limited and the risk of its use to the payment system and cardholders is slight; 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.

The HKMA has included in its *Guide to Authorisation* of September 2002 a chapter explaining the principles and criteria that the HKMA will use in exercising its powers for the authorisation of MPCs.

The current framework for MPCs in the Ordinance only regulates card-based multipurpose electronic stored value schemes. The HKMA is considering the need to expand this framework to cover network-/software-based schemes.

Relevant security issues. The criteria which the HKMA requires to be satisfied in respect of security are clearly set out in a questionnaire to be completed by scheme operators when applying for authorisation to issue MPCs. These include:

- (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).

Ongoing assessments of the adequacy of security measures of an e-money scheme is important. In ensuring this, the HKMA will assess among other things the relevant security controls during its on-site examinations and off-site reviews. MPC issuers may be requested to appoint outside experts to assist in appraising the security of e-money schemes if the need arises.

Issuer details. Please refer to the paragraph above on general legal issues regarding who may issue MPCs. In developing the legal framework for MPCs, the HKMA has adopted the following principles:

- (a) it is important to maintain the stability of the payment system (and thus of the financial system as a whole). Therefore, the HKMA needs to be careful about extending access to the payment system beyond fully licensed banks, to which it is confined at present;
- (b) at the same time it is important to provide some flexibility in the legal framework for service providers to take advantage of e-money technology to improve the efficiency of their services to the public;
- (c) these two considerations would argue that there should be some scope for non-bank issuers to issue MPCs, but that these should be more limited in scope than those issued by licensed

banks. Only the MPCs issued by fully licensed banks 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 MPCs because of their analogy to cash and deposits. However, single purpose cards also raise considerations of consumer protection which need to be addressed (though not necessarily in the Banking Ordinance).

Payment system issues. Hong Kong’s retail payment systems are considered to be efficient, effective and reliable.²⁹ The providers of Hong Kong’s payment systems are innovative and well tuned to market needs. These providers develop and operate products which generally meet the market’s needs in terms of service required, timeliness and response time. There is no particular problem relating to the clearing and settlement arrangements for e-money.

Oversight issues. There are three key policy objectives to be addressed in Hong Kong’s oversight of retail payment systems: (i) promoting transparency of the operation of payment systems and services; (ii) monitoring fees and charges; and (iii) promoting market access, competition and efficiency. These issues are in turn essential to the efficiency and competitiveness of Hong Kong’s payment systems. A progressive approach was suggested to improve regulatory oversight in Hong Kong and achieve the three objectives stated above. It was recommended to introduce a self-regulatory approach, under which the industry would draw up codes of practice and also monitor compliance with such codes, while the HKMA would oversee the overall implementation of such an approach.

Supervisory issues. The policy responses on supervisory issues with respect to e-money developments are described in the paragraphs “General legal issues” and “Issuer details”.

Law enforcement issues. The potential for e-money being exploited for money laundering purposes argues for restricting the issuance of MPCs to regulated entities. The advent of e-money may create a convenient vehicle for money launderers to transport money without having to carry a huge bulk of cash. As part of the criteria for approving the issue of MPCs, the HKMA will need to be satisfied that there are adequate controls to guard against money laundering activities. These would include, for example:

- (a) audit trails;
- (b) a limit on the amount that can be transferred to and from the card;
- (c) linking the card to specific bank accounts for the purpose of downloading and offloading of value;
- (d) limiting the amount that can be exchanged through the linked accounts; and
- (e) monitoring transaction behaviour and reporting any suspicious activities.

Current legislation on money laundering, counterfeiting, false accounting, etc is applicable to e-money schemes.

Cross-border issues. As Octopus does not involve the use of foreign currencies or payments outside Hong Kong, there are no material cross-border issues associated with this scheme.

Other issues. In November 2001, the Hong Kong Association of Banks and the Deposit-taking Companies Association issued jointly a revised Code of Banking Practice, which was also endorsed by the HKMA. The revised Code includes a chapter on banking practices in relation to stored value cards.

²⁹ See the Review of retail payment services in Hong Kong, conducted by the HKMA in August 2000.

Hungary

1. Card-based products

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

2. Network-/software-based products

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

3. Policy responses

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

A government decree based on Recommendation 97/489/EC was issued in May 1999 and reissued in January 2002 [232/2001 (XII 10) Korm]. It defines the term "electronic money instrument" and sets some basic rules. Current regulations restrict e-money issuance to credit institutions.

The implementation of Directive 2000/46/EC (18 September 2000) on the taking-up, pursuit and prudential supervision of the business of electronic money institutions is under way.

Iceland

1. Card-based products

There have been no major developments in the adoption of card-based e-money schemes in Iceland. A pilot project, initiated by all the credit institutions, for a card-based e-money scheme (KLINK) was completed successfully and tested in 2002. However, due to a lack of business interest the credit institutions decided not to implement the project. They have shown little interest in promoting such payments and there are no projects for establishing separate e-money institutions.

2. Network-/software-based products

There have been no major developments in the adoption of network-/software-based e-money schemes in Iceland.

3. Internet and mobile payments

Icelandic credit institutions have developed a shared platform for home banking through the internet. On the basis of the shared platform each credit institution has developed its own site and access facilities for payment intermediation and payment of bills. The use of internet banking has become widespread in Iceland. Banks' customers can send payments with almost immediate finality and access funds through the shared platform.

Projects are being developed for linking mobile payments to the shared platform. Two solutions have been developed, one by the card companies, and the other by one of the largest telephone companies. A shared platform has been developed enabling connections between card and telephone numbers.

4. Policy responses

In April 2002 a new act on e-money institutions was adopted in Iceland, later transferred to a new act on financial companies. The relevant provisions on e-money institutions are in conformity with EU legislation.

India

1. Card-based products

The Reserve Bank of India (RBI) has been partnering a multi-application smartcard project - under the aegis of the Ministry of Communications and Information Technology, Government of India to run another pilot project on the use of multi-application smartcards in the country. Various issues relating to technology, security, regulatory and supervisory concerns and legal implications were examined to make the use of smartcards a viable proposition after the conclusion of the pilot project. The project is aimed at combining applications relating to banking, insurance, postal services, identification, etc in a single card. A few banks and the card industry consortium are currently implementing the project with the help of two academic institutions.

Three banks (ICICI Bank, HDFC Bank and Oriental Bank of Commerce) have been given permission by the Reserve Bank to issue prepaid multipurpose cards. A few banks allow withdrawal of cash from ATMs using the prepaid card.

The fee structure is left to the participants and no specific structure has been stipulated.

2. Network-/software-based products

Currently, there are no network- or software-based e-money schemes in existence in India.

3. Internet and mobile payments

In order to facilitate faster and more efficient service to customers, some banks in India have started providing services via the internet. To examine the various regulatory, supervisory and legal issues raised by internet banking, a working group was constituted by the Reserve Bank to address these issues and make recommendations. The working group made recommendations covering technology and security standards, legal issues, and regulatory and supervisory issues. Based on these recommendations, guidelines on internet banking have been issued to banks which they are required to observe when providing internet-based banking services to their customers.

The internet channel is also being used for various banking and other services including railway reservations, retail purchases, etc where the instruction is given electronically and, based on the instruction, the account of the customer is debited and credit passed on to the service/goods provider.

Banks are integrating the internet banking services being offered into the **RBI Electronic Funds Transfer (RBI-EFT)** system, facilitating transfers of funds across accounts with other banks.

With banks moving over to implementing core banking solutions and also providing internet banking, more transactions are being carried out online either through use of a credit card PIN or instructions by the customer to directly debit the account.

E-cheque: the Negotiable Instruments Act has been amended to provide for recognition of e-cheques. A working group has been constituted by the Reserve Bank to formulate recommendations on the specification and usage of e-cheques.

At present four banks in India - Corporation Bank, Dena Bank, State Bank of India and ICICI Bank - are issuing smartcards.

The following banks in India are authorised to provide internet banking services to customers: ABN AMRO, BNP Paribas, Citibank, Corporation Bank, Deutsche Bank, Federal Bank, Global Trust Bank,

IDBI Bank Ltd, IndusInd Bank, Punjab National Bank, Standard Chartered Bank, Vysya Bank, UTI Bank, State Bank of India, Centurion Bank, ICICI Bank, Syndicate Bank, Credit Lyonnais, Bank of America, JPMorgan Chase, HSBC, South Indian Bank, and Kotak Mahindra Bank.

4. Policy responses

Monetary policy and seigniorage. The Reserve Bank has constituted a working group to study the various issues related to e-money. After detailed analysis, the group made the following main recommendations:

- Multipurpose e-money may be issued only by authorised banks against payment of full value of central bank money or against credit. The issuance of e-money on a credit basis should, however, be strictly regulated and closely monitored.
- Issuers must be under obligation to offer redemption of their e-money liabilities net of service charges, if so required. From a monetary policy point of view, such a redemption requirement is essential in order to preserve the unit of account function of money as well as to control money supply in the economy.
- E-money could have a profound impact on the composition of monetary statistics and money supply unless regulated prudently. E-money could be issued against cash (ie 100% backed by central bank money paid up front). Since e-money schemes are close substitutes for central bank money, these should be explicitly accounted for in monetary statistics. If e-money were to be issued only by authorised banks, then currency would be replaced with demand/time liabilities through e-money. In that eventuality, issuance of e-money would be money stock neutral and no change would be required in the definition of money stock. However, if e-money is issued by entities other than depository institutions (ie banks), the money creating sector as embedded in the composition of monetary statistics would need to be broadened.

Statistics on e-money are not being collected at present.

Legal framework. As a result of the passing of the Information Technology Act (2000) and subsequent amendments, electronic modes of payment now receive explicit recognition. Amendments to the Negotiable Instruments Act were passed in November 2002, giving legal recognition to cheque truncation and e-cheques.

The IT Act includes, among other things, an amendment to the RBI Act which empowers the Reserve Bank to regulate electronic funds transfers among banks and financial institutions.

Security issues. The Guidelines for Internet Banking issued by the Reserve Bank permit banks to provide internet-based banking facilities subject to compliance with the following security requirements:

- At the minimum, banks should use the proxy server type of firewall so that there is no direct connection between the internet and the bank's system;
- The application server should be isolated;
- PKI is the most favoured technology. However, until the PKI is put in place, banks should use at least 128-bit SSL;
- Encryption of sensitive data like passwords in transit within the enterprise itself;
- All computer accesses, including messages received, should be logged;
- Banks should have a solid infrastructure and schedules for backing up data;
- Business continuity should be ensured by setting up disaster recovery sites.

As and when banks in India propose to provide any facility apart from permitted ones, approval of the Reserve Bank is to be obtained.

Issuer details. Multipurpose e-money would be issued only by authorised banks against payment of full value of central bank money or against credit. The issuance of e-money on a credit basis should, however, be strictly regulated and closely monitored.

Payment system issues. As e-money transactions are yet to take place/gain momentum, data on internet/mobile banking transactions using these channels have not yet been collected.

The Committee on E-money has noted that the usage of e-money may result in a reduction of the demand for notes and coins, especially small denominations.

The benefits of e-money have been noted: convenience to the consumer, back office automation, safety, etc.

Oversight issues. The various types of payment systems in vogue are presently to some extent regulated and supervised by the Reserve Bank. However, it is proposed to enact a Payment Systems Act to empower the Reserve Bank to regulate and supervise all payment systems - including those provided by private service providers.

Indonesia

1. Card-based products

There are no card-based products at the moment in Indonesia. However, there has been some development in the area of card-based prepaid products which might possibly be considered as a type of e-money. Before the economic crisis started in 1997, several banks conducted an in-depth study on e-money schemes like Visa Cash, Proton, Mondex, etc, but as yet none of the banks have decided to launch the products.

E-wallet was introduced in October 2001 by a local bank in Indonesia in cooperation with Visa International. The product uses a magnetic technology. The value of the money in the e-wallet is maintained in a special account (pool account) by the issuer bank. Users of e-wallet need a PIN and a signature mechanism for online authorisation.

E-wallet is available at bank counters, outlets, kiosks, etc. Each card has a 16 digit number which is unique. This number should be used when reloading value. The issuer bank does not pay interest on the outstanding value.

E-wallet is a prepaid and multipurpose product which can be used at any merchant in any place (domestic or abroad) displaying the Visa Electron logo. The value of money in the wallet is reduced each time it is used for payment and it can be reloaded at bank counters, over booking, by interbank transfer via clearing, or from ATM terminals.

2. Network-/software-based products

There are no network-/software-based products at the moment in Indonesia.

3. Internet and mobile payments

In Indonesia, internet banking was initiated by a domestic bank in mid-1999. At the time of writing, there are about seven banks providing internet banking services with informational and transactional services. Meanwhile, several banks have developed websites limited to informational and communication purposes. In the future, more internet users and tighter competition among banks will probably increase the number of banks entering into internet banking. Products or services generally offered consist of funds transfers within bank accounts, provision of information, eg on interest rates, exchange rates, account balances, historical transactions, bill payments (telephone, electricity, insurance, etc), buying top-up vouchers for mobile phones, and other services such as application forms (for a new account or loan), purchasing of cheque books, etc.

Meanwhile, with the wider usage of mobile phones, several banks have taken the opportunity presented to develop the delivery channel to their customers. There are currently about seven banks providing phone banking. The services, mostly offered via mobile phone, are quite similar to those

provided via internet banking, such as funds transfers, information provision transactions, bill payments, buying top-up vouchers for mobile phones, etc.

Prepaid telephone card. Mobile phone companies have started to provide prepaid schemes. Customers can reload their card with credit through ATMs or by using a credit card. The take-up of this scheme has pushed the providers to innovate with regard to their prepaid range of products. One of the most significant innovations that will soon be developed is the facility to transfer a credit balance from one customer to another customer by using the "short message service" facility ("sms-based").

Currently, the central bank only collects data on card-based transactions, but in the future it plans to extend the information to be collected to internet and mobile payments.

4. Policy responses

4.1 Policy responses relating to e-money developments

Bank Indonesia is monitoring the development of electronic means of payment. According to the law, Bank Indonesia has the authority to determine the usage of payment instruments. The issuance of a new type of payment instrument has to be approved by Bank Indonesia.

At this time, there is no specific central bank policy or regulation regarding the implementation of e-money schemes. Since Indonesia does not yet have any e-money schemes, the issue is seen more as one of awareness for the time being. For this reason, Bank Indonesia is monitoring the current issues relating to e-money and its implementation in other countries. E-money issues will also be addressed in the new version of the Indonesian National Payment System Blue Print, which is now being revised. It is expected that the revised Blue Print will give some policy directions on e-money schemes.

4.2 Policy responses relating to internet and mobile payments

Since March 1995 Bank Indonesia has passed a regulation on the application of information technology systems (ITS) that oversees the application procedure as well as risk mitigation and security measures. However, this regulation does not specifically mention the ITS of internet banking. Therefore, Bank Indonesia is now developing a specific regulation on the provision of internet banking services, which is expected to come into force in 2004.

The regulation is based on the following principles: (i) it may not discourage the growth and innovation of internet-based financial services and should increase benefits; (ii) it should offer effective protection to the public; (iii) attention should also be paid to international aspects such as home country supervision, cross-border issues, etc; (iv) the regulation should conform to anti-money laundering, bank secrecy and anti-monopoly policies.

Ireland

1. Card-based products

There are no multipurpose prepaid card schemes in Ireland at the moment.

2. Network-/software-based products

No developments to report.

3. Internet and mobile payments

Mobile payments

mPark. Traditionally parking meters in Dublin have been coin operated, but in January 2003 Dublin City Council introduced the mPark mobile payment parking service. This enables motorists to use their mobile phones to pay for on-street parking. The parking fee is billed to the motorist's telephone or credit card bill. Motorists are also afforded the opportunity to view a record of their parking transactions on the internet.

Fee structure. To use the service, motorists must first register online at the mPark website or by dialling the mPark number. Once registered a user dials up a general number where an automated operator answers and recognises the user, who then keys the pay and display parking machine number into his/her phone. The system remotely signals the machine to "wake up" enabling the user to obtain tickets issued in EUR 1 increments.

Parties involved. Itsmobile Ltd, the Irish mobile payment software firm which developed the mPark solution on behalf of Dublin City Council, is operating the service.

Payment details. Charges for parking using the mPark system are billed via the user's credit card bill or through his/her mobile phone bill. The method of billing depends on where the user has registered for participation in the system. If the user has registered with mPark any charges will appear on his/her credit card bill. By registering with his/her mobile operator, the user will be charged via the mobile bill.

Italy

1. Card-based products

MINIpay is an electronic purse based on a microchip technology (not EMV) that allows offline transactions. The MINIpay card is issued by banks to all applicants, who need not be account holders. Both registered and anonymous cards are provided. The card can be reloaded at any branch of the issuing bank and, through a credit or debit card, at the ATMs of other participating banks. It can also be loaded from home by telephone using a portable terminal. The bearer can redeem the residual value at the issuing bank at any time.

MINIpay funds can be spent through two types of terminal: one for merchants, which may be either fixed or mobile; and the other, equipped with a supplementary module, for vending machines and payphones. At the end of the working day the merchant can transfer the value loaded onto the terminal to his/her bank current account by using a telephone link or by loading the value onto a "merchant card" which is then delivered to the bank. Card-to-card payments are not allowed. The security infrastructure of the project takes account of different requirements, such as limits on transferability; online loading of e-money; uniqueness of transaction identifier, card identifier and terminal identifier; key management and storage; physical integrity of the equipment; cryptography; and full accountability.

Kalibra (and other prepaid products with different names) is a registered prepaid card issued by a bank and based on magnetic stripe technology; it can be loaded with value up to EUR 3,000 and is reloadable. The card can be issued on the Visa (Visa Electron) or MasterCard (Cirrus/Maestro) International network. It can be used for purchases at merchants accepting Visa Electron or Maestro cards and for cash withdrawals at Visa or Cirrus ATMs. It can be bought at the issuing bank or at other banks belonging to the same prepaid card network. The card is issued by the bank after it receives funds via an online procedure, after the distributing bank immediately delivers the card into the customer's hands. The issuer keeps a record of the amount received and of any following use of the card through single accounting evidences. The card can be reloaded by cash (at any branch of the

issuing bank or banks belonging to the same prepaid card network), using ATM facilities or credit transfers. The residual value can be redeemed at both the issuing and the distributing banks.

PagoBancomat Prepagato. At the end of 2001 Cogeban (Convention for the Management of the Bancomat Trademark³⁰ - operating within the Italian Banking Association) promoted an initiative aimed at enabling all licensed banks of the PagoBancomat trademark to issue both anonymous and registered prepaid cards with standard features. Cards are based on magnetic stripe technology; the value is not stored on the card but is recorded by each issuing bank through single accounting evidences. Cards are issued by the bank after receiving funds and can be loaded by cash at any bank branch of the issuing bank or through a debit card at some ATMs accepting Bancomat cards. Anonymous cards are issued up to a maximum of EUR 500 and are not reloadable; as regards registered cards, each issuing bank sets a maximum value on a discretionary basis and the cards can be reloaded at any branch or ATM of the issuing bank and at the ATMs of other participating banks. Cards can be used for: purchases at merchants accepting PagoBancomat cards; cash withdrawals at ATMs of the Bancomat circuit. The residual value can be redeemed at the issuing bank within 12 months of the card expiry date.

Carta Chiara is a registered prepaid card issued by a bank and based on magnetic stripe technology; the card can be loaded with value up to EUR 3,000 and is reloadable. There are two versions of Carta Chiara: a Visa Electron card that can be used for purchases at merchants accepting Visa Electron cards and for cash withdrawals at Visa ATMs, and a Cirrus/Maestro card that can be used for purchases at merchants accepting Maestro cards and for cash withdrawals at Cirrus ATMs. The cards can be bought at the issuing bank or at other banks (distributing banks). The cards are issued by the bank after receiving funds; the issuer keeps a record of the amount received and of any following use of the card through single accounting evidences. The cards can be reloaded by cash at any branch of the issuing bank and at the ATMs of the issuing and distributing banks. The residual value can be redeemed at both the issuing and the distributing banks.

Sella-Planet is an anonymous and not-reloadable prepaid card, issued by a bank. It can be used to make purchases at merchants accepting Visa cards. The plastic support of the card (not yet operational) is distributed at shops that usually sell telephone cards. The card becomes operational when the user calls an operator of the issuing bank; value can be loaded by cash at the issuing bank or using a telephone card (according to an agreement between the telecommunications company and the bank, the user can convert the telephone credit into a credit at the bank).³¹ The residual value can be redeemed at the issuing bank.

2. Network-/software-based products

Omnipay Prepagato is a scheme developed by one of the major Italian telecommunications companies, managed by a financial intermediary and issued by a bank. The user buys a telephone card and, according to an agreement between the telecommunications company and the bank, converts the telephone credit (provided it is still intact) into a credit at the bank (Omnipay account) that can be used to purchase low-value goods over the internet at merchants subscribing to the scheme. The financial intermediary manages the technological infrastructure, network transactions and relations with merchants. The telecommunications company creates scratch cards and PIN codes. The bank sets up and operates the Omnipay account (an account related to the card number from which funds are available through the PIN code). When paying, the user (identified only by a number) is automatically routed to the Omnipay management system. While being connected, the user - protected by adequate security systems - transmits his/her Omnipay card number to the Omnipay management system. On no occasion does the merchant have access to the user's PIN code. Within the purchase transaction, the merchant's identity is verified by an authentication process using electronic signature. Confidentiality is guaranteed by encryption mechanisms. The customer can have any residual credit of his/her Omnipay account refunded provided his/her credit is equal to or more than EUR 10, and the Omnipay account was created not less than three months and not more than 24 months before.

³⁰ Bancomat is the Italian interbank ATM network; PagoBancomat is the most widespread Italian debit card for POS payments.

³¹ See Omnipay scheme.

Moneta online is a scheme issued by one of the largest Italian banks. The user buys a scratch card (up to EUR 250) that can be used to purchase low-value goods over the internet at merchants subscribing to the MONETA and Visa circuits. The card can be bought at any branch or ATM of the issuing bank or of a bank having an agreement with the issuing bank. Technological infrastructure, network transactions and relations with merchants are outsourced by the bank. Scratch cards and PIN codes are created by the issuing bank. The card becomes operational when the user - protected by adequate security systems - connects to the Moneta online website by using his/her PIN code, and the bank sets up an account related to the card number. When paying, the user connects to the Moneta online website and gets a temporary, disposable virtual Visa card to be used in the payment transaction on the merchant's website. From this moment on the payment process follows the rules of the Visa circuit. The customer can have any residual credit refunded provided his/her credit is more than, EUR 10 and there are at least 12 months left before the expiry date on the card.

CartaFacile is an anonymous prepaid instrument issued by a bank. The bank sets up and operates an account related to the card number from which funds are available through a PIN code. Funds can be provided to the issuing bank by cash, using a payment card at ATMs, via credit transfer (for users holding a bank account at any bank) or via internet credit transfer (for users holding a bank account at the issuing bank). The instrument can be used to purchase low-value goods (up to EUR 500) over the internet at merchants subscribing to the scheme. The residual value can be redeemed at the issuing bank.

Moneta MobilMat is an anonymous prepaid instrument issued by a bank that uses the mobile phone as a delivery channel. Funds can be loaded as follows: (i) by cash at the issuing bank; (ii) by credit transfer (made through mobile phone - PayFriend); (iii) by using a telephone card (according to an agreement between the telecommunications company and the bank, the user can convert the telephone credit into a credit at the bank).³² The residual value can be redeemed at the issuing bank. For terms and conditions of use see the description of MobilMat below.

3. Internet and mobile payments

MobilMat is a virtual electronic purse, promoted by a financial intermediary, that allows the use (in a virtual way) of different payment instruments (credit cards, anonymous and registered prepaid cards, credit transfers) to make both face-to-face and remote payments. The users communicate to the issuer the data of the payment instrument they would like to use through the MobilMat. The issuer provides the user with an identification code linked to the chosen payment instrument. When paying, the user - using his/her mobile phone as a virtual POS terminal - gives the identification code to the merchant, who does not need the payment instrument data. MobilMat can be used to make purchases over the internet at merchants subscribing to the scheme; at shops subscribing to the scheme and equipped with a POS terminal (in this case the mobile phone is used as an authentication tool); at shops subscribing to the scheme that are not equipped with a POS terminal (in this case the mobile phone is used both as an authentication tool and as a POS terminal); at vending machines (using the mobile phone as a POS terminal). The scheme also allows users to make credit transfers via mobile phone although, according to anti-money laundering provisions, credit transfers can be originated using all the payment instruments envisaged by MobilMat except anonymous prepaid cards.

BANKPASS Web is an electronic wallet promoted by a committee operating within the Italian Banking Association (the E-Committee, manager of the BANKPASS Web trademark). It allows the use of different payment instruments (bank debit and credit cards) to make payments over the internet. The user communicates to the bank the data of the payment instrument(s) they would like to use. The bank provides the user with an identification code and a password linked to his/her e-wallet that contains the payment instrument(s). BANKPASS Web can be used to make purchases over the internet at: (i) merchants subscribing to the scheme; in this case when paying, the user will key in only his/her identification code and password without inserting the real number of his/her credit or debit card; (ii) merchants not subscribing to the scheme; in this case when paying, the user connects to the BANKPASS website and obtains a virtual PAN to be used only for that payment transaction on the merchant's website.

³² See Omnipay scheme.

4. Policy responses

Monetary policy and seigniorage. Following the Eurosystem framework, the Bank of Italy allows only supervised institutions to issue; for the purpose of monetary control, e-money is treated as an “on-balance sheet” liability of the issuing institution, similar to other liquid liabilities such as “overnight” deposits. The Bank of Italy collects 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. As regards innovation in payment instruments, the Bank of Italy conducts ad hoc annual surveys on e-money schemes, paying special attention to those to be used on the internet: the aim is to detect the introduction of features which might hamper control of the monetary base and aggregates (eg person-to-person transactions). A similar section is devoted to m-payments, which, at present, have a very limited diffusion.

The features and the dimension of e-money products have not reduced the control central banks have over very short-term interest rates, as might happen if a widespread substitution of central bank money with privately issued e-money were to reduce the size of central banks’ balance sheets. The loss of seigniorage revenues due to the substitution of notes and coin by e-money is negligible. At present the Bank of Italy does not envisage issuing e-money itself.

As regards m-payments, they might be considered as simply a new delivery channel to send payment instructions to supervised financial institutions.

General legal framework and issuer details. The legal framework for the issue of multipurpose prepaid cards is provided by the 1993 Banking Law, which specifies that “any form of fund-raising related to the issue of generally spendable means of payment (instruments with general purchasing power) is restricted to banks”. Therefore, according to this principle only banks can issue multipurpose cards that are included within the assets covered by deposit insurance (with the exception of bearer instruments).

As to electronic money, the European regulatory framework limits the issuance of e-money to traditional credit institutions and to a new type of credit institution called an ELMI. The framework is defined in two directives: European Parliament and Council Directive 2000/46/EC on the taking-up, pursuit and prudential supervision of the business of electronic money institutions and the European Parliament and Council Directive 2000/28/EC amending Directive 2000/12/EC relating to the taking-up and pursuit of the business of credit institutions. The directives were transposed into the Italian legal framework through Law No 39 of 1 March 2002, which grants the Bank of Italy regulatory and monitoring functions in order to implement the law. In particular the Bank of Italy has the power to define both prudential supervision requirements for ELMIs and oversight requirements for e-money instruments and circuits.

Anti-money laundering competencies are conferred upon the Bank of Italy, the Italian Foreign Exchange Office and the Customs Police. From the oversight perspective, architectural characteristics of the payment circuit and instrument are considered in order to avoid illicit uses. This is all the more true for anonymous instruments.

Relevant security issues. The assessment of the technical features and the functional aspects of e-money schemes lies within the scope of the Bank of Italy in its capacity as payment system overseer. In this regard, the Bank of Italy assesses whether the technical features implemented in the scheme are able to prevent, detect and limit threats of fraud, forgery and money laundering (see “Payment system oversight issues” below). In addition, the Bank of Italy assesses whether the internal procedures of the issuer or of the outsourcing company committed to managing the operational functions are effective in controlling and managing operational risks.

The Bank of Italy has been actively involved in work at Eurosystem level aimed at defining the security objectives of e-money schemes: the so-called *Electronic money system security objectives* (EMSSO) report (2003) contains a general description of e-money schemes, a comprehensive risk/threat analysis and a list of security objectives that should be met by e-money schemes in order to cover these risks/threats. In particular, the analysis provides an overall description of a typical e-money

scheme and highlights the threats and organisational guidelines that arise on the basis of certain assumptions.³³

Provider issues. As mentioned above, only banks and ELMIs can issue e-money; at present only banks can issue multipurpose prepaid cards. In this context the role of service providers in initiating and transmitting payment information is growing together with the diffusion of ICT in the payments industry. Non-financial providers are usually owners and/or developers of the new technologies which might be applied to the management of payment instructions. In Italy, control of the activity of service providers in the field falls under the scope of the oversight of payment systems, mainly for the proper management and prevention of operational risks.

Payment system oversight issues. Monitoring of the issues relating to payment instruments, including prepaid cards and e-money, are part of the activity of the Bank of Italy as payment system overseer. The 1993 Banking Law formally assigned payment system oversight to the central bank. Specifically, under Article 146: "The Banca d'Italia 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 operators.

In line with the Eurosystem oversight policy stance, the Bank of Italy's activity concerning e-money is based on the 1998 ECB *Report on electronic money* and on the recently issued EMSSO report (2003) for the security requirements of e-money schemes. The Italian implementation law for the E-money Directives assigns to the Italian overseer the right to issue specific rules aimed at ensuring the reliability of e-money schemes (in the event of non-compliance with these provisions, administrative sanctions may apply). Moreover, the overseer is entrusted with the promotion of the development of e-money. On the basis of the February 2001 oversight guidelines - addressing banks, financial intermediaries and payment system infrastructures - operators are requested to communicate in advance the characteristics of each e-money scheme to the Italian overseer following a "term of reference" prepared by the overseer itself on the basis of the international and European guidelines. In particular, the overseer is interested in information concerning the integrity of the circuit, the efficiency of coordination mechanisms and technical security. As to the security requirements set at European level,³⁴ the Italian overseer will assess the existing schemes for the criteria of the EMSSO report. Lastly, the Italian overseer is concerned with the effective observance of Recommendation 97/489/EC on the transparency of electronic payment instruments.

In its catalyst function, following a proactive approach to innovation, the Italian overseer informs the market of the relevant issues concerning e-money and multipurpose prepaid electronic payment instruments, in order to make operators aware of possible problems arising from these innovative products.

With regard to m-payments, the Italian overseer has the right to ask for information on proposed and ongoing market activity; in this respect the Italian overseer cooperates with other public authorities at European level (ECB, European Commission) with a view to fostering a safe and efficient growth path for the sector.

Supervisory issues. Banks and ELMIs are subject to Bank of Italy supervision.

Law enforcement issues. The Bank of Italy checks that the schemes do not include features that might make them attractive for money laundering purposes and that issuers comply with anti-money laundering provisions.

³³ 11.03.2004

³⁴ The main requirements concerning e-money and multipurpose prepaid electronic payment instruments are the following: sound and transparent legal arrangements: the rights and obligations on the part of customers, merchants, issuers and operators must be clearly defined and disclosed; technical security: e-money schemes must maintain adequate technical and organisational procedures. The issuer must explicitly formulate the security policies. The arrangements between the issuer and the outsourcing companies should enable the former to monitor and check operational risks; settlement procedures: the procedures used must be efficient, reliable and secure; redeemability: the issuer is obliged to redeem the residual values against legal tender at the request of the holder; protection against criminal abuse: electronic payment schemes should foresee measures to prevent criminal abuse; proper statistical reporting: in order to meet the needs of overseers and supervisors, but also to build up an adequate internal control mechanism for operational risks.

Cross-border issues. At present about half of the products are used on a national level, even if some of them are expected to be used in the Visa circuits and others are planning to extend their circuits to some European merchants. Cross-border issues are more relevant for schemes used over the internet at merchants subscribing to the Visa circuit in accordance with its rules. Up to now in Italy, there are no ELMs and the benefits of a European passport for e-money schemes are still to be experienced.

Jamaica

1. Card-based products

As at the date of this survey only two institutions are considering anything resembling this type of scheme. The details are as follows:

Pay Plus Card. This scheme, which is being offered by a non-banking entity in conjunction with a local commercial bank, is intended to allow customers to conduct multiple transactions including phonecard credit purchases, money transfers, salary advances and purchases of prepaid internet time through the use of a card. The product is still at the discussion stage and will be rolled out in three phases. It is proposed to include multicurrency features and in the final stage the face of the card will bear the Visa logo. The legal and fee structure arrangement has not yet been finalised. The local commercial bank will be responsible for the clearing aspects as well as the provision of key segments of the hardware infrastructure of the scheme.

Visa Travel Money (VTM). As the name implies, Visa is the major partner to this scheme and will be responsible for the supply of software (Wildcard's security and encryption) and clearing, along with a Trinidad and Tobago-based entity that is a co-sponsor along with Visa. The scheme is intended to act strictly as a prepaid money card that will have cross-border and multicurrency features and will allow the holder to access funds from any ATM or POS device bearing the PLUS logo. The issuers of these cards will be limited to two related companies under the Grace, Kennedy Group (one a local commercial bank and the other a foreign currency dealer enterprise domiciled in Jamaica). The fee structure will see the local commercial bank assume the cost of processing while its customers will cover the cost of the card, loading, etc.

2. Network-/software-based products

With regard to network-based schemes, only one institution is currently considering introducing such a service.

Cash Link. Operated by a locally based non-bank bill payment company, Cash link is intended to extend the features already available with Pay Plus Card, described above. The general arrangements are therefore similar, and loading procedures can be conducted at any of the relevant outlets island-wide.

3. Internet and mobile payments

No internet or mobile payment schemes are currently being considered, piloted or implemented by any institution surveyed.

4. Policy responses

Monetary policy and seigniorage. Given that there are no e-money schemes currently operating in Jamaica, no steps have yet been taken to collect statistical information on e-money and therefore there is no existing impact on monetary policy. Further, based on data collected on schemes currently under consideration, the likely material impact on monetary policies appears minimal at this time. Based on current industry developments, however, the Bank of Jamaica has timetabled the potential impact of these e-based products on monetary policy for consideration.

General legal issues. The Jamaican government is responsible for the development of the general legislative framework for e-commerce. The Bank Supervisory Authority also contributes to these developments through participation on the National E-commerce Advisory Committee, which was first convened in 1999. The Supervisory Authority is looking at all relevant issues against the background of the existing legal and bank supervisory framework so as to tailor amendments as may be considered necessary. This anticipates that banks will be looking to venture into this area in the future. With regard to new e-money products, the legal ramifications are still being considered.

Relevant security issues. Generally, the central bank requires institutions to have an integrated approach to risk management to identify, measure, monitor and control risks including, where applicable, an e-money/e-banking security risk management system. The central bank's evaluation process involves ascertaining:

- Robustness of security infrastructure (via proof of a comprehensive security plan).
- The presence of an appropriate security policy that establishes guidelines defining an institution's banking security risk tolerance, outlining responsibilities for implementation and enforcement of security measures, establishing procedures for evaluation of policy compliance, enforcing discipline and identifying and reporting policy violations.
- The presence of an adequate security controls and ability to enforce, security measures such as encryption, passwords, firewalls, virus control, e-money counterfeiting controls and employee screening.

The security issues relating to Jamaican financial entities accessing e-money schemes developed and offered abroad are not a major concern at this time. However, the authorities will need to develop criteria to evaluate and address security issues linked to e-money products introduced into Jamaica. The issues relating to cross-border legal challenges as well as other operational security issues would nonetheless warrant further consideration.

Currently, there are no restrictions on deposit-taking financial institutions entering into e-money schemes. The Bank of Jamaica is in the process of formulating guidance to the industry in this area of operations, based on guidelines issued by the BIS. In the interim, however, if a licensee is desirous of introducing such a scheme, it would be subject to the central bank's comprehensive and rigorous evaluation, approval and supervisory process prior to any implementation, on a case by case basis. Evaluation criteria include satisfying specific capital and liquidity requirements, as well as displaying an ability to adequately identify, understand and manage the various risks involved. The underlying principle is that the issuance of e-money should be regulated and must have a comprehensive risk management process that is subject to oversight by the Bank of Jamaica or some other regulatory authority.

The following represent several factors that could possibly influence future policy responses:

- Changes and/or need for changes in the legal framework.
- Experiences of other jurisdictions regionally and internationally.
- Current developments and/or strategic plans relating to e-money activities of licensees and other financial institutions.
- Impact of policies on development and implementation of schemes.
- Success or failure of schemes regionally and internationally.
- Success of policies in adequately regulating schemes implemented.

Payment system issues. Not applicable as no e-money schemes are currently in operation in Jamaica.

Oversight issues. Not applicable at this time as no e-money schemes are currently in operation in Jamaica. However, supervisory policy to provide guidance is currently being developed in anticipation of the introduction of such schemes.

Supervisory issues. The Financial Institutions Supervisory Division, the regulatory arm of the central bank, has made several specific policy determinations with respect to e-money developments; these are as follows:

- There will be biyearly surveys on e-money developments.

- There will be no approval of any e-money scheme unless the supervisor is satisfied that the applicant has in place a robust and functional risk management policy framework.
- Information on risk management techniques (eg the Basel Committee's paper on *Risk management for electronic banking and electronic money activities*) received by the supervisory authority is to be shared with the licensees.
- Development of comprehensive risk management guidance for the conduct of e-banking and e-money activities.

The Financial Services Commission (FSC) regulates non-bank financial institutions. The FSC has not issued any formal risk management policies to that industry in relation to e-money activities. Nonetheless, existing inter-regulatory protocol would require dialogue and coordination between the regulators of banks and non-bank financial entities on risk mitigation approaches.

Law enforcement issues. As there are no e-money schemes currently in operation the issue of specific anti-money laundering measures covering this area does not arise. However, current anti-money laundering and fraud prevention schemes that are in place are sufficiently comprehensive to allow for risk identification and mitigation in all areas. Additionally, the central bank has recently upgraded its guidance notes³⁵ to the industry, which on finalisation will replace the existing guidance notes on anti-money laundering. The enhanced guidance notes are a part of a countrywide project of legal reforms currently being undertaken by the authorities to put in place a comprehensive legal platform for AML/CFT. A part of this project was the formation of a financial investigative unit (in 2001), one of its objectives being to detect and prevent financial crimes, which includes investigating schemes/activities that are suspected to be fraudulent.

In addition to the AML/CFT guidance notes, the Bank of Jamaica is in the process of drafting specific guidelines on the required risk management framework for electronic banking, which includes e-money schemes.

Cross-border issues. As noted above, there are currently no e-money schemes in existence locally. With regard to cross-border implications, the following will be among the policy considerations in the evaluation and ongoing assessment of future e-money schemes:

- Country and transfer risk.
- International cooperation.
- Arrangements over home/host responsibilities.
- Bilateral agreements for cross-border sharing of contractual information.
- Other legal impediments.

The existing framework was designed to deal with the regulatory issues of international banking; therefore policy developments will be focused on enhancing and/or expanding these principles to address issues of cross-border or cross-currency e-money schemes. These will be developed in accordance with the Basel Committee E-Banking Group's advisory guidance notes with respect to e-banking/e-money. The Bank of Jamaica is cognisant of the issues surrounding products or schemes being promoted by foreign vendors and their implications for domestic currency denominated transactions. A possible regulatory consideration could be to allow only institutions that are licensed and supervised under the principal banking legislations to operate these schemes as they could arguably equate to deposit-taking activities.

Other issues. As there are no e-money schemes currently in operation locally, the issues listed below will have to be dealt with on a case by case basis. However, in any event the central bank's supervisory approval process and risk mitigation standards would have to be satisfied and the following issues addressed prior to approval of any such schemes:

³⁵ The recently upgraded AML/CFT guidance notes were issued to the industry for comments by end-November 2003. The guidance notes were upgraded in line with the FATF 40 recommendations as well as the eight recommendations dealing with combating financial terrorism. Additionally, the guidance notes have incorporated the Basel Committee's upgraded customer due diligence standards of best practice.

- Taxation issues.
- Standardisation.
- Consumer protection (provisions covering loss, theft or counterfeiting of e-money value).
- Dispute resolution mechanisms.
- Implementation of operational and technical standards.
- Access and competition.

Japan

Overall, the use of e-money remains very limited in Japan. Two schemes using stored value cards have been put into commercial use in recent years, but no significant developments have been observed in network-based schemes. Internet and mobile payment services are widely available but their use is still minimal relative to other access channels.

1. Card-based products

Suica. Suica (acronym for super urban intelligent card) is a stored value fare card issued by JR East (East Japan Railway Company). Using Sony's "FeliCa" contactless chipcard technology, the card enables passengers to pass through station gates by placing the card over a reader. The number of cards issued has been increasing steadily since the scheme's inception in November 2001 and as of September 2003 had reached 7 million (including cards with commuter pass function). The maximum value that can be stored on a card is JPY 20,000. The card can be reloaded at ticket vending machines in values ranging from JPY 1,000 to JPY 10,000.

At the moment Suica is a single purpose card that can be used only for the transportation service provided by JR East. The company, however, is planning to expand the use to purchase of goods at kiosks located within station premises in the second quarter of 2004 (a pilot started in November 2003).

Edy. Edy (acronym for euro, dollar, yen) is a card-based scheme operated by bitWallet Inc. It started full operation in November 2001. Issuers of value currently include finance companies, credit card companies and a bank. As of November 2003, Edy was available on 3.3 million cards, and was accepted by 3,200 merchants, including convenience stores, fast food chains, hotels and online shopping sites.

At the point of sale, the purchase amount is deducted by placing the chipcard, also based on FeliCa technology, over the merchant's terminal. A special reader/writer called Pasori is used for purchases over the internet. The card is reloaded either with cash at designated terminals within user stores or by credit card using Pasori. It can be reloaded in amounts ranging from JPY 1,000 to JPY 25,000, and can hold up to JPY 50,000.

The scheme does not allow cardholder-to-cardholder transfers of value, nor does it have any multicurrency or cross-border features. In June 2003, an airline company added Edy to its frequent fliers programme, allowing mileage points to be exchanged for Edy value at the rate of JPY 1 for every mile.

2. Network-/software-based products

No network-based schemes are currently being considered.

3. Internet and mobile payments

Internet payment services, including both traditional banking services and e-commerce payment services, have become widely available in recent years reflecting the growing usage of the internet and mobile phones. The volume and value of transactions nevertheless remain limited compared with other access channels such as bank counters and ATMs.

3.1 Internet banking services

In the past several years, a large number of banks have launched internet banking services on their websites, typically including credit transfers and account balance inquiries. Many also make such services available through mobile phones with text-based web interfaces (mobile banking).

Credit and debit transfers initiated over the internet, both intra- and interbank, are processed using the same infrastructure as those initiated using other channels. Interbank payments are cleared through the Zengin System and other private clearing systems. In the case of payments handled by the Zengin System, when a payer initiates an interbank transfer from a PC or a mobile phone, the payer's account is debited immediately. The payee's account is credited on either the same day or the following business day, depending on when the payer's bank forwards the payment instruction to the Zengin Centre. Interbank obligations arising from the Zengin System are settled via current accounts held with the Bank of Japan.

A service called **Pay-easy** is under development, which will allow consumers to initiate credit transfers for bill payments and payments to the government (eg tax payments) using internet banking services.³⁶ Pay-easy uses a network called the Multipayment Network, which links financial institutions, the central and local governments and other billers or their agents. As of July 2003, there were 2,376 institutions, including 135 financial institutions, participating in the project.

3.2 Internet payments for e-commerce

The e-commerce market has been growing rapidly in Japan. In 2002, the amount of internet-based business-to-consumer transactions reached JPY 1.6 trillion, almost double the amount in the previous year.³⁷ The vast majority of e-commerce payments, however, are still made using non-internet methods such as credit transfers through ATMs and cash on delivery.

Among the various types of payment method available over the internet, the most widely used is the credit card. Credit card payments made online are processed in a similar way to those made at the point of sale.

Two online real-time debit transfer schemes, **Inter Debit** and **Net Debit**, have been launched in the past few years. In both services, the consumer obtains authorisation by inputting information preregistered with his/her bank, such as customer ID codes and passwords, and the consumer's account is debited immediately. Inter Debit started operation in April 2001 and is currently offered by two financial institutions. It is operated by the Japan Internet Payment Promotion Association, whose membership comprises 189 institutions including 94 financial institutions (as of June 2003). Net Debit was first introduced in late 2000 and is offered by a number of commercial banks.

4. Policy responses

General legal issues. E-money. Stored value cards and their issuers are governed by the Law Concerning Regulation of Prepaid Certificates (usually referred to as the Prepaid Card Law), enacted in December 1989. Issuers of prepaid instruments are required to file or register with the Prime Minister, and the government is empowered to carry out inspections and to request information and documents from those institutions. Where the outstanding unused value exceeds JPY 10 million, the

³⁶ The service has been in partial operation since October 2002.

³⁷ See Ministry of Public Management, Home Affairs, Posts and Telecommunications, "Information and Communications in Japan", *White Paper*, 2003.

issuer must deposit funds equivalent to half or more of the unused value with the legal affairs bureaus of the Ministry of Justice.

The Prepaid Card Law also allows issuers of prepaid instruments to establish an industry organisation, and this provision led to the incorporation of Maebaraishiki Shohyo Hakko Kyokai in 1992. From December 2002 to July 2003, a working group established under this organisation conducted a study on consumer protection and other issues that arise in relation to new types of prepaid instrument³⁸ but which cannot be addressed under the current legal framework.

Internet payments. In 2001, a law concerning special provisions in the Civil Code on electronic consumer contracts and electronic consent and notification was enacted. The law provides exceptions to the rules for contracts set out in the Civil Code, with the aims of clarifying the rules applied to transactions conducted over the internet, ensuring consistency with relevant international rules, and establishing effective consumer protection measures for online transactions.

Payment system issues. Although statistics that offer a comprehensive coverage of the volume/value of e-money transactions and internet payments do not exist at this stage, it seems that their use is still limited and does not have a significant influence on the amount of notes and coin in circulation.

Oversight issues. As the overseer of payment systems in Japan, the Bank of Japan closely monitors developments in private sector retail payment systems, including e-money and internet payment arrangements, taking into due consideration the implications of these developments for risk and efficiency. At the moment, such arrangements are not expected to have a systemic influence on Japan's overall payment system in terms of either the volume/value of transactions or the nature of payments handled. The Bank does not therefore consider these arrangements a matter that requires its urgent attention at this time.

Jordan

1. Card-based products

Major credit cards are issued and used in Jordan. Commercial banks have formed a company called "Visa Jordan Card Services" which operates a network and a switch for card-based retail payments. Payments can be made on a local or multicurrency cross-border basis.

Banks have extensively promoted the use of cards at POSs by their customers in place of cash. Some banks are even making it mandatory for their customers to replace cards used only at cash dispenser ATM machines with these cards.

A number of ATM and POS machines are connected to a switch enabling banks to execute bilateral settlements.

The two local companies, ALO and JPP, which used to provide public telephone services through prepaid cards, were unable to survive in the market due to the widespread use of mobile phones. These companies also used to issue multipurpose smartcards.

Some banks are offering internet shopping cards with limited lines to limit risk exposure carried by the users over the internet. These cards can be reloaded.

2. Network-/software-based products

Oryx, a new company, has recently started to introduce services to the market. It provides an online connection to its agents, usually shops. Using this connection, customers can pay their utility bills and reload mobile phones instead of buying prepaid cards.

³⁸ Chipcards, prepaid mobile phones and other such instruments issued in neither paper nor magnetic form.

3. Internet and mobile payments

E-dimension, a subsidiary of Jordan Telecom, has launched new internet payment services. A payment gateway has been established to enable customers to buy from major shops and make payments online using credit/debit cards.

Jordan Telecom also accepts bill payments over the internet using credit/debit cards.

4. Policy responses

The new Banking Law, which came into force in August 2000, includes an important article that recognises electronic tools, methods and records. This law provides the general background for electronic banking issues and allows for the establishment of an electronic payment system. Another specialised law, the Electronic Transactions Law, has been in force since March 2003. The latter deals with the related issues in more depth, but it also leaves room for the central bank to regulate the markets in more detail. The Central Bank of Jordan issued a directive paper for banks in late 2002. This paper gave special attention to security issues that should be followed by banks.

Kazakhstan

1. Card-based products

Nowadays commercial banks of Kazakhstan issue magnetic stripe cards and chipcards of both international and local systems.

Magnetic stripe cards of international systems such as Visa, Europay/MasterCard, American Express and Diners Club, and of local systems such as Altyn Card, a local card of Citibank Kazakhstan, Duet and Irtysh Card have been issued.

Chip-based cards are issued by four of Kazakhstan's banks. These include local chipcards SmartAlemCard and Caspian, and also international chipcards Visa VSDC and MasterCard M/Chip Lite.

At the end of October 2003 the number of issued chipcards was 217,000, including 38,000 local cards and 179,000 international cards. The number of terminals used for chipcards was 1,148 units, or 28.7% of the total number of terminals in the payment card market.

During the first 10 months of 2003 the number of payments by chipcards issued by the Kazakhstan banks was 3,031.4 thousand transactions for KZT 46.9 billion, of which 540.7 thousand transactions for KZT 12.9 billion were made by local cards and 2,490.6 thousand transactions for KZT 34.0 billion by international cards. In comparison with the same period of the previous year the number and the value of payments by chipcards increased by 2.5 times and 3.2 times respectively. The number and the value of local chipcard payments increased by 1.5 times and 3.4 times respectively, and those of international chipcards by 3 times and 3.1 times respectively.

As a result of non-cash payments, increased share in retail trade and a narrowing of the cash money in circulation, the National Bank of the Republic of Kazakhstan and a number of commercial banks began a project to create the National Interbank System of Payment Cards. As part of this task the central bank, with the participation of commercial banks, created the Processing Centre, the main purpose of which is to develop a uniform payment market in Kazakhstan for payment cards.

The National Interbank System of Payment Cards will be based on chipcard technologies. However, the transition to chipcards will be carried out slowly and at the initial stage the construction of the system is planned on the basis of the standards supporting both the magnetic stripe and chip technologies.

At the same time, within the framework of this system it is being considered whether to apply chipcard technologies for realisation and maintenance of the various nationwide programmes (in the field of assignment and application of an identification number for a person, a business identification number for legal entities, in medical insurance, etc).

2. Policy responses

The introduction of the National Interbank System of Payment Cards based on the use of chipcards is planned in 2005.

Kenya

1. Card-based products

Although there are a number of single purpose prepaid card schemes, there are no electronic money schemes implemented in Kenya.

Major cards. Cards in use are credit and debit cards, ATM cards, smartcards and single purpose cards. Prepaid cards such as mobile phone scratch cards, Kenya wildlife services cards for tourists and fuel cards are gaining popularity in the country. Various large supermarkets have issued customers with their own cards for use in their outlets.

Major firms involved. Commercial banks, oil companies, mobile phone companies, etc.

Suppliers. Visa, MasterCard.

2. Network-/software-based products

There are no network-/software-based products or plans to implement them in the country. Presently, the only significant development in the field of e-money is the use of bank cards with chips that store balances held by bank customers and allow the management of deposited funds (prefunding) via ATMs.

3. Internet and mobile payments

A number of banks have developed online banking for corporate and high net worth customers through computer terminals (web-based), mobile and fixed telephone lines, including some proprietary lines. Eight of the 42 commercial banks operating in Kenya offer some or all of these services.

4. Policy responses

The Central Bank of Kenya has no specific policy on e-money schemes. The East African National Payment System Harmonization Committee (EANPSHC), on which the Bank is represented, has issued guidelines for regulating and licensing e-money schemes and products in East Africa. This is a regional national payment system (NPS) initiative embracing the three countries of the East African Community. Kenya has adopted the Guidelines and is in the process of implementing them via issuance of a Prudential Guideline by the central bank's Supervision Dept.

Monetary policy and seigniorage. Since there are no card- or network-/software-based e-money schemes, e-money does not currently affect monetary policy and it does not have an impact on money in circulation.

The NPS Division is to carry out a study in order to ascertain the possible impact of e-money schemes on monetary policy, financial stability and seigniorage.

General legal issues. No specific laws or regulations have been adopted to deal specifically with e-money but an explicit NPS and EFT act (draft) is under discussion by the stakeholders. The Kenyan government has adopted the UNCITRAL Model Laws on Electronic Commerce and Electronic Signatures that formed the main basis for the Draft ICT Bill 2003.

Relevant security issues. There are no special criteria for evaluating security features of e-money schemes at the moment.

Issuer details. At present there is no legislation that restricts the issuance of e-money to a certain type of institution.

Payment system issues. Since there are no e-money schemes in place the central bank has not been faced with practical problems relating to clearing and settlement issues.

Oversight issues. Steps are being taken to amend the Central Bank of Kenya Act to give the central bank oversight powers vis-à-vis the country's payment systems. The amendment to this effect is contained in the Finance Bill 2003 issued by the Minister of Finance during the budget speech for fiscal year 2003/04.

Supervisory issues. According to Kenyan legislation, the Banking Supervision Department has the authority to supervise financial institutions. However, under the current framework the Department would have no direct power if issuers of e-money were to be non-financial institutions.

Law enforcement issues. The government of Kenya is working on legislation that will address anti-money laundering issues.

Cross-border issues. This area is being addressed by the East African National Payment System Harmonization Committee (EANPSHC). One of the Committee's directives is to have an integrated RTGS System for the three E.A. Countries by 2005 on the lines of the ECB's TARGET. The three Central Banks have been carrying out a joint Cross Border Survey to facilitate an appropriate Cross Border Payment System.

Korea

1. Card-based products

K-Cash. K-Cash, a pan-bank scheme operated by banks, The Korea Financial Telecommunications and Clearings Institute (KFTC) and credit card companies, was launched in July 2000. Up to KRW 500,000 (USD 429) can be loaded in K-Cash per card. The loading and refunding of K-Cash is carried out at the issuer's website, CDs, and ATMs on the cardholder's bank account. K-Cash is protected with SEED, a Korean unique algorithm, and uses a PIN.

By June 2003, 16 banks and two credit card companies had issued about 554,000 cards and 744 merchant terminals had been installed. K-Cash is used in universities, hospitals, retail stores, online shopping malls, etc. It may also be used to pay public transport fares in several medium-sized provincial cities - Chuncheon, Suwon, Gimhae, Andong, Seogwipo, etc.

MYbi, developed by MYbi Corp, which was established jointly by Pusan Bank and several companies, is currently issued by three banks and three credit card companies. It has contact and contactless features and is based on the cardholder's account. It is now mainly used for public transport within Busan and provincial cities, but is being expanded for use in offline and online retail stores. About 2,058,000 cards had been issued by the end of September 2003.

A-Cash is being developed as an add-on function by two credit card companies. It is used to pay for public transport services in some provincial cities. About 400,000 cards had been issued by the end of August 2003.

Mondex, issued by three banks and three credit card companies, is provided by Mondex Korea, which was established in January 1998 as a subsidiary of MasterCard Corp. Transferability is possible within families. About 700,000 cards had been issued by the end of June 2003.

Visa Cash. Visa Cash, which is issued by two banks and four credit card companies, is provided by Visa Cash Korea. About 860,000 cards had been issued at the end of August 2003.

2. Network-/software-based products

Nemo is being developed solely for use on a network (the internet and mobile networks) by SK Telecom, which is one of the major telecommunications companies. Customers can use Nemo for

purchasing goods and services over the internet at merchants subscribing to the scheme and can transfer the loaded value to another user. Nemo can also be used at offline retail stores with mobile devices - mobile phones and PDAs.

In fact, all card-based products in Korea except A-Cash are designed to allow use over the internet.

3. Internet and mobile payments

Internet Giro is an electronic bill presentment and payment service which is provided by the KFTC, a company established to handle clearing systems of domestic banks. Developing software and system conservation are supported by the KFTC. Users can pay bills to the National Tax Office, local governments, gas supply companies, and so on. The Internet Giro is protected with an algorithm based on PKI.

4. Policy responses

Monetary policy and seigniorage. At present e-money balances are not included in monetary statistics because the amount is negligible. However, when e-money comes to be used nationwide or the amount issued increases significantly, the Bank of Korea (BOK) thinks it will be necessary to include it in monetary statistics.

E-money will not have any considerable impact on seigniorage, because its use is not expected to increase significantly in the near future.

General legal issues. The regulatory provisions governing prepaid cards including e-money are set out in the Specialised Credit Financial Business Act. The provisions include the obligation to set aside 3% of the amount of e-money issuance for collateral and repayment procedures, etc. Because its provisions were originally established to regulate prepaid cards, they are not adequate to regulate e-money. Therefore, the government has presented a draft electronic financial transaction act to the National Assembly. The draft bill contains the general definition and regulations for e-money and electronic transactions.

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

Provider issues. At present only banks and credit card companies are allowed to issue card-based e-money (credit card companies are able to clear their e-money through bank accounts).

However, if the electronic financial transaction act is enacted, non-financial companies will be able to issue e-money subject to consent of the Financial Supervisory Commission.

Payment system issues. The BOK is actively participating in the process of determining features of e-money schemes in line with its policy considerations, being a member of the committee that coordinates banks' projects related to payment and information systems. The KFTC is in charge of technical development, operation and clearing of K-Cash funds, and final interbank settlement is carried out across banks' accounts with the central bank.

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

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

Cross-border issues. Customers are not expected to use domestic-based e-money overseas or to use foreign currency based e-money in Korea because the infrastructures are different and are in fact incompatible at the moment.

Standardisation issues. Because e-money standards have been set up and these apply to all banks and credit card companies, systems using these standards will be able to operate nationwide.

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

Kuwait

1. Card-based products

The use of card-based e-money schemes is developing in a limited way within Kuwait and includes gift cards, charge cards and smartcards. For example, one of the local banks has issued "BeeWallet", which is a multipurpose, reloadable gift card. Similarly, currency exchange companies issue prepaid charge cards, based on arrangements with Visa. These cards can be bought from these exchange companies against cash payment or by debiting the customers' bank accounts and can be used locally and globally. Another card-based e-money scheme introduced by the leading oil company, Kuwait National Petroleum Company (KNPC) is a single purpose, prepaid smartcard that can be used in petrol stations across Kuwait. Prepaid telephone cards are also used within Kuwait, to make international calls.

2. Internet and mobile payments

Network-based schemes in Kuwait include telephone banking, mobile/WAP banking and internet banking. Local banks provide online banking services that are used by customers to pay utility bills like mobile phone, water and electricity bills, to carry out stock settlements and to buy prepaid mobile and internet cards. Telebanking services are offered by banks and are used to conduct normal banking transactions and to purchase prepaid mobile cards and make ISD calls. Mobile/WAP banking is used in a limited way to carry out stock market deals. With regard to internet banking, a few banks have issued virtual credit cards, based on arrangements with Visa. These are reloadable, multipurpose cards used by customers to carry out online transactions. These virtual cards serve as an alternative to credit cards, but avoid providing sensitive credit card details for carrying out online transactions.

3. Policy responses

Monetary policy and seigniorage. The Central Bank of Kuwait is closely monitoring developments in electronic means of payment. For the moment, no controls are placed on e-money, since usage is insignificant.

General legal issues. No regulatory guidelines have been issued.

Security issues. The issue of prepaid cards is tightly controlled. Adequate segregation of duties ensures that undue reliance is not placed on a few individuals. Besides that, individual banks have developed their own policies and procedures to monitor the activities within each bank.

Payment system issues. Since most of the e-money schemes that are currently operating within Kuwait are of prepaid nature, no particular problems are faced concerning clearing and settlement arrangements for such schemes.

Oversight issues. Since the volume of transactions through e-money schemes is marginal, the central bank has not felt the need to issue specific guidelines to monitor them.

Kyrgyz Republic

Electronic money schemes are not very advanced in the Kyrgyz Republic. As in previous years, only one bank (Bank++) is using network-/software-based schemes for transactions between foreign

clients, and some people are using the internet for individual transactions. Concerning the plastic card market, there are positive trends in the use of bank payment cards.

Currently, most banks (13 out of 20) in the Kyrgyz Republic are involved in servicing cards of international schemes via the banks of the CIS countries. Four commercial banks issue cards of international card schemes Visa and MasterCard as agent banks, and one bank as an associate member of Visa.

Since 2001, the number of cards issued in the Kyrgyz Republic has grown steadily. As of 1 October 2001 there were 166 international cards and 2,069 local cards issued, whereas at the same period of 2003, these numbers had increased to 1,275 and 5,611 respectively.

The existing card processing centres ensure processing of the local Demir24 cards (offered by Turkish company Banksoll), Union Card and Alay-Card (within the Russian Union Card and Golden Crown card schemes, respectively). As of 1 October 2003 there were two cards issued under the Union Card scheme, 1,333 Demir24 cards, and 4,056 cards by Alay-Card.

A considerable increase in the number of transactions was also observed from the beginning of the current year; and there is still a persistent tendency towards a large number of low-value (retail) payments in the national currency within the country. Thus, 63,589 transactions were processed within local systems over the first nine months of 2001, and 8,673 within international ones. Over the same period of 2003 the number of transactions processed by local systems was 126,233 and within international 31,542.

As to the qualitative evaluation of transaction volumes, figures have been positive since the beginning of 2001. There is a clear trend in card turnover growth. Whereas in the first nine months of 2001, turnover in the international systems was KGS 148.3 million and KGS 48.7 million for local systems, in the first nine months of 2003 these figures were already KGS 322.5 million and KGS 178.95 million, respectively.

However, the existing plastic card infrastructure is not well developed yet, especially in the rural areas of the Kyrgyz Republic. The local Alay-Card system consists of 64 terminals (five of which come under the Golden Crown system) and one ATM; Demir24 has eight ATMs, and the international system (Visa and MasterCard) has 160 terminals and four ATMs.

Lithuania

1. Card-based products

Currently Lithuania has one card-based electronic money scheme, called **eLitoCard**. Snoras Bank is the issuer, operator and supporter of the eLitoCard scheme. Four card-based products - eLitoCard Classic, eLitoCard Amber, eLitoCard LSP and ImparCard + EuroCard/Mastercard - have been issued under the eLitoCard scheme. eLitoCard Classic, eLitoCard Amber and eLitoCard LSP are multifunctional microprocessor cards with a MULTOS 4.0 operating system. ImparCard + EuroCard/Mastercard is a hybrid product (both magnetic stripe and microprocessor are present) and is used additionally for MasterCard International card transactions. eLitoCard LSP is a co-branded product with the Lithuanian Students Association (student photo, bar code and magnetic stripe are present) and is used additionally for person identification.

The eLitoCard (formerly ImparCard) project was launched in May 1996. Snoras Bank has been issuing ImparCard since 1996; eLitoCard Classic, eLitoCard Amber and ImparCard + EuroCard/Mastercard since 1999; and eLitoCard LSP since 2000.

At the end of August 2003, 1,650 POSs and 265 ATMs were active nationwide. As of 1 September the number of e-cards in circulation amounted to 143,000 (about 7% of all payment cards issued in Lithuania) and the outstanding value of e-money was USD 27 million. By the end of the year it was planned to have issued 150,000 cards.

eLitoCard is a reloadable, preauthorised electronic purse scheme. The card is loaded from the cardholder's accounts by means of online authorisation using a PIN code. The cardholder has the possibility to review the last three loads and the last 10 payments. Payment by the card is effected

offline with the use of a PIN. The value of the transaction is transferred from the card to the merchant payment device. All security keys are loaded on the merchant's card. This card is also used to encrypt transactions and identify the merchant's POS. The merchant's card is a microprocessor card operating on MULTOS 4.0.

2. Network-/software-based products

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

3. Internet and mobile payments

For some time in Lithuania there has been a shift from traditional paper-based payments to electronic payments. This is caused by rising supply and quality of e-payment services, lower transaction costs and a general upward trend of computer and mobile phone usage. Though internet and mobile payments often stand together, they represent different weight categories; while internet payments are already functioning with success, mobile payments are still at the infant stage.

In general, most traditional payment instruments have been altered for use over the internet, especially credit transfers. In 2002, compared to 2001, the number of credit transfers initiated over internet rose by four times. In the first half of 2003 the value of credit transfers initiated over the internet amounted 14.6% of all credit transfers' value. Payments by debit and credit cards are also affected, although to a lesser extent.

Until now internet payment schemes have been introduced only by banks. Most of the domestic banks (nine out of 10) and to a lesser extent branches of foreign banks (one out of three) have developed internet payment schemes, more precisely "Eta bankas" from Ukio Bank, "VB internetas" from Vilniaus Bank, "SB linija" from Siauliu Bank, "Bankas internetu" from Snoras Bank, "Internetines bankininkystes sistema" from Medicinos Bank, "Interneto linija" from Bank Nord/LB Lietuva, "Hanza.net" from Bank Hansabankas, "E-bankas" from Sampo Bank, "Parex internet bankas" from PAREX BANK, and "Solo internetine bankininkyste" from the Lithuania branch of Nordea Bank.

Before using any internet payment scheme, customers are asked to sign terms and conditions for this service. Such contracts are subject to the provisions of the Law on Payments, which formulates minimum requirements for the terms and conditions for providing electronic payment instrument services. All schemes' (10 in all) users are given user ID numbers and the majority of schemes give permanent passwords (which users can change at any moment while connected to the system). Further login processes vary among banks, with most providing code cards (plastic cards). Some banks use password generators, or give password sheets. After login, the majority of schemes require additional numbers/codes to confirm transactions. Communication between the customer and the bank in all cases is encrypted using 128-bit SSL technology.

Although there is some variety in the services that internet payment schemes provide, usually they allow users to make domestic and cross-border funds transfers and carry out currency exchange transactions. Most schemes can be used to arrange term deposits. In addition, five schemes allow bill payments for public utility services. Other schemes intend to offer such services in the near future. Several schemes can be used by merchants to collect payments from customers for goods sold in e-shops. Finally, all schemes provide their users with comprehensive information on their account balances, transactions made during any chosen period, exchange rates and other relevant information. Usually banks charge lower fees for transactions carried out over the internet than in bank branches. In addition, some banks promote their schemes using cash-back and other incentives.

When funds are transferred within the same bank that operates an internet payment scheme, the majority of schemes process payment orders in a real-time manner. However, some schemes delay execution of payment orders until the next business day when orders are initiated after bank operating hours. When funds are transferred between accounts in different banks, payment orders are executed according to the Bank of Lithuania's payment system rules. Currently they are executed twice a day, although in the near future the possibility to execute payments in a real-time manner will be implemented.

With regard to mobile banking, the majority of banks offer a service for customers of checking their account balances and transactions effected using SMS messages. Nevertheless, SMS services usually serve as an information channel, but not the transmission channel of payment orders. Recently

some attempts have been made to expand mobile payment services using SMS by offering funds transfer between accounts of the same customer within the same bank. Only one bank uses different technology and offers a possibility to make domestic and cross-border payments via WAP (GPRS). The security of this service is guaranteed by the WAP security standard (Wireless Transport Layer Security).

4. Policy responses

The Bank of Lithuania monitors the development of e-payments in Lithuania. In accordance with a resolution of the Board of the Bank of Lithuania, banks periodically provide the Bank with statistical data about payment instruments including, inter alia, information on e-money circulation. Major information on internet and mobile payments has been collected by the Bank of Lithuania since 2001. In order to collect a wider range of statistical information on internet payments the central bank amended its periodical statistical report on payment instruments in 2002. The Bank of Lithuania includes outstanding value of e-money in its monetary statistics under the demand deposits item. Therefore, reserve requirements are applied on e-money in Lithuania.

The size of the outstanding value of e-money is not significant and is not likely to affect the size of the central bank balance sheet in the near future. The Bank of Lithuania has no plan to be an issuer of e-money at present.

Legal provisions related to e-money are laid down in the Law on Payments that was amended in June 2003. A definition of electronic money is given in the Law. E-money has been defined as monetary value as represented by a claim on the issuer, which is stored on a device (chipcards or computer memories) and accepted as a means of payment by undertakings other than the issuer. The Law regulates rights, obligations and liabilities of issuers and users of e-money and procedure for considering consumer claims. Provisions on holders' right to convert e-money into cash of the same currency at face value are implemented in the Law. Only traditional credit institutions are allowed to issue e-money in Lithuania.

The Law on Payments also regulates issues relating to internet and mobile schemes imposing minimum security requirements and fostering consumer protection.

The Bank of Lithuania performs the oversight function for large-value as well as retail payment and securities settlement systems. Oversight of payment instruments is not included in oversight policy as an oversight objective. Internet and mobile payment schemes exist in a highly competitive market and oversight procedures are not necessary at this stage of development. While the operators of all internet and mobile payment schemes and one e-money scheme are exclusively credit institutions, they all fall under the prudential supervision of the Bank of Lithuania.

Luxembourg

1. Card-based products

The national multipurpose e-money scheme, called miniCASH, was launched in February 1999 by CETREL, the domestic ACH, in cooperation with the main banks and the Post Office. miniCASH is a prepaid card scheme operating on a chip embedded in a debit card and is based on the German GeldKarte technology. Fourteen institutions issue e-money in Luxembourg.

miniCASH is intended to replace cash for small-value transactions. Amounts ranging from EUR 10 to EUR 125 can be loaded on the chip at loading terminals or ATMs, after verification of the PIN and the availability of funds on the card-linked account. Transactions carried out at the POS are offline; the merchant later sends the transaction details in batches from his purchase terminal to CETREL for clearing and settlement.

CETREL is the technical operator for the electronic payment transaction processing system in Luxembourg. It manages ATMs and POS terminals, clears domestic and international card transactions and operates the miniCASH scheme. CETREL updates the cardholder, issuer and

merchant accounts according to the e-money transaction details received. The update is done with a complete set of mirror accounts, which enable the transactions to be traced in the system.

Credit institutions do not charge consumers specific costs for the activation or the use of miniCASH. Merchants pay a commission for each transaction.

miniCASH can be used in two German cities just across the border and conversely. This interoperability is the result of the PACE project (Purse Application for Cross-border use in Euro) and could be extended to other countries.

2. Network-/software-based products

No scheme of this type exists or is being piloted in Luxembourg.

3. Internet and mobile payments

pay@cetrel, an internet payment solution, was launched at the end of 2000 by CETREL. After browsing on the merchant's site, the customer is redirected to the pay@cetrel URL for the credit card payment. CETREL acts as a central virtual POS for all the affiliated internet merchants. The customer sends his/her credit card information to CETREL via an SSL secured link. CETREL then initiates the credit card authorisation procedure as usual. CETREL charges merchants a monthly fixed connection fee and a commission for each transaction.

No widely accepted mobile payment solutions exist or are being piloted in Luxembourg.

4. Policy responses

Monetary policy and seigniorage. The current regulatory reporting by the credit institutions does not include data relating to the issuance of e-money.

E-money institutions are subject to the same minimum reserve requirements as credit institutions.

General legal issues. The Law of 5 April 1993 constitutes the main legal framework for the financial institutions operating in Luxembourg. It has been amended several times, in particular to address issues relating to e-money institutions; see Issuer details below.

Relevant security issues. See Oversight issues below.

Issuer details. The Law of 14 May 2002,³⁹ which modifies the Law of 5 April 1993, sets the legal framework for the e-money institutions in Luxembourg. Only credit institutions and e-money institutions have the right to issue e-money.

E-money institutions are entitled to a limited scope of activities and are subject to prudential supervision by the national banking supervisors (Commission de Surveillance du Secteur Financier - CSSF).

Payment system issues. E-money institutions do not qualify as credit institutions within the meaning of the settlement finality directive.⁴⁰ Hence measures have been adopted to exclude their participation in LIPS-Gross, the Luxembourg component of TARGET.

Oversight issues. The ECB's *Report on electronic money* of 1998 serves as a basis for the oversight of e-money schemes by the national central banks in the euro area. This report is complemented by

³⁹ Transposing into Luxembourg law:

- Directive 2000/46/EC of 18 September 2000 on the taking-up, pursuit and prudential supervision of the business of electronic money institutions;
- Directive 2000/28/EC of 18 September 2000 amending Directive 2000/12/EC relating to the taking-up and pursuit of the business of credit institutions.

⁴⁰ Directive 98/26/EC of 19 May 1998 on settlement finality in payment and securities settlement systems, transposed into Luxembourg law in the Law of 12 January 2001.

the *Electronic money system security objectives* (EMSSO) report of May 2003. The latter provides a comprehensive risk/threat analysis, and a list of security objectives that should be met by e-money schemes in order to cover these risks/threats. Hence, it will be used to assess the overall reliability and technical security of e-money schemes.

Supervisory issues. See Issuer details above.

Law enforcement issues. The legal framework applicable to credit institutions to combat money laundering is equally applicable to electronic money institutions.

In the miniCASH scheme, the electronic value can be used once only. The issuer reimburses the value after each transaction. Such a closed system guarantees a higher level of traceability and security than open systems in which money can be transferred several times between users before returning to the issuer. Control by the issuer after each transaction is necessary to ensure the redeemability of the value in case of loss, theft or technical deficiency of the storage device, as introduced in the Law of 14 May 2002.

Cross-border issues. Credit institutions authorised and supervised in other member states or in the European Economic Area may exercise the freedom to provide services in Luxembourg for any authorised and supervised activity in their home country, including the issuance of e-money.

Conversely, a nationally authorised and supervised e-money issuer which intends to exercise its e-money activities in a member state other than Luxembourg or in the European Economic Area must inform the CSSF, which in turn will inform the host country authorities.

Other issues. The Law of 14 August 2000,⁴¹ or the E-commerce Law, establishes the obligations and liabilities of the parties involved in transactions effected electronically, including electronic payment instruments and electronic money. Additionally, the Law acknowledges the legal effect of electronic signatures.

The Law on Personal Data Protection of 2 August 2002⁴² is applicable to personal data collected through e-money scheme operations. Data relating to an individual or identifiable individual must be processed fairly, ie it must be collected for specified, explicit and legitimate purposes and must not be processed in a way incompatible with those purposes.

Macau SAR

1. Card-based products

In Macau, there are currently no e-money products, whether card-based or network-/software-based, or whether being piloted or implemented, as defined by the Committee on Payment and Settlement Systems. There are only a few single purpose card schemes, primarily for the payment of transport and telecommunication services. Nevertheless, interest in issuing e-money products, such as smartcards and e-payments over the internet, is evident, given the several enquiries received by the Monetary Authority of Macau (AMCM) about the relevant legal framework.

⁴¹ Transposing into Luxembourg law:

- Directive 1999/93/EC of 13 December 1999 on a Community framework for electronic signatures;
- Directive 2000/31/EC of 8 June 2000 on electronic commerce ; and
- partially, Directive 97/7/EC of 20 May 1997 on the protection of consumers in respect of distance contracts.

⁴² Transposing into Luxembourg law Directive 95/46/EC of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data.

2. Network-/software-based products

There are no network-/software-based products in Macau.

3. Internet and mobile payments

As regards internet and mobile payments, two of the 23 commercial banks in Macau have launched both mobile and online banking services, which enable their customers to transfer money from their accounts for bill payments to public utilities (such as water, electricity and telephone) or tax payments to the government. The account holders send the payment instructions over the internet or via mobile phone. Funds are immediately debited from their accounts and made available on the accounts of the recipients the following day. Apart from these account transfers, there are no other internet- or mobile phone-based electronic payment instruments.

4. Policy responses

Monetary policy and seigniorage. Due to the absence of card-based and software-based e-money products, no related statistics are compiled or included in the monetary statistics of Macau. However, the Monetary Authority will take appropriate measures to collect this information when necessary, such as requiring e-money issuers to periodically report the relevant data.

As e-money does not exist in Macau, it is unlikely that its development would significantly reduce the volume of notes and coin in circulation in the foreseeable future. The development of e-money is also unlikely to undermine exchange rate stability because the legal tender of Macau, the pataca, is linked to the Hong Kong dollar under the currency board system, and hence all pataca issues are fully covered by foreign reserves.

At present, the Monetary Authority has no plan to issue e-money itself. However, it will continue to follow developments closely, and is prepared to regulate the related activities with a view to maintaining monetary stability.⁴³ After all, the policy stance of the Monetary Authority is to be open to financial innovation, including e-money.

General legal issues. The legal framework for regulating the issue of e-money products is contained in the Financial System Act of Macau (the Banking Ordinance). This Act principally governs the operations of credit institutions, which are the only institutions that may operate a business involving the acceptance of deposits and other repayable funds from the public. Any institution taking deposits (though of small value) from the public for storage on cards or other types of devices which are special purpose vehicles is to be authorised and regulated as a credit institution under the Act for the protection of the interests of the depositors.

As the Financial System Act, which came into effect in 1993, does not specifically touch on the issue of e-money, the rules and other legal provisions stipulated in this Act may need to be adapted to deal with this new payment medium if developed. With respect to the issue of e-money, authorisations may be granted to institutions on condition that the sole business authorised institutions conduct is issuing e-money or facilitating the issue of e-money and not other types of deposit-taking or lending subject to other conditions for supervisory purposes if considered necessary.

Relevant security issues. With regard to the security of e-money products, the Monetary Authority has the following concerns:

- (a) adequacy of security measures for system operations as well as for the creation, downloading and storage of value;
- (b) adequacy of risk management and internal control procedures;
- (c) sufficiency of audit trails;

⁴³ For the purpose of protecting e-money users, e-money issuers may be required to meet backing requirements for issuing e-money.

- (d) sufficiency of arrangements to handle situations such as disputes over the amount of stored value and cardholders' or e-money depositors' liability with respect to unauthorised transactions;
- (e) adequacy of safeguards against counterfeiting, tampering with or storing fraudulent value;
- (f) effectiveness of contingency plans and backup systems to deal with disaster recovery;
- (g) adequacy of safeguards against the use of e-money products for money laundering activities.

Considering that there are highly technological aspects to the security of e-money products, requiring a commensurate level of expertise, the Monetary Authority may consider appointing outside experts to assist in assessing the security of these products or the certification of the security side of each scheme by trusted third parties.

Issuer details. As mentioned above under "General legal issues", only authorised credit institutions, as banks, are allowed to issue e-money value. Being a bank, the issuer of e-money may offer the entire range of payment processing services.

Payment system issues. Since no e-money schemes have been implemented in Macau, the Monetary Authority has no experience of problems that may arise in connection with the related clearing and settlement system. However, as it is envisaged that e-money will principally be issued by credit institutions joining the present local payment system, which has so far proved to be reliable and generally capable of meeting market needs, there should not be any particular problem relating to the clearing and settlement arrangements for e-money.

Oversight issues. The Monetary Authority, being a supervisor of financial institutions, will assume the oversight function for e-money schemes, whether card-based or network-/software-based, and internet and mobile payment schemes, all of which must be run by authorised credit institutions. At present, the Monetary Authority does not intend to take any steps to influence the design or operation of e-money schemes but will consider any supervisory measures deemed necessary.

Supervisory issues. To date, the Monetary Authority has not undertaken any specific policy responses with respect to e-money, internet or mobile payment developments, apart from those mentioned above under "General legal issues" and "Issuer details".

Law enforcement issues. It has been discussed that the features of e-money products may make them particularly convenient for money laundering. The Monetary Authority advocates the prevention of money laundering and will have to be satisfied with the adequacy of safeguards against the use of e-money products for money laundering activities before any authorisations are granted. For instance, there must be a limit on the amount of stored value, the amount of value that can be transferred to and from the products, the size of individual transactions that can be carried out with e-money and an audit trail of all transactions. In addition, the current legislation and guidelines on money laundering should be applicable to e-money schemes, though certain adaptations may be necessary taking into account the nature and specific characteristics of each e-money scheme.

Cross-border issues. Any issue of e-money products, whether single or multicurrency or whether provided by domestic or foreign vendors, will have to be approved by the Monetary Authority under the provisions of the Financial System Act as mentioned above under "General legal issues" and "Issuer details".

Certainly, there may be difficulties in the regulation of e-money schemes being promoted to local residents by foreign vendors over the internet due to territorial restrictions. However, it is believed that cooperation among supervisors or central banks is conducive to the effective supervision of the operations of these schemes.

Other issues. Since no e-money schemes have been implemented in Macau, the Monetary Authority has not needed to address either taxation questions that may arise from e-money schemes or issues related to the standardisation of schemes.

Regarding consumer protection and dispute resolution issues, the Monetary Authority will ensure that any authorised e-money schemes are sound enough to protect the interests of e-money depositors, that policies are clear and fair with respect to the rights and obligations of the various parties involved in a scheme and that there are adequate arrangements to handle cases in which e-money value has been lost, stolen or counterfeited, or disputes over the liability of e-money depositors in respect of unauthorised transactions.

All applications for access to the industry, must satisfy all the criteria that the Monetary Authority sets for the approval of e-money schemes under the provisions of the Financial System Act. Regarding competition, the Monetary Authority does not consider it to be within its remit to prohibit anticompetitive practices among e-money schemes, but will ensure that competition within the industry is healthy and does not harm the stability of the financial system.

Republic of Macedonia

1. Card-based products

There are no card-based e-money schemes in the Republic of Macedonia.

2. Network-/software-based products

There are no network-/software-based schemes in the Republic of Macedonia.

3. Internet and mobile payments

Payment over the internet is offered by three banks in Macedonia, using a specially designed system (based on remote PCs or the internet). The existing credit order payment instruments are exchanged electronically, with digital signatures, in compliance with the law on electronic documents and electronic signature.

No statistics are compiled on the number or value of payments exchanged through this payment channel. From the information which the National Bank of the Republic of Macedonia receives from banks, this type of payment now accounts for around 30% of all bank payments. The impact of this payment channel is that it decreases costs for the banks, thus lowering the cost per transaction for the customer.

There is one mobile payment scheme, **Mobi payment**, run by a non-bank, Mobimak. Mobimak is the biggest mobile phone operator in Macedonia. The maximum amount that can be paid over this system is MKD 1,000 (approx EUR 16) to any merchant who has a contract with Mobimak, by any Mobimak subscriber activating this service by dialling a special number.

The National Bank does not compile statistical data on these payments because of their low value and number.

There are real-time payment channels at many banks, whereby, if a customer chooses an "urgent" payment, the bank processes it over the central bank's RTGS system, and money is available to the recipient within seconds. The payment instruction may be submitted only to the institution (bank) which maintains the account.

4. Policy responses

There are no specific regulations regarding e-money schemes or internet and mobile payments, but general rules regarding payment operations apply to this type of payment. The law on banks allows banks, among other activities, to issue e-money.

1. Card-based products

Functional aspects. There are currently two smartcard schemes operating in Malawi: Smartcash and Sparrow. Smartcash is owned and operated by Malswitch, while National Bank of Malawi owns and operates Sparrow. These schemes operate on the Malawi kwacha only but have multiple functions.

Smartcash was launched in 2002 under the auspices of Malawi Switch Centre (Malswitch). Set up by the Reserve Bank of Malawi, Malswitch provides a countrywide network. Malswitch is both the issuer and operator of the scheme. Smartcash transactions are cleared and settled through batch processing by the Central Real-Time Interbank Settlement Processor (CRISP), a real-time gross settlement facility owned by the Reserve Bank of Malawi. The CRISP software was designed and supplied by Perago, a South African firm. Smartcard transactions are batched and scheduled for clearing and settlement on the next business day in this system. The smartcard scheme is operated on Microchip Circuit software supplied by Net 1. There are 255 wallets on this card.

The number of cards issued since inception is 18,900, a figure which is expected to rise dramatically from December 2003 onwards when the government implements the automated salaries and wages project. Currently there are 51 merchant terminals countrywide.

The Smartcash card is a reloadable electronic purse that allows users to buy goods and services from merchants who have POS facilities. The card can also be used to collect cash through ATMs. Cash is loaded from the cardholder's account by means of online authorisation using PIN codes. In addition to PIN codes, Smartcash also utilises biometric techniques as a security feature for user verification. Loading is restricted to the cardholder's bank and authorised agents. Currently, there is no restriction on the maximum amount that can be loaded. The card can duly be used at ATM and POS terminals. Card-to-card transactions are scheduled for the end of October 2003.

National Bank of Malawi operates an in-house designed smartcard scheme called **Sparrow**. The scheme is limited to Malawi kwacha transactions. Cardholders are able to shop in various supermarkets as well as to collect cash through ATM machines operated by National Bank of Malawi. A total of 49 merchants accept Sparrow cards through POS terminals. National Bank of Malawi is the sole issuer of this card. NCR Malawi supplied most of the hardware for this scheme. The hardware comprises servers, ATMs and POSs.

Sparrow transactions are limited to National Bank of Malawi ATMs and POSs. Funds transfers are executed internally, whereby National Bank of Malawi directly debits the account of the cardholders against cash withdrawals on ATMs or transactions via POSs for the credit of merchants' accounts.

Government salaries and wages. The Malawi government has approved the implementation of the civil servant salary and wage payment scheme. All civil servants will be paid via the Smartcash scheme. The registration procedures will involve capturing personal information and bank details as well as fingerprints as biometric features to be stored on the chipcard for authentication of cardholders when loading and collecting salaries at ATMs or POSs. By the end of December 2003, approximately 35,000 cards will have been issued to civil servants. The expectations are that the total number of cards to be issued will be 135,000 at the end of the registration process.

2. Network-/software-based products

The development of network- and software-based e-money products is in its infancy in Malawi. Currently, there are no network-based electronic money schemes but two major commercial banks have developed in-house software packages that offer online banking services to corporate and high net worth customers via the internet. Through these bank-specific schemes, online customers access their accounts through their computer terminals and are able to conduct basic banking functions such as consulting daily account balances and executing transactions.

National Bank of Malawi launched its online banking services in the mid-1990s and has 15,000 customers under the scheme. Stanbic Malawi upgraded its Customer Access Terminal System (CATS) in 2002. Online customers obtain digital certificates and PIN codes during registration to ensure restricted and secured access to the systems. The Reserve Bank of Malawi is monitoring and

encouraging further development of these products with advanced digital certification and sophisticated encryption techniques.

3. Internet and mobile payments

Electronic Cheque Clearing House (ECCH) project. In a bid to modernise and improve cheque processing, the National Payment Council (NPC) in conjunction with the Bankers' Association of Malawi (BAM) launched an Electronic Cheque Clearing House project in 2002. Currently, cheques are physically exchanged and manually processed for settlement in two concurrent batches in real time through the CRISP system. The ultimate objective of the ECCH project is to provide an efficient and secure cheque processing system that will be interfaced with CRISP.

Malawi will adopt a cheque imaging and truncation system. As one of the preparatory arrangements for the ECCH, banks in Malawi have already started issuing MICR-encoded cheques to their customers.

Hardware and software for the ECCH central processor will be provided by NCR. One Sybrin server will be installed at Malswitch while two others will be installed at each of the two clearing centres. These clearing centres are located at RBM Head Office in Lilongwe and the RBM branch in Blantyre. All banks participating in the ECCH project are required to install servers of their choice that will be linked to the central server at Malswitch in Blantyre. The ECCH is scheduled to go live on 1 May 2004.

4. Policy responses

The Payment System Division of the Reserve Bank of Malawi is monitoring the development of smartcard technology and electronic commerce, though oversight and regulatory functions are generally weak in the absence of a comprehensive legal framework to specifically address e-money products at this point in time.

Monetary policy and seigniorage. Statistical information on e-money is being collected but not included in monetary statistics because the amounts are negligible. This is because the population of Malawi is predominantly rural and has long been highly dependant on cash as a payment instrument. These factors limit the use and acceptability of payment instruments other than cash. Against this background, the Reserve Bank of Malawi does not expect a substantial increase in the use of e-money in the near future that would considerably impact on seigniorage.

General legal issues. Laws and regulations have not been fully adapted to deal with e-money developments. A draft bill has been prepared and presented to government for enactment for the recognition of electronic money and electronic means of transferring funds. The proposed Act would also empower the Reserve Bank of Malawi to issue legally binding directives on electronic money products.

Relevant security issues. Malswitch was primarily established to provide the electronic infrastructure (Wide Area Network) for a national online linkage of all commercial banks. To enhance the security on this network, IP Granite security software was installed which requires the use of a set of keys and the necessary encryption and authentication to maintain complete data security and confidentiality. To ensure Malswitch meets minimum internationally accepted security standards, KFMG were invited as an external independent party to evaluate and report on security intrusion possibilities. All issuers of electronic money products are required to include the necessary encryption and authentication controls in their individual schemes.

Issuer details. Besides Malswitch, only one commercial bank, namely National Bank of Malawi, issues e-money products. Though non-banking institutions have not shown much interest in this area, the Reserve Bank of Malawi would restrict such a function to commercial banks since e-money value translates into deposits and constitutes liabilities to issuing institutions. Should e-money products and values increase over time and hence have a significant impact on monetary policy and operations, this would warrant the central bank having oversight and supervisory responsibilities vis-à-vis issuers of e-money.

Payment system issues. The Payment Systems Division (PSD) of the Reserve Bank of Malawi actively collects and analyses various payment system data. The Division periodically compiles reports that evaluate the impact of new payment products and services on the economy as well as on financial industry operations. These reports provide critical input to both policymakers and market participants

in formulating policies and evaluating the performance of the financial sector. So far, the analysis of the clearing and settlement processes has not shown any problems emanating from e-money products. It is envisaged that the prevalence of cheques as well as the amount of notes and coin in circulation would decline slightly as e-money products gain acceptance among the general public.

Cross-border issues. Regional and international cooperation is a critical factor that would facilitate the reduction of cross-border risks emanating from e-money operations. The Reserve Bank of Malawi is actively involved in the SADC regional payment system modernisation projects. The ultimate goal of the SADC is to enable cross-border trade in the region by linking the national financial infrastructure of the member states. Through such a network cardholders/account holders will have access to their accounts and funds in any of the SADC member countries.

Oversight issues. Through its Payment Systems Division, the Reserve Bank of Malawi is responsible for payment systems oversight. Rules and procedures have been established with the aim of providing guidance to all participants in clearing and settlement systems. The Division continuously interacts with market participants through the National Payment Council and its various subcommittees to solicit input on the formulation of rules and regulations on the operational aspects of various payment system products and services such as e-money.

Malaysia

1. Card-based products

MEPS Cash, the banking industry's e-money scheme, was initially launched on a commercial pilot basis in September 1999 in Bangsar, a suburb of Kuala Lumpur. It is based on Proton technology, and the maximum amount that may be loaded is MYR 2,000. MEPS Cash can be used for retail purchases of goods and services and is reloadable at most of the participating banks' ATMs. The MEPS Cash scheme is operated by a payment consortium owned by 12 domestic banking institutions, the Malaysian Electronic Payment System (1997) Sdn Bhd (MEPS).

MEPS Cash is incorporated into the Bankcard, ie the Payment Multipurpose Card (PMPC) and the MyKad (Government Multipurpose Card). The Bankcard contains three applications, namely ATM, debit ePOS and MEPS Cash. In addition to the basic government applications such as the national ID, health and immigration information, driving licence and PKI, the MyKad could contain payment applications such as MEPS Cash and ATM should a cardholder choose to have them. In order to ensure a wide acceptance of MEPS Cash, the participating banking institutions are currently upgrading the existing POS terminals at retail outlets on a nationwide basis. At present, more than 9,000 terminals are able to accept MEPS Cash transactions.

In addition to MEPS Cash, a non-bank operator has introduced a limited purpose e-money scheme, the Touch 'n Go card, mainly for payments at highway toll plazas. The Touch 'n Go card, a contactless card, is issued and operated by a private company, Rangkaian Segar Sdn Bhd, for the transportation sector. The Touch 'n Go card is also an optional application incorporated into the MyKad, and can be loaded at designated POS terminals and ATMs.

E-money schemes are also in operation in closed communities, such as private colleges and universities, via smartcards that are used as a student card for accessing the campus facilities as well as making payments.

2. Network-/software-based products

In Malaysia, network-based e-money schemes are still in the early stages of development. Nevertheless, a private operator has introduced an electronic points system to facilitate online purchases using the points issued by the operator.

3. Internet and mobile payments

Internet banking. In Malaysia, internet payments are mainly driven through the banking channel. Effective from 1 June 2000, domestic banking institutions were allowed to provide transactional internet banking facilities. The Central Bank of Malaysia has taken the approach of allowing the banking institutions to provide transactional internet banking facilities in phases. Effective from 1 January 2002, all banking institutions, including locally incorporated foreign banks, were allowed to provide a transactional internet banking service. Typically, the services offered by the banking institutions through their internet banking facilities are account balance summaries, requests for account statements, funds transfer between own accounts and between own accounts and third party accounts, payment facilities and cheque book requests. In some cases, it is also possible to submit loan applications and perform online share trading. Several banks have also provided online bill payment services using credit cards. To foster the orderly development of internet banking services, the Central Bank of Malaysia issued the Guidelines on Internet Banking in June 2000 outlining several minimum requirements, such as security arrangements, the involvement of banks' senior management in internet banking, and clear terms and conditions of service. By end-June 2003, nine domestic banks and four locally incorporated foreign banks had introduced transactional internet banking services. There were 1.3 million individual internet banking subscribers as at the second quarter of 2003. This represents approximately 5.4% of the total population of Malaysia.

Payment gateway for internet transactions. In 1999, MEPS developed an internet payment gateway to facilitate credit card payments for internet-based transactions. The payment gateway accepts both SSL and SET transactions.

Mobile payments. The development of mobile payments is also being led by the banking institutions. Leveraging on the popularity of the SMS amongst the Malaysian public, four banking institutions in collaboration with telecommunication companies have launched mobile financial services with SMS facilities.

Issues to be addressed. In response to the growth in e-commerce, the Central Bank of Malaysia is working with MEPS to develop a national multibank payment infrastructure known as the Financial Process Exchange (FPX) to facilitate online payment for e-commerce transactions. The system, operating on an internet-based platform, would enable participants to execute online payments to their bank of choice. The FPX system would provide a common platform for all banking institutions to facilitate payments through credit transfers and direct debit. The system is expected to be implemented in the first quarter of 2004.

4. Policy responses

Monetary policy and seigniorage. The development of e-money schemes at this stage is not expected to have significant implications for monetary policy implementation. Currently, statistical information on e-money schemes is collected and aggregated on a monthly basis, and the Central Bank of Malaysia is closely monitoring developments in the marketplace. The Central Bank of Malaysia has no plans to issue electronic money at present.

Legal issues. The legal framework for regulating the issue of card-based e-money or multipurpose stored value cards is contained in the Payment Systems Act 2003 (PSA). The PSA, which was passed on 23 June 2003, has been introduced to improve the efficiency of the payment-related infrastructure, while maintaining the safety and integrity of the payment system. In addition to the new legal framework, the Central Bank of Malaysia is in the midst of formulating a regulation on e-money. The e-money regulation, which will be issued pursuant to Section 69 of the PSA, is designed to:

- promote orderly development of e-money schemes in Malaysia by stimulating healthy competition and e-money product innovation while maintaining financial and payment system stability;
- ensure the soundness of multipurpose e-money schemes and the stability, reliability and integrity of the issuers; and
- protect the interests of the public and maintain public confidence in the payment instrument and payment systems.

Relevant security issues. The Central Bank of Malaysia requires any issuers of e-money, internet and mobile payments to have adequate safeguards against fraud, forgery and money laundering,

adequate controls to manage the risks involved and efficient contingency plans in the event of a system breakdown or any compromise to the scheme. In addition to the security requirements, banking institutions which provide transactional internet banking services were required to put in place the following internet security arrangements:

- data privacy and confidentiality;
- data integrity;
- authentication;
- non-repudiation;
- transaction verification;
- user encryption;
- intrusion detection.

Issuer details. Under the regulation on e-money, stored value cards are categorised into three e-money instruments; single purpose, limited purpose/closed community, and multipurpose. Non-financial institutions are not prohibited from issuing single purpose stored value cards but the Central Bank of Malaysia may require the issuers to submit information under the PSA. Financial institutions as well as non-financial institutions can issue limited purpose e-money instruments, defined as a means of payment in a classified sector, eg the Touch 'n Go card. However, only financial institutions, are allowed to issue multipurpose stored value cards.

Payment system issues. Banking institutions are the main players in internet payments and e-money issuance. The clearing and settlement arrangements are done via the local automated clearing house, operated by MEPS for e-money, internet and mobile payments. As the development of e-money, internet and mobile payments is in its early stages, their use is not widespread and has not significantly affected the amount of notes and coin in circulation or the usage of cheques.

Oversight issues. The issuers of e-money as well as internet and mobile payment operators would be regulated under the PSA and, therefore, would be subject to oversight and supervision by the Central Bank of Malaysia.

Law enforcement. In respect of concerns regarding money laundering, the amount which can be loaded onto prepaid cards is limited, and they are used mainly for small-value transactions. As such, there is little incentive for them to be used as a medium for money laundering. Nevertheless, to mitigate money laundering in Malaysia, the Anti-Money Laundering Act 2001 was passed. The provisions of the Act include customer identification, record keeping and reporting of suspicious transactions by reporting institutions, and allowing for the seizing, freezing and forfeiture of properties that are the proceeds of money laundering activities.

Cross-border issues. At present, there are no problems relating to cross-border or multicurrency schemes, as e-money schemes such as MEPS Cash only allow for a single currency, ie the Malaysian ringgit.

Mauritius

1. Card-based products

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

2. Network-/software-based products

No scheme of this type exists in Mauritius.

3. Internet and mobile payments

For information in respect of internet and mobile payments please see Tables C and D. Two banks currently offer internet banking services in Mauritius.

4. Policy responses

No new developments.

As reported in the 2001 survey, the Electronic Transaction Act 2000 was passed in the National Assembly and received the assent of the President on 1 August 2000. The Act provides for an appropriate legal framework to facilitate electronic transactions and communications by regulating electronic records and electronic signatures and the security thereof.

Mexico

1. Card-based products

There are two e-money projects in Mexico. Banco Inbursa, a Mexican bank with a Proton licence, promotes one project, called Monedero Electrónico CHIP i). The second project is promoted by a large bank, Banamex-Citigroup, which holds a Mondex licence with two other banks, BBVA-Bancomer and Banco Internacional SA (Bital).

The Proton project uses a single currency rechargeable stored value card. By November 2003, Inbursa had issued 900,000 cards; modified 180,000 public phones; installed 2,100 POSs and 526 ATMs with chip readers in order to enable transactions through them with Monedero Electrónico CHIP i); and is working with a group of banks (Santander-Serfin and Banregio), supermarkets and retailers, petrol stations and transportation service providers to introduce Monedero Electrónico CHIP i) in those services. The value of e-money issued is around USD 160,000 and the volume of transactions is 685,000. Currently, Monedero Electrónico CHIP i) is not charging fees for its use.

Banamex-Citigroup, BBVA-Bancomer and Bitel, the three largest credit card issuers in Mexico and three of the major commercial banks in Mexico, joined forces to promote a new national smartcard infrastructure incorporating Mondex electronic cash.

On 26 March 2001 Banamex-Citigroup launched a pilot programme with 23,000 cards and seven participating merchants; the e-money issued was around USD 100,000. Banamex-Citigroup charged no fees for cardholder transactions. However, there was a fee of approximately 1.5 to 2% charged to merchants. This pilot ended in December 2001 and Banamex-Citigroup has been evaluating the results.

2. Network-/software-based products

No developments so far.

3. Policy responses

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

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

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

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

Payment system issues. The two schemes under consideration plan to use the existing clearing and settlement arrangement and thus are not expected to give rise to any 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 concerning e-money products. There have been no central bank attempts to standardise e-money products.

Moldova

There are no e-money schemes in Moldova at the moment.

Mongolia

1. Card-based products

There is no e-money card-based scheme in Mongolia. There have as yet been no officially announced initiatives related to the development of e-money.

However, the commercial banks are showing interest in issuing e-money.

Although cash has been the most important mode of payment, the use of plastic cards has been growing. A number of cards were launched in 2002, namely credit cards and debit cards, and they are increasingly popular.

At present, two commercial banks, the Trade and Development Bank (TDB) and Golomt Bank, issue internationally accepted Visa cards and MasterCard. ATMs have started to play an important role in cash withdrawal and depositing.

Another commercial bank, Anod Bank, issues its own smartcard, Tsakhim togrog, in national currency; the card can be used only in Mongolia and Russia. This being a payment card, the cardholder is granted a line of credit authorising him to make purchases and/or withdraw cash up to a maximum limit.

2. Network-/software-based products

There are no such schemes in Mongolia at the moment.

3. Internet and mobile payments

Internet and phone banking are at an early stage of development. Internet banking was initiated in mid-2002, and there are already four banks providing internet banking services, which generally consist in supplying information such as interest rates, exchange rates and account balances, and enabling customers to open a new account, pay bills, transfer funds, etc.

4. Policy responses

Monetary policy and seigniorage. There are no significant developments in e-money schemes, so e-money is excluded from monetary statistics. E-money has no impact on monetary policy or on seigniorage.

General legal issues. No laws or regulations have as yet been adopted to deal specifically with e-money, internet and mobile payment schemes.

Morocco

1. Card-based products

Currently there are no card-based e-money schemes implemented in Morocco.

As of today there are four bank card networks, which operate independently. However, in order to promote bank cards as a means of payment, the professional bank group of Morocco (GPBM) has established the Interbank Money Center (CMI). This will permit the interconnection of the four existing bank card networks, and the centralisation, processing and securitisation of transactions.

2. Network-/software-based products

Currently there are no network-/software-based e-money schemes implemented in Morocco.

3. Internet and mobile payments

Back in 1998 a pioneer bank set up a platform for communication via its website. This environment was the first internet-based interactive banking server in Morocco (e-banking). It allows bank 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. As of today most of the banks have their own website to promote their products, but at least three of them are offering e-banking services. One major requirement should be underlined: the physical presence of the customer is always required for identification purposes on setting up a new e-banking account.

Another bank in 1998 set up an EDI (electronic data interchange), a system whereby companies and administrations can exchange, in electronic and structured form, commercial documents such as invoices, notices and declarations between their computer systems. The system's participants can also make payments to suppliers and employees, and pay their taxes and other duties.

No steps have been taken to collect statistical information on e-money because it is not significant enough, and it is unlikely to have an impact on the value of notes and coin in circulation or on the size of the central bank balance sheet for the time being, or even in the near future.

4. Policy responses

General legal issues. Pursuant to its new statutes, the central bank will ensure the security of means of payment, as well as that of the payment system as a whole.

Issuer details. In accordance with the Banking Act, only legal entities that are licensed as credit institutions are allowed to conduct operations relating to the management of means of payment. To be licensed, credit institutions are required to commission an assessment of the internal control system to be put in place to prevent any kind of risk, including fraud.

Payment system issues. Internet and mobile payments are insignificant. Therefore, no steps have yet been taken to collect related statistical information.

Oversight issues. The central bank does not perform any kind of oversight activity vis-à-vis e-money, internet and mobile payment schemes, because the volume of the transactions is insignificant and does not justify oversight activity.

Supervisory issues. No specific policy responses have been undertaken by bank supervisors with respect to e-money. Supervisors consider that e-money schemes are still at an early stage, and that acceptance by Moroccan consumers will take more time.

Law enforcement issues. As mentioned earlier, e-money transactions represent a small part of the country's overall financial market. However, a directive is being developed by the central bank which will require banks to implement efficient measures. This will help avoid the use of these channels for money laundering, including e-money schemes.

Cross-border issues. The exchange control legislation and regulation office has set rules prohibiting local residents from holding international credit cards unless active in import/export business, with any amounts transacted having to be justified as a business expense. With regard to foreign vendors, so far none has promoted products to local residents.

Other issues. No such issues have arisen.

Netherlands

1. Card-based products

Two competing e-purse systems existed until January 2002: Chipper and Chipknip. After 1 January 2002 no new Chipper e-purses were issued. After 1 April 2002 it was no longer possible to make payments with Chipper. The issuing bank of Chipper started to give out Chipknip cards instead.

Chipknip is generally issued in combination with a debit card. Postbank also issues Chipknip without debit card functionality. Chipknip has to be loaded at a terminal with a minimum amount of EUR 5. For loading Chipknip, the PIN is required, debiting the customer's bank account. The number of Chipknip cards issued is 17.3 million. The number of payment-accepting terminals is 164,000. The balance on the card generally cannot exceed EUR 500. The annual value of transactions is estimated at EUR 220 million. The growth of the use of Chipknip is concentrated in parking and catering. An interesting additional application of the chipcard is age verification, especially in cigarette vending machines.

Payments are made offline and the cardholder does not have to enter a PIN code. Retailers have to unload their terminals at least once every week. This is done by transmitting the payment information by telephone to Interpay (technical operator of Chipknip). Card-to-card transfers are not possible. Currently the number of Chipknip loading terminals is approximately 5,000. There is a small number of portable loading devices that can be connected to the telephone and used at home.

Since January 2002 **Prepaid Chipknip** has been on sale (mainly to tourists). This is to facilitate payments (eg parking fees, which in some cities can only be paid by means of a chipcard) by consumers that do not have a Dutch bank account and a debit card with Chipknip. Prepaid Chipknip is issued by Interpay Elektronisch Geld Instelling BV, the only licensed electronic money institution in the Netherlands so far. Prepaid Chipknip is sold in fixed denominations of EUR 5, 10, 20 and 50. On most cards a service fee of EUR 2.50 is charged.

In 2003 a prepaid scratch card, **Wallie**, was launched for use on the internet. Wallie is sold in regular shops in denominations of EUR 5, 10, 20 and 50. A cardholder can draw on the prepaid amount by entering his card number at an accepting pay site. Wallie is issued by a company that also distributes prepaid telephone cards (scratch cards).

2. Network-/software-based products

Few network-based e-money schemes exist in the Netherlands and their use is limited. The most prominent issuers of this kind of product are banks. **Way2Pay**, offered by ING Bank, is an example of

a network-based e-money scheme in which an e-mail address is used as an “account number”. The Way2Pay account is prefunded from a bank account. When paying at a website, the Way2Pay button is clicked, a password is then required and payment is authorised. This payment is then debited from the prepaid Way2Pay account. Use of Way2Pay is free of charge for consumers, whereas retailers pay fees for receiving funds.

The www.bon (ie WWW-coupon) can be bought by paying in to an account of the issuing organisation. The buyer’s e-mail address and mobile phone number have to be registered. After the money is credited to the issuer’s account, the buyer receives an e-mail message with a link and/or an SMS with an “account number”. Payment on the internet is possible with the www.bon by sending an e-mail with the transaction code taken from the digital www.bon.

3. Internet and mobile payments

The most used means of payment for transactions over the internet remains the credit card, although the use of bank-based direct debit and credit transfer is steadily rising. All major banks offer e-banking or internet banking. Real-time online payment from a bank account is possible only when the account to be credited is held at the same bank. An estimated 4.7 million subscribers to internet banking facilities are reported for 2002 (out of an estimated 8.7 million internet users). **Rabo’s Direct Payment** has approximately 1 million users.

Some banks offer possibilities for mobile payments. **M-banking** (Postbank) offers a similar possibility to pay real-time online as a direct payment through the internet. More recent examples of m-banking initiatives are I-mode banking (Rabobank, SNS Bank).

Telephone companies also facilitate payments. Traditionally, the telephone company’s administration charges airtime to the customer’s bill or prepaid balance. This administrative capacity allows it to process many small transactions, such as payments for premium rate services. In this way many small payments are replaced by one bank payment (consolidation), viz the payment of the phone bill. With the emergence of SMS, another channel for paying opened up.

Mobile2Pay offers a means of payment which requires subscription and signature of a direct debit form. Registration takes place on the internet and includes submitting a mobile phone number. The merchant submits the payment information to Mobile2Pay, who call the customer for confirmation of the transaction and for payment authorisation (with the aid of the PIN code).

4. Policy responses

Monetary policy and seigniorage. The Netherlands Bank has recently investigated the potentially more difficult implementation of monetary policy likely to result from the further development of e-money. A particular point of interest has recently been the development of mobile payments and their potential effects. The impact on the effectiveness of monetary policy and seigniorage is likely to be small. The Bank, however, continues to monitor the development of e-money closely.

General legal issues. Under the Act on the Supervision of the Credit System (ASCS), a licence is required for issuing deposits and e-money. Banks traditionally offer payment facilities on the basis of the deposit money they issue. Electronic money institutions settle payments on the basis of a prepaid balance, e-money. ELMIs operate under a so-called “lighter” supervision regime with an ELMI licence.

Security. In cases of direct access to the bank account through either the i- or the m-channel, a high level of security is required. For online payments, identification takes place generally through a token which, independently of the channel, generates an identification number (digipas or e-dentifier). Otherwise, m- and internet banking functionality requires a PIN.

In non-bank initiatives, identification often takes place through a separate channel. First, there are schemes having an elaborate registration procedure when the contract is closed between customer and payment service provider. For payment over the internet, registration of personal data (name, address, e-mail address, mobile phone number) takes place. For confirmation of the customer’s identity, the payment service provider returns a message to one of the submitted numbers, or (e-mail) address or both. That message contains the initial password or PIN code to be used in later transactions facilitated through the payment service provider.

Oversight and supervision issues. Oversight as well as the issuing institutions' awareness of the importance of maintaining confidence in the payment services they offer are the most important forces promoting an adequate level of security. It has proved to be important to require credit institutions to formulate a sound security policy for the product as well as an 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. The central bank performs oversight on internet and mobile payment schemes. The overseer monitors market developments and assesses the security of the scheme before a product is launched. The overseer encourages self-regulation among market parties but can also influence new product and scheme design on the basis of regulation by the Bank. Prudential supervision assesses these products in order to establish the consequences for the individual credit institution. In order to prevent duplication of work and to prevent a divergence in requirements and assessments, the overseers and supervisors cooperate closely.

Law enforcement. With respect to money laundering activities, e-schemes are being monitored just like transfers with other payment instruments. However, the limited value that can be stored on electronic purses does not make them a likely vehicle for money laundering. Since most innovations take place in order to facilitate low-value payments and micropayments, no important law enforcement issues arise.

Cross-border issues. Electronic purses can only be used nationally.

New Zealand

1. Card-based products

Trials to date indicate that there is little demand or interest in New Zealand in card-based schemes. This is largely attributed to the widespread acceptance and use of debit and credit cards for transactions of all values. Debit card transactions as low as NZD 1 in value are not uncommon.

There are instances of card-based schemes being offered in limited geographic areas, such as at universities, for a limited range of products. However, generally, stored value cards have not developed beyond single use cards, such as prepaid phone or transport cards.

Banks are investigating the use of chip technology that would enable the use of e-money, and at least one bank has installed the technology onto a credit card, though at this stage the technology is not being used for e-money.

2. Network-/software-based products

The Reserve Bank is aware of two proposals to develop software-based e-money. In neither case have the proposals developed beyond the preliminary stages in New Zealand.

3. Internet and mobile payments

The use of the internet is well established in New Zealand as a way to purchase goods and services, pay bills, and for customers to access their bank accounts. Online payment for internet purchases is predominantly effected using credit cards. In internet-based bill presentation and payment services, registered users typically access the service website using a personal identifier and password. Payments are made electronically from preauthorised bank accounts.

A mobile phone company has begun to promote using mobile phones to purchase and pay for event tickets, but again these developments are at a preliminary stage.

4. Policy responses

The Reserve Bank of New Zealand has statutory responsibility for the oversight of payment systems in New Zealand. There have been no specific policy responses to e-money to date because the use of

e-money is still at an embryonic stage domestically. The Reserve Bank continues to monitor developments and keeps informed of new initiatives in e-money and related products in New Zealand.

Nicaragua

1. Card-based products

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

2. Network-/software-based products

No developments at the present time.

3. Policy responses

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

Nigeria

1. Card-based products

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

Single purpose stored value cards

With respect to single purpose stored value cards, the service provider and the issuer are one and the same party. Nigerian Telecommunications Limited (NITEL), MTN, Econet, Globacom and other telephone service providers have for some years now been issuing this type of prepaid card, which is used exclusively for purchasing airtime and making telephone calls.

Multipurpose stored value cards

A number of such schemes exist, and the cards are used to pay for goods and services at any retail outlet that accepts them.

Valucard. This is a smartcard or electronic payment scheme that was introduced (with the approval of the Central Bank of Nigeria) by a special purpose vehicle, Smartcard Nigeria Plc (now called Valucard Nigeria Plc), which was incorporated by a consortium of banks. The trial run of the scheme commenced in selected Nigerian cities in April 1999. Full and final implementation of the scheme began in 2000, and the cards are currently accepted by 4,207 retail outlets in most of the major cities in Nigeria. About 184,924 cards have been issued since the launch. Valucard Nig Plc, which acts as the clearing and settlement institution, also coordinates the hardware and software procurement, with the software being supplied by Card Services International of Dublin, Ireland. The participating banks serve as card issuers while cardholders are required to maintain an account with the issuing bank.

The cards are PIN-protected and can be used for loading or withdrawal of funds at any of the participating banks, and for payment of goods and services.

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

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

Other security features of Smartpay include the encryption of transactions and processes using triple DES algorithms and RSA keys.

About 78,266 cards have been issued to date and are accepted by more than 760 retail outlets spread over some 20 cities in Nigeria.

Electronic Smart Card Account (Esca) is another reloadable electronic purse in a scheme operated by Allstates Trust Bank Ltd. The bank, which is the issuer, also serves as the clearing institution for Esca. Merchant terminals and bank teller machines were supplied by Verifone, the cards by Gemplus and the computers by Compaq.

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

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

To date, over 17,500 cards have been issued, and Esca is accepted at over 58 locations, including at the bank's 14 ATMs.

Paycard. This is an electronic purse which was introduced by Diamond Bank Plc in 1997. Access to the value on the card is PIN-restricted. Paycard is used for making small purchases at retail outlets that accept the card.

The security features of Paycard include the encryption of transactions and processes using triple DES algorithms and RSA keys.

The hardware and software were supplied by Bull and Slumberger respectively.

MasterCard International products. Approval was granted in 2003 for some Nigerian banks to serve as acquirers and issuers of MasterCard International products. The cards concerned will be debit and credit cards and will be based on both the local (Nigerian naira) and foreign currency (US dollar). No cards have as yet been issued by any of the designated banks. The applications from other banks to serve as acquirers and issuers are under consideration.

2. Network-/software-based products

A few banks have developed online banking to enable their customers to execute simple banking transactions over the internet; however, there are currently no developments with regard to network-/software-based e-money products via the internet.

3. Internet and mobile payments

Internet banking payments. The development of internet payment is still in its early stages in Nigeria. However, between 2000 and 2003 some Nigerian banks developed online banking, enabling customers to execute a wide range of simple banking transactions over the internet, including: balance enquiries; viewing and downloading of statements; confirmation of cheques; online shopping; requests for cheque books, bank drafts, traveller's cheques and smartcards (Valucard, Smartpay, etc); funds transfers; payment of bills; bulk payments (such as salaries and vendor payments); and monitoring of trade finance transactions.

So far, over 17 banks have offered internet banking in some form or other.

With regard to security, most of the systems provide for user authentication, data encryption and user entitlement and authorisation in securing transactions. They generally use passwords (or PINs) for authentication; firewalls and SSL to provide privacy between web customers and servers; and 128-bit encryption through digital certificates to enable users to establish secure internet sessions. Authorisation for customer activities is controlled or limited through user identity access rules.

Mobile banking payments. Following the launch of GSM services in Nigeria in 2001, a few Nigerian banks have launched mobile banking services that enable customers to carry out simple transactions based on SMS technology with the customers' mobile phones serving as the terminals. Such transactions include: account balance enquiries; funds transfers between customers' own accounts and to other accounts with the same bank; transaction tracking; third party payments, such as bill payments; cheque book requests; and cheque confirmation.

So far, over 10 banks have offered mobile banking/payments services.

The security controls used are PIN code and pass code identification.

De'Hastrup Communications Nigeria Limited is the major supplier of most of the mobile banking/payment applications.

4. Policy responses

A joint monitoring committee comprising staff of the Central Bank of Nigeria and representatives from Valucard Nigeria Plc and Smartpay Nigeria Ltd was constituted to monitor development of the Valucard and Smartpay projects. In addition, guidelines covering all aspects of electronic banking were issued by the Central Bank in September 2003. The guidelines also require banks which exclusively serve as issuers of electronic money to submit separate statistical returns on their e-banking activities (including all cases of fraud and forgeries) to the appropriate regulatory authorities. Card scheme operators are also required to supply statistical information to the regulatory authorities as and when required.

Monetary policy and seigniorage. Due to its present state of development, electronic money is not expected to have any significant impact on monetary policy implementation as the amounts involved are still low. The Central Bank of Nigeria does not for the time being envisage issuing e-money itself. Issuers are, however, required to submit statistical information that includes the volume and value of transactions with a view to including them in monetary statistics.

General legal issues. There is currently no legislation specifically adapted to dealing with electronic money but such schemes are being accommodated within the existing legal framework. As mentioned above, guidelines have been issued to cover all aspects of electronic banking, including issuance of electronic money by Nigerian banks.

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

Security issues. All e-money issuers must ensure adequate safeguards against counterfeiting, tampering or fraudulent use, and money laundering activities; in addition, there must be an audit trail of all transactions as well as adequate provision for recovery in the event of loss.

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

Payment system issues. The Central Bank is not aware of any particular problems which have arisen from the clearing and settlement of transactions with e-money since issuing banks are required to pledge Nigerian Treasury bills to the equivalent amount of 110% of their liability limits.

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

Other issues. None reported.

Norway

1. Card-based products

Buypass, a smartcard-based system, was established in 2001. Cards are issued by the Norwegian National Lottery and Norway Post. Buypass provides solutions for identification and shopping on the internet and via other sales channels (digital TV, mobile phones, POSs, vending machines). Users must have an electronic ID, which can be stored in the chip on a smartcard, on a mobile phone (SIM) or in other devices.

The smartcard also contains an electronic purse, which is used for secure payment to merchants who have implemented the Buypass solution. Buypass is planning to establish a net account in addition to the smartcard. The aim is for payment to be made from the smartcard or the net account. A virtual Buypass Net ATM will allow the transfer of funds between the smartcard and the net account and will be connected to a Visa/MasterCard/Eurocard account or bank account.

The maximum amount that may be stored in the electronic purse in the chip is currently NOK 2,500, and the maximum amount in the net account will be NOK 9,500.

The system will probably receive authorisation in accordance with the new Act of 13 December 2002 relating to Electronic Money Institutions.

2. Network-/software-based products

There are four network-/software-based products in operation: Payex, Contopronto, KOPEK and SmartPay. These systems will probably all receive authorisation in accordance with the new Act of 13 December 2002 relating to Electronic Money Institutions.

Payex is an electronic wallet for online and mobile commerce. The system was established in October 2001 and has been developed by the E-solutions Group. Payex is designed to facilitate small-value face-to-face retail payments as well as small-value payments over the internet. All purchases are debited to the user's Payex account. Money can be deposited from a bank account, credit card or by buying a Payex cash card. The cash cards have a safety code, and the Payex accounts have a user limit of NOK 1,000.

Contopronto is a system that has created an electronic wallet for mobile commerce. The mobile wallet is a method of payment using money stored on a mobile phone. Payments can be made at sales points in shops, kiosks, restaurants, service stations, or at online stores and net auctions. Thus, Contopronto facilitates small-value face-to-face retail payments as well as small-value payments over the internet. In accordance with the premises of the authorisation which is likely to be granted, the mobile wallet will have a user limit of NOK 10,000.

The **KOPEK Internet Payment System** is a complete internet-based transaction system that incorporates security, transport, identification and (micro) payment in one solution. The system works with all types of merchandise, including web pages, web services, images, live video streams, audio, applications and physical items.

SmartPay is a system of payment using a mobile telephone. Goods and services can be ordered via a mobile telephone or the internet. The system then facilitates small-value face-to-face retail payments as well as small-value payments over the internet. SmartPay allows users to choose whether to pay directly from a bank account or using money stored on their mobile telephone. The prepaid value stored on the telephones will probably be limited to NOK 10,000.

3. Policy responses

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

Impact on notes and coin. As the development of e-money is still at a very early stage in Norway, no major impact is expected on notes and coin. However, the Central Bank of Norway does not rule out the possibility that e-money products may become more widespread in the long run.

Monetary policy and seigniorage. The Central Bank of Norway does not expect a major impact on its seigniorage. The share of notes and coin as a percentage of its balance sheet is low, and note and coin circulation would have to fall substantially to represent a threat to the Bank's income position.

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

Issue of e-money. The Central Bank of Norway is not planning to issue e-money.

Legal provisions. The Act relating to Electronic Money Institutions was adopted by the Storting on 13 December 2002 and implements provisions in the two EU directives on e-money from 2000, 2000/46/EC and 2000/28/EC.

Role of various authorities. The Payment Systems Act states that the Central Bank of Norway shall authorise interbank systems, while the Banking, Insurance and Securities Commission shall authorise all retail systems for payment services. The Act relating to Electronic Money Institutions stipulates that the Commission is responsible for supervising e-money companies.

Relevant security issues. The Central Bank of Norway has left security issues to the market participants. The need for integrity and a good reputation will be adequate incentive for the participants to include a high level of security in the system(s). However, with the Payment Systems Act, all issues related to retail payment systems, including security issues, are the responsibility of the Commission.

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

Supervisory issues. The Act relating to Electronic Money Institutions stipulates that the Banking, Insurance and Securities Commission is responsible for supervising e-money companies.

Cross-border issues. In our view, the participation of local banks in cross-border e-money schemes involving Norwegian kroner does not raise any new policy issues. Transfers of funds by residents to foreign e-money schemes will be captured in the balance of payments statistics. Transactions over foreign accounts held by residents should be reported to the Central Bank of Norway. This would probably also apply to e-money accounts held by foreign issuers.

Other issues. The electronic payment system in Norway is highly integrated and includes all commercial and savings banks. The technology platform is magnetic stripe card with online PIN verification. In cooperation with the Banks' Central Clearing House, four of Norway's largest banks initiated the Smart Card Norway Project. The project's objective is to prepare for the transition from magnetic stripe technology to smartcard technology for Norwegian payment cards and payment terminals. The smartcard technology will be based on the international EMV standard, and the plan is to complete the transition by the end of 2004. As part of this project, banks also have plans to introduce new solutions for small payments using smartcards (electronic purses). A limited, technically successful pilot was carried out in the autumn of 2002. The Banks' Central Clearing House has come to an agreement with Proton World that facilitates the use of Proton technology for smartcards. A pilot is planned for the first quarter of 2004.

Oman

1. Card-based products

In Oman, at present, there are no e-money schemes in operation.

2. Network-/software-based products

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

3. Policy responses

The Central Bank of Oman is closely monitoring developments in electronic means of payment. It is yet to issue a regulation on electronic payments.

Monetary policy and seigniorage. The monetary and financial system in Oman continues to be largely cash-based in relation to comparable systems in advanced economies, and e-money has been only a recent and very insignificant development for the country so far. Hence, no specific initiative has been undertaken as yet to collect statistical information on e-money. Developments are, however, being closely monitored and when felt necessary, appropriate returns will be designed to collect the information for use as part of monetary statistics.

The central bank also recognises the fact that greater use of e-money as a medium of exchange could in the future substitute for central bank currency, potentially affecting the size of the central bank balance sheet and seigniorage revenue.

The implications for monetary policy operating procedures are not very clear as yet, and examples of the experience of other central banks would be useful in this regard. There are several possible options for dealing with the challenge: (a) regulate the creation of e-money in the private sector; (b) impose a high cash reserve requirement on e-money balances; (c) monopolise the issuance of e-money; and (d) sterilise/use open market operations to regain monetary independence.

The mainstream view as of now is that central banks need not issue e-money, but they must regulate the e-money creation process and use reserve requirements to ensure monetary stability. At the moment, the prime concern is the security features of e-money, since e-money fraud is easy to commit and difficult to detect. Sudden lack of faith in e-money at some point of time could be highly destabilising for the monetary and financial systems.

Loss of seigniorage revenue could be a reality once e-money begins to substitute for central bank currency on a large scale. Such developments, at the moment, appear to be a very distant reality for Oman and, therefore, no specific measure is being contemplated to deal with a possible fall in seigniorage revenue.

Pakistan

E-money products currently do not exist in Pakistan. However, single purpose prepaid cards are already being marketed by retailers in the telecommunications and oil industries.

Banks in Pakistan use franchised credit cards such as Visa, MasterCard, Maestro and American Express. Besides ATMs and debit cards, some of the banks in Pakistan have also introduced internet banking, funds transfer and acceptance of utility bills through ATMs.

There are certain proposals being considered by the financial market for the introduction of chip-based cards but their launch has not yet been confirmed. Meanwhile, the authorities concerned are also

engaged in framing a relevant legal structure around a Cybercrime Law, E-banking Law and Anti-Money Laundering Law.

Peru

1. Card-based products

Up to now no card-based products have been developed by entities in the financial system. At present, the only products in circulation are the single purpose prepaid cards issued by the telephone companies.

2. Network-/software-based products

Digital money is in its initial phase of development. Banco Wiese Sudameris is one of the institutions which has initiated the development of non-traditional payment systems.

Since April 2002, Banco Wiese Sudameris together with MasterCard has offered the public a payment system called Pagum.Com which enables both firms and individuals to transfer money and make payments as well as to make purchases via the internet.

Pagum.Com is an open system, in that it is not necessary to be a customer of the bank to participate in the system; it is enough to have an active e-mail account. In order to make transfers or payments, it is necessary to register with the system and open a virtual account. As such an account bears no relation to ordinary bank accounts and is not considered a typical source of funds account, it is non-interest bearing.

Once registered, the customer must buy an "internet card", which is a prepaid card that allows the virtual account to be credited. Internet cards can be purchased in local currency, in denominations of PEN 20, 50 and 100, or in foreign currency, in denominations of USD 20, 50 and 100. To make purchases via the internet, the customer must ask for a MasterCard Pagum Card, which must be charged through the virtual account before any transaction can be undertaken.

The system restricts the amount of money that can be credited to a virtual account or to the MasterCard Pagum Card to a maximum of USD 5,000, PEN 17,500 or EUR 5,000. Likewise, the maximum daily cash withdrawal permitted through a virtual account is USD 500, PEN 1,500 or EUR 500. Such withdrawals are subject to a fee ranging from USD 1.5 to USD 2.

The system is subject to Peruvian legislation and its legality is not guaranteed in other countries. Concerning physical security, mainframes are equipped with triple redundant energy and air and fire suppression systems, etc. As for information protection, mainframes are not connected directly to the internet, but are located behind a firewall. In addition, the processed information is encrypted automatically using SSL encryption keys. Furthermore, in order to undertake a transaction, the customer must have a 20 digit confirmation number (eight digits being the minimum) associated with the registered e-mail account.

At the time of writing, there were no statistics on the transactions processed by the system.

3. Internet and mobile payments

Recently, some financial institutions, such as Banco Continental and Interbank, have developed systems which allow their customers to order credit transfers through the internet.

In November 2001, the electronic clearing house Cámara de Compensación Electrónica SA (CCE) started processing credit transfers. Since then, some banks have enabled their customers to order transfers through the internet, without having to go to the banks' offices.

The customers authorise such transfers by means of the passwords given to them by the banks where they hold their accounts. Operations involving credit transfers are subject to the rules issued by the central bank and by the CCE.

4. Policy responses

Monetary policy and seigniorage. The central bank is monitoring the development of digital money in Peru. In February 2003, the central bank, through its Circular on the Means of Payment (Circular 004-2003-EF/90), declared digital money an additional statistic to be reported to the central bank.

General legal issues. At present there is no specific legal framework governing e-money.

Issuer details. There is no legislation which restricts the issue of e-money.

Oversight issues. While there is no explicit legal mandate to supervise electronic money, through its Circular 004-2003-EF/90 the central bank has taken the first steps to put into effect a more extensive oversight system for e-money should its development warrant it.

Given that e-money is in an incipient state of development, there are at present no relevant statistical data available.

Philippines

Electronic banking generally refers to the provision of banking products and services through electronic channels. The Central Bank of the Philippines (Bangko Sentral ng Pilipinas, BSP), under Circular No 240 dated 5 May 2000, defines electronic banking as the system that enables bank customers to have access to banking products and services through a personal computer (using direct modem dial-in, internet access, or both) or a mobile/non-mobile phone. Such products and services can include deposit-taking, lending, account management, the provision of financial advice, electronic bill payment, and the provision of other electronic payment products and services such as electronic money.

Electronic money products are usually stored value or prepaid products in which a prepaid balance of funds or value is recorded on a device (eg a card) held by the consumer. The balance of funds on the device is decreased, or debited, when the device is presented for payment.

In contrast to the many existing single purpose prepaid card schemes (such as those offered by telephone companies, internet service providers and mass rail transport companies), e-money products are intended to be used as a general, multipurpose means of payment. E-money products can be categorised into three groups: (1) card-based products; (2) prepaid software products that use computer networks such as the internet; and (3) access devices.

1. Card-based products

Some Philippine banks have started to introduce card-based e-money products that are aimed at facilitating retail payments and tapping the enormous commercial potential of the internet. The stored value card products provide a method of retail payment that allows funds to be electronically transferred to the card, which can then be used to make purchases up to the total value stored on the card.

Presently, there are five stored value cash cards in the market, issued by four Philippine banks: **Express Cash** of the Bank of the Philippine Islands, **E-ON Electron** of Unionbank, **FASTcard** of Equitable PCI Bank, **Cash Card** and **Smart Money** of Banco de Oro. Two multipurpose cash cards are issued by non-banking institutions: the **PLDT Visa Cash** card issued by PLDT, a telecommunications company, and the **Mondex card** issued by Mondex Philippines. The cash card schemes are being implemented using either Visa Electron, Master Electronic or Ace Arizona, a locally developed cash card system.

The stored value cards issued by the Philippine banking institutions are multifunctional and reloadable, and can be accessed via ATM, POS, over-the-counter tellering system, mobile phone and soon via internet. The values stored on the cards are in Philippine currency ranging from PHP 10,000 to PHP 100,000. Presently, there is a pending request from one of the issuer banks to increase the limit to PHP 200,000 per card.

2. Network-/software-based products

No network-/software-based e-money products exist in the Philippines at the moment.

3. Policy responses

Monetary policy concerns. While the use of electronic money is still relatively undeveloped in the Philippines, the possibility of greater acceptance and adoption as well as future expansion in use by customers and merchants could affect monetary policy in the following areas: (1) the central bank's monopoly in issuing currency; and (2) the power of the central bank to require banks to deposit part of their reserve requirements with the central bank. Currency issued and banks' reserve deposits are the primary source of the central bank's liabilities and, together, form the base on which the central bank manages the supply of money in the banking system. Any diminution of the central bank's power in these two areas poses a major challenge to maintaining effective monetary management.

Stored value cards compete directly with notes and coin for making retail payments and can, therefore, reduce currency in circulation. Overissuance could also compromise the unit of account role of money. Finally, network money has the potential to reduce substantially the central bank's role as the payment and settlement bank and can, therefore, undermine its capability to manage banks' reserve deposits and the monetary base.

General legal and regulatory framework. Although at present there is no specific law for e-money, Republic Act No 8792 (otherwise known as the E-commerce Law) dated 14 June 2000 serves as the basic legal framework for the recognition and use of electronic commercial and non-commercial transactions.

The General Banking Law enacted in May 2000, on the other hand, provides the central bank with the specific legal basis to regulate the use of electronic devices in the operations of financial institutions under its supervision, including the delivery of electronic banking products and services to customers. Prior to the enactment of the law, however, the central bank had already been closely monitoring global and local developments in electronic banking, particularly the growing number of Philippine banks offering this service. At the same time, bank regulators were well aware that the provision of electronic banking services and e-money products is not without risk, particularly operational risk.

As the supervisory and regulatory authority of the banking industry, the central bank is concerned that competitive pressures might encourage banks to engage in electronic banking without the necessary operational controls in place, thus harming the general public. This led to the issuance of BSP Circular No 240 dated 5 May 2000, which became the pioneer regulatory framework governing electronic banking activities in the Philippines. The new regulations did not cover ATM services, where the technology is already stable. Instead, it focused on the newer internet and mobile and non-mobile phone banking services.

Under this Circular, banks are required to seek prior central bank approval before they can be allowed to provide electronic banking services. Applicant banks must prove to the central bank that they have in place a risk management system that can adequately assess, control and monitor risks arising from electronic banking activities.

Subsequently, the regulations were refined with the issuance of BSP Circular No 269 dated 21 December 2000 in order to fast-track the procedure for processing electronic banking applications. Under the revised procedures, applicant banks are pre-qualified for financial strength and track record of compliance with prudential regulations. Pre-qualified banks may then immediately launch their electronic banking services on a conditional approval basis provided that the bank president has certified that basic risk management requirements related to its electronic banking product have been met. Final approval by the Monetary Board is granted after market launch upon the applicant bank's full compliance, as determined in a formal review process of all risk control requirements.

As of 31 March 2002, the central bank had given the go-ahead to 32 banking institutions to provide electronic banking services. These electronic banking applications were either approved as per Circular No 240 or conditionally approved under Circular No 269.

While there are regulations governing the delivery of electronic banking services, there is at present no specific regulation governing the issuance of electronic money. It may be necessary to revisit the provisions of existing laws to determine whether they adequately address major issues regarding the

treatment of e-money and supervision of the issuers of e-money. These laws include the New Central Bank Act, the General Banking Law of 2000 and the Electronic Commerce Act of 2000.

Supervisory issues. The existing BSP regulations (ie BSP Circulars 240 and 269) governing electronic banking activities in the Philippines are consistent with the BIS *Risk Management Principles for Electronic Banking* in encouraging banks to establish a risk management system that can adequately assess, control and monitor risks arising from electronic banking activities.

Payment system issues. The real-time gross settlement Philippine Payment System (PhilPaSS) was fully implemented on 5 December 2003 and covers Megalink (Network) transactions.⁴⁴ Thus far, no major problem has been encountered with regard to the clearing and settlement of these transactions.

Poland

1. Card-based products

There is currently no electronic purse system operating in Poland.

There are, however, pilot programmes under way to develop chipcard technology in regional areas, for instance at a university, in a small town, and for ski lifts, parking meters and public transport. Most of the schemes are single purpose card schemes, which the National Bank of Poland does not treat as e-money.

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

2. Network-/software-based products

So far, no projects have been launched.

3. Policy responses

The possible effects of the development of e-money in Poland have been discussed at the National Bank. The Monetary and Credit Policy Department believes that implementation of e-money in the near future in Poland would not affect seigniorage and the demand for notes and coin to any appreciable degree.

Portugal

1. Card-based products

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

Both card issuance and transactions are anonymous; this means that a lost PMB card is equivalent to lost cash. At ATMs or PMB terminals, cardholders can be provided with information on stored value as

⁴⁴ This is an ATM (access device) network which allows people to withdraw or deposit cash, transfer funds and pay bills from their bank accounts without physically going to the bank or writing a cheque.

well as with a record of the last 30 transactions made with the card. Some debit and credit cards already include the PMB card facility. Clearing is through SIBS and settlement takes place at the Bank of Portugal. The scheme works only at domestic level and does not have multicurrency features (transactions in euros only).

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 the cards' 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-based electronic money, the Bank of Portugal has no information on any development in this field, although it is believed that some credit institutions might be envisaging schemes as part of their strategic planning. However, as the interbank solution for internet payments evolves (MB-Net - see below), the possible development of network-/software-based schemes may be put on hold.

3. Internet and mobile payments

Both the internet and the mobile payment schemes currently available in Portugal are subject to the oversight of the Bank of Portugal, which has been applying the same supervisory procedures as for card schemes in general.

3.1 Internet payments

MB Net. This scheme was designed to provide a solution for internet payments based on credit and debit cards. Innovatively developed jointly by the Portuguese commercial banks, it requires prior enrolment with MB-Net to allow secure online payments, for both consumers and merchants.

MB-Net allows payments in any online shop, either Portuguese or foreign, with all transactions being executed in euros. Merchants can be registered in the system, and a list of all online member merchants is available on the scheme's website, www.mbnet.pt.

Consumers can subscribe to MB-Net either at a Multibanco ATM, at a bank branch or at a bank's website, provided that they are holders of a payment card issued by that bank. Upon subscription to the service, a code is given to the consumer, to be used when paying online to a registered online merchant. When making payments to a non-registered online merchant, a one-off code is generated by the system and is valid for one specific transaction.

Since its launch in September 2001, the scheme has not generated significant amounts or volumes of transactions, but it has been growing. By the end of September 2003, a total of 123 online merchants were registered with MB-Net, including bookshops, travel agencies, florists, supermarkets, entertainment venues and ticket outlets.

3.2 Mobile payments

Telemultibanco. This scheme was developed jointly by SIBS and mobile phone operators, and was launched in September 1996. To access this service, the user has to contact the bank where he/she is a customer, or one of the mobile telecommunication companies, which will provide all the necessary information.

After the service has been activated, which can be done at any Multibanco ATM by associating a bank account with a telephone number, the user will have to predefine a telecode, which will guarantee total confidentiality and security whenever this service is used. Further information is available on SIBS's website, <http://www.sibs.pt/telemultibanco/layout.asp?categ=255&flag=0>.

Telemultibanco can be used, inter alia, to make statement and balance enquiries, pay utility bills and request cheques. The scheme operates only for domestic transactions denominated in euros. However, if there is a roaming agreement with the mobile operator involved, payments can be initiated from abroad.

4. Policy responses

4.1 Policy responses relating to e-money developments

Monetary policy and seigniorage. Concerning statistical information, the Bank of Portugal collects the data which each bank provides 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 by the Bank of Portugal in the monetary statistics, specifically as part of the M1 aggregate. In terms of seigniorage, the impact of e-money on the circulation of notes and coin, and therefore on the central bank balance sheet, has not been significant so far, and it is not foreseen that seigniorage will be significantly reduced in the short term.

General legal issues. EU Directives 2000/28/CE and 2000/46/CE, which jointly define the activity and scope of ELMIs, were transposed into Portuguese legislation by Decree Law 42/2002. This allowed the limits on the activity of ELMIs to be established, as well as the conditions for redeemability of funds and the prudential regime that ELMIs are subject to. The activity of credit institutions was also reviewed and it now includes the activity of ELMIs (ie banks can be issuers of e-money). In the Bank of Portugal regulations on e-money (noted above), electronic purses are defined as multipurpose prepaid means of payment which enable different types of transaction to be effected using 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 established as guidelines, as minimum common features for domestic payment systems, combined with the stipulation that only credit institutions authorised to take deposits and ELMIs are allowed to be e-money issuers.

Provider issues. Banks authorised to take deposits and ELMIs are the only types of institution that are allowed to issue e-money. Once money is involved, these are the only institutions able to issue and manage such means of payment. So far, no ELMIs have reported that they are issuing e-money in Portugal.

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 of problems arising. The Bank of Portugal accepted the banks' proposal for the PMB scheme concerning this matter, as it respected the stipulated features to be implemented.

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, foremost being the non-transferability of funds and the low limit on the value loaded (maximum EUR 315/USD 270).

Cross-border issues. Since the PMB scheme allows only one denomination (the euro), and functions only on Portuguese territory, it does not have cross-border features yet.

4.2 Policy responses relating to internet and mobile payments

Monetary policy and seigniorage. Concerning statistical information, the Bank of Portugal collects the data which each participant bank provides on the MB-Net and Telemultibanco schemes. Since both schemes are designed to allow payments associated with a credit or debit card, there are no specific monetary policy features involved. In terms of seigniorage, since the volumes and amounts generated by both schemes have not been significant so far (see statistical tables), it is not foreseen that seigniorage will be reduced in the short term due to MB-Net and Telemultibanco.

General legal issues. The same as apply to the issue of payment cards.

Relevant security issues. The criteria that are used by the oversight authorities are those that the European Central Bank 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. Only credit and debit card issuers are allowed to participate in both MB-Net and Telemultibanco. These are mainly commercial banks, plus Unicre, a Portuguese Visa and MasterCard acquirer and issuer of credit cards, which is supervised by the Bank of Portugal.

Payment system issues. No particular problems have arisen, mainly because all participants in the schemes are supervised by the Bank of Portugal. As for Unicre, the bank accounts that are associated with the cards it issues are all domiciled in a bank that participates in the national clearing and settlement system, which reduces the risk of problems arising.

Supervisory issues. Participants in both existing schemes are supervised by the Bank of Portugal. Thus, this question is not directly applicable to Portugal, where the only supervisory authority is the Bank of Portugal.

Law enforcement issues. As with credit and debit card schemes, all transactions can be traced, so it is always possible to establish an audit trail from the information collected by SIBS.

Cross-border issues. Both schemes allow only one denomination (the euro), so there are no multicurrency features. As to cross-border issues, Telemultibanco is a scheme that only allows domestic transactions, even if initiated from abroad (when there is a roaming agreement); on the other hand, MB-Net has so far had only Portuguese online merchants, but it allows registered consumers to make payments with any merchants on the internet.

Romania

1. Card-based and network-/software-based products

At present, there are no electronic money issuers or e-money institutions in Romania.

Two Romanian banks and a few foreign banks have declared their intention to start issuing electronic money, either under their own name or by establishing distinct e-money institutions.

However, all these entities have stated that they intend to issue solely card-based electronic money instruments (ie chipcards or smartcards) and not network-/software-based ones.

2. Internet and mobile payments

Reference will be made only to the internet/intranet and mobile payments included in the category of remote access payment instruments.

In Romania there are 13 banks offering internet banking applications, 16 banks offering home banking applications and three banks offering mobile or phone banking applications.

Since various channels of communication are used for these payments, there are obviously different security issues for every channel involved: internet applications (ie public networks), home banking/intranet applications (ie private networks), virtual private network applications or mobile phone applications.

For internet and home banking/intranet applications, the relevant security aspects vary from one application to another and include:

- user/customer/holder identification issues: username, password, token, electronic certificate, PIN, electronic signature, public or private keys, other ID certificate requirements;
- transaction route security: dial-up connection, LAN, WAP, dedicated lines, leased lines or internet (TCP/IP) using bridge, router or gateway connections, etc.

For example, data encoding is usually done using RSA or a symmetric algorithm for authorisation with the dynamic exchange of keys, and non-repudiation (proof of origin and proof of delivery) is achieved by means of electronic signature or similar tools.

Firewalls, VeriSign certificates and 128-bit Secure Socket Layer are also commonly used. 3-D Secure is only just starting to be used by card issuers and no relevant information is available except that it is used in a few internet and home banking applications.

The general legal agreements comprise written contracts between participants (issuers, holders, acquirers), contracts on general and specific legal provisions and agreements on the above-mentioned technical issues.

Almost all of the internet and home banking applications allow multicurrency payment orders.

As regards remote access payment instruments for mobile banking applications, the common solution is based on SIM Toolkit technology, with a Java application loaded on a SIM card (SchlumbergerSema Simeria 364k) using an OTA (over the air) platform and based on the mobile phone network. Similar user/customer/holder identification criteria as for internet banking applications are used.

In addition, four types of "virtual" card have been issued, designed solely for internet transactions as a solution to prevent card fraud.

3. Policy responses

Monetary policy and seigniorage. All issuers of electronic payment instruments submit quarterly reports to the National Bank of Romania containing all the relevant information on their activity in this area.

Since e-money issuance is in its infancy, it is not seen as posing a threat from a monetary policy and seigniorage perspective, but by monitoring this activity over time, it will be possible to implement adequate measures as necessary.

General legal issues. According to the legislation, no payment instruments can be issued on Romanian territory unless the National Bank of Romania has previously licensed the issuer. Consequently, this section is related only to electronic money activities from the point of view of the payment instruments.

According to the legislation:

Electronic payment instrument: an instrument enabling the holder to effect operations such as those described below under "Card"; this may be both a card or other remote access payment instrument and an e-money payment instrument.

Card: an electronic payment instrument, ie a standardised, secured and customised information carrier that allows the holder to use his/her own money in an account opened on his/her behalf with the card issuer or to use a credit line, up to the financial limits applied, opened by the issuer in favour of the cardholder in order to effect, either cumulatively or not, the following operations:

- cash withdrawal, ie loading and discharge of value units, in the case of an electronic payment instrument, at terminals such as cash dispensers and ATMs in the offices of the issuer/acquirer bank or on the premises of an institution that is under contract to accept the electronic payment instrument;
- payment for goods and services purchased from acquirer merchants and payment to public administration authorities of taxes, charges, fines, penalties, etc via imprinters, POS terminals or other electronic means;
- funds transfers between accounts, other than those ordered and executed by financial institutions.

Electronic money instrument: an electronic payment instrument, reloadable or not, other than a remote access payment instrument, such as a chipcard, computer memory or other electronic device, with a predetermined value on which value units are stored electronically, enabling its holder to effect transactions of the kind specified above (see under "Card"), and which is accepted for payment by other entities, apart from the issuer, the monetary value of value units being obligatorily equal to that received in cash by the issuer from the holder.

Remote access payment instrument: an instrument enabling the holder to access the funds in his/her account and effect payments to a beneficiary or other types of funds transfer, and which usually requires a username and a PIN/password and/or other similar proof of identity; the category of remote access payment instruments encompasses mostly cards, other than those included in the category of electronic money instruments (debit, credit cards, etc), and internet and home banking applications.

Besides funds transfer operations, in which the instrument holder can send electronic instructions to debit his/her current account and transcribe the desired message onto the payment order to be generated automatically by the system, the holder may also effect foreign currency transactions, make deposits and obtain information about account balances and transactions; every transaction is recorded by the bank's communication server and processed through its own technology for authenticating the payment message prior to sending it to the IT system.

In the case of internet banking applications, the operation of such remote access payment instruments is based on internet (web) technology and on the IT systems of the issuer.

The relevant legal provisions, referring solely or mainly to electronic payment instruments, are: National Bank of Romania Regulation No 4 of 13 June 2002 on transactions via electronic payment instruments and the relationship between participants in these transactions (regulating the issuance and use of electronic payment instruments, envisaging the obligations and liabilities of the issuer, holder, acquirer merchant and acquirer bank, etc); E-commerce Law No 365 of 7 June 2002 (regulating the environment related to e-commerce activities generally and in particular establishing sanctions against fraudulent activities for both legal entities and individuals involved in transactions via electronic payment instruments); and Ministry of Communications and Information Technology Order No 16 of 24 January 2003 regarding remote access payment instrument licensing procedures (establishing the minimum technical requirements to be met by the issuers - the licence represents a prerequisite for the issuer before it can apply to the National Bank of Romania for final approval).

Also worth mentioning are Law No 455 of 18 July 2001 on electronic signature and Emergency Ordinance No 193/2002 regarding the introduction of modern means of payment.

Relevant security issues. The analysis of security issues related to the issuance of remote access payment instruments (except cards) is performed by the Ministry of Communications and Information Technology.

The analysis closely monitors the fulfilment of strict requirements related both to the information system and to the software solutions used in the internet/intranet or mobile applications:

- confidentiality and integrity of data;
- confidentiality and non-repudiation of transactions;
- identification and authentication of all parties involved;
- protection of personal data;
- protection of banking secrecy;
- transaction tracing;
- continuity of the services provided to customers;
- gridlocking, detecting and monitoring unauthorised system access;
- restoring information using backup techniques in case of natural disasters or unforeseen events;
- management and administration of the information system.

In the case of a system based on an electronic payment instrument such as a chipcard (domestic and/or international card), the application submitted to the National Bank of Romania must be accompanied by a letter from Visa International or MasterCard International certifying that the electronic payment system complies with the latest edition of the Europay/MasterCard/Visa (EMV) specifications, valid on the date the application is submitted; authentication is not necessary in the case of a chip integrated in a payment instrument being used for purposes other than payment (identification, access, etc).

Issuer details. According to current legal provisions, subject to future amendment, only banks licensed by the National Bank of Romania are allowed to issue electronic payment instruments. With respect to e-money, the law regarding banking activity, as amended in December 2003 (Law No 485/2003), enables entities other than banks, so-called electronic money institutions, to issue electronic money. The prudential rules for electronic money institutions have already been issued by the National Bank of Romania.

Payment system issues. As mentioned above, steps have been taken in the collection of statistical data and all issuers of electronic payment instruments submit quarterly reports to the National Bank of Romania with all the relevant information on their activity in this area.

Oversight issues. Arrangements are being made for payment system oversight within the National Bank of Romania.

The National Bank of Romania is involved, for the time being, only in creating the environment for the issuance and use of electronic payment instruments, laying down the obligations and liabilities of the issuer, holder, acquirer merchant and acquirer bank, etc.

Supervisory issues. The issuer and the acquirer bank must identify any irregularities in the maintenance of the account by the holder or by the acquirer merchant. If such irregularities result in pre-established limits being exceeded in terms of either accumulation or excess transactions on the credit card of the acceptor merchant due to an increase in deposits on the part of the cardholder, or for any other reason the issuer and the acquirer bank deem necessary in order to prevent payment default, they must provide the acceptor merchant, the cardholder, other persons and specified entities with the information and any other documentation they might use for reasoned decisions aimed at containing and preventing payment default.

Upon authorisation by the National Bank of Romania of the card to be issued, including cases where the card is issued by another brand owner, the issuer is obliged to prove itself capable of collecting, processing, managing, storing and archiving information it acknowledges when accepting payment; this information enables the issuer to identify, assess, contain and share risks on a timely basis. Otherwise, final settlement might be impaired.

The issuer and the acquirer bank must prove that, upon authorisation of payment, they have in place procedures for measuring and managing the risks of payment default by standardising these and classifying the holders and acceptor merchants according to the risks identified, to ensure the proper functioning of the internal structures, as well as being able to reject the payment, impose restrictions and prohibitions so as to provide for a level playing field for e-customers, and prevent payment default.

Risk classification of the holders and acquirer merchants by the issuer and the acquirer bank should take 90 days at most from the date on which the issuer or the acquirer bank discovers that, at the points of sale where authorisation of payment is required, the terms and/or the reasons for the acceptor merchants or, where applicable, the holders being classified have changed.

The issuer and the acquirer bank must have adequate systems to analyse and authorise transactions. These systems will be instrumental in rejecting payments as a result of incorrect or fraudulent use of the card. Rejection of payments must be recorded by the acquirer bank and reported to the acceptor merchant on a timely basis, according to the provisions of the contract.

The issuer and the acquirer bank must conduct the authorisation process so that any fraudulent actions vis-à-vis any acceptor merchant that is classified as bearing high risk during the 90-day monitoring period are rejected for payment, on the initiative of a third party, making the issuer liable to the acceptor merchant.

The issuer must provide the National Bank of Romania with evidence that it is able to produce, process, store and archive information and data concerning card transactions, ensuring legitimate, prompt and accurate operations for final settlement. The issuer must prove that the information shall only be used, exchanged, sent or sold in accordance with the terms of the contract concluded between the issuer and the holder or the acceptor merchant for reporting to the National Bank of Romania and to the National Office for the Prevention and Control of Money Laundering, or for other purposes, in compliance with the legislation in force.

The issuer and the acquirer bank must keep track of information and data concerning the card transactions carried out, to ensure timely reporting to the competent authorities.

Issuers are obliged to submit quarterly reports to the National Bank of Romania on transactions carried out using electronic payment instruments, according to the relevant legal provisions, as well as to draw up reports at the request of the National Bank of Romania.

The acquirer bank must keep a close watch on the activity of the acceptor merchant and the processor as regards the flow of documents, records and notifications in order to prevent excessively high demand for receipts, ie a demand whose level, over a given period, exceeds the average established previously on the basis of information supplied by the acceptor merchant and the holder, or on the basis of information inferred from applications for the recovery of receipts declared as lost, stolen or damaged.

Cross-border issues. The adoption is planned, during 2004, of a special law on cross-border credit transfers to ensure:

- full harmonisation of Romanian legislation with the provisions of Directive 97/5/EC on cross-border credit transfers;
- adequate and effective grievance and redress procedures for the settlement of any disputes between providers of cross-border credit transfer services and their customers;
- the role of the National Bank of Romania as "out-of-court arbitrator" for the settlement of any disputes over cross-border credit transfers.

Russia

1. Card-based products

No specific developments at the moment.

2. Network-/software-based products

As stored value scheme, **PayCash**, developed by Bank Tavrichesky, has been implemented on the territory of the Russian Federation. The scheme allows a consumer to make payments for information, services or goods using a PayCash virtual electronic purse over the internet. The PayCash purse is installed on the hard disk of the user's (merchant's or consumer's) PC. Business-to-business transactions are prohibited.

Payments. Cross-border payments are not possible. PayCash is a monocurrency system, with payments only in roubles.

Costs and fees. Private and commercial.

Suppliers. Alcorsoft Ltd.

3. Internet and mobile payments

Traditional instruments such as the bank cards of international and Russian payment systems, as well as the prepaid cards of the local Russian Rapida system, are actively used over the internet and for mobile payments.

The above-mentioned PayCash system is the most widespread among such systems. The volume of operations is not significant.

4. Policy responses

In 1997 the Board of Governors of the Central Bank of the Russian Federation authorised the Payment Systems and Settlements Department to study the legal, economic and social aspects of the implementation of electronic money in the sphere of retail payments.

The Bank of Russia is thoroughly examining international e-money systems.

General legal issues. No specific law or regulations have been adopted concerning electronic money.

The Bank of Russia drew up Directive 277-U (3 July 1998), "The procedure of granting registration certificates to resident credit institutions for issuing prepaid financial products", in order to prevent uncontrolled issue and circulation of prepaid card products and prepaid software products on the territory of the Russian Federation.

The Bank of Russia is studying the requirements regarding e-money issue and e-money issuers stipulated in EU Directives 2000/46/EC, 2000/28/EC and 2000/12/EC, as well as the recommendations on e-money issue contained in reports by the ECB and the BIS. The Bank of Russia intends to formulate a provision regulating the circulation of e-money in line with the requirements of the above-mentioned EU directives and considering the specificity of existing legislation in Russia.

Saudi Arabia

The Saudi Arabian Monetary Agency (SAMA) has put in place the major components of a comprehensive electronic payments infrastructure. The infrastructure provides a national network for all payment card and credit card transactions at ATMs and points of sale (the Saudi Payments Network, or SPAN), and a single electronic funds transfer system for high-value same day and forward-dated payments and direct debits (the Saudi Arabian Riyal Interbank Express, or SARIE). All Saudi banks are members of SWIFT, via which they send and receive all their international payment messages. SAMA recently started work on a project to upgrade the existing SPAN system for all payment card and credit card transactions. This initiative forms part of SAMA's continuing objectives to shrink the cash economy within the Kingdom and to support new and enhanced electronic banking services for the country's residents and companies.

The upgrade project will, over the next three years, enhance the SPAN infrastructure to:

- service the continued growth in card payment transactions within the Kingdom of Saudi Arabia;
- broaden the scope of ATM and EFTPOS services, for example, introducing centralised bill payments and cash-back at EFTPOS terminals;
- implement and support EMV2000 smartcard-based credit and debit cards;
- support other multi-application smartcard-based services;
- introduce new channels including e-commerce (internet) and m-commerce (mobile phone) initiated banking transactions;
- provide stronger security for payment services based on PKI systems;
- facilitate further consumer and business services, such as full electronic bill presentment and payment.

The upgrade project is taking place against a background of sustained growth for SPAN. There are currently 2,577 ATM terminals in online, daily operation in SPAN, processing 18.3 million transactions a month for a total monthly value of SAR 11.4 billion.

1. Card-based and network-/software-based products

Currently there are no card-based or software-based e-money schemes in operation in Saudi Arabia.

2. Internet and mobile payments

E-payments

A B2B e-payments project has been initiated; the main aims of which are to:

- address e-commerce opportunities;
- establish an effective and secure means of settlement between buyers and sellers of e-commerce goods and services;
- leverage existing funds transfer service offerings and investments made in the associated technical infrastructures, including SARIE (Saudi Arabian Riyal Interbank Express system) and SWIFT;
- put in place an internet-based architecture;
- adopt open industry standard protocols and message formats;
- facilitate both domestic and international e-payments.

It is the aim of SAMA that an infrastructural solution is developed for e-payments in the Kingdom. The design of the e-payments system(s) should:

- address the needs of small, medium and large corporates;
- support PKI in order to address the security requirements (non-repudiation, authentication, confidentiality and integrity);
- support the push model (buyer-initiated payments);
- support bulk payments and forward-dated payments as well as payment advices and enquiries.

e-Trust and PKI

As part of the e-payments project SAMA has also initiated an E-Trust centre project to establish a national PKI. The e-Trust centre will be developed using commercially available technology based on open standards.

The e-Trust centre will provide the ability to issue and manage digital certificates for use within the Kingdom's financial sector. Specifically, the e-Trust centre will provide the following functions:

- end-entity certificate registration;
- end-entity certificate issuance;
- certificate renewal;
- certificate revocation and suspension;
- certificate publication;
- certificate revocation list publication;
- online certificate status checking support.

SAMA envisages that the root certification authority (root CA), the subordinate CAs, the certificate repository and the validation authorities will reside within a data centre contained within and operated by SAMA. The registration authorities will be hosted and operated by individual banks within the Kingdom. The commercial banks will therefore be responsible for the registration of end-entities, who will be issued certificates by the e-Trust centre.

SAMA sees the introduction of B2B e-payments as being a key driver to increase e-commerce transaction volumes, reduce risks and provide flexibility to allow future business opportunities.

The B2B e-payments infrastructure will:

- for **businesses**, provide a paperless, cost-effective and secure B2B e-payment environment. It will also enable businesses to benefit from opportunities available via the internet;

- for **banks**, provide the infrastructure for an enhanced range of services while maintaining consistent standards and good service levels in a high-growth environment. It will eliminate manual processes traditionally involved in supporting payment processing. It will also maintain an effective balance between competition and cooperation to avoid duplication of infrastructure and to control the financial industry's costs.

Internet and mobile banking

Considerable progress has been made recently in adopting the internet for the provision of some banking services. The majority of commercial banks (eight out of 11) now offer internet banking services. Only two of these banks offer mobile banking.

The services offered over the internet are balance enquiry and payments, both domestic and international. In the case of mobile banking, the services on offer are balance enquiry, inter-account transfer and utility bill payments.

Internet banking services have been available from some banks, from the earliest provider, since June 2000, with the other banks offering the service over the last year to 18 months.

The number of customers who have registered for this service has increased significantly over the past year. This increase has been in the region of 135% across all banks who offer this service. The number of customers actively using the service has also increased over the last year, by approximately 160%.

The number of customers who have registered for internet banking now stands at over 3% of the total number of bank customers; the number of active users stands at just over 2% of the same total.

Mobile banking has been available from one bank since June 2001, while the other bank introduced this service in January 2002. The number of customers using the service remains relatively low (exact statistics are not available)

The volume of transactions through both internet and mobile banking still accounts for a relatively small proportion of the total volume of payments processed by all banks in the Kingdom, although it has increased significantly over the past year.

The value of these transactions, while relatively low in proportion to the total value of payments in the Kingdom, at approximately 1% of the total value of customer payments has now become quite a substantial amount.

It is expected that the total volume and value of payments made via internet and mobile banking, particularly internet payments, will continue to grow quite rapidly over the coming months and years.

Internet and mobile banking services are available only from commercial banks in the kingdom.

The B2B e-payments project being launched by SAMA is expected to significantly expand the volume and value of payments being processed over the internet.

3. Policy responses

Internet banking. SAMA issued a policy document entitled *Internet Banking Security Guidelines* to all commercial banks in May 2001. This set out the minimum standards that the banks must comply with for the security of their internet banking services. The policy document can be found on the SAMA website: <http://www.sama.gov.sa/en/control/procedure/ibsguidelines.htm>.

B2B e-payments. SAMA aims to develop an infrastructural solution for e-payments in Saudi Arabia. The design of the e-payment system(s) should:

- address the needs of small, medium-sized and large corporates;
- utilise PKI in order to address security requirements (non-repudiation, authentication, confidentiality and integrity);
- support the "push" model (buyer-initiated payments);
- support bulk payments and forward-dated payments as well as payment advices and enquiries.

SAMA conducted a detailed study of requirements during 2001. In October 2001, SAMA sent a letter to all Saudi banks advising them that, because of the delay in the finalisation of international standards, they were free to develop their own interim solutions. However, SAMA cautioned against any large expenditure on these interim solutions prior to decisions on a national solution.

In June 2002, SAMA issued guidelines for message types and formats to banks covering the transmission of payment instructions from corporate customers to their bank.

Following a recent detailed study of B2B e-payments SAMA has decided to implement a national programme for such payments in Saudi Arabia and to take a very active approach to leading this programme. However, due to a lack of readiness in the market, both in the domestic market and in the development of agreed standards at international level, SAMA has decided to take a cautious and phased approach to implementing the full solution.

A three-phased approach is being adopted.

1. *Launch phase.* This phase is intended to deliver, in the short term:
 - governance rules and procedures for B2B e-payments;
 - message standards and protocols for minimal buyer and seller data to be linked with an electronic payment;
 - common trust and security requirements for corporate and bank communication.
2. *Development phase.* This phase has a medium-term target of delivering:
 - a PKI-based solution to address security requirements (ie non-repudiation, confidentiality, integrity, encryption, authentication and validation) for all banks in Saudi Arabia based on the e-Trust Centre currently being established by SAMA.
3. *Market maturity phase.* This phase will, in the long term, deliver:
 - the design, development, piloting and implementation of a single national infrastructure for B2B e-payments based on a recognised international B2B e-payments scheme.

PKI. SAMA is currently in the process of making a comprehensive PKI solution available to and through the Saudi Arabian financial services industry. The UniCERT system from Baltimore Technologies has been selected to provide the solution. UniCERT provides a complete policy-based digital certificate management system for the creation and management of certificate-based digital identities and signatures.

Banks will provide the PKI service to the wider corporate community, thus allowing businesses throughout the Kingdom to carry out secure online transactions and to assure the integrity and authenticity of all transactions. It will enable companies to verify electronic counterparties and securely manage the extent to which users can access resources and information through open networks. It will play a vital part in enabling the development of e-commerce.

SAMA will operate the e-Trust Centre for the financial industry in the Kingdom. The Centre will facilitate secure electronic transactions, both domestically and internationally. The commercial banks will be responsible for the registration of end user entities that will be issued certificates by the e-Trust Centre.

Laws governing electronic transactions. The drafting and introduction of laws dealing with all aspects of “electronic transactions”, including the legal status of electronic signatures, is currently being actively worked on by the relevant government departments.

E-money. There are currently no e-money schemes in operation in Saudi Arabia.

There are a number of policy issues to be resolved before the introduction of e-money services in Saudi Arabia. These include seigniorage, legal and regulatory issues, security, consumer protection and privacy, implications for anti-money laundering regulations, monetary policy issues, etc.

SAMA continues to keep a watchful eye on e-money developments in other countries and will monitor carefully the responses being developed to the complex policy issues raised by e-money.

1. Card-based products

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

NETS⁴⁵ CashCard. The CashCard, a smartcard-based multipurpose SVC, was issued by a consortium of banks in November 1996. The CashCard is a bearer SVC containing stored value and is widely accepted by retailers in Singapore as a convenient mode of cashless payment. In addition, some of the debit cards issued for use at EFTPOS terminals and ATMs also have CashCard features. At the end of 2002, about 6 million CashCards were in circulation.

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

ez-link card. The ez-link card, a multipurpose stored value card based on contactless smartcard (CSC) technology, was introduced in April 2002 for use in the public transport system. Citibank NA is the issuing bank, and EZ-Link Pte Ltd⁴⁶ is responsible for the sale, distribution and management of ez-link cards. At the end of 2002, there were about 4 million ez-link cards in circulation.

Since its introduction, the ez-link card's use has been progressively extended to non-transit purposes such as retail payments. Top-ups can be done at General Ticketing Machines located at train stations or via Giro.

2. Network-/software-based products

eNETS VCard, a server-based stored value scheme on trial as at end-2002, is used for internet and mobile payments to online retail merchants as well as person-to-person payments. It is operated by NETS and issued by the same consortium of banks as CashCard.

3. Internet and mobile payments

eNETS is a suite of internet and mobile payment services offered by NETS which allows consumers to pay for online purchases or pay bills using their existing credit cards, CashCards and internet banking accounts.

TeleMoney is a mobile payment service by Systems@Work that enables the use of the mobile phone as an identification and authentication device for making payments. TeleMoney can be used for internet, mobile and over-the-counter payments. TeleMoney users need to link their mobile phones to their preferred payment methods, such as credit card, debit card, prepaid card, or charging to phone bills and direct debit.

⁴⁵ Network for Electronic Transfers (Singapore) Pte Ltd (NETS) is owned by a consortium of banks in Singapore.

⁴⁶ EZ-Link Pte Ltd is a wholly owned subsidiary of the Land Transport Authority of Singapore.

4. Policy responses

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

As issuers of SVCs, banks are responsible for the security, integrity and accuracy of all related data and records pertaining to the issue and operation of their SVCs, and the SVCs' related systems. In addition, issuers need to continually assess and mitigate risks posed by the use of SVCs.

Slovak Republic

1. Card-based products

There are currently no card-based schemes being piloted or being implemented.

2. Network-/software-based products

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

3. Internet and mobile payments

3.1 Payment cards

Banks provide various payment services for their customers:

- secured online credit card payments over the internet allow the holder of the credit card to pay over the internet; the credit card details are sent via the bank to the processing centre for authorisation;
- virtual credit cards for payments only over the internet;
- ATMs are used also for loading GSM prepaid cards.

3.2 Remote electronic payment instruments based on mobile phone or PC techniques

Banks provide their customers with various banking applications - home banking, internet banking, mobile banking.

Payment services provided by the banks:

- payments over the internet - credit transfer order effected via internet banking application;
- payment portals.

3.3 Mobile payment schemes

There are currently no mobile payment schemes being implemented.

4. Policy responses

General legal issues. The Act on Payment Systems no 510/2002 Coll (Payment Systems Act) governs inter alia the issue and use of electronic payment instruments including e-money payment instruments. The legally binding regulations of the European Union (including the E-money Directives,

the Settlement Finality Directive and the Recommendation on Electronic Payment Instruments) were transposed into the Payment Systems Act. The National Bank of Slovakia has also issued the Decree on Collecting Statistical Information on E-money.

Oversight issues. The National Bank of Slovakia Act no 619/2002 Coll stipulates inter alia the task of the National Bank of Slovakia to promote the smooth operation of the payment system, which includes promoting the security and efficiency of all types of payment instruments (including e-money payment instruments).

Supervision issues. E-money issuers (either banks or e-money institutions) are subject to the prudential supervision of the National Bank of Slovakia according to the amendment of the Act on the Payment System as from 1 January 2004.

Slovenia

1. Card-based products

There are no electronic purse schemes currently operating in Slovenia. There are also no plans reported by the commercial banks to start any such project, since the available information on the operation of the existing card-based (as well as network-based) schemes in many countries has not been favourable.

2. Network-/software-based products

There are no projects regarding network-based products under way at the moment.

3. Internet and mobile payments

Most of the commercial banks are using electronic banking to enable customers to monitor and manage the funds on their accounts. Some solutions use the internet, while others are based on private network infrastructure.

In addition, more and more companies are offering the possibility to buy their products and services via the internet. Special attention is paid to ensuring the highest possible security for the execution of payments via the internet. Although there is still the possibility of fraud and consequently a lack of confidence on the part of customers, internet payments are slowly gaining in importance.

Regarding mobile payments, there is a project under way that will enable customers to use a mobile phone for making payments for various products and services via POS terminals. There are special procedures for identification and confirmation of each transaction.

Currently, these types of payments can only be made by mobile phone subscribers and for a limited amount, since it is the mobile phone operator that is charged by the merchants for the amount of purchased items, while customers are only charged at the end of the month together with the bill they receive for phone services.

In order to reduce the existing credit risk for the mobile phone operator and also to stimulate higher-volume payments, a new scheme is being developed that will enable the debiting of customers' bank accounts at the end of each day. The project, run jointly by one of the major banks and the mobile phone operator, is scheduled to go live in 2004.

4. Policy responses

In April 2002 the Bank of Slovenia adopted the Payment Transactions Act (PTA), which also covers the issuance of electronic money, taking into consideration the EU directive on the taking-up, pursuit and prudential supervision of the business of electronic money institutions (Directive 2000/46/EC).

According to the PTA, electronic money may be issued by a bank as well as by a special company for the issuance of electronic money.

Pursuant to the PTA, a regulation has also been adopted on companies issuing electronic money, containing the detailed organisational, staffing and technical requirements for the issuance of electronic money and the supervision of the issuing companies determined.

The Bank of Slovenia is also in the process of preparing a new regulation on reporting on the use of modern payment instruments which will also cover statistical information on payments that arise from the use of electronic money as well as internet and mobile payments.

South Africa

1. Card-based products

Gaming

A casino developer has introduced smartcards in 10 of its casinos across South Africa and intends to create a tokenless and coinless environment in these casinos. The cards can only be used inside the casino and entertainment resort, where they can be used for gambling, buying food and beverages, paying for parking, etc. Patrons may purchase value using cash, a credit card, a debit card or traveller's cheques, whereupon the cashier loads the value onto the card. Value can also be loaded onto the cards at any of the slot machines, as all slot machines are equipped with note readers (acceptors) that will accept all South African note denominations up to ZAR 100 (USD 15). The balance recorded on the card is mirrored in, and verified against a database. In the event of the non-availability of the computer system, the balance on the card is assumed to be correct. To date, the casino developer has issued 4.5 million cards for use in its casinos. Patrons can apply for their own personalised card that is also linked to a loyalty scheme. Value can be redeemed for cash at any teller within the casino complex or at a "smart cashier" which is an ATM-type device that dispenses up to ZAR 1,500 (USD 230) per card per day. There are 70 "smart cashiers" installed within the 10 casinos.

e-tag (Bakwena tags)

The name "e-tag" refers to the South African brand name for an electronic toll collection device that has been implemented on certain of the toll roads in South Africa. Upon passing through the toll station, the e-tag, which is a transponder device, is identified by a reader device and the "owner" billed for the toll fee. The e-tag can be used for payment of toll fees on the Bakwena Platinum Highway, which includes the toll plazas on the N1 from Pretoria to Bela-Bela and on the N4 between Pretoria and the border of Botswana, ie six ramp toll plazas and two mainline toll plazas. Plans are being made to introduce the e-tags on other South African toll roads. To date, 10,000 e-tags have been issued to road users. The toll fees due to the toll company, as a result of the e-tags being utilised, are currently collected via a billing system. The rollout of a prepaid e-tag system is envisaged in the near future.

GSM

Prepaid mobile communication has once again undergone rapid expansion in South Africa and comprises approximately 14.8 million cards.

2. Network-/software-based products

South Africa is still in the early stages of development with regard to network- and software-based products. The South African Reserve Bank is monitoring 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. Internet and mobile payments

No in-depth study has to date been undertaken by the National Payment System Department into internet and mobile payments.

3.1 Internet banking payments

All major banks in South Africa offer internet banking services and provide their customers with:

- direct access to their accounts portfolio, eg cheque account, savings account, home loan account;
- the functionality to view and download real-time statements and balances;
- the functionality to transfer money between accounts;
- the functionality to make online payments to various beneficiaries and third parties;
- the functionality to receive real-time confirmation, via e-mail or SMS, of deposits, transfers, withdrawals and purchases on all accounts;
- the option to apply for a range of financial products and services online.

This service is available 24 hours a day, seven days a week and includes telephone operator assistance should the internet service not be available.

The South African Reserve Bank is, however, concerned about the security issues relating to internet banking. Banks in South Africa offering internet banking have undertaken extensive advertising campaigns to educate the general public regarding banking security matters.

3.2 Mobile banking payments

The major South African banks also offer secure banking utilising mobile telephone technology. Two options are available to customers in this regard:

Mobile banking via the internet (WAP). This option allows the customer direct access to his/her bank accounts, via the internet, by using a WAP-enabled mobile telephone handset and a SIM card that is open for data and fax services. These facilities allow the customer to make balance/statement enquiries, make transfers between linked accounts and also effect defined payments. Once the customer has applied for the service, a security certificate is downloaded to the mobile telephone handset from the bank.

Mobile banking via secure SMS (wireless internet gateway - WIG). This option allows the customer access to his/her bank accounts via encrypted SMS technology. A mobile telephone handset and a 32K SIM card are required to make use of this service. The SIM card encrypts all messages sent to and from the mobile telephone handset. This option also enables the customer to make balance/statement enquiries, make transfers between linked accounts and effect payments.

One of South Africa's largest banks also offers a service that notifies the customer, either via real-time SMS or an e-mail message, whenever a transaction occurs on the customer's account/s eg credit card transactions. This facility has been implemented by the bank as an additional measure in the fight against fraud.

4. Policy responses

Monetary policy and seigniorage. E-money will be included in money aggregates as and when systems are established and values reach a significant amount. Development of e-money products is monitored on a continuous basis. The promise of e-money products of several years ago remains unfulfilled.

General legal issues. The Reserve Bank issued a *Position Paper on Electronic Money* in April 1999 as well as *Submission Guidelines for Electronic Money Products and Schemes* for persons wishing to implement e-money schemes in South Africa. In addition, potential operators must ensure that their proposed schemes are not in contravention of any relevant South African legislation.

A concern of the National Payment System Department of the Reserve Bank is the establishment of so-called prepaid schemes that offer multiple goods or services that are not necessarily those of the issuer of the prepaid tokens. A large float may be built up by the selling of tokens by scheme operators, and where such operators are not subject to any prudential and/or risk management requirements, the risk to the participants in the scheme may be unacceptable. A further issue is whether such schemes could be in contravention of legislation (the Banks Act) with regard to deposit-taking and of the National Payment System Act with regard to offering payment and clearing services as a regular part of the issuer's business.

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

Issuer details. The *Position Paper on Electronic Money*, April 1999, states that only banks will be permitted to issue electronic money. Primary and intermediary issuers of electronic value will therefore be subject to regulation and supervision by the Reserve Bank.

At this stage, the Reserve Bank does not intend to issue stored value cards, nor provide any other form of e-money to the public. The possibility is, however, not excluded that this may happen some time in the future.

Other issues. *Electronic Communications and Transactions Act.* The Electronic Communications and Transactions Act, Act No 25 of 2002 (ECT Act), provides for the facilitation and regulation of electronic communications and transactions. It covers, inter alia, e-government services, cryptography and authentication service providers, domain name authority and administration and cybercrimes. The ECT Act also contains protection measures relating to consumer protection, protection of personal information and critical databases. Electronic transactions are now afforded legal recognition as a result of the ECT Act. The Act came into effect on 30 August 2002, as per Regulation 68 of 2002.

The Smart-ID card. The South African government, through the Department of Home Affairs, plans to issue a multi-application smartcard, known as the Smart-ID card, to each South African citizen, which will replace the present "paper book" identity documents. A number of government departments have expressed an interest in placing an application on the card. It is envisaged that the Smart-ID card will become South Africa's national identity card, with some of the following features: a colour photograph of the holder; biometric identification by fingerprints; a payment application for state pensioners and grant beneficiaries to receive their monthly allowance; and a generic bank payment application.

South African Post Office Trust Centre. The South African Post Office (SAPO) launched the Trust Centre in the town of Grabouw at the beginning of 2003. The Trust Centre will allow SAPO to start issuing legally recognised digital certificates on smartcards in 2003. This structure was created by the ECT Act and establishes SAPO as the first and preferred authentication service provider when it comes to electronic dealings between citizens and the government.

"Paymaster to the nation" project. This is a project established by the South African Post Office (SAPO) with the goal of removing the cost, risk, inconvenience and danger that social grant beneficiaries face in receiving their allowances. The solution that SAPO selected was a combi card, ie a smartcard with a magnetic stripe. The social grant beneficiary's fingerprints and identity number are saved on the chip on the card. A digital certificate issued in compliance with the ECT Act is also saved to the chip on the card. The magnetic stripe part of the card contains the details of the beneficiary's PostBank account. The card is personalised and printed in a procedure that takes less than 10 minutes. With this card, the beneficiary will have access to his/her social grant via any banking system available in South Africa.

EMV Forum. The EMV Forum is a major initiative by South African banks, leading card associations and retailers to implement the global EMV chipcard standard into the South African payment environment. To date, six banks have joined the EMV Forum. An "initial controlled rollout" of EMV is planned for June 2004 to August 2004, and will be implemented at the Canal Walk Shopping Centre in Cape Town. The banks and retailers in the centre will all be participating in the pilot project.

Statistical tables. The Reserve Bank strives to ensure that adequate information is available on the structure and operation of the financial system. Statistical and other information is essential input to 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, and to this end, the Reserve Bank will be working with the various parties involved to ensure that statistical collection and reporting arrangements are appropriately extended and adapted to meet the future information needs of both policymakers and market participants.

1. Card-based products

Since 1996, the three Spanish card network providers (Sistema 4B, Servired and Euro 6000) have been responsible for the development, launching and implementation of the different multipurpose prepaid card schemes that are currently being used in Spain.

Monedero 4B. This is a reloadable electronic purse that can be issued by any member of Sistema 4B (a processing company owned by banks and an automated 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 Servired Sociedad Española de Medios de Pago, SC, an entity owned by credit institutions that operates in the area of credit and debit cards. Currently a total of 108 institutions issue e-purses under this logo which can be used in around 174,000 shops across the country. Visa Cash started its nationwide expansion in the second half of 1996, after being tested in two small Spanish towns. Visa Cash e-purses have also been pioneers as regards the promotion of card readers, allowing chip-based payment instruments to also offer a feasible solution for internet transactions.

The Visa Cash project has been implemented in cooperation with Sistema 4B and its bank members. Currently, SERMEPA, an IT and communication solutions provider primarily working for the associates of Servired, has developed its own technical solution, called Advantis, that allows for a flexible combination of several applications and currencies in one single chip. Operating in a contactless environment, Advantis marries EMV and CEPS standards in one chip, making dynamic offline authorisation possible. Visa Cash also profits from the TIBC operating system developed for Servired, which has found other potential use in fields other than the financial sector (social security, universities, public transport networks, digital TV payments, etc).

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 members of Red 6000 (the card network and technical operator for Spanish savings banks). Many savings banks have joined the project, which was launched at national level in early 1997. At present, 45,000 shops accept the Euro 6000 e-purse solution.

All three Spanish systems (Monedero 4B, Visa Cash and Euro 6000) have certain similar features. They are all intended to be a replacement for notes and coin in small-value payments in vending machines, coffee shops, kiosks, taxis, cinemas, lottery ticket outlets, car parks, etc. Initially, only ATMs are being used to load (and reload) the cards, although in the near future other specialised equipment (eg modified telephones) 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. At the time of the purchase or after the amount has been debited, it is possible for the cardholder to check the remaining balance on the card. The existing card networks are used to manage the exchange, clearing and settlement of transactions, in order to reduce the costs of developing the system. Card-to-card transactions are not permitted. In most cases, e-purses have been distributed in combination with other applications (eg credit and debit and/or identification purposes for various institutions such as universities and public administration bodies).

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

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

2. Network-/software-based products

The development of network-based or software-based electronic money schemes in Spain is still at a very preliminary stage. There are currently no plans to achieve interoperability among them since they are the outcome of proprietary research. Several credit institutions have launched similar products as a strategy to increase consumer confidence in e-commerce and boost sales. However, most schemes remain small-scale.

As a general common feature, these systems are designed to operate on a "virtual account" on which funds transfers can be ordered once the identification number of the card (a code made up of a maximum of 16 digits) has been entered. Additional confirmation of the payment transaction is required through the compulsory typing of a PIN number. Data transmission takes place in a secure environment where the e-money management system is responsible for the debiting and the crediting. The availability of funds - prepayment - is a prerequisite. All network-based cards are designed to be anonymous and allow for reloads against the major credit card brands. When the holder of the card is also an account holder at the issuing institution, it is also possible to reload the card via an internal credit transfer.

For commercial reasons, a physical scratch card is issued which may contain the card number as well as the PIN code⁴⁷ but it serves mainly as a reminder to the holder since the lack of chip or magnetic stripe renders the use of these cards in regular EFTPOS impossible. In most cases, virtual cards are issued under an international brand such as Visa or MasterCard, which provides the payment instrument with a wider flexibility as regards the number of points of sale where it may be used.

A similar procedure as for card-based schemes is used for the processing and clearing of network-based products. However, software-based schemes are not intended to be multifunctional.

Some of the best known schemes are:

Cybertarjeta. A prepaid Visa product (sold via a scratch card) designed for secure internet payments. It is issued by a savings bank free of charge, whatever the type of transaction. Reloading can be done through ATMs or via the issuer's website for a minimum value of EUR 5. Since it carries a Visa logo, it can be used on any website where this brand is accepted. In shops displaying the "Verified by Visa" sign, additional security conditions are provided by the Visa secure protocol.

Virtual C@sh+. This is a virtual card issued by another credit institution which is specifically designed for payments via the internet. It can be used in about 1,000 virtual establishments and reloaded at any 4B ATM. Like Cybertarjeta, it is also free of charge and the available balance can be checked online. If lost, the card can be blocked and the remaining stored value may be recovered.

Virtual BBVA clic-e. This is also a virtual card for purchases via the internet issued by one of the major credit institutions in Spain. It works as a prepaid card, involves no fees and holds a maximum value of EUR 600. It can be used, loaded or unloaded online from or to a credit/debit card or an account.

3. Internet and mobile payments

3.1 Mobile payments

Initially, m-banking solutions were limited to a set of standardised traditional consultation-driven services (eg availability of different financial products and information on their fees), some equity-related operations and also certain types of purchase transactions. These financial solutions were based on WAP and GSM technologies.

Current mobile telephone technology permits easy adaptation of the devices, allowing them to be used as payment instruments. The potential growth of this market has been identified by various stakeholders (credit institutions, telecommunications operators, card networks) that have started to offer different solutions.

⁴⁷ Covered by a silver coating.

At present there are three main schemes for mobile payments, two of which have been developed by national companies (Mobipay and Visa Móvil) while the third (Paybox) was designed and tested in other European countries before being deployed in Spain.

Mobipay is a platform for m-payments implemented by the three main domestic m-phone operators, the vast majority of the credit institutions licensed in Spain and the three national card network operators. This cooperative approach was taken in order to avoid technological fragmentation. Two different companies (Mobipay Internacional and Mobipay España) were created in order to develop and promote this payment solution in both the domestic and the foreign markets.

This platform was first tested in May 2002, during a six-month period in a small town prior to its rollout. Mobipay benefits from pre-existing networks and communication protocols, with the mobile phone functioning merely as a card payment initiator. At the same time, the mobile phone does serve to authenticate the customer and to authorise/confirm a transaction, ie mobile phones are not supposed to be substitutes for cards. Mobipay can be subscribed at any of the participating credit institutions. Their customers may apply for the service, asking for a linkage between their credit card and the phone number. They will be supplied with a PIN (for authorisation purposes), a mobile identification number and a bar code to be placed on the terminal which may also be used for identification purposes in some reader devices.

In addition, adaptation to Mobipay for the POS terminals presents no technical complication, since it has been designed as an easily installable additional service that is compatible with various POS solutions. Mobipay acts as an intermediary between the interested parties, ie it provides the appropriate technical infrastructure to manage the exchange of messages (queries, authorisation, confirmation, etc) for each transaction. In this particular case an internet-like session is opened and the exchange of messages takes place via USSD technology.

Since the mobile phone functions as a transaction initiator and not as the payment instrument itself, real-time processing is possible while debit and credit value dates may be subject to the nature of the card.

Visa Móvil is a proprietary solution from a single credit institution designed specifically for internet payments under the Visa brand. It was launched in 2000. The basic features are common to those of Mobipay: (a) the phone is used as a payment initiator for a transaction to be settled on a card previously linked to the device; (b) the buyer selects the product and the payment option in a secure environment (SSL) and sends a request for authorisation to the operator; (c) a phone call is received by the buyer asking for confirmation; (d) confirmation is given by entering a secret number; and (e) an "end of transaction" web message is issued. The scheme operates on the infrastructure of the Servired card network for authorisation, clearing and settlement but an additional automatic dialler unit is necessary for the confirmation process. Recently, a new setup has been established (3-D) where the card number is given to the seller instead of the phone number. This way the payment solution can be widely accepted since no specific POS is required.

Paybox. This scheme was developed by Deutsche Bank AG in 2000. Paybox works as an independent service provider. As with the other m-payment instruments, the mobile phone also functions as an initiator. It is not necessary either to be a customer of a certain credit entity or to subscribe to any particular phone operator. Paybox also enables a transaction to be settled on an account instead of a card. Applications can be submitted online or by phone. The seller needs only to sign an agreement with Paybox where several flexible business options (face-to-face, e-commerce, m-commerce) are offered.

3.2 Internet payments

In the last few years, the range of financial services using internet-related technologies has noticeably increased in Spain. After the spread of consumer-oriented phone banking services and the more company-tailored PC banking ones, internet banking is visibly growing. Aggregators, financial marketplaces, enabling companies and the like are rapidly becoming familiar alongside traditional banking channels.

All three major card networks, and their technical providers, have become actively involved in the promotion of more secure and more reliable platforms for e-commerce. The 3-D model implemented by both Visa and MasterCard has been taken into account when designing the proprietary solutions. This model offers the issuing institutions various alternatives for verifying their customers' identity (PIN number, digital certificate, EMV cryptogram, etc).

Another important innovation is the provision of certain types of P2P solutions in the domestic market. Particularly significant is the case of “epagado.com”. This is a web-based payment service provided by Bankinter where existing payment instruments (direct debit and credit transfers) and channels (IFT) are used. It is only necessary to open an account at any credit institution from which transfers to an operational account opened at Bankinter are processed. To make a payment, the user has to log into a secure environment by typing several keys. This will grant him access to the accounts.

The login process can be executed either on the website or via an SMS message. Then the beneficiary’s e-mail address is provided and, finally, a confirmation of the payment is required. Once the operation is authorised, it becomes irrevocable. Balances in the operational account can be varied through interbank credit transfers or, alternatively, via preauthorised direct debits on a bank account linked to the operational one. Two types of accounts are offered in the system: business and personal. Different commissions and conditions are applied depending on the type of account. To ensure confidentiality between the customer’s computer and the credit entity, the entire data flow in that path is encrypted with the SSL protocol (128 bits). Additional security measures include informing the user on each connection of the date and time stamp of his previous login as well as the last time the password was changed. Certain programmed routines ensure that the system automatically disconnects following prolonged inactivity and even that the account is blocked when no clarity about the transaction exists.

4. Policy responses relating to e-money developments

Monetary policy and seigniorage. The Bank of Spain collects general statistical data on e-money schemes on a monthly basis. Additionally, in the course of its oversight duties, it performs a more in-depth quarterly analysis of the schemes. 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 prepaid card schemes has not been major; a potential increase in the usage of e-money is not necessarily to be expected, for which reason it is not foreseen that seigniorage will be substantially reduced in the near future.

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

General legal issues. EU Directives 2000/28/EC and 2000/46/EC have established the current legal regime for regulating e-money and e-money issuers within the European Union. On 23 November 2002, Law 44/2002 on Measures to Modify the Financial System finally transposed the previous EU legislation. According to the provisions contained in the aforementioned legal documents, only credit institutions, as defined by the current wording of Directive 2000/12/EC, will be allowed to issue e-money and will therefore benefit from the mutual recognition agreements. The law also regulates the type of asset portfolio (high liquidity and low risk) that any EDE (electronic money issuer) may predominantly hold and imposes the compulsory redeemability of the outstanding floats in any e-money devices.

Under certain circumstances (the electronic money issued by the institution is accepted as a means of payment only by any subsidiaries of the institution which perform operational or other ancillary functions for the institution related to electronic money issued or distributed by the institution, any parent undertaking of the institution or any other subsidiaries of that parent undertaking) several exemptions from the general regime are allowed.

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

Relevant security issues. The Bank of Spain, as an integral part of the Eurosystem, has adopted the common oversight criteria published in the ECB’s 1998 “Report on Electronic Money”. The latter defined a common policy with regard to electronic money and established a set of general requirements that electronic money schemes should fulfil.

As a follow-up to this report, the Bank of Spain also included among its oversight tools the 2002 “Electronic Money System Security Objectives” (EMSSO) report, which presents the expectations of the Eurosystem with regard to the technical security of e-money schemes.

The improvement of the soundness and efficiency of payment systems as well as the technical security of e-money schemes will increase public confidence in these systems. This is the keystone of

the EMSSO report, which also calls for the development of a regulatory playing field for the different schemes.

Issuer details. Law 44/2002 stipulates that only credit institutions are allowed to issue e-money. Transactions are processed and cleared within the network of the operator they belong to, using existing infrastructures.

Payment system issues. No major problems have been observed in relation to either clearing or settlement arrangements for e-money, internet and mobile payment schemes. The Bank of Spain is currently involved in the process of streamlining the flow and content of statistical data on initiatives related to e-payments.

Oversight issues. The Bank of Spain is the competent legal authority in the performance of oversight activity on all types of payment instruments and systems (Autonomy Law 13/1994). Yearly information on e-money schemes is provided to the Bank of Spain whereas quarterly information on m-, internet payments and e-commerce is also collected. A regular exchange of information between the Bank of Spain and network operators also takes place as an additional means of monitoring and analysing whatever trends arise in the market. When necessary, the Bank of Spain may also act as a catalyst.

Supervisory issues. In compliance with the recent provisions of the European directives on e-money (and the transposition thereof into Law 44/2002), all issuers of electronic value must be credit institutions. Therefore the supervisory activity is performed by the authorised body in each country, which, in the case of Spain, is the Bank of Spain. On the other hand, the applicable legal regime establishes certain requirements on initial capital, own funds, limitations of investments and allowed business activities.

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

Cross-border issues. The provisions contained in Directive 2000/46/EC of 18 September on mutual recognition arrangements shall apply only in relation to business activities regarding the issuance of electronic money. Currently no card-based schemes operate on a cross-border level.

Other issues. Representatives of the Spanish networks have already signed an agreement to make their systems interoperable in both the domestic and foreign markets. At the present moment, the Common Electronic Purse Specifications (CEPS) and the EMV projects stand for the most feasible initiatives in this field, since they have already laid the groundwork for a first practical testing and implementation calendar.

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

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

Euro 6000 has developed a feature by which single purpose prepaid cards can be transformed into multipurpose cards by downloading the required applications from an ATM.

Sri Lanka

1. Card-based products

In 1998 one of the leading domestic banks in Sri Lanka launched the SMARTCASH scheme (electronic purse) to enable cardholders to make payments at retail outlets where card readers had been installed. This scheme experienced a setback, and arrangements are now being made to reactivate it.

2. Network-/software-based products

Currently there are no network-/software-based schemes.

3. Internet and mobile payments

Eight banks have implemented internet and phone/mobile banking schemes, while one bank has introduced phone banking without internet banking.

These schemes provide a range of banking services such as transfer of funds, settling of utility and credit card bills, account balance enquiries, cheque books requests, channelling of doctors and consultation of financial information through phone/mobile/telebanking facilities. Individual and corporate customers of the banks have benefited from these services as they have been given access to their accounts and can also send messages to their banks over the phone/internet at any time of the day. Internet banking permits banks' customers to obtain conventional banking services using the internet as a medium in a convenient manner. There is a trend of banks developing their networks specially to enable their corporate customers to perform large-value and import-/export-related transactions through the internet. The level of utilisation of these technologies varies between banks depending on their business strategies.

The number of financial transactions effected through phone and internet banking services during the first three quarters of 2003 was 152,588, while the total value of transactions amounted to LKR 70 billion. At the end of September 2003, banks provided phone and internet banking services to 546,932 customers.

4. Policy responses

There is no specific law governing electronic transactions. Transactions in e-money/internet/mobile banking schemes are covered by contract law until the proposed Payment Act and Electronic Transaction Act are passed by parliament.

Sweden

1. Card-based products

There is one card-based scheme in operation, backed by three of the largest Swedish banks acting as issuers (Nordbanken, Sparbanken, S-E Banken). These three banks together have over 75% of the Swedish bank card market, both as issuers and as acquirers. Although they share the same technology, the banks compete with each other by issuing their own cards. The bank-specific systems use common standards, ie all Cash terminals accept cards issued by the 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 and a patented dynamic key management system, and has payment execution times of less than half a second. It has been designed to the specifications set by Europay, MasterCard and Visa and has been profiled as a substitute for physical cash in small-value transactions (under USD 15). At the moment it cannot be used for network payments.

The Cash Card system works as follows. The user has to register at the issuing bank when the card is bought, meaning that the user must be identified. The card is personal - only the registered user is lawfully allowed to use it. The user is given a PIN code to be used when the card is reloaded. The card can be reloaded through 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 and forgery. Transactions are offline; no communication is needed between the POS and the issuing bank for verification. The system does not allow transferability. Users receive no interest payment for the money on the smartcard.

The system was launched nationwide in 1998. Originally the Cash Card worked as a standalone product. A conclusion from the first market evaluation, a few months after the national rollout, was that the Cash function would be accepted more widely if it were installed on a multifunctional card. Thus the three banks behind the Cash association integrated the Proton technology into their bank card products.

Commercial associations were not quite as positive shortly after the national rollout. They disagreed with the scheme developers over pricing, particularly as regards the distribution of costs and fees between banks and vendors. Some of the issuing banks responded by changing their pricing structure and introducing a charge-free period for merchants. The objective was to increase merchant adoption and thereby the incentives for cardholders to use the technology.

Currently, there are about 41,000 terminals that accept Cash payments. The number of multifunctional Cash Cards issued is about 4,200,000. However, thus far, the Cash Card has not gained acceptance in Sweden and, recently, growth has even been negative. During 2002 the number of transactions with Cash amounted to less than 0.9 million, compared with 1.5 million in 2001 and 2.9 million in 2000. In terms of value, purchases made with Cash amounted to USD 3.6 million.

2. Network-/software-based products

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

3. Internet and mobile payments

The share of households with access to the internet in Sweden is 60%. This large internet penetration ratio has contributed to a rapid adoption of internet banking. Currently e-banking is a major service channel used by a large share of both corporate and private customers. In 2002 the number of e-banking customers amounted to over 4 million, which is quite a high figure considering that Sweden has a population of less than 9 million.

E-banking is still mostly used as a new interface for traditional payment services. The payments processing chain has not yet undergone any substantial change. Retail payments, whether internet-initiated or not, cannot be made in real time. However, the clearing platform used by the Bank Giro System (BGC), the Swedish national clearing house, allows for several clearing and settlement cycles per day. Even though it has affected mostly traditional payment services, the development of e-banking has contributed to greater automation. The increase in payment automation has occurred mostly in credit transfers. Although credit transfers were to a large extent electronically initiated even before the advent of the internet, there was a significant amount that relied on paper-based methods. Most corporate bank customers were already using direct electronic file transmission. Private customers, however, did not have this possibility until e-banking services became available. In 2002, almost 30% of the total number and 16% of the total value of credit transfers were initiated over the internet.

Between 1997 and 1999 all major Swedish banks launched **Electronic Bill Presentment** schemes as an additional information intermediation service associated with internet-initiated credit transfers. Two different schemes, the E-giro and the E-faktura, run by two different bank consortia emerged initially. These schemes were not interoperable and showed very little progress in gaining acceptance from corporate and private customers. In May 2002 the two schemes reached an interoperability agreement. According to the banks involved, this agreement has contributed to increasing adoption during the past months. Currently, there are approximately 140 bill-presenting corporations associated with the Electronic Bill Presentment schemes. Usage is still very low. In value terms only 0.01% of the total value of credit transfers over the internet was initiated through electronic bill presentment.

In 2002, two of the four major banks in Sweden also launched new schemes for secure card payments over the internet. One of the schemes relies on Visa's 3-D Secure and MasterCard's Secure Payment Application standard agreement. The other relies on a bank-own solution but plans to develop this scheme according to the 3-D Secure standard in 2004/2005. No data on these card schemes have

been reported yet. However, both schemes are quite recent and have not yet achieved any considerable volumes. Some of the major banks also provide access to digital marketplaces in connection with their internet services. At associated e-shops, purchases can be made using the same type of security solution used for access to e-banking services. Both payer and payee must have accounts with the same bank; the payment itself is just an in-house credit transfer. There is no interoperability between the schemes for digital marketplaces offered by the different banks. Thus each e-shop has to open accounts in the different banks offering these services if they want to reach all potential customers.

Some of the major banks also launched an electronic identification (e-ID) service for their customers in 2002. Although not originally a payment application, these services may eventually be implemented for payment solutions. The e-ID service is a digital signature and certificate that both corporate and private customers can use in their interaction with public authorities, such as the tax or social security authorities. Thus customers using these e-ID services may fill in their tax forms or parental leave/child sickness absence forms directly over the internet. The schemes are PKI-based. Some of the major banks cooperate in one of these schemes. In this scheme, the BGC functions as technical supplier and CA. However, each bank is legally responsible for its own certificates.

4. 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. Since only banks are currently involved in e-money schemes, these activities naturally fall under the supervisory responsibility of Finansinspektionen. Similarly, banks are in contact with Finansinspektionen for the evaluation of operational risks in products and schemes developed for the internet channel.

Monetary policy and seigniorage. The Swedish central bank has contributed its own calculations to the analysis carried out by the CPSS in the field of seigniorage losses. Major issues relating to e-money were discussed at the Riksbank at an early stage of this development. In 1997, the Riksbank published a report on electronic money that reflected the conclusions drawn from the internal analysis and discussion. In this report, consideration was given to whether monetary operating procedures might have to be adapted in case a large substitution of e-money for banknotes led to a shrinkage of the central bank's balance sheet. The Riksbank's standpoint is that there is no cause for concern on this subject. The procedures for implementation of monetary policy are not dependent on the size of the balance sheet, and the central bank also has measures at its disposal to counteract the shrinkage of the balance sheet. The same applies to possible loss of seigniorage, which can also be counteracted by specific measures, 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.

Provider issues. There is nothing more to report on this item besides what is already mentioned under "Supervisory issues".

Law enforcement issues. The Swedish position emphasises 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 and internet payments are cleared and settled via the same regular channels and procedures as other retail payments.

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

1. Card-based products

Banks in Switzerland launched a national rollout of a Proton-based scheme, called **CASH**, in January 1997. In autumn 1997 Schweizerische Post joined the system introducing the **Postcard CASH**. At the same time the ATM network of the banks (Bancomat) and the network of Schweizerische Post (Postomat) mutually opened their network. With regard to CASH, both networks provide a fully compatible loading facility. Since the start in 1997 the installation of merchant terminals has been implemented gradually. The promoter of CASH is Multipay Switzerland (formerly Europay Switzerland) and the operator is Telekurs Card Solutions (formerly Telekurs Payserv). The maximum value that can be held on a consumer card at any time is CHF 300. 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 partnership under which individual participating banks assume liability of debts jointly and severally). With regard to the fee structure, merchants pay 0.7% of the transferred amount plus CHF 0.01-0.02 per transaction.

2. Network-/software-based products

Currently there are no network-/software-based schemes available.

3. Internet and mobile payments

EBPP. An EBPP system is intended to enable the current paper invoice and payment slip procedures to be carried out electronically and in paperless form. There are currently two EBPP systems in operation, yellowbill for B2C solutions and PayNet for B2B solutions.

Yellowbill. Yellowbill is an EBPP system offered by Postfinance, the financial services subsidiary of Schweizerische Post. Yellowbill has been developed by Postfinance and yellowworld AG, another subsidiary of Schweizerische Post. Yellowbill was put into operation in February 2002.

At present, yellowbill solely provides B2C services. For the future it is planned to launch a B2B solution. Postfinance expects to see substantial growth for yellowbill services. Yellowbill accepts payments in CHF and EUR, but does not allow cross-border payments. The fee is a maximum of CHF 0.70 per transaction.

As regards the security aspects of yellowbill, the biller transfers the data through a secured channel (FTP or HTTPS) to yellowbill. The data can also be encrypted. The customer logs into its e-banking application, with the usual security measures (128-bit key, username and password). To receive the bill, the customer needs an e-bill account number.

PayNet. Telekurs Holding was charged by its shareholders to develop an EBPP system, named PayNet, for Swiss banks. Telekurs Holding sold PayNet to SAP AG in 2001. Telekurs Holding has been operating PayNet for B2B solutions since autumn 2002 under licence from SAP AG. In 2004 a B2C solution is scheduled to be put into operation.

Remote electronic payments

The utilisation of remote electronic payments such as online credit transfers, direct credits and debits is very common in Switzerland. Postfinance and almost every bank offer these types of services to their customers.

Credit card innovations

At the end of October 2002, Cornèr Bank was the first bank in Switzerland to introduce the "Verified by Visa" solution based on 3-D Secure technology. In the following months the other Swiss issuers (UBS Card Centre, Swisscard AECS and VISECA) were also expected to introduce this new technology. In

November 2003 MasterCard was scheduled to introduce SecureCode, which is also based on 3-D Secure.

Mobile payments

Currently there are no mobile payment instruments available.

4. Policy responses

4.1 Policy responses relating to e-money developments

Monetary policy and seigniorage. The Swiss National Bank collects statistical data on electronic money on a quarterly basis, covering the number of cards in circulation, the volume and the value of payments made, and the number of terminals. Electronic money is not included in the monetary statistics. For the time being, the potential substitution of notes and coin is expected to be moderate.

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

Relevant security issues. The Swiss National Bank monitors the market to assess the systemic importance of the various elements of the payment system infrastructure. Monitoring includes, on the one hand, collecting sufficient data to assess systemic importance and, on the other, maintaining an understanding of the functioning and interdependence of the various elements of the payment services market. CASH has not been considered systemically important.

Issuer details. For the time being, no legislation exists that restricts the issuance of electronic money to a certain type of institution. However, depending on the issuer's services, a banking licence may be required.

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.

Oversight issues. In its capacity as overseer of payment systems, the Swiss National Bank is mainly concerned with systemically important payment systems. As CASH has not been considered systemically important, the Swiss National Bank has not taken any policy measures.

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 for the following reasons: no transferability from purse, account-based scheme, maximum amounts that can be stored on the card and single currency.

4.2 Policy responses relating to internet and mobile payments

The following policy issues refer to yellowbill and PayNet, the two EBPP systems in Switzerland.

General legal issues. Currently, there is no specific legislation concerning internet and mobile payments. However, in connection with commercial bookkeeping, Articles 962 ff of the Swiss Code of Obligations refer to the electronic keeping of invoices. Moreover, an ordinance of the Swiss Federal Department of Finance regulates the electronic transmission of data and information. The EBPP system yellowbill is a product offered by Postfinance, the financial services subsidiary of Schweizerische Post. Postfinance is subject to the Post law of 1997. The law on money laundering is applicable to financial intermediaries in general. Postfinance is considered to be a financial intermediary in terms of this law, whereas Telekurs Holding is not. Since 1992 a law on the protection of data has been applicable to both individual persons and legal entities.

Relevant security issues. The Swiss National Bank monitors the market to assess the systemic importance of the various elements of the payment system infrastructure. Monitoring includes, on the one hand, collecting sufficient data to assess systemic importance and, on the other, maintaining an understanding of the functioning and interdependence of the various elements of the payment services market. Yellowbill and PayNet have not been considered systemically important.

Issuer details. For the time being, no legislation exists that restricts the provision of EBPP services to a certain type of institution. In the case of yellowbill and PayNet, a non-bank institution (Postfinance and Telekurs Holding respectively) runs the EBPP system. Postfinance offers the entire range of payment processing services. Schweizerische Post is a public institution. According to the Post law of 1997, Schweizerische Post has to offer universal services in the areas of mail and payment services. Telekurs Holding is a holding company that provides services and products in the area of financial information, payment traffic and cashless means of payment. It is a joint stock company owned by the Swiss banking community.

Payment system issues. Until now no particular problems have arisen relating to clearing and settlement arrangements. The procedure for yellowbill is the following: Postfinance debits the customer account and credits the amount to the biller account. Yellowbill is an open system; the customer and the biller do not have to hold an account at Postfinance, they could have an account at other financial intermediaries as well. However, for the time being, no other financial intermediaries are involved. In the case of PayNet, the debiting and crediting of the biller and customer accounts take place at the respective financial intermediaries.

Oversight issues. In its capacity as overseer of payment systems, the Swiss National Bank is mainly concerned with systemically important payment systems. As yellowbill and PayNet have not been considered systemically important, the Swiss National Bank has not taken any policy measures.

Supervisory issues. The Federal Banking Commission has not adopted any specific regulations.

Law enforcement issues. The money laundering law is applicable to Postfinance but not to Telekurs Holding. However, with PayNet, the debiting and crediting of the biller and customer accounts take place at a financial intermediary to which the money laundering law is applicable.

Taiwan, China⁴⁸

Currently, several e-money schemes are under development or being piloted in Taiwan. A variety of stored value cards (SVCs) are emerging one after another, especially single purpose SVCs. Moreover, internet (or mobile) payments are creating almost limitless possibilities for consumers in terms of when, where and how they can make their payments. However, all these new payment methods are still at an initial development stage and might take a long time to be widely accepted. The central bank is maintaining a prudential stance in closely monitoring new technological trends in order to avoid interfering in the development of e-money.

1. Card-based products

FISC-IC Card system. This card system was designed and is operated by the Financial Information Services Co Ltd (FISC). Operations began in August 1993, enabling cardholders to withdraw cash, manage account transferral, make phone calls and pay gas bills. Since February 1998, an additional prepaid function has been introduced to this card for purchases with e-cash. There are now 22 domestic banks participating in this system for card issuance and acquisition. The IC Card associates a microchip with the magnetic stripe ATM card issued by banks; the chip comprises an array of functions as mentioned above. The main feature is the combination of ATM, credit, debit and prepaid functions in one all-purpose card. The money value is loaded from ATM machines. There is a minimum and maximum limit for the stored value, that is, TWD 500-10,000 (USD 15-295). As of September 2003, the number of IC cards issued was around 2,030,000, and the number of merchants available 14,528. Average daily transactions were 152 by volume and USD 513.5 by value, making the average value per transaction USD 3.38.

⁴⁸ Hereinafter referred to as Taiwan.

Mondex Taiwan system. This system is provided by Mondex Taiwan, a subsidiary of MasterCard Corp, and a joint venture company with Taiwan's ACER Group. The pilot began in September 1999 at Oriental Scientific Industrial Zone in Taipei County. Operations began in June 2002, enabling cardholders to pay taxi fares, buy lotto tickets and make purchases at convenience stores and supermarkets. There are now nine domestic banks participating in this system for funds management, card issuance and merchant acquisition. The Mondex card uses EMV standard format with an embedded microchip. Its multiple functions allow this card to store cash value for consumption both offline and online. The money value is loaded from an array of Mondex devices or via the internet. There is a maximum limit on the stored value, ie TWD 10,000 (USD 295). As of September 2003, the number of IC cards issued by banks was around 250,000, with the number of merchants available around 3,500. Average daily transactions were 215 by volume and USD 1,486 by value, making the average value per transaction USD 7.

2. Network-/software-based products

E-SUN e-Coin system. This is a purely network-based SVC system, designed and operated by domestic E-SUN Bank. It was launched in February 2003 to provide customers with an online payment alternative, enabling them to make small online payments through a virtual bank account opened online with E-SUN Bank. The money value is stored in E-SUN Bank's server instead of the microchip. Customers may use e-Coin to purchase digital content products, play games, shop in e-markets, or participate in e-auctions. The e-Coin is digital cash. The money value can be loaded via ATMs, internet banks, mobile banks or convenience stores. The maximum amount of stored value is TWD 10,000 (USD 295). As of September 2003, the number of consumers was around 88,000 and the number of merchants available 110. Average daily transactions were 350 by volume and USD 1,470 by value, making the average value per transaction USD 4.2.

3. Internet and mobile payments

FISC-Internet-Bank system. This system was launched by the FISC in February 1999 to provide banks and operators with a new service platform for home/firm banking through the internet channel. At present, 39 financial institutions participate in this system, and a total of about 2,000 end users were registered in September 2003. Average daily transactions were 234 by volume and USD 414,172 by value, making the average value per transaction USD 1,770. The market share of internet payments to the total value of non-cash transactions in 2002 was around 0.002%.

It is a network-based facility using SET standards. It was developed to provide internet banking services, enabling the public to apply for certification, digital signature via the internet in order to perform around-the-clock funds transfer as well as tax, regular and shopping payments. End users must apply to the Taiwan Certification Authority (TiCA) for personal digital signatures. Thereafter, they may pay their bills from home or the office. Through the internet channel, the public may use PCs or other terminals to connect with internet stores for credit card purchases, or link with financial institutions to perform ATM account transfer and online payments and perform balance enquiries. Interbank transfers and payments may not exceed TWD 2 million (USD 58,823) per transaction. Transactions performed later than 3.30 pm will not be effective till next business day.

FISC-Mobile-Bank system. This system was launched by the FISC in June 2001 to provide banks and operators with a new service platform for mobile banking. Thirteen financial institutions now participate in this system, and a total of about 70,000 end users were registered in September 2003. Average daily transactions were 504 by volume and USD 517,330 by value, making the average value per transaction USD 1,179. The market share of mobile payments to the total value of non-cash transactions in 2002 was around 0.001%.

The mobile banking service may be regarded as a "mobile ATM", as its operations and regulations are similar to those of ATMs. In fact, the FISC Mobile Banking System is a joint venture with banks for analysing and determining requirements as well as establishing security standards and operational guidelines in order to prevent abuses and safeguard customer transaction information. The system implementation covers most mobile phone subscribers, effectively eliminates interaction issues among players and increases economies of scale to create a win-win scenario. Through this system, users may perform interbank funds transfer or balance enquiries with a simple application provided by telecoms operators for the FISC Mobile Banking System SIM card.

TCH-E-Cheque system. Taiwan Clearing House (TCH) launched this system on 29 September 2003. It was initiated by the central bank in December 2000 to meet the demand for e-commerce, to promote the efficiency of payment systems, and to provide payment alternatives for business transactions. For the time being, Hwa Nan Commercial Bank is the leading participator in this system, with an additional 13 domestic banks, including the top 10 largest cheque issuers, set to join in due course.

The e-cheque is a virtual bill of exchange with all the same elements and functions as a physical paper cheque. Three types of electronic cheques and bills are available: e-promissory notes, e-drafts and e-cheques. In a PKI, the e-cheque is designed to adopt the symmetric and asymmetric cryptographic algorithms to generate electronic signatures and certificates for online identity authentication, non-repudiation and data integrity purposes. Encryption and decryption technologies are also applied to message transferral via the internet to ensure data confidentiality. The message content is in a uniform format stipulated by the Banking Association in Extensible Markup Language (XML). In applications, the e-cheque may accommodate the needs of e-commerce and associate accounting procedures with straight through processing. It may also deliver bill and invoice data with attached file for document display, certificate issuance or order confirmation.

The rights and obligations pertaining to e-cheques among counterparties are mainly based on the Law on Electronic Signatures in Electronic Commerce and the Negotiable Instrument Act, and prescribed in the Rules Governing Financial Institutions Participating in the Exchange of E-cheques and the Standard Contracts on Applying for E-cheques.

4. Policy responses

4.1 Policy responses relating to e-money developments

Unless e-money possesses all the properties of cash - eg reliable and stable money value, low charge, transferability, anonymity, convenience and unconditional irrevocability and inconvertibility - it may not be used to replace fiat money issued by the central bank.

E-money in Taiwan is still at an initial development stage and might take a long time to take off - even more to become a credible instrument widely accepted by the public. Moreover, the credibility established by the central bank over the long term is not easily reproduced by those banks or other institutions which issue e-money for only a short time. Even so, the rapid changes in IT technology may someday make e-money more competitive and finally widely accepted by the public. Once e-money becomes tomorrow's mainstream money, it may pose a far-reaching challenge to the role and function of the central bank, for instance: reducing seigniorage revenues; curtailing the effectiveness of monetary policy implementation; aggravating the administrative burden of payment and settlement systems; and making it more difficult to maintain a stable foreign exchange rate.

To counter these problems, banks in Taiwan must obtain the competent authority's approval prior to issuing stored value cards; and the competent authority shall prescribe rules for the approval and management of such issuance after consulting with the central bank. The Ministry of Finance promulgated Regulations Governing Approval of the Issuance of Stored Value Cards by Banks on 8 October 2001. According to these regulations, a non-bank may not issue e-money in the form of an SVC, while a bank may issue an SVC and thus accept an advance. This is treated as deposit-taking, and the advance is the insured item in accordance with Article 4 of the Deposit Insurance Act. The bank must deposit reserves at the central bank in accordance with the required reserve ratio of demand deposits. Besides, these issuing banks have since January 2002 been required by the central bank to report monthly data on e-money.

Pursuant to the same regulations, the central bank conducts on-site examination of those banks issuing e-money, and focuses on the robustness and soundness of the system's framework, including executive organisation, IT system technology, security controls, resistance to counterfeiting, business operation guidelines, internal audit, inner controls, risk management, accounting procedures, and managing contracted merchants. When a licensed bank does not comply with the regulations, or is likely to engage in unsafe or unsound practices, the central bank will be entrusted to take (and/or require a bank to take) prompt remedial action and impose a range of sanctions when necessary.

For the purpose of administration and statistics compilation by the central bank, a bank engaging in international SVC (foreign currency denominated) business is required to send monthly reports to the central bank before the 10th day of the following month. These monthly reports must include the

following items: the number of cards issued, the total value of the cards issued, the amount paid, the number of cards in circulation, the total value of the cards in circulation, and the number of terminal facilities. All foreign currencies should be converted into USD.

4.2 Policy responses for internet and mobile payments

Internet/mobile payments are proliferating. Currently, 39 banks offer internet banking services and 13 are engaged in mobile banking. In securities markets, 79 securities brokerage firms offer online placement of orders. People in Taiwan can now shop online for securities transactions, funds transfers, information, and internet auctions. These payment innovations extend the scope of banking services to any which time, any which place, any which way. For e-commerce requirements, most banks have chosen to form a strategic alliance with other application service providers (ASPs) for cross sales purposes or to acquire or merge with other institutions for market share or economies of scale so as to create their own financial domains.

The emerging payment innovations may change money-holding behaviour and result in a fundamental shift in payment methods, which may thereby reshape the conduct of monetary policy, increase the burden of prudential supervision, and impinge on the stability of financial systems. With these considerations in mind, the Taiwanese authorities have been closely watching the recent development of payment innovations, ie e-money and e-payments via the internet.

To create a sound legal environment for electronic commerce, the Taiwanese authorities have promulgated the following regulations, which together form the cornerstone for online transactions via the internet.

- The Security and Management of Criteria for Electronic Banking by Financial Institutions (May 1998). These criteria are aimed at establishing the minimum requirements for e-banking security controls, ie symmetric and asymmetric cryptographic algorithms, commonly known as DES and RSA mechanisms respectively. They serve to manage such security risks as alteration or duplication of information, repudiation of transactions, and hacking. When conducting electronic banking activities, banks are required to adopt appropriate prevention measures to safeguard critical data and processes through PC-based, network-based or internet-based channels. These measures must be taken to meet the requirements for confidentiality, integrity, authentication, non-duplication and non-repudiation.
- Standard Service Agreement for PC and Internet Banking (May 1999). This agreement basically provides a sample contract for banks wishing to engage in electronic banking with customers.
- The Law on Electronic Signatures in Electronic Commerce, issued on 14 November 2001 and put into effect on 1 April 2002. This law is based on three principles - non-discrimination, function equivalency and technological neutrality - so as to give legal validity to electronic documents, and electronic media the same legal status as paper-based media. This law is also applied to prevent possible illegal actions, but not hinder creative intentions. In other words, it does not contain any regulation that imposes unnecessary burdens on technological innovation.
- Guidelines on Consumer Protection in Electronic Commerce (November 2001). These guidelines reinforce the Consumer Protection Law to protect internet consumers.

At present, the government authority only grants licences to banks with a physical presence and a skilled management team. All electronic banking activities in Taiwan are accordingly offered as an extension or complement to existing banks. Approval for standalone virtual banks is yet to be considered. A bank is required by the authorities to establish a physical presence for the purpose of prudential regulation. Such an office will enable customers to make enquiries or file complaints and allow the bank to verify the identity of its customers in compliance with relevant laws and regulations.

1. Card-based products

Tembo Card is the first and the only implemented nationwide e-money scheme. It was launched in November 2002 and has so far met with general acceptance. Although the scheme is conducted by a single commercial bank, the cardholder need not be an account holder at that bank. The card is a multipurpose smartcard usable at points of sale, ATM devices and as an identification card for account holders of the issuing bank.

As regards general legal arrangements, the issuing bank uses application forms and applies terms and conditions to bind both customers and merchants. Currently the card does not have any multicurrency or cross-border features in use.

The card can be reloaded at any branch of the issuing bank, either through ATM, teller counter or POS. With regard to the fee structure, there is a USD 0.25 fee for every reload from an account and a USD 0.50 fee for loading from cash; there is also a cash-back fee of USD 0.50. Since this card scheme is operated by a single commercial bank, there is a different fee structure for non-account holders, with a USD 0.75 loading fee for up to USD 1,000 and USD 0.50 for each extra USD 1 loaded on the card; the cash-back fee is for non-account holders is USD 0.75 at the bank and USD 0.50 at a merchant POS.

For merchants, however, each merchant card costs USD 15 and every merchant is provided with two merchant cards per POS, with a monthly POS service fee of USD 25. Merchants are allowed to give cash back to customers for an optional fee not exceeding USD 5. In addition, there is an offloading fee for merchants payable whenever merchants offload transactions to merchant collection accounts. The offloading fee is charged per offloading irrespective of the sales value to be offloaded.

2. Network-/software-based products

Currently there are no network-/software-based e-money schemes in Tanzania.

3. Internet and mobile payments

Currently there are no internet or mobile e-money payment schemes in Tanzania.

4. Policy responses

In response to initiatives by the commercial banks, in January 2000 the Bank of Tanzania issued guidelines on the introduction and operation of auditable card-based electronic money schemes in Tanzania.

In addition, in September 2000 the East African Payment System Harmonisation Committee adopted these guidelines with a few amendments to accommodate non-auditable e-money schemes. The guidelines mainly lay down conditions for licensing and regulating e-money products and schemes in the East African countries.

Monetary policy and seigniorage. Both sets of guidelines stipulate that:

- e-money issuers are required to submit to the central bank statistics on the amount of e-money loaded and redeemed values in their periodic financial statements;
- redemption shall be through central bank money, at par, as and when required by the bank;
- all e-money products denominated in the national currency should be treated as sight deposits. In this regard, e-money must be issued in exchange for the equivalent in central bank money or highly liquid assets acceptable to the central bank;

- the central bank reserves all rights to the use of the name of the national currency (Tanzanian shilling) in any electronic money scheme at all times (that is, during pilots and live operation of such schemes);
- card issuers may be required by the central bank to provide information regarding the issued cards and to do within 24 hours. This would help the central bank not only to collect statistics for the purposes of monitoring developments in e-money, but also to manage risks; and
- the scheme should be able to demonstrate a means of providing sufficient and reliable information to monitor and control the quantity and velocity of e-money supply in the economy.

General legal issues. There is no explicit legislation that would help clarify the legal provision of e-money. However, the Bank of Tanzania has issued guidelines on the introduction and operation of auditable card based e-money schemes in Tanzania. The amendments made to the Bank of Tanzania Act in 2003 also give the Bank explicit powers to regulate the payment systems (including the instruments involved).

The guidelines stipulate that:

- the scheme must not contravene any of the laws governing contracts, insolvency, consumer protection, banking or any other relevant legislation;
- the rights and obligations of the central bank and other participants must be clearly defined, comprehensive and understandable;⁴⁹
- the scheme must provide for arbitration and dispute resolution mechanisms which are effective both domestically and internationally; and
- an adequate regulatory framework must be put in place to cater for prevention of money laundering and other relevant criminal activities.

The major uncertainty remaining with respect to the new products is statutory recognition of e-evidence. Efforts are being made to amend and enact laws.

Security issues. The guidelines require that there should be clear risk management measures which are acceptable to the Bank and in conformity with national payment system risk management principles. Particularly, there should be an indication of how the scheme operator will provide the Bank with risk-related information that will enable it to assess, control and monitor all relevant payment system risks related to such schemes.

For the reasons stated above, the Bank will consider financial institutions as issuers of e-money value because they fall directly within the scope of the regulations of the central bank, which would facilitate risk management.

The criterion used by the Bank of Tanzania to determine that the security features of e-money products are currently adequate is to require the introducer of such schemes to seek no objection from the central bank, with the central bank following up to ensure compliance via the statutory regulatory powers it has.

The Bank of Tanzania has not considered asking or using a third party to certify the security aspects of e-money schemes. If a security issue arises in the context of products developed abroad, before granting a non-objection the Bank of Tanzania would evaluate the scheme and determine whether there were any security issues it would recommend the applicant resolve.

No specific policy approaches have been formulated with respect to security risks introduced by providers of payment processing services. However, the various risks inherent in products and their operation are factors that would influence possible future policy responses.

Payment system issues. The guidelines require that only commercial banks participate in the e-money clearing and settlement mechanisms. The central bank is the settlement agent for e-money transactions.

⁴⁹ Written in plain language which can be understood by all potential participants in the scheme.

The scheme should facilitate provision of final settlement no more than 24 hours after a payment instruction has been initiated in the banking system.

Oversight issues. As indicated above, the Bank of Tanzania has already issued guidelines for e-money products and schemes. The guidelines clearly state that only auditable card-based electronic money schemes are allowed in Tanzania at the moment.

However, the central banks in the East African Community have jointly issued guidelines for licensing and regulating e-money schemes and products in East Africa. These guidelines cover both auditable and non-auditable e-money products and schemes.

The guidelines state that the central bank shall provide for the conditions of the licence and for the licensing of e-money products and schemes. Only institutions that are supervised and regulated by the central bank may apply for a licence to introduce e-money products and schemes.

Supervisory issues. The guidelines state that the Bank of Tanzania, as a regulator of the banking industry, will assume certain roles and responsibilities in supporting the operations of any authorised interbank auditable e-money schemes based on payment cards in the country. Such roles and responsibilities include, but are not limited to:

- regulation of the e-money products and schemes based on the payment card products;
- development of policies and guidelines that would be required to implement such schemes.

Law enforcement issues. The guidelines require that the Bank of Tanzania:

- put in place, in consultation with the government, the required legal framework in support of such schemes in general and in the EFT legislation in particular. The Bank may also assist in the establishment of institutional agreements or mechanisms for dispute resolution; and
- establish risk management measures to address the issues associated with fraudulent activities and any other measures that may be required to maintain security within such schemes. In connection with this task, the central bank recommends that, provisionally, all participants should read, understand and deploy, as much as possible, the recommendations from the Group of Ten report on risk management for electronic banking and electronic activities.⁵⁰

E-money, internet and mobile payment products are seen to have features that might make them particularly attractive for money laundering. However, no specific measures against money laundering and fraud prevention in the context of e-money, internet and mobile payment schemes have been introduced.

Cross-border issues. The guidelines for licensing and regulating e-money schemes and products in East Africa provide for issues related to cross-border e-money transactions.

Other issues. The guidelines require that:

- the scheme should abide by internationally acceptable standards and recognised practices to facilitate national and international interoperability of e-money products and product-accepting devices; and
- the operator should indicate consideration of the impact of such developments in the low-income, unbanked and rural communities, which constitute a high percentage of the country's population.

The guidelines further stipulate that there should be a clear business plan that outlines, among other things, the overall implementation plan, automation strategies and a capacity building plan. The key issues to be addressed in the capacity building plan are:

- training to provide knowledge and skills to local staff with regard to e-money products, processing mechanisms and risk management, among others;

⁵⁰ Basel Committee on Banking Supervision, *Risk management for electronic banking and electronic money activities*, Basel, March 1998, BS/97/122.

- institutional development, including structures, processes, facilities and accommodation of existing investments as far as possible;
- outsourcing of technical assistance, where necessary;
- establishment of sustainable maintenance capability; and
- appropriate staffing and retention schemes to reduce the chances of operational risk.

In addition, the guidelines require that each proposed scheme's implementation plan must have a controlled mandatory pilot phase.

Thailand

1. Card-based products

E-money in Thailand is still at the early stage of development. The past decade saw few projects launched in the market, all of them involving card-based products, and acceptance was not widespread. However, interest is still being shown by the private sector in introducing e-money to customers, and the regulators have also started discussing the regulation of e-money and related issues.

In the late 1990s a small number of pilot projects were launched in the market, the best known being the MicroCash card and SCB Smart Card.

The **MicroCash** card was launched in 1996 by a non-bank institution, the Bangkok Payment Technology Company (BPT). The company was a joint venture comprising four participants - a public bus provider, a computer/software distributor, an ATM processing centre company and the DBS Thai Danu Bank (DTDB), which held a 10% stake at the early stage and acquired a full stake in 1999.

The MicroCash card was a reloadable anonymous electronic purse. The system architectures were those of Finland's Avant scheme. MicroCash cardholders could use the card to pay for bus fares on Micro Buses, for cinema tickets, and for goods and services at designated merchants such as retail stores, petrol stations, bookshops and school shops. Direct consumer-to-consumer transfer features were not available. The value stored on the card was denominated only in Thai baht. However, due to the small number of merchants, the limited number of points of sale and also the small total of transactions, the scheme was terminated in 2001.

SCB Smart Card was launched in 1999 with the cooperation of Siam Commercial Bank, Advanced Vision Systems and Chulalongkorn University to provide services to students at the university. The functions available on SCB Smart Card were identity card, ATM functionality, and electronic purse. The programme has been extended to another university in Thailand. However, the e-purse function has not been widely accepted, thus leaving the smartcard with only ID and ATM functionality. Currently, Siam Commercial Bank's staff are using the smartcard as an ID card, with e-purse functionality for the staff canteen. At present, the average number of transactions from staff e-purses is approximately 700 per day, with a value of USD 349.

Thai Smart Card Co Ltd, a joint venture involving private companies and commercial banks (CPSeven Eleven, Government Savings Bank, Telecom Asia Corporation, Bank of Ayudhya, Krung Thai Bank, Krung Thai Card Service, SVOA, Loxley, and Siam City Bank), is preparing to launch Digital Purse. The scheme is aimed at small-value payments. Only banks will issue the cards, with Thai Smart Card acting as an operator and a clearing house. The scheme is expected to be launched in the second quarter of 2004.

The government has a project to launch a common ticket to be used for fares in mass rapid transit systems such as the sky train, subway and expressway as well as in retail stores. The project is currently in the initial stage, the plan being to implement the first phase for the subway in April 2004.

In the past decade, the development of e-money has been slow and some schemes have not been very successful due to limited demand, rapid changes in technological infrastructure, and high investment cost. However, there is still a chance for e-money to become widely adopted in Thailand as

modern payment methods are increasingly accepted by customers. Furthermore, the private sector - both banks and non-banks - and the government sector are cooperating to introduce e-money, a factor which would allow greater acceptance of e-money from shops and operators.

2. Network-/software-based products

To date, there has been no software-based electronic money scheme in Thailand. However, the Bank of Thailand takes the view, at least on a preliminary basis, that there should be no fundamental differences in the legal or regulatory approach between card-based schemes and software-based schemes.

3. Internet and mobile payments

Many commercial banks have launched internet and mobile payment schemes because of their convenience, speed, branch cost reductions, and the modern banking image.

The mobile payment schemes do not have multicurrency or cross-border features, and payments are made by debiting customers' bank accounts. In contrast, the internet payment schemes do have cross-border features. Payments for international transactions or e-commerce are made via debit or credit card with the Visa or MasterCard co-brand. In addition to payments by credit or debit card, domestic payment transfers can be made by debiting customers' bank accounts as well. Internet and mobile payments facilitate immediate submission of a payment instruction, with simultaneous debiting and crediting of the accounts concerned online and in real time.

Internet payments. Internet payment schemes have been rolled out by the commercial banks to both corporate and general customers since 2000. Currently, there are 12 commercial banks providing such a service, which includes P2P payment (third party funds transfer and account transfer), P2B payment (bill payment and EBPP), B2B payment and B2C payment (for the payment of goods and services).

Internet banking is showing a continuing growth trend due to market creation by commercial banks and the increase in internet subscribers.

Mobile payments. Mobile payments remain limited as the high transaction costs of mobile operators and the need for advanced technology (WAP technology) limit it to a small group of customers.

At present, six commercial banks provide mobile payment services, namely Bangkok Bank, Bank of Ayudhya, Kasikornbank, Thai Military Bank, Siam Commercial Bank and Bank of Asia. The mobile payment services include funds transfer, bill payments and credit card payments. The services are still limited to payments within the same bank.

There is now a new mobile payment product called Mobile Payment Club (MPC). This is a joint venture between a private sector mobile operator (WRC - Wireless Routing Center Limited), commercial banks and merchants. WRC developed the product to use SMS as the message carrier for purchase and payment instructions. The new development will reduce transaction costs and also expand the customer base. MPC will provide for m-commerce payments, funds transfer, bill payments and internet payments. The service was planned to be implemented by the end of 2003.

4. Policy responses

4.1 Policy responses relating to e-money developments

Monetary policy and seigniorage. As cash and cheques remain the most popular means of payment in the Thai economy, the existing electronic money products are used primarily for small-value transactions within the city of Bangkok. The products can only replace coins and small-denomination banknotes, and thus will not significantly reduce the volume of notes and coin in circulation.

The proportion of electronic money to notes and coin in circulation is less than 0.001% and is not significant enough to warrant the inclusion of electronic money in the monetary statistics. However, the Bank of Thailand has closely monitored the widespread use of e-money in order to take account of its

impact on monetary policy in the early stages. Nevertheless, 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. However, the Bank of Thailand is collaborating with the Ministry of Finance to draft a legal framework for regulating the issuance of multipurpose electronic money. The objective of the framework is to ensure the integrity, credibility and stability of the payment and financial system, protect customers' rights and benefits, and prevent any impediments to e-money product development.

Relevant security issues. The conclusion of the G10 Task Force on the Security of Electronic Money can be used as a reference for assessing of the technical security of an electronic money system. The Bank of Thailand and related authority have been reviewing this issue on that basis.

Issuer details. The Bank of Thailand is aware that multipurpose electronic money provided by non-bank institutions would not be subject to regulation and supervision under the Bank of Thailand's authority. However, if necessary, under certain laws, the Ministry of Finance also has authority to regulate non-financial institutions in connection with the issuance of e-money. Since it is important to maintain the stability of the payment system, the policy stance regarding provider issues is currently under review.

Payment system issues. No problems have emerged yet in connection with the clearing and settlement arrangements for the existing schemes. However, the Bank of Thailand is considering restricting the use of electronic money to consumer spending.

Oversight issues. The Bank of Thailand's Payment Systems Group has been meeting with the card issuers to encourage them to take the issue of the security of e-money, system design and consumer protection into account.

Supervisory issues. The Bank of Thailand is proposing an amendment to the Bank of Thailand Act that will give the Bank more explicit power to oversee payment instruments and their issuer institutions, including those of electronic money.

Moreover, the Bank of Thailand and the Ministry of Finance are currently drafting a framework for the supervision of e-money. The framework will focus on the issuance of e-money, risk management and consumer protection.

Law enforcement and cross-border issues. Specific measures to prevent money laundering through e-money schemes have not yet been implemented. Nevertheless, the Bank of Thailand has a plan to allow only electronic money denominated in Thai baht. In addition, 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 consistent with that law.

Other issues. The Smartcard Working Group under the Subcommittee on National Payments Cooperation, which is comprised of representatives from the commercial banks and the Bank of Thailand, is working to define and establish the position and responsibilities of each participant in e-money business, including the rights and benefits of the consumers. The recommendation on these issues is nearing completion. The working group's next task will be to study and make recommendations on standards for an interoperable framework of smartcard applications in Thailand.

4.2 Policy responses relating to internet and mobile payments

Monetary policy and seigniorage. Internet payments have been playing an increasingly significant role in the payment system. Although cash and cheques remain the most popular means of payment in the Thai economy, the proportion of internet payments to notes and coin in circulation is approximately 1.3 to 1% and the proportion to cheque payments is approximately 0.04 to 1%. The Bank of Thailand has closely monitored the spread of the usage of internet and mobile payments in order to assess their impact on monetary policy in the early stages. Nevertheless, the Bank does not have any plans to issue its own internet or mobile payment schemes.

General legal issues. Under the Bank of Thailand's authority, commercial banks are subject to regulation and supervision in their banking business, including the running of internet and mobile payment schemes. The Bank of Thailand grants permission for these schemes only to financial institutions, in particular commercial banks.

Relevant security issues. The Bank of Thailand has been referring to the BIS Standard for security control and risk management in e-banking operations. The Bank has imposed the Internet Banking Technology Risk Management Guidelines that the commercial banks have to comply with. Moreover, commercial banks must submit details of procedures, duration, security measures for systems and data, risk management, system technology development and internal control for the Bank of Thailand's consideration prior to launching products.

Issuer details. The Bank of Thailand allows only commercial banks to provide internet and mobile payment schemes. The issuers must have a banking licence in order to ensure the integrity, credibility and stability of the payment and financial system.

Payment system issues. No problems have yet emerged in connection with the clearing and settlement arrangements for the existing schemes since the commercial banks provide only for funds transfer within the same bank. The Bank of Thailand is considering encouraging interbank funds transfers in order to enhance the efficiency of the payment system.

Supervisory and oversight issues. The Bank of Thailand has imposed the Internet Banking Technology Risk Management Guidelines developed by the BIS, and the Basel Committee on Banking Supervision's Risk Management Principles for Electronic Banking. The commercial banks have to comply with these guidelines to meet the BIS Standard for security control and risk management in e-banking operations.

There are 14 principles for e-banking, and they are divided into three main parts: (1) board and management oversight; (2) security controls; and (3) legal and reputational risk management.

Law enforcement and cross-border issues. No specific measures to prevent money laundering through e-money schemes have been implemented yet. 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 consistent with that law.

Tonga

Tonga's financial system currently does not have any form of electronic money.

Trinidad and Tobago

1. Card-based products

In Trinidad and Tobago, traditional instruments such as cash, cheques, and debit and credit cards are the dominant retail payment products. However, the use of electronic payments is increasing.

One commercial bank has introduced a stored value card, the Visa Travelmoney card, for overseas travel. At present the card is issued only in US dollars. The customer pays for the value that he/she wishes to purchase and has access to the funds the following day. The card is PIN-based and can be replenished by the owner at any branch office. There are approximately 1,800 of these cards in circulation.

Recently, an e-money scheme for a prepaid card was introduced by a government ministry in collaboration with a commercial bank. The Student Support Visa Electron card is intended for use by recipients of a book grant. It was estimated that 60,000 cards, each with a one-time value of TTD 1,000, would be issued in 2003.

Prepaid cards are also issued by the telephone company for use with residential and mobile phones. These cards are available throughout the country.

2. Policy responses

The Central Bank does not play a direct role in the development of e-money instruments. This area has been left to the commercial banks and other institutions. However, reform of the payment clearance and settlement systems is progressing and a new payment system architecture to support increased electronic transactions is being implemented. The Bank is also currently formalising its role as overseer of all payment systems.

Turkey

1. Card-based products

One of the recent e-money schemes in Turkey is **Kampüs Kartı** (Campus Card), issued by Vakifbank. This reloadable, multipurpose, prepaid smartcard has been piloted for a university campus in the city of Trabzon. Related figures are given in the table at the end of the report.

İs Bankası has started a pilot project at its head office and at a university in Ankara. Smartcards issued by the bank have an embedded chip that is capable of holding value and identification information for the user. The cards are used to purchase goods at vending machines and allow users access to restricted areas. Money can be transferred to the card at the bank's ATMs.

Besides banks, some municipalities in the major cities such as Istanbul, Ankara and Izmir are providing "intelligent tickets" for public transportation. These are in the form of prepaid cards with magnetic stripes or embedded chips.

There are also other types of prepaid cards, such as phone cards and gas cards. Phone cards are available throughout the country whereas gas cards are used in a couple of metropolitan areas only.

2. Internet and mobile payments

In Turkey, there were 17,001,962 credit and 37,507,581 debit cards as of the end of June 2003. In addition to ordinary credit cards, most Turkish banks have issued credit cards that can only be used for payments through the net. These credit cards do not have magnetic stripes or embedded chips and allow owners to change their credit limits using internet or telephone banking as needed.

Most Turkish banks provide internet and telephone banking services which enable their customers to perform most of the operations that can be done at branches. The rationale behind this is to allow banks to reach new customers, to reduce operational costs and to decrease the workload of the branches. These services deliver a broad range of information on, inter alia, customers' accounts and applicable rates, money transfers between accounts, RTGS payments between banks, credit card payments, public utility payments and investment operations (purchasing and selling of stocks on the Istanbul Stock Exchange, investment funds, repos, etc). Some banks also provide their institutional customers with more sophisticated internet services.

One of those banks (İs Bankası) reported 1,249,712 internet and telephone banking customers performing 17,247,605 internet and telephone banking operations for a total amount of USD 5.225 billion during the first five months of 2001.

Yapı Kredi Bankası, together with a GSM operator (Turkcell), have developed a project called **Mobil Ödeme** (Mobile Payment) involving mobile telephones and the internet. Customers that shop at the member sites send a payment instruction through their mobile phones to the issuer bank. The customer completes the transaction using the bank's approval code sent as an SMS to his/her mobile. İs Bankası has also developed a project to recharge counters to mobile phones through SMS messages.

Several Turkish banks have started to use 3-D Secure technology. For example, İs Bankası had 2,500 3-D Secure members with a USD 5,600 monthly volume in September 2003.

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 Banks Association of Turkey. The CBT would only be involved if there were settlement problems, in which case its role as a regulatory body would be relevant.

United Kingdom⁵¹

1. Card-based and network-/software-based products

Overall, the UK market for both card- and network-based e-money schemes has been quiet. All major card-based e-money trials in the United Kingdom had been discontinued by end-2000. This includes the Mondex and Visa Cash pilots described in the previous survey.

2. Internet and mobile payments

Though not the primary focus of this survey, the predominant means for payment on the internet in the United Kingdom is use of plastic cards that were not specifically designed for the new channels. Some 90% of such purchases are made by card, of which around two thirds are credit card and the remainder debit card transactions.⁵² However, several developments aim at better adapting these products to the internet, such as by enhancing security. For example, MasterCard's SecureCode and Verified by Visa use smartcards which require the customer to input a password, to enable financial institutions to authenticate to merchants the validity of cards used in online payments.⁵³

Turning to payment arrangements primarily developed for the internet and mobile phones, a range of products have recently entered the UK market. There are few data on the use of such services, but the general understanding is that usage to date is negligible - probably a fraction of 1% of all non-cash transactions. Descriptions of some service types seen in the United Kingdom follow.

The United Kingdom has several online account-based e-payment services, used for person-to-person payments and sometimes by businesses to offer customers a means to pay online. Examples are Moneybookers, NatWest FastPay, NOCHEX, PayHound and Yahoo! PayDirect from HSBC. Also, PayPal is planning to launch a UK-based service in early 2004. These require users to set up and prefund an "e-payments" account with the service provider, which can then be used to make "instant" online payments to other users. The sender only needs to know the recipient's e-mail address; recipients of funds must join the payment service to accept the money. Funding and defunding of accounts is effected through traditional banking channels, such as ACH transfers and plastic cards. Some services (eg NatWest FastPay) offer access to the service via mobile phone as well as internet. Another variation is where recipients do not need to join the e-payments service to receive funds - for example, Egg Pay can also send funds via ACH transfer to any UK bank account the recipient specifies. Moreover, services can operate without requiring users to have bank accounts or payment cards. For example, Splash Plastic's⁵⁴ payment service for online shopping is particularly aimed at young people and can be pre-funded using cash at certain shops.

⁵¹ Examples of services cited in the text and tables for the United Kingdom are illustrative and not exhaustive. No special significance should be attached to the inclusion or exclusion of any service.

⁵² Data for 2003, based on market research. Source: Association for Payment Clearing Services (APACS).

⁵³ A further development in plastic cards is the introduction of services such as Visa Direct and MasterCard MoneySend, offering card-to-card payment arrangements, including for person-to-person and cross-border transactions. One (of several) access channels will be online, requiring the sender to supply the recipient's e-mail address.

⁵⁴ Splash Plastic is a product of PrePay Technologies, a UK-based company with a range of stored value products. It is authorised as an e-money issuer by the UK's Financial Services Authority.

Several types of mobile phone payment arrangements operate in the United Kingdom. Some use the phone as an access channel through which to initiate and authenticate transactions from existing payment means such as bank accounts or payment cards. For example, the Vodafone m-pay cards system enables users to charge purchases directly to payment cards they have pre-registered with the service. Another arrangement is reverse charging or ex post billing, where payments for goods/services are placed as additional items on the customer's post paid phone bill, which is then paid in the normal way, say through a bank or using direct debit - an example is Vodafone m-pay bill. Mobile phones are also used to access premium rate services and can be funded using prepaid airtime - both of which can be used as payment for goods/services. Moreover, the purchase of prepaid airtime was recently introduced as an additional service at some ATMs in the United Kingdom.

In the United Kingdom, MobileATM and Simpays plan to offer a range of the above mobile payment services under their respective brands. MobileATM is a joint venture between LINK (which manages the UK ATM network) and a mobile technology provider which from 2004 plans to roll out mobile payment services including balance enquiries, initiation of payments from existing bank accounts and an e-purse facility for small payments. Simpays is an association of mobile network operators⁵⁵ which plans to enable larger payments using debit and credit cards pre-registered with the service and, for smaller payments, the facility to charge them to the phone bill.

UK examples of services directed at micropayments include BT click&buy, which allows registered users to have content purchases from participating online merchants charged directly to a credit/debit card, to a direct debit or BT phone bill each month. Ymogen similarly enables cumulative payment for premium web content/services, billing daily to the user's credit/debit card or to certain mobile phones by sending reverse-charge SMS messages.

There are several internet bill payment services; one example is BillPay, operated by Alliance & Leicester Commercial Bank. This has arrangements with many utility companies, local councils and the Inland Revenue (the UK tax authority), allowing customers to pay online using debit cards.

3. Policy responses

The Bank of England welcomes developments (such as in the areas of electronic and mobile payments) which increase the efficiency and convenience of payment systems. The Bank has to date considered that questions about the development of the market (for example in areas of interoperability and standards) are normally best determined by market forces, given the risk that inappropriate interventions could constrain the natural development of these payment products. There may, however, be potentially wider implications of such schemes, for example regarding systemic risk, monetary policy, consumer protection and law enforcement, which need to be considered by the appropriate authorities, in cooperation with others where necessary.⁵⁶

General legal issues and cross-border issues.⁵⁷ The EU E-money Directives (2000/28/EC and 2000/46/EC) regulate e-money issuance by so-called "ELMIs", electronic money institutions. These are a new category of non-deposit-taking credit institution which, once authorised, benefit from a single passport to issue e-money throughout the European Union. Implemented in April 2002, the UK regime is administered by the Financial Services Authority (FSA). It places prudential requirements on ELMIs, including on the investment of their e-money float. Small issuers of e-money can apply to be exempted from the requirements contained in the regulations although this results in the loss of the EU passport. Banks (ie traditional deposit-taking credit institutions) continue to be able to issue e-money under their existing supervisory regimes, which in the United Kingdom requires an explicit e-money permission from the FSA.

There are, however, inevitably difficulties in interpretation and there is active debate within the European Union over regulatory approaches. Questions include precisely which of the new mobile and

⁵⁵ Simpays's founder members were Orange, Telefonica Moviles, T-Mobile and Vodafone.

⁵⁶ E-payments in the United Kingdom and possible policy issues for central banks are discussed in H Allen, "Innovations in retail payments: e-payments", *Bank of England Quarterly Bulletin*, December 2003.

⁵⁷ For more detailed information on EC directives relevant to this area, see contribution from the ECB.

e-payment products should be regulated as e-money and whether the current regulatory framework needs to be adapted in the light of innovations in payment services.⁵⁸

Data, monetary policy and seigniorage. Data. Since assuming responsibility for the regulation of ELMIs in 2002, the FSA collects data from authorised ELMIs and from those smaller institutions it has largely exempted from the requirements, in addition to its general data gathering from banks. The Bank of England also collects some data on e-money issued by banks. Overall, however, published data in the area of e-payments and m-payments are very limited; the general impression of usage patterns comes from sources such as surveys, market participants and the trade press.

Monetary policy and seigniorage. It is recognised that developments in e-money and related innovations may affect the information content in the monetary aggregates used by policymakers. For example, they may alter the frequency of transactions and cause substitution between payment means. However, other payment developments (such as the use of credit and debit cards) have over time had similar effects - the Bank of England believes that the key for monetary policymakers is awareness of developments and their probable impact. Impact on seigniorage incomes from e-money is likely to be negligible while the market is developing.⁵⁹

Relevant security and law enforcement issues. Supervisors of financial institutions and overseers of payment systems with responsibilities for new payment services will want to be satisfied that appropriate security arrangements are in place. Awareness of matters such as whether new products were developed in a jurisdiction where regulatory/security standards were lower and whether services outsource certain operations would also be relevant. More generally, international cooperation is essential for widespread confidence and security in the market for payment services. An example is the cooperation concerning the combating of terrorist financing and money laundering: the European Commission and member states are currently considering their implementation of FATF Special Recommendation VII on providing originator information in payment messages, and to which payment instruments it should be applied.⁶⁰ The applicability of such requirements to new payment services as they develop needs to be kept under review.

Payment system and oversight issues. The Bank of England's payment system policy and oversight focus is directed mainly towards financial stability risks. This means that the intensity of oversight is proportionate to the assessment of risks posed to the wider financial system. For the moment, the limited use of e-money and related e-payments in the United Kingdom means the Bank does not undertake formal oversight of e-money and similar schemes. Were the new schemes to grow significantly, however, any resulting changes in the distribution of risks might make it appropriate to adjust the form and extent of payment system oversight in this area. In the case of new payment services, this could include consideration of those risks potentially arising from new intermediaries (such as whether their risk management is appropriate to their activities) or from new systems' interactions with traditional payment systems (examples might be risks to reputation or security).

Statistical tables. As at mid-December 2003 in the United Kingdom, there were two authorised ELMIs and 14 small issuers that the FSA had exempted from the authorisation requirements (as described above).⁶¹ The UK tables include examples of these. No data for individual services are available.

The nature of the organisations' products is such that most fit more appropriately in the tables for internet and mobile payments, even when their regulatory position describes them as an e-money issuer. In the column "Payment instrument" in Table C, the term "e-money" is used for those institutions which are regulated as ELMIs, formally exempted from the requirements, or operate

⁵⁸ For example, the European Commission's consultation document, *New legal framework for payments in the internal market*, 2 December 2003, includes consideration of whether the current EU legal framework should be adapted given "the existence of a wide range of new payment services and the needs in the market".

⁵⁹ The Bank of England is not funded from seigniorage income - such income accrues to HM Treasury.

⁶⁰ See Annex 8 of the European Commission's consultation document, *New legal framework for payments in the internal market*, 2 December 2003.

⁶¹ At mid-December 2003 the authorised ELMIs were: PrePay Technologies (the issuer of Splash Plastic) and Moneybookers. A list of exempted bodies, to which the FSA grants a "Small E-Money Issuer Certificate" is maintained at http://www.fsa.gov.uk/register-res/html/prof_e_money_fram.html. The various limits for this exemption are also displayed on the site, specifying for example the maximum value of e-money the bodies can issue, storage limits and usage restrictions.

services under a bank's e-money permission. These are mostly account-based e-money schemes (not the card-/network-based e-money that is the subject of Table A). In the case of account-based services that are not regulated as e-money issuers, the term used is "internal transfer".

United States

1. Card-based products

Many new card-based products offered in the United States do not fit all aspects of the traditional definition of e-money. The fundamental e-money characteristic, that a liability is issued by an entity primarily for the purpose of making payments, is retained, but in general these products record the value available to the consumer on a central computer server.

There has been growing use of prepaid debit cards, which are being issued by several banks through the Visa, MasterCard and American Express card networks. These cards are network-based products, and are similar to a standard credit or debit card in terms of technical implementation. Most cards are used to make purchases at the point of sale, but some restrict consumers to particular merchant types or locations. Some cards are reloadable, allowing consumers to add funds in variable amounts; others are non-reloadable and available in fixed amounts. Markets targeted by the reloadable products include the teenage, payroll receipt and travel markets. These cards are typically loaded from a credit card or a bank account, and the value limits range from USD 200 to USD 10,000. Non-reloadable cards are generally marketed as gift cards, with value limits that range from USD 10 to USD 1,000.

The **Starbucks Card Duetto**, issued on the Visa network, is a hybrid credit card and "closed system" stored value card. Consumers earn points towards Starbucks products when making purchases with the credit card. These points are stored on the card, and consumers can access them through a reader at a Starbucks location and redeem them at the point of sale.

Cobalt card. American Express discontinued its Cobalt card in November 2001.

SmarTrip. The Washington Metropolitan Area Transit Authority (WMATA) has implemented a contactless fare card system for the local subway. The "SmarTrip" cards accept up to USD 200 in value and complement the traditional magnetic stripe cards throughout the subway system. WMATA piloted an expansion to metropolitan area buses in 2002. There were 360,000 SmarTrip cards in circulation as of September 2003.

GWorld Card. Various other "closed system" stored value card projects are in operation or being implemented in areas such as sports facilities, university campuses, military bases and other facilities. An example of a university smartcard project is George Washington University's "GWorld Card". The chip-based card provides official university identification, security access to buildings, stored value for on-campus dining, and a prepaid debit account for on- and off-campus purchases, including photocopying and off-campus dining. Value can be added through the internet, at a university office, or at value transfer machines located on campus.

The Financial Management Service of the US Treasury sponsors a stored value card for use in closed government locations, such as military bases and ships at sea. In some locations, cards are reloadable, in others non-reloadable. These cards use chip technology, in conjunction with encryption and PINs for authorisation.

The University of Michigan discontinued its stored value card programme in 2001.

2. Internet and mobile payments

2.1 Internet payments

According to the US Census Bureau, there was USD 12,477 billion in US retail e-commerce sales during the second quarter of 2003, representing a 27.8% increase over the same period in 2002. No comprehensive statistics exist on the payment instruments used to conduct these transactions over the internet. The volume of payments made over the internet, however, is reportedly increasing along

with the growth of internet-based purchases. Credit cards are reportedly the primary instrument used to make purchases on the internet, although signature-based debit cards, ACH transactions and even cheques are also used to some extent. A few new payment instruments are also now being used commercially. In addition, financial institutions and other organisations have begun offering electronic bill payment services over the internet. These services typically rely on ACH or credit card payments.

PayPal is an internet payment provider that allows customers with an e-mail address to send and receive payments online. For customers with PayPal accounts, the system debits and credits its participants' accounts in real time - meaning that funds are transferred between members nearly instantaneously. Funds can be added to a PayPal account by credit card, cheque deposit, or ACH transfer. Funds can be withdrawn from an account using an ACH transfer or a paper cheque. Customers can also obtain an ATM or debit card that is linked to their account at PayPal and can be used to withdraw money from an ATM or make purchases at locations that accept the debit card. Customers decide whether to have PayPal hold their funds in a money market account or a bank-based account that offers "pass-through" federal deposit insurance. PayPal became a publicly traded company in 2002 and was subsequently bought by Ebay, the world's largest internet-based auction service. PayPal describes itself as an expanding internet-based payment service provider with a strong position in the internet auction market.

C2IT. Citibank discontinued its C2IT service in 2003.

.NET Passport. Several banks and technology companies are currently expanding "wallet" technologies for internet-based transactions. A wallet provider aggregates and stores a consumer's credit card, debit card and shipping information. While this technology does not represent a fundamentally new payment instrument, it does facilitate the use of current payment instruments online. Microsoft's .NET Passport includes MSN Wallet, which stores payment and other related data at a single location that can be used by consumers to pay for purchases from participating internet vendors. The consumer, when enrolling in .NET Passport, sets up a user profile with user name and password. He/she can then choose to use the wallet option. The system provides an internet authentication mechanism. The user profile contains a payment method that is encrypted in a separate database. Consumers authorise payments by typing in an e-mail address at participating internet vendor websites. The system can be accessed from a personal computer, MSNTV, personal digital assistant, or public kiosk. The system is designed to provide a unique identification code, which serves as a primary identifier for each customer regardless of the medium of commerce.

1-Click. Online retailer Amazon.com offers a variant of the wallet technology called 1-Click for use by its customers and those of affiliated retailers. Amazon.com keeps customers' credit card and shipping information on file, allowing them to focus primarily on ordering products. Some types of 1-Click orders that are placed within a 90-minute period are consolidated, potentially decreasing total shipping costs for the customer.

2.2 Mobile payments

Mobile payments are generally transfers of monetary value that are conducted using a wireless telecommunications network. Internet-enabled mobile phones could potentially make payments over the internet in the manner described above. Other mobile payment products have not been widely marketed or adopted in the United States.

3. Policy responses

Monetary policy and seigniorage. E-money liabilities issued by depository institutions are likely to be regarded as transaction balances, subject to reserve requirements, and included in M1. The Federal Reserve at present has no legal authority to require statistical reporting of any e-money balances issued by non-depository institutions. Voluntary reporting, as has been the case with traveller's cheques issued by non-banks, may be encouraged.

At present, the introduction of e-money is not expected to have any effect on monetary policy implementation - neither reserve demand nor reserve supply is expected to be significantly affected. The situation will need to be monitored if and as e-money balances expand.

The introduction of e-money, if successful, would presumably reduce the demand for notes and coin; the magnitude of this effect obviously depends on the demand for e-money. The Federal Reserve would be expected to accommodate any reduced demand for currency.

Provider issues. The Federal Reserve and other US banking agencies have not recommended restrictions on issuance of e-money to any particular type of entity. Issuance of e-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 e-money may be subject to existing state government regulations applicable to money transmitters and issuers of payment instruments, such as traveller's cheques. These regulations often involve examination by state banking authorities, portfolio restrictions, audits and reporting requirements.

Supervisory issues. Currently, federal banking authorities are updating bank examination procedures to encompass electronic banking developments and their associated risks. Given the very limited experience with e-money products and the small number of institutions offering such products in the United States, however, specific supervisory guidance in this area is likely to be developed over time as necessary.

Law enforcement issues. In August 1999, the Financial Crimes Enforcement Network (FinCEN), a bureau of the US Treasury Department, issued final regulations defining money service businesses (MSBs) and requiring registration with the US Treasury Department of certain types of such businesses, such as currency dealers, cheque cashers and issuers, sellers and redeemers of traveller's cheques or money orders. In March 2000, FinCEN issued final regulations requiring certain MSBs to file reports of suspicious activity. These regulations included issuers, sellers and redeemers of stored value products within the definition of MSBs, thereby requiring such organisations to comply with certain applicable provisions of anti-money laundering regulations, but specifically excluded these organisations from the registration and suspicious activity requirements.

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

Other issues. In April 1996, the Federal Reserve 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. To date, the Board has not taken further action on the April 1996 proposal; however, it continues to monitor developments and issues concerning electronic stored value products.

In August 1996, the Federal Deposit Insurance Corporation published an opinion concluding that certain types of stored value cards issued by insured depository institutions are not deposits as defined under the Federal Deposit Insurance Act and thus are not covered by federal deposit insurance.

Uruguay

There are no developments with regard to e-money in Uruguay.

1. Card-based products

Venezuela has a number of card-based e-money schemes, which are operated by banks in association with international companies Mondex and Visa.

Mondex Venezuela Consortium. There are four commercial banks testing usage of Mondex cards on various Venezuelan university campuses. The prototype is being issued as a student ID card plus e-money card. Although the card has been designed to be multicurrency, usage is currently restricted to local currency.

At the moment, there are more than 22,000 intelligent cards distributed among students, professors and administrative staff at the Simón Bolívar and Católica Andrés Bello universities, with commitments for the issue of more than 20,000 cards for the Monteávila, Jose Antonio Páez, Tecnológica del Centro, Fermín Toro and Católica Andrés Bello (graduate degree) universities.

Mondex implemented the ACI (Smart Card Infrastructure) Mondex Solution for MULTOS Cards. ACI Worldwide (Nasdaq: TSAI) had been chosen to provide Mondex System solutions to Mondex Venezuela. ACI provides the back office and card management solutions needed to create a Mondex smartcard processing infrastructure for Venezuela, and Mondex Venezuela uses the ACI solutions to enable existing and future members, whether banks or non-banks, to handle Mondex value and risk management services. The system has the ability to handle Mondex smartcard processing through traditional ATM and POS channels, as well as Mondex value transfer and customer service via the internet. In addition to implementing the core Mondex smartcard infrastructure, ACI upgraded the BASE24® processing systems of Mondex Venezuela members to enable the processing of Mondex value transfer. This gave members the ability to trade electronic Mondex value utilising their existing channels. The BASE24 systems set the standard for 24x7 processing power. Integrated with the MONAD™ suite of applications, Mondex Venezuela has the ability to manage the complete life cycle of multiple applications on MULTOS chips. This opens the door for the loading of new functions in the future, such as health care, transportation, identity, or loyalty applications. Mondex International is committed to the promotion of Mondex electronic cash on the high-security MULTOS smartcard platform.

Multipurpose campus ID smartcard

Recently, UCAB, a private Catholic university based in Caracas, adopted a multipurpose campus ID solution. In addition to serving as traditional ID badges for security and access control, the cards function as electronic money and debit cards. Sponsored by Banco Mercantil, UCAB enlisted the local Zebra Authorised Reseller to create software that further customised the smartcard system according to the university's needs. With the Eltron P310 printer smartcard and magnetic encoding capabilities, the new badges now allow UCAB to easily administer several functions. Contactless access control is achieved through use of a MIFARE® chip on the campus ID. UCAB ID cards also control library borrowing privileges and intranet access. However, the cards also incorporate several other features that truly make them the most comprehensive campus ID solution. For example, the smartcard feature allows the campus ID cards to incorporate the Mondex electronic cash system. Students, faculty and staff may prepay and have money digitally stored on the card's reloadable and highly secure microprocessor computer chip. Additionally, the new campus ID is a Maestro card, which is a debit card linked to the user's bank account. It can be used to pay for goods and services both locally and internationally. These combined e-money and debit features eliminate the need to carry cash on campus, thus making transactions easy and convenient.

Intelligent University Card

The Intelligent University Card project is based on an agreement of cooperation between Simón Bolívar University and the Venezuela Bank/Santander Group. The agreement allows the university to initially generate, without cost, the customised membership cards of the active members of the community. The Intelligent University Card includes a microprocessor which enables it, among other applications, to be used as an electronic purse, thus facilitating secure retail operations both on campus and with external merchants adopting this service. The Bank of Venezuela/Santander Group

initially obtained the Visa Cash electronic purse licence and, at the end of July 2000, decided to adopt the Mondex electronic purse standard, which is accepted by the university by virtue of its greater technological and operational status.

Visa Travel Money (prepaid ATM card). Currently issued by two large banks and one casa de cambio (institution that intermediates in foreign exchange currency), Visa Travel Money is a prepaid travel card that gives 24-hour access to travel funds in any local currency. With Visa Travel Money, customers can conveniently obtain cash to pay for taxi and metro fares, gratuities, museum entrance fees, telephone calls, souvenirs, snacks, and many other cash expenses. The travel funds can be quickly accessed from Visa ATMs. The funds are fully protected by the personally selected PIN. And because Visa Travel Money is a prepaid, disposable card - not associated with any bank accounts - the card can simply be discarded when funds are depleted.

Visa Cash. In February 2000, Visa Cash was introduced, and there have been a number of pilot programmes promoting the use of this electronic purse with the support of seven banking institutions. Visa Venezuela will be a new way to pay for everyday necessities without having to carry around a pocketful of change. This fast, easy, convenient method of payment can be used for small purchases such as a cup of coffee, newspaper, pay phones, cinema tickets, parking meters or public transportation. Visa Cash is a chip-based card which can be used offline or online.

2. Network-/software-based products

There are two network-based e-money schemes operated by banks.

eCard Mercantil. Run by a large commercial bank, Banco Mercantil, this is a service provided to both credit card and deposit customers, who can apply over the internet or by phone for an eCard number that is valid for one transaction only. It was designed for online shopping.

Pasaporte Digital. The Digital Passport is an initiative launched by another large bank, Banco de Venezuela, and is very similar to the eCard scheme. It directly protects the credit card number of any customer who decides to make purchases over the internet. The Digital Passport is instantaneously generated free of charge once applied for by the customer through the bank's website. Customers who require this service can ask for as many passports as purchases they intend to make over the internet. The service was designed as the result of a survey involving 700 customers, who expressed fear of their credit cards being "cloned" during e-commerce transactions.

3. Policy responses

Since most of the e-money schemes are being developed by banks, both the central bank and the banking supervisory authority have taken a prudent approach when considering new products by regulated entities.

Monetary policy and seigniorage. It is considered that the e-money schemes currently lack the volume to influence the volume of notes and coin in circulation, and it is not envisaged that they will be able to attain such a volume in the near future, primarily due to the fact that a large proportion of the population do not have easy access to the internet.

Legal issues. There is no specific legal framework for e-money, although the approved Law on Data Messages and Electronic Signatures (28 February 2001) should provide some cover for future developments. This law regulates the validity and legal treatment of electronic messages and signatures, considering them functional equivalents to handwritten signatures and paper documents under certain circumstances. The law establishes rules for determining the time when and place where a data message will be deemed issued and/or received, as well as rules regarding acknowledgments of receipt. The law also regulates digital certificates and certification service providers, calling for the creation of a superintendency to accredit and supervise entities providing electronic certification services. The law further establishes certain legal and technical requirements for certification entities to be accredited, and institutes sanctions against those certification entities that do not comply with their obligations under the law. One very interesting feature of this law is that it calls for the Venezuelan fiscal and customs authorities to implement all the steps necessary to carry out their functions using the elements regulated under this law (data messages, electronic signatures and certificates), and to allow taxpayers to discharge their fiscal duties through these means.

At the same time, the banking law will address services provided by banks online. Finally, the Central Bank Law will be amended to allow the central bank to oversee every kind of payment system, including e-money schemes.

Multicurrency issues. There is some concern regarding both card- and network-based schemes with multicurrency features and foreign exchange market stability. Currently, Venezuela does not have any forex transaction restrictions, except for reporting requirements related to anti-money laundering policies. It is not clear if the e-money schemes could be used to sidestep those requirements.

Note about currency restrictions. Due to the rigid exchange control mechanisms put in place by the Venezuelan government at the beginning of 2003, foreign exchange transactions must take place through commercial banks or exchange houses at the official rate. These exchange houses may change US dollars into bolívares (the local currency) at the official rate, but are unlikely to trade bolívares back into US dollars. Credit cards are accepted at most upmarket tourist establishments. Visa, MasterCard and American Express have representatives in Venezuela. However, their cards cannot be used by Venezuelan citizens outside the country.

Vietnam

1. Card-based products

No significant developments so far. Only single purpose prepaid cards are issued by post companies.

2. Network-/software-based products

No developments so far.

3. Internet and mobile payments

A number of small pilot schemes have been planned by a few commercial banks.

4. Policy responses

The development of e-money is insignificant, so in the near future e-money will not significantly reduce the value of notes and coin in circulation and therefore will not affect the size of the central bank balance sheet.

To date, e-money as non-cash payment instruments has been regulated in the Law on Credit Institutions, which provides detailed provisions and guidance from the State Bank of Vietnam. There has not been any specific regulation of e-money.

Yemen

There are no developments with regard to e-money in Yemen.

Zimbabwe

The only prepaid cards in use are telephone and electricity cards issued by Tel One (Zimbabwe's largest telecommunications company) and the Zimbabwe Electricity Supply Authority respectively. Mobile network providers also use prepaid mobile cards on their networks.

One merchant bank, in conjunction with the three mobile network operators and other technical partners, has developed a mobile payment service that allows payments to be made in real time through mobile phones and the internet.

The mobile payment gateway requires that subscribers obtain security-encoded SIM cards from their mobile network operators and open a "positive balance only" account with this particular merchant bank before they can operate their mobile payment accounts.

Table A
Design features of e-money products

Country	Name of systems	Type of system	Loading procedures	Value limit on card or consumer software (in USD)	Transferability among end users	Adapted for network payment	Multicurrency features	Multifunctional payment features
Austria	Quick	Card-based	ATM, self-service terminals, teller	400 ¹	No	Yes	No	Yes
	Paysafecard	Network-based	Other	100 ¹	No	Yes	No	No
Belgium	Proton	Card-based	ATM, phone, internet	145	No	No	No	Yes (debit card function and ATM access)
Brazil	Visa Cash	Card-based	ATM, internet, loading terminal	na	No	Considered	No	No
Canada	Visa Cash	Card-based	Specialised loading unit, internet	325 (average)	No	No	No	Yes
Czech Republic	FUNCHIP	Card-based	Terminal	17	No	No	No	No
Denmark	Danmønt	Card-based	ATM	32	No	No	No	No
Finland	Avant	Card-based	ATM, cashless ATM, internet	400 ¹	No	Piloted	No	Yes (debit, credit, ATM use options on a single card)
	Matkahuolto	Card-based	Other	na	No	No	No	No
	Rovaniemi Citycard	Card-based	Other	na	No	No	No	No
	Seinäjäki Citycard	Card-based	Other	na	No	No	No	No
	Waasa Card	Card-based	Other	150 ¹	No	Yes	No	Yes

Table A (cont)
System design features

Country	Name of systems	Type of system	Loading procedures	Value limit on card or consumer software (in USD)	Transferability among end users	Adapted for network payment	Multicurrency features	Multifunctional payment features
France	Moneo	Card-based	ATM	100 ¹	No	No	No	Yes (debit card function)
Germany	GeldKarte	Card-based	ATM	200 ¹	No	Yes	No	Yes
Ghana	Sika Card	Card-based	Only at bank premises	No limit	No	No	No	No
	Mondex	Card-based	ATM, bank premises	No limit	Yes	Yes	Yes, but currently using only local currency	No
Greece	egnatiaPrepay	Software-based	Internet	No	No	Yes	No	No
Hong Kong SAR	Octopus	Card-based	Self-service add value machines Over the counter Auto-reloading	Approximately 130	No	No	No	No
	Yahoo! PayDirect with HSBC	Network-based	From bank accounts or other PayDirect accounts	Approximately 640 ¹	No ²	Yes	No	No
India	State Bank of India (bank)	Prepaid foreign travel card		10,000 ¹			USD and EUR	Used at ATMs and merchant establishments
	Oriental Bank of Commerce	Prepaid		20,000 ²			INR-denominated	Used at ATMs and merchant establishments

Table A (cont)

System design features

Country	Name of systems	Type of system	Loading procedures	Value limit on card or consumer software (in USD)	Transferability among end users	Adapted for network payment	Multicurrency features	Multifunctional payment features
India (cont)	ICICI Bank	Prepaid		15,000 ² for non-travel cards and 50,000 ² for travel cards			INR-denominated	Used at ATMs and merchant establishments
	HDFC Bank	Prepaid		The bank is asked to fix a limit			International card	Used at ATMs and merchant establishments
	UTI Bank	Prepaid international travel card		10,000 as per BTQ			USD	Used at ATMs and merchant establishments
	IDBI Bank	Prepaid multi-utility gift card		25,000 ²			INR-denominated	Only at merchant establishments
	Citibank	Prepaid dollar card		As per BTQ			USD	Used at ATMs and merchant establishments
Italy	MINIpay	Card-based	Bank branch, ATM, phone	262	No	Yes	No	No
	Omnipay Prepagato	Network-based	Internet	157	No	Yes (only for internet)	Considered	Considered
	Moneta online	Network-based	ATM and bank branch (for purchasing the prepaid scratch cards) Internet (for loading)	524	No	Yes (only for internet)	No	No

Table A (cont)

System design features

Country	Name of systems	Type of system	Loading procedures	Value limit on card or consumer software (in USD)	Transferability among end users	Adapted for network payment	Multicurrency features	Multifunctional payment features
Italy (cont)	Kalibra (and other initiatives)	Card-based	Bank proprietary procedure ATM Credit transfer Web	3,146	No	Yes	No	Yes (ATM)
	PagoBancomat Prepagato	Card-based	ATM, bank branch, other	Nominative: no limits Anonymous: 524	No	No	No	Yes
	CartaFacile	Network-based	ATM Internet (only for bank account holder)	524	No (considered)	Yes (only internet)	No	No
	Carta Chiara	Card-based	ATM and credit transfer	3,146	No	Yes	No	Piloted (debit card and ATM)
	Sella Money	Card-based	Phone, internet, bank branch	524	No	Yes	No	Yes (ATM, POS)
	Sella-Planet	Card-based	Phone, bank branch	524	No	Yes	No	Yes (ATM, POS)
Jamaica	Pay Plus Card	Card-based	Customers will "deposit" funds in their card account through a local payment service company	Being considered	Being considered	Being considered	Yes - phase 3 of the project is intended to include this feature	Yes (combined credit card features)

Table A (cont)
System design features

Country	Name of systems	Type of system	Loading procedures	Value limit on card or consumer software (in USD)	Transferability among end users	Adapted for network payment	Multicurrency features	Multifunctional payment features
Jamaica (cont)	Pay Cash Link	Network-based	Customers will add value by crediting the required value to the card account	Being considered	Being considered	Being considered	Yes - phase 3 of the project is intended to include this feature	
Korea	K-Cash	Card-based and network-based	CD/ATM, website, POS terminal, teller terminal	429 ¹	No	Yes	Considered	ID card, saving public authentication file, credit card, debit card, etc
	MYbi	Card-based and network-based	CD/ATM, website, POS terminal, teller terminal	429 ¹	No	Yes	Considered	ID card, saving public authentication file, credit card, debit card, etc
	A-Cash	Card-based	CD/ATM, website, POS terminal	429 ¹	No	No	No	ID card, credit card
	Mondex	Card-based and network-based	CD/ATM, website, phone	429 ¹	No	Yes	Piloted	Credit card
	Visa Cash	Card-based and network-based	CD/ATM, website, phone, POS terminal	429 ¹	No	Yes	Considered	Credit card, saving public authentication file
	Nemo	Network-based	Internet, mobile network	429 ¹	No	Yes	No	No
Lithuania	eLitoCard	Card-based	ATM, PC-based terminals	No limit	No	No	LTL, USD, EUR	Yes (debit card, identity card)

Table A (cont)
System design features

Country	Name of systems	Type of system	Loading procedures	Value limit on card or consumer software (in USD)	Transferability among end users	Adapted for network payment	Multicurrency features	Multifunctional payment features
Luxembourg	miniCASH	Card-based	ATM	131	No	No	No	Yes (debit card and ATM)
Malawi	Smartcash	Card-based	Value loaded directly from bank account as well as offline through agents	No limit	Scheduled for end-October 2003	No	No	Yes (POS and ATM)
	Sparrow	Card-based	Value loaded directly from bank account through ATM and POS terminals	200,000 ¹	na	No	No	Yes (POS and ATM)
Malaysia	MEPS Cash	Card-based	ATM/loading device (attended and unattended)	2,000 ¹	No	Considered	No	Yes (with Bankcard, MyKad)
	Touch 'n Go	Card-based	Loading terminals/ATM	500 ¹	No	No	No	No
Netherlands	Chipknip	Card-based	Dedicated loading device	450 ¹	No	No	No	> 70% issued on debit card
Nigeria	Valucard	Card-based	Other	Varies with each issuing bank, but capable of carrying up to 16m ¹	No	No	No	Yes

Table A (cont)
System design features

Country	Name of systems	Type of system	Loading procedures	Value limit on card or consumer software (in USD)	Transferability among end users	Adapted for network payment	Multicurrency features	Multifunctional payment features
Nigeria (cont)	Smartpay	Card-based	Other	Varies with each issuing bank, but capable of carrying up to 16m ¹	No	No	No	Yes
	Esca	Card-based	Other	Up to 16m ¹	No	No	No	Yes
	Paycard	Card-based	Other	Up to 16m ¹	No	No	No	Yes
	MasterCard (local version)	Card-based	Other	Not indicated	na	na	No	Yes
	MasterCard (international version)	Card-based	Other	Not indicated			Yes	na
Norway	Buypass	Card-based	From a bank account or credit card	Card: 2,500 ^{1,2} Net account: 9,500 ^{1,3}	Yes	Yes	Yes	Yes
	Payex	Network-based	From a bank account, credit card or by buying a preloaded cash card	1,000 ^{1,4}	Yes	Yes	No	No
	Contopronto	Network-based	From a bank account, using Visa/MasterCard or at a Conto-pronto pay point	10,000 ^{1,5}	Yes	Yes	No	No

Table A (cont)

System design features

Country	Name of systems	Type of system	Loading procedures	Value limit on card or consumer software (in USD)	Transferability among end users	Adapted for network payment	Multicurrency features	Multifunctional payment features
Norway (cont)	KOPEK	Network-based	From a bank account, credit card or mobile telephone	1,000 ^{1,4}	Yes	Yes	No	No
	SmartPay	Network-based	From a bank account or credit card	10,000 ^{1,5}	Yes	Yes	No	No
Philippines	Master Electronic	Card-based	ATM, POS, OTC, mobile	180-900	No	No	No	Yes (can be used as ATM card, purchase card and discount card)
	Visa Electronic	Card-based	ATM, POS, OTC	180-900	No	No	No	Yes (can be used as ATM card and purchase card)
	Ace Arizona	Card-based	ATM, POS, OTC, mobile	180-1,800	No	No	No	Yes (can be used as ATM card and purchase card)
Portugal	PMB (Porta Moedas Multibanco)	Card-based	ATM	233.40 ¹ (maximum daily loadable value)	No	No	No	Debit and/or credit card functions; ATM access
Russia	PayCash	Network-based	Internet	No limit	Yes	Yes	No	No

Table A (cont)
System design features

Country	Name of systems	Type of system	Loading procedures	Value limit on card or consumer software (in USD)	Transferability among end users	Adapted for network payment	Multicurrency features	Multifunctional payment features
Singapore	CashCard	Card-based	ATMs, kiosks, HomeNETS, ¹ mobile phones, internet reload	287.94	No	Yes ²	No	ATM and debit cards
	ez-link card	Card-based	General ticketing machines, giro top-up	57.59	No	No	No	No
	eNETS VCard	Server-based	eNETS debit, credit card, giro	287.94	Yes	Yes	No	No
Spain	Monedero 4B	Card-based	ATM	170.72	No	Yes	No ¹	Yes
	Visa Cash	Card-based	ATM ²	170.72	No	Yes	No ¹	Yes
	Euro 6000	Card-based	ATM ³	204.86	No	Piloted	No ¹	Yes
	Virtual C@sh+	Network-based	ATM/internet	239.01	No	Yes	No ¹	No
	Cybertarjeta	Network-based	ATM/internet	1,707.2	No	Yes	No ¹	No
	La Caixa Virtual BBVA clic-e	Network-based	Internet	681.82	No	Yes	No ¹	No
Sweden	Cash Card	Card-based	Special terminals and phone		No	No	No	Yes (debit cards and ATM access)
Switzerland	CASH	Card-based	ATM	193 per card	No	No	No	Yes
Taiwan, China	FISC-IC Card	Card-based	ATM	15-295	No	No	No	Yes (ATM, credit, debit, phone card)
	Mondex Taiwan	Card-based	Mondex devices Internet	Upper limit 295	No	Yes	No	Yes (credit card and debit card)

Table A (cont)

System design features

Country	Name of systems	Type of system	Loading procedures	Value limit on card or consumer software (in USD)	Transferability among end users	Adapted for network payment	Multicurrency features	Multifunctional payment features
Taiwan, China (cont)	E-SUN e-Coin	Network-based	Internet, ATM/credit/debit cards, convenience stores	Upper limit 295	No	Yes	No	No
Tanzania	Tembo Card	Card-based	ATM, counter	5,000 for non-account holders 10,000 for account holders	No	No	No	No
Thailand	SCB Smart Card	Card-based	Online loading device	465	No	No	No	E-purse ATM Staff ID card
Turkey	Kampüs Karti (Campus Card)	Card-based	PC-connected card readers	na	No	No	No	Debit card functionality
	ODTU Akilli Kart Sistemi (METU Campus Smart-card System)	Card-based	ATMs with special interface	1.5	No	No	No	No
United States	Reloadable: Visa: Buxx	Network-based	Credit card or bank account	200-1,000	No	Yes	Yes	ATM
	Travel	Network-based	Credit card or bank account	10,000	No	Yes	Yes	ATM
	Payroll	Network-based	Bank account	na	No	Yes	na	ATM

Table A (cont)
System design features

Country	Name of systems	Type of system	Loading procedures	Value limit on card or consumer software (in USD)	Transferability among end users	Adapted for network payment	Multicurrency features	Multifunctional payment features
United States (cont)	MasterCard: Non-payroll	Network-based	Credit card or bank account	500-5,000	No	Yes	Yes	ATM
	Payroll	Network-based	Bank account	na	No	Yes	na	ATM
	American Express: Travel	Network-based	Credit card or bank account	2,750	No	Yes	Yes	ATM
	Non-reloadable: Visa: Gift cards	Network-based	Credit card or bank account	10-1,000	No	Yes	na	ATM
	MasterCard: Gift cards	Network-based	Credit card or bank account	25-2,500	No	Yes	na	ATM
	American Express: Gift cards	Network-based	Credit card or bank account	25-500	No	Yes	na	ATM
	Other: Visa: Starbucks Duetto	Network-based/ card-based	Points for purchasing with credit	na	No	Yes	na	Credit card

Table A (cont)
System design features

Note: "na" indicates that data are not available.

Austria ¹ In EUR.

Finland ¹ In EUR.

France ¹ In EUR.

Germany ¹ In EUR.

Hong Kong SAR ¹ Account holder can load up to around USD 640 from bank accounts for any 30-day period. ² Payments can be made between PayDirect account holders via PayDirect system.

India ¹ In both USD and EUR. ² In INR.

Korea ¹ KRW 500,000.

Malawi ¹ In MWK. USD 1 = MWK 108.09 as at end-September 2003.

Malaysia ¹ In MYR. USD 1 = MYR 3.80.

Netherlands ¹ In EUR.

Nigeria ¹ In NGN. USD 1 = NGN 136.50 as at end-December 2003.

Norway ¹ In NOK. ² Approximately EUR 300. ³ Approximately EUR 1,200. ⁴ Approximately EUR 125. ⁵ Approximately EUR 1,250.

Philippines Source: Supervisory Reports and Studies Office (SRSO), Bangko Sentral ng Pilipinas (BSP).

Portugal ¹ EUR 200.

Singapore ¹ Handheld terminal which allows CashCard top-ups at home via the telephone line. ² The CashCard can be used to make small-value payments for purchases on the internet. This scheme is known as NETSCash.

Spain ¹ Devices with a single currency feature (EUR). However, technically, the platform allows for multicurrency operation. ² Although at a very early stage, several devices called self-service EFT have been tested in member CIs. No cash withdrawals can be made but e-money products can be loaded. ³ There is also the possibility of loading the electronic purse (prior cash payment) in special devices installed inside any branch of the issuer. Decoders operating for pay TV are currently being modified so as to allow for loading and consumption.

Table B
Data on use of e-money products

Country	Name of systems	Type of system	Number of issuers	Number of cards issued (or home PC users)	Number of merchant terminals (or merchant PCs)	Float outstanding (in USD millions)	Volume of daily (purchase) transactions	Value of daily (purchase) transactions (in USD)	Average value of (purchase) transactions (in USD)	Memo:	
										Reporting period	Launch date of product
Austria	Quick	Card-based	1	6 million	74,657	14.11 ¹	47,123	363,013 ¹	7.70 ¹	December 2002	1995
	Paysafecard	Network-based	1	40,000	130	1.05 ¹	na	8,000 ¹	na	2002	November 2000
Belgium	Proton	Card-based	25	2.5 million ¹	113,000	129	300,445	1,774,438	5.90	February 2003	February 1995
Brazil	Visa Cash	Card-based	7	50,000	700	na	7,233	125,704 ¹	17.38 ¹	2003	
Canada	Visa Cash	Card-based	1	77,358	333	0.008	na	na	1.50	August 2002	October 1997 ¹
Czech Republic	FUNCHIP	Card-based	1	800,481	4,118	0.109	15,092	413,228	27.38	1 January-31 December 2002	1 February 1998
Denmark	Danmønt	Card-based	1	896,000	1,757	3	20,731	23,965	1.16	2002	1994
Finland	Avant	Card-based	4	Still valid: approximately 1 million	Approximately 6,000	Approximately 1.4	Approximately 2,500	Approximately 5,000	Approximately 2	2003	March 1997
	Waasa Card	Card-based	1	153	20	3.888 ¹	na	na	na	2002	1995
France	Moneo	Card-based	11 credit institutions	1,110,000	100,000	21,013,000 ¹	53,700 ¹ (January-June)	198,000 ¹ (January-June)	3.70 ¹ (January-June)	June 2003	2000-03
Germany	GeldKarte	Card-based	3,500	62 million	133,000	75 ¹	107,547	209,569 ¹	1.95 ¹	July 2003	1996

Table B (cont)

Data on use of e-money products

Country	Name of systems	Type of system	Number of issuers	Number of cards issued (or home PC users)	Number of merchant terminals (or merchant PCs)	Float outstanding (in USD millions)	Volume of daily (purchase) transactions	Value of daily (purchase) transactions (in USD)	Average value of (purchase) transactions (in USD)	Memo:	
										Reporting period	Launch date of product
Ghana	Sika Card	Card-based	1	82,636	480		130	14,763			1997
	Mondex Card	Card-based	2	3,637	283	95	70	76	2		April 2003
Greece	egnatiaPrepay	Software-based	1	128	19	0.0059	0.6	20	36	2002	2002
Hong Kong SAR	Octopus	Card-based	Approximately 60	Approximately 9 million	Approximately 23,000	Confidential	Approximately 7 million	Approximately 6 million	Approximately 1	October 2003	September 1997
	Yahoo! PayDirect with HSBC	Network-based	1 ¹	na	na	na	na	na	na	October 2003	2002 Q4
Italy	MINipay	Card-based	20	11,362	2,340	0.27	466	938.90	2.01	2002	1996
	Omnipay	Network-based	1	20,276	339	0.38	84.25	950.70	11.28	2002	October 2000
	Prepagato	Network-based									
	Moneta online	Network-based	1	12,632	All merchants accepting Visa cards on the internet	0.61	66.10	2,733.04	41.34	2002	December 2000
	Kalibra (and other initiatives)	Card-based	1	62,492	All Visa and Maestro terminals	7.89	1,303	7,398.14	54.10	2002	July 2001
	PagoBancomat	Card-based	40	205,000	750,000	na	40,000	2,847,456	71.08	2002	December 2001
	Prepagato	Network-based									
	CartaFacile	Network-based	1	2,035	150	0.19	7	286.44	40.74	2002	June 2002
Carta Chiara	Card-based	na	750	na	0.06	125	5,309.80	42.44	2002	June 2002	
Sella Money	Card-based	1	9,388	All Visa merchants	0.04	302	12,453.90	41.24	2002	December 2002	
Sella-Planet	Card-based	1	5,199	All Visa merchants	na	2.5	93.93	37.01	2002	March 2003	

Table B (cont)

Data on use of e-money products

Country	Name of systems	Type of system	Number of issuers	Number of cards issued (or home PC users)	Number of merchant terminals (or merchant PCs)	Float outstanding (in USD millions)	Volume of daily (purchase) transactions	Value of daily (purchase) transactions (in USD)	Average value of (purchase) transactions (in USD)	Memo:	
										Reporting period	Launch date of product
Jamaica	Pay Plus Card	Card-based	1	Being considered	Being considered	na	na	na	na	na	na
	PayCash Link	Network-based	1	Being considered	Being considered	na	na	na	na	na	na
	Visa Travel Money (VTM)	Card-based	2	3,420 users (in year 1)	Worldwide usage wherever the "Plus" logo is displayed on any ATM, at merchants and at any FGB branch	na	na	na	na	na	na
Korea	K-Cash	Card-based and network-based	18	554,260	744	0.49	12,858	7,600	0.59	July 2002-June 2003	July 2000
	MYbi	Card-based and network-based	6	2,057,500	7,006	3.72	501,020	308,700	0.62	September 2003	September 2000
	A-Cash	Card-based	2	400,000	15,318	0.34	80,000	47,100	0.59	June 2001-August 2003	June 2001
	Mondex	Card-based and network-based	7	700,000	4,000	0.08	na	2,600	na	August 2002-September 2003	June 2000
	Visa Cash	Card-based and network-based	5	860,000	644	0.02	na	na	na	August 2003	October 2001
	Nemo	Network-based	1	3 million	70	na	na	na	na	June 2003	November 2001

Table B (cont)
Data on use of e-money products

Country	Name of systems	Type of system	Number of issuers	Number of cards issued (or home PC users)	Number of merchant terminals (or merchant PCs)	Float outstanding (in USD millions)	Volume of daily (purchase) transactions	Value of daily (purchase) transactions (in USD)	Average value of (purchase) transactions (in USD)	Memo:	
										Reporting period	Launch date of product
Lithuania	eLitoCard	Card-based	1	143,000	1,650	27	3,020	28,400	9.4	September 2003	1996
Luxembourg	miniCASH	Card-based	14	383,720	7,200	3.57	7,718	23,640	3.06	2002	February 1999
Malawi	Smartcash	Card-based	1	18,900	51	na	na	na	na	January-September 2003	2001
	Sparrow	Card-based	1		49	0.007	11	106.97	3,209	October 2003	2001
Malaysia	MEPS Cash	Card-based	12	9.2 million	8,176	1.7 million ¹	42	43.87 ¹	1.12 ¹	June 2003	1996
	Touch 'n Go	Card-based	1	2.4 million	395	46.7 million ¹	80,615	260,867 ¹	3.24 ¹	June 2003	1997
Netherlands	Chipknip	Card-based	All retail banks	17.2 million	165,000	60 million ¹	238,356	645,945 ¹	2.71 ¹	2002	October 1996
Nigeria	Valucard	Card-based	43	184,924	4,207	2,436.21m ¹	na	na	119.73m ¹	22 September 2003	
	Smartpay	Card-based	22	78,266	760	45.202m ¹	na	na	1.538m ¹	15 August 2003	
	Esca	Card-based	1	17,500	58	na	411	na	na	31 December 2002	
	Paycard	Card-based	1	na	22	na	na	na	7.67m ¹	31 December 2002	
	MasterCard (local - NGN version)	Card-based	2	Issuance is yet to commence	na	na	na	na	na		
MasterCard (international - USD version)	Card-based	2	Issuance is yet to commence	na	na	na	na	na		18 November 2003	

Table B (cont)

Data on use of e-money products

Country	Name of systems	Type of system	Number of issuers	Number of cards issued (or home PC users)	Number of merchant terminals (or merchant PCs)	Float outstanding (in USD millions)	Volume of daily (purchase) transactions	Value of daily (purchase) transactions (in USD)	Average value of (purchase) transactions (in USD)	Memo:	
										Reporting period	Launch date of product
Philippines ¹	Master Electronic	Card-based	2	530,000	20,000	0.64	54,298	160	0.003	None	2000
	Visa Electronic	Card-based	1	19,886	20,000	0.012	36	65	na	None	March 2003
	Ace Arizona	Card-based	2	50,000	1,800	0.298	17,510	900	0.051	None	December 2002
Portugal	PMB (Porta Moedas Multibanco)	Card-based	26	Balance > 0: 21,867 Balance = 0: 3,678,678	129,903	180,606.79 ^{1,2}	977	2,302.41 ³	2.36 ⁴	1 January-30 September 2003	April 1995
Russia	PayCash	Network-based	1	47	3	2,038.78	1.26	38.19	30.33	29 August 2003-21 October 2003	29 August 2003
Singapore	NETS CashCard	Card-based	3	6 million	20,000	26.30	116 million ¹	138 million	1.19	2002	November 1996
	ez-link card	Card-based	1	4 million	22,000	29.77	Transit: 0.585 million Non-transit: 1.98 million	Transit: 0.26 million Non-transit: 0.96 million	Transit: 0.44 Non-transit: 0.48	March-December 2002	April 2002
Spain	Monedero 4B	Card-based	184	10,150,949	186,789	21.566	3,083.79	6,648.6	2.35	January-December 2001	End-1996
	Visa Cash	Card-based									Second half of 1996
	Euro 6000	Card-based									Mid-2000
	Virtual C@sh+	Network-based									End-1996
	Cybertarjeta La Caixa	Network-based									Mid-2000

Table B (cont)

Data on use of e-money products

Country	Name of systems	Type of system	Number of issuers	Number of cards issued (or home PC users)	Number of merchant terminals (or merchant PCs)	Float outstanding (in USD millions)	Volume of daily (purchase) transactions	Value of daily (purchase) transactions (in USD)	Average value of (purchase) transactions (in USD)	Memo:	
										Reporting period	Launch date of product
Spain (cont)	Virtual BBVA clic-e	Network-based									Mid-2000
Sweden	Cash Card	Card-based	3	4.2 million	41,000	0.013	2,337	9,863	4.2	2002	Nationwide 1998
Switzerland	CASH	Card-based	350	3,692,000	33,508	na	54,795	128,392	2.35	September 2003	January 1997
Taiwan, China	FISC-IC Card	Card-based	22	2.03 million	14,528	na	152	513.5	3.38	September 2003	February 1998
	Mondex Taiwan	Card-based	9	250,000	3,500	0.41	215	1,486	7	September 2003	September 1999 (pilot), June 2002 (rollout)
	E-SUN e-Coin	Network-based	1	88,000	110	0.12	350	1,470	4.2	September 2003	January 2002
Thailand	SCB Smart Card	Card-based	1	50,000	20	0.0059	700	348.8	2.01	October 2003	1999
Turkey	Kampüs Kartı (Campus Card)	Card-based	1	50,000	14	na	na	na	na	na	Autumn 2003
	ODTU Akilli Kart Sistemi (METU Campus Smartcard System)	Card-based	5	27,500	10	na	na	na	na	na	Partly in 2004 Full system in 2006
United States	Reloadable: Visa: Buxx	Network-based	8	na	5.3	na	na	na	na	na	August 2000

Table B (cont)

Data on use of e-money products

Country	Name of systems	Type of system	Number of issuers	Number of cards issued (or home PC users)	Number of merchant terminals (or merchant PCs)	Float outstanding (in USD millions)	Volume of daily (purchase) transactions	Value of daily (purchase) transactions (in USD)	Average value of (purchase) transactions (in USD)	Memo:	
										Reporting period	Launch date of product
United States (cont)	Travel	Network-based	2	na	5.3	na	na	na	na	na	na
	Payroll	Network-based	na	na	5.3	na	na	na	na	na	July 2001
	MasterCard: Non-payroll	Network-based	9	na	4.3	na	na	na	na	na	na
	Payroll	Network-based	na	na	4.3	na	na	na	na	na	na
	American Express: Travel	Network-based	1	na	na	na	na	na	na	na	October 2003
	Non-reloadable: Visa: Gift cards	Network-based	6	na	5.3	na	na	na	na	na	na
	MasterCard: Gift cards	Network-based	2	na	4.3	na	na	na	na	na	na
	American Express: Gift cards	Network-based	1	na	na	na	na	na	na	na	October 2002
	Other: Visa: Starbucks Duetto	Network-based/card-based	1	na	5.3	na	na	na	na	na	October 2003

Table B (cont)

Data on use of e-money products

Note: "na" indicates that data are not available.

Austria¹ This number shows the amount of active cards, ie Proton cards, that have been used for at least one transaction in the last six months.

Canada¹ The project was terminated in September 2002.

Brazil¹ In BRL.

Finland¹ In EUR.

France¹ In EUR.

Germany¹ In EUR.

Hong Kong SAR¹ Value loading needs to be initiated via the PayDirect system though the funds can be transferred from accounts other than HSBC's.

Malaysia¹ In MYR. USD 1 = MYR 3.80.

Netherlands¹ In EUR.

Nigeria¹ In NGN. USD 1 = NGN 136.50 as at end-September 2003.

Philippines¹ As of 30 June 2003. Source: Supervisory Reports and Studies Office (SRSO), Bangko Sentral ng Pilipinas (BSP).

Portugal¹ Actual figure. ² EUR 154,761.60. ³ EUR 1,972.93. ⁴ EUR 2.02.

Singapore Note: Volume and value figures reflect total for respective reporting periods. ¹ Total for reporting period.

Table C

Design features of internet and mobile payments

Country	Name of product	Type	Issuer (B = bank; NB = non-bank)	Payment instrument type	Transaction speed	Facilitates micropayments	Multicurrency features
Bahrain	Internet banking using IBM - Interactive Financial Services	Internet	B	Transfer utility, bill payments, credit card payments, time deposit services Transfer within HBME - Bahrain; otherwise, for third-party payments, standard remittance value dates apply	Real-time	Yes	Yes
Belgium	Banxafe	Internet	Banksys (NB)	Credit and debit card	Same day (debit) to several days	No	No
	Ogone	Internet	Abssys Consulting (NB)	Debit card, credit transfer	Real-time to several days depending on payment option	No	Yes
	Isabel	Internet	28 banks (B)	Credit transfer, direct debit	Real-time	No	Yes
	Banxafe-Mobile	Mobile	Banksys (NB)	Debit card	Same day	No	No
Bulgaria	EPay.bg	Internet	B	Debit card, credit transfer	Same day to 1 day		No
Chile	Chequing account	Internet	B	na	na	na	Yes ¹
Denmark	mPay	Mobile/internet	B	Connected debit or credit card	Card dependable	No	No
	eDankort	Internet	B	Direct debit	1 day	No	No
	Dankort	Internet	B	Direct debit	1 day	No	No

Table C (cont)

Design features of internet and mobile payments

Country	Name of product	Type	Issuer (B = bank; NB = non-bank)	Payment instrument type	Transaction speed	Facilitates micropayments	Multicurrency features
Denmark (cont)	Visa/Eurocard/ MasterCard	Internet	B	Credit card	7-28 days	No	Yes
	CoinClick eWire Valus	Internet	NB	Credit transfer, debit card or credit card	1-28 days	Yes	No
Estonia	Internet bank	Internet	B	Credit transfer	Real time, same day, several days	Yes	Yes (AUD, CAD, CHF, CYP, CZK, DKK, EEK, EUR, GBP, HUF, JPY, LTL, LVL, NOK, PLN, RUR, SEK, SKK, USD)
	Internet merchants	Internet	B	Credit transfer	Same day, several days	Yes	No
	Mobile payment	Mobile	NB	Credit transfer	Same day, several days	Yes	No
	Mobile parking	Mobile	NB	Credit transfer	Same day, several days	Yes	No
	M-account	Mobile	NB	Credit transfer	Same day, several days	Yes	No
Fiji	E-banking	Internet	B - ANZ	Funds transfer to accounts with same bank, bill payments (exclu- ding credit cards)	Account debited on same day but bill paid on next working day	Yes	FJD only
	Phone banking	Phone banking	B - ANZ	Funds transfer to accounts with same bank, bill payments (exclu- ding credit cards)	Account debited on same day but bill paid on next working day	Yes	FJD only

Table C (cont)

Design features of internet and mobile payments

Country	Name of product	Type	Issuer (B = bank; NB = non-bank)	Payment instrument type	Transaction speed	Facilitates micropayments	Multicurrency features
Fiji (cont)	Phone banking	Phone banking	B - WBC	Funds transfer to accounts with same bank, bill payments (excluding credit cards)	Several days	Yes - applies only to personal accounts. Access to business accounts for bill payments is under development	FJD only
Finland	Wallet e-Pay provides branded services to merchants	Mobile Mobile	NB NB	Credit card Credit card, pre-paid, direct debit	Several days Real-time/several days	na Yes	No Being considered
France	e-banking e-Carte Bleue Moneytronic m-banking w-Ha	Internet Internet Internet Mobile Both	B B B B Specialised credit institution	Credit transfer Credit card E-money Credit transfer Kiosk	1-3 days 1-3 days 1-3 days 1-3 days 1-3 days	No No Yes No Yes	na na No na
Germany	Verified by Visa (international) SPA (international) HBCI FIRSTGATE click&buy Click & Pay net900	Internet Internet Internet Internet Internet	Visa MasterCard/ Europay B NB NB	Credit card, direct debit Credit card, direct debit Credit transfer Direct debit Phone bill/direct debit	Several days Several days (Same) Several days Several days Several days	Larger amounts Larger amounts Larger amounts Yes Yes	Yes Yes No No No

Table C (cont)

Design features of internet and mobile payments

Country	Name of product	Type	Issuer (B = bank; NB = non-bank)	Payment instrument type	Transaction speed	Facilitates micropayments	Multicurrency features
Germany (cont)	Paysafecard	Internet	NB	Credit transfer	Several days	Yes	No
	MicroMoney	Internet	NB	Credit transfer	Several days	Yes	No
	Paybox	Mobile	NB	Direct debit	Several days	Smaller and larger amounts	No
	STREET CASH	Mobile	NB	Direct debit	Several days	Smaller and larger amounts	No
Greece ¹	Internet banking	Internet	B	Credit transfer, direct debit, credit card	Real-time, market conditions		Yes, all currencies
	Mobile banking	Mobile	B	Credit transfer, direct debit, credit card	Real-time, market conditions		Yes, all currencies
Hong Kong SAR	PayDollar	Internet	NB	Credit transfer/ direct debit/credit card	Several days	Minimum payment: HKD 30 (USD 3.85)	No
	PPS	Internet/phone	NB	Direct debit	Real-time	Minimum payment: HKD 1 (USD 0.13)	No
India	(i) Transfer of funds in/to own savings bank account within the bank (ii) Utility bill payment		B	Direct debit, using credit card	B2B is not online Utility payments have the option of being executed online	Yes	B2B - enquiries only, and funds leg is not at present permitted

Table C (cont)

Design features of internet and mobile payments

Country	Name of product	Type	Issuer (B = bank; NB = non-bank)	Payment instrument type	Transaction speed	Facilitates micropayments	Multicurrency features
India (cont)	(iii) B2B transaction - information only. Funds transfer is through normal mode (iv) e-cheque (product name) - uses EFT						
Ireland	mPark	Mobile payment	NB - Itsmobile Ltd	Credit card	Real-time	na	No
Italy	Omnipay	Internet	B	E-buy with prepay cards	Real-time	Yes	No
	Prepagato						
	Moneta online	Internet	B	E-money	Based on Visa rules	Yes	No
	Moneta Mobilmat	Mobile	B		Mostly real-time	Yes	No
	CartaFacile	Internet	B	E-money	Real-time	Yes	No
Kenya	Borsellino	Mobile	B		Mostly real-time	Yes	No
	MobilMat						
	BANKPASS Web	Internet	B	E-wallet (chargeable with credit and debit cards)	Real-time	Yes	No
Kenya	ECEH	Mobile	B - Consolidated	Credit transfer	Real-time	No	Yes
	cba@net	Internet	B - CBA	Credit card and credit transfer	Same day	Yes	No
	CBA SMS	Mobile	B - CBA	Credit card	Real-time	No	Yes
	Telephone banking	Mobile	B - Barclays	Credit transfer	Same day	Yes	No
	CATS Africa	Mobile	B - Stanbic	Credit transfer and debit	Same day	Yes	Yes

Table C (cont)

Design features of internet and mobile payments

Country	Name of product	Type	Issuer (B = bank; NB = non-bank)	Payment instrument type	Transaction speed	Facilitates micropayments	Multicurrency features
Kenya (cont)	IBS	Internet	B - First American	na	na	No	Yes
	SMS banking	Mobile	B - Standard Chartered	na	na	No	No
	ADC (African Delivery Channel)	Internet	B - Standard Chartered	na	na	No	No
	epayments	Internet	B - Standard Chartered	na	Same day	Yes	Yes
	STP (straight through processing system)	Internet	B - Standard Chartered	Credit and debit transfer, SWIFT instructions and bank draft requests	na	Yes	Yes
	IDC (Internet Delivery Channel)	Internet	B - Standard Chartered	Transactional details	na	No	No
	CITIDIRECT	Internet	B - Citibank	Credit transfer and direct debit (pilot)	Same day	Yes	Yes
na	Mobile	B - Co-operative	na	na	na	No	na
Korea	Internet Giro	Internet	KFTC (The Korea Financial Telecommunications and Clearings Institute)	Direct debit	T+2	Yes (minimum: KRW 50 = USD 0.04)	No
	K-PAY	Internet	Korea Paynet Corp	Direct debit, credit card	T+11	No (minimum: KRW 1,000 = USD 0.86)	No
Luxembourg	pay@cetrel	Internet	CETREL (NB)	Credit cards	Next working day ¹	No	No

Table C (cont)

Design features of internet and mobile payments

Country	Name of product	Type	Issuer (B = bank; NB = non-bank)	Payment instrument type	Transaction speed	Facilitates micropayments	Multicurrency features
Macedonia	IBEBS	Internet	B	Credit order	Maximum: real-time Minimum: same day (depending on the payer's requirements)	No maximum or minimum limit on amounts payable over this system	No
	24 ebanking	Internet	B	Credit order	Maximum: real-time Minimum: same day (depending on the payer's requirements)	No maximum or minimum limit on amounts payable over this system	No
	ebank	Internet	B	Credit order	Maximum: real-time Minimum: same day (depending on the payer's requirements)	No maximum or minimum limit on amounts payable over this system	No
	Mobi payment	Mobile	NB - mobile operator	Credit order	Same day/several days	Yes	No
Malawi	CATS	Internet	B	Credit transfer and direct debit	Same day	No	Yes
	NATBANK	Internet	B	Credit transfer and direct debit	Same day	No	Yes
Malaysia	Internet banking	Internet-based	B	Credit transfer/ direct debit/credit card	Same day	Yes	No

Table C (cont)

Design features of internet and mobile payments

Country	Name of product	Type	Issuer (B = bank; NB = non-bank)	Payment instrument type	Transaction speed	Facilitates micropayments	Multicurrency features
Mauritius	Internet banking	Internet banking	B	Funds transfer	Real-time	na	na
Mongolia	Internet banking		B	Funds transfer	Same day (in 2 minutes)	PC	Yes, in USD and local currency
	Phone banking		B	Account balance, providing information on interest rate and exchange rate	Same day (in 2 minutes)	Phone	No
Norway	Buypass	Internet/card	NB	E-money	Real-time	Yes	Yes
	Payex	Internet	NB	E-money	Real-time	Yes	No
	Contopronto	Mobile	NB	E-money	Real-time	Yes	No
	KOPEK	Internet	NB	E-money	Real-time	Yes	No
	SmartPay	Mobile	NB	E-money	Real-time	Yes	No
Portugal	Telemultibanco	Mobile	B	Credit transfers (mainly)	Real-time	No	No
	MB-Net	Internet	B	Credit/debit card	Real-time	No	No
Romania	Internet banking	Internet banking	B - Commercial Bank of Greece (Romania) SA	Credit transfers	na	na	na
	Libra Web Banking	Internet banking	B - Banca Romana pentru Relansare Economica - Libra Bank SA	Credit transfers	na	na	na
	Internet banking	Internet banking	B - UniCredit (Romania) SA	Credit transfers	na	na	na
	CitiDirect	Internet banking	B - Citibank Romania SA	Credit transfers	na	na	na

Table C (cont)

Design features of internet and mobile payments

Country	Name of product	Type	Issuer (B = bank; NB = non-bank)	Payment instrument type	Transaction speed	Facilitates micropayments	Multicurrency features
Romania (cont)	Online banking	Internet banking	B - HVB Bank Romania SA	Credit transfers	na	na	na
	e-Bank	Internet banking	B - Banc Post SA	Credit transfers	na	na	na
	BT NET	Internet banking	B - Banca Transilvania SA	Credit transfers	na	na	na
	EKI-Plati ROL	Internet banking	B - Frankfurt Bukarest Bank AG, Frankfurt am Main - Bucharest branch	Credit transfers	na	na	na
	ING Online	Internet banking	B - ING Bank NV, Amsterdam - Bucharest branch	Credit transfers	na	na	na
	<i>i</i> -BFR	Internet banking	B - Banque Franco-Roumaine, Paris - Bucharest branch	Credit transfers	na	na	na
	MultiCash@Office	Internet banking	B - Volksbank Romania SA	Credit transfers	na	na	na
	myBanking	Mobile banking	B - Raiffeisen Bank SA	Credit transfers	na	na	na
	MOBILE BANKING	Mobile banking	B - Banca Romana pentru Dezvoltare SA	Credit transfers	na	na	na
Russia	PayCash	Internet	B	E-money	Real-time	Yes	No
Saudi Arabia	Internet banking	Internet	B	Inter-account transfers Utility bill payments Domestic payments International payments	Over 80% of all payments are fully automated and processed in STP mode		Domestic and foreign currencies

Table C (cont)

Design features of internet and mobile payments

Country	Name of product	Type	Issuer (B = bank; NB = non-bank)	Payment instrument type	Transaction speed	Facilitates micropayments	Multicurrency features
Saudi Arabia (cont)	Mobile banking	Mobile	B	Inter-account transfers Utility bill payments Domestic payments (predefined beneficiary only) International payments (predefined beneficiary only)	Over 90% of all payments are fully automated and processed in STP mode		Domestic currency only
Singapore	eNETS Debit	Internet	DBS, UOB (B)	Direct debit from bank account	T+1	The business model does not support micropayments although, technically, any amount can be paid	Supported but not offered
	eNETS Credit	Internet and mobile	Banks and credit card companies (eg Amex, Diners) worldwide	Credit card	T+1	The business model does not support micropayments although, technically, any amount can be paid ¹	Yes (SGD, USD)
	eNETS Credit	Internet and mobile	Banks and credit card companies (eg Amex, Diners) worldwide	Credit card	T+1	The business model does not support micropayments although, technically, any amount can be paid ¹	Yes (SGD, USD)

Table C (cont)

Design features of internet and mobile payments

Country	Name of product	Type	Issuer (B = bank; NB = non-bank)	Payment instrument type	Transaction speed	Facilitates micropayments	Multicurrency features
Singapore (cont)	eNETS CashCard	Internet	Singapore local banks	E-purse multi-purpose smart card	T+1	Yes	No
	eNETS VCard	Internet and mobile and POS terminals	Singapore local banks	Stored value server wallet	T+1	Yes	No
	TeleMoney	Mobile	NB	Credit, debit, transfer, stored value	T+1	Yes	Yes (USD, SGD, MYR)
Spain	Mobipay	Mobile	NB	Payment card	Real-time ¹	Yes	No
	Visa Móvil	Mobile	B	Payment card	Real-time ¹	Yes	No
	Paybox	Mobile	B	Payment card	Real-time ¹	Yes	No
	Epagado.com	Internet	B	Credit transfer	Real-time	Yes	No
Sri Lanka	Internet banking ¹	Internet	B	Credit transfer, debit transfer, credit card	Real-time	Yes	No
	Mobile banking ²	Mobile	B	Credit transfer, debit transfer, credit card	Real-time	Yes	No
Switzerland	yellowbill	Internet	NB	EBPP	Next day	No	CHF/EUR
	PayNet	Internet	NB	EBPP	na	na	na
Taiwan, China	FISC Internet Banking	Internet	B	Online transfer	Real-time	No	No
	FISC Mobile Banking	Mobile phone	B	Online transfer	Real-time	No	No
	TCH-E-Cheque	Proprietary line	B	Online transfer	Real/deferred	No	No

Table C (cont)

Design features of internet and mobile payments

Country	Name of product	Type	Issuer (B = bank; NB = non-bank)	Payment instrument type	Transaction speed	Facilitates micropayments	Multicurrency features
Thailand	Internet banking	Payments via internet	B	Credit transfer, credit card	Real-time	No	No
	Mobile banking	Payments via mobile	B	Credit transfer	Real-time	No	No
Turkey	biz.card	Mobile/internet payment system	Akbank (B)	Cash deposit with overdraft facility	Same day or 1 day after the value date	Yes	No
	Mobil Ödeme (Mobile Payment)	Mobile	Yapi ve Kredi Bankasi (B) Turkcell (NB)	Credit card	Real-time	Yes	No
	IsMobil+	Mobile	Türkiye Is Bankasi (B) Aria (NB)	E-money, credit card	Real-time	Yes	No
	Aria Kontür Yükleme (Aria Counter Recharging)	Mobile	Türkiye Is Bankasi (B) Aria (NB)	E-money, credit card	Real-time	Yes	No
United Kingdom	Egg Pay	Internet	B (operated by Egg)	ACH transfer for non-Egg destination accounts Internal transfer for Egg destination accounts	3-4 working days (to non-Egg accounts) Real-time ¹ to other Egg accounts	No	No
	Moneybookers NatWest FastPay	Internet/mobile Internet/mobile	ELMI ² B (operated by Royal Bank of Scotland Group)	E-money E-money (operates under an FSA e-money permission)	Real-time ¹ Real-time ¹	Yes Yes	Yes No

Table C (cont)

Design features of internet and mobile payments

Country	Name of product	Type	Issuer (B = bank; NB = non-bank)	Payment instrument type	Transaction speed	Facilitates micropayments	Multicurrency features
United Kingdom (cont)	Nochex	Internet	NB - small e-money issuer ²	E-money and wire transfers	Real-time ¹	Yes	Not at present
	Vodafone m-pay bill	Internet/mobile	NB - small e-money issuer ²	E-money	Real-time ¹	Yes	No
(also United States and Hong Kong)	Yahoo!PayDirect from HSBC	Internet	B (operated by HSBC)	E-money (operates under an FSA e-money permission)	Real-time ¹	Yes	Domestic currency
United States ¹	PayPal	Internet	NB ²	Person-to-person credit transfer	Real-time	Yes	Yes (CAD, EUR, GBP, JPY)

Note: "na" indicates that data are not available.

Chile ¹ It is possible to obtain information on the balance of purchases abroad using the credit card.

Greece ¹ There are no data available for e-business services.

Luxembourg ¹ Same as POS credit card transactions.

Singapore ¹ Usually micropayments charged through credit cards are prone to a high level of chargebacks. For this reason, they are not ideally supported through a credit card business model.

Spain ¹ Initiation and processing are real-time but funds availability depends on the agreements relating to each card type.

Sri Lanka ¹ Total internet banking usage in Sri Lanka. ² Total usage of mobile, phone and telebanking in Sri Lanka.

United Kingdom ¹ "Real-time" refers to transfers across the "virtual account" - whereas funding and defunding using, say, ACH transfers will be dependent on the speed of the methods used. ² For UK/EU institutions, the term "ELMI" is used in the case of an authorised electronic money institution - the new class of non-deposit taking credit institution - while "small e-money issuer" indicates those formally exempted from the full ELMI requirements.

United States ¹ In the United States most internet payments use traditional payment instruments, such as credit cards, signature-based debit cards, ACH transfers and cheques. New technologies facilitate the use of these traditional instruments. ² Funds can be placed in an FDIC-insured master account.

Table D
Statistical data on internet and mobile payments

Country	Name of product	Type	Number of issuers	Number of users	Number of acceptance points	Volume of daily (purchase) transactions	Value of daily (purchase) transactions (in USD)	Average value of (purchase) transactions (in USD)	Market share	Memo:	
										Reporting period	Launch date of product
Bahrain	Internet banking using IBM-Interactive Financial Services	Internet	1	1,250	0	28	113,102	3,534	Less than 0.5%	October 2003	March 2003
Belgium	Banxafe	Internet	Most banks	na	70	na	na	na	Approximately 25% of e-payments	November 2002	na
	Ogone	Internet	15 banks	na	na	na	na	na	Approximately 65% of e-payments	November 2002	2000
	Isabel	Internet	28 banks	45,000	45,000	na	na	na	na	November 2002	1996
	Banxafe-Mobile	Mobile	na	na	na	na	na	na	na	October 2003	2003
Bulgaria	Goods and services payments using ATMs		27	na	1,122	456.85	8,064.57	na	Less than 0.5%	2003	2000
	Internet payments	Internet	19	na		311.13	6,276.69	na	Less than 0.5%	2003	1999
Chile ¹		Internet	18 banks	600,888	na	30,296,845 ²	na	na	na		
Denmark	mPay	Mobile/internet	1	na	82	na	na	na	na	2003 Q1	May 2002
	eDankort	Internet	150	2 million (number of internet banking agreements)	15	60	1,262	21	na	22-30 September 2003	22 September 2003

Table D (cont)

Statistical data on internet and mobile payments

Country	Name of product	Type	Number of issuers	Number of users	Number of acceptance points	Volume of daily (purchase) transactions	Value of daily (purchase) transactions (in USD)	Average value of (purchase) transactions (in USD)	Market share	Memo:	
										Reporting period	Launch date of product
Denmark (cont)	Dankort	Internet	150	3.29 million (number of cards issued)	2,575	18,650	1,538,950	83	na	2003 Q1-Q2	April 1999
	Visa/ Eurocard/ MasterCard	Internet	50	696,000 (number of cards issued)	1,541	360	10,610	29	na	2003 Q1-Q2	April 1999
	CoinClick eWire Valus	Internet	3	na	64	na	na	na	na	na	May 2002
Estonia	Internet bank	Internet	7	800,000	7	63,000	38 million	603	22%	1 January- 10 September 2003	1996
	Internet merchants	Internet	na	na	na	na	na	na	na		na
	Mobile payment	Mobile	3	11,000	600	na	na	na	na		2003
	Mobile parking	Mobile	3	45,000	9	na	na	na	36%		2000
	M-account	Mobile	1			na	na	na	na		
Finland	e-Pay provides branded services to merchants	Internet, mobile	5	7,000	20	30	90	3	Less than 0.5%	2003	1 February 2001
France	e-banking	Internet	All major banks	na	na	na	na	na	na	na	na
	Moneytronic	Internet	Banks	na	na	na	na	na	na	na	na
	w-Ha	Both	Specialised credit institution	na	na	na	na	na	na	na	na

Table D (cont)

Statistical data on internet and mobile payments

Country	Name of product	Type	Number of issuers	Number of users	Number of acceptance points	Volume of daily (purchase) transactions	Value of daily (purchase) transactions (in USD)	Average value of (purchase) transactions (in USD)	Market share	Memo:	
										Reporting period	Launch date of product
Greece ¹	Internet banking	Internet	12	259,255	na	6,900 ²	20 million ²	2,900	na	2002	
	Mobile banking	Mobile	6	67,248	na	2 ²	80 ²	40	na	2002	
Hong Kong SAR	PayDollar	Internet	1	na	na	na	na	na	na	October 2003	2000
	PPS	Internet/ phone	1	Around 1.5 million	na	na	na	na	na	October 2003	1999
Ireland	mPark	Mobile	1	na	180	300 (approx)		6.00	Negligible		16 January 2003
Italy	Moneta online	Internet	1	12,632	All merchants accepting Visa cards on the internet	66.10	2,733.01	41.34		2002	December 2000
	Moneta Mobilmat	Mobile	1	147	61,927	0.98	85.83	87.52		2002	May 2002
	CartaFacile	Internet	1	2,035	150	7	286.44	40.74		2002	June 2002
	Borsellino MobilMat	Mobile	1	350	61,927	1.22	17.21	14.10		2002	July 2002
	BANKPASS Web	Internet	50	17,000	200 (but BANKPASS Web works with all web-sites, accepting credit cards by generating virtual PAN)	60	6,365.40	106.09		2002	October 2002

Table D (cont)

Statistical data on internet and mobile payments

Country	Name of product	Type	Number of issuers	Number of users	Number of acceptance points	Volume of daily (purchase) transactions	Value of daily (purchase) transactions (in USD)	Average value of (purchase) transactions (in USD)	Market share	Memo:	
										Reporting period	Launch date of product
Kenya	ECEH (Consolidated)	Mobile	1	200	1	15	na	na	na	August 2003	July 2003
	cba@net (CBA)	Internet	1	429	1	7	730	105	na	August 2003	July 2003
	CBA SMS (CBA)	Mobile	1	788	1	45	na	na	na	August 2003	April 2003
	Telephone banking (Barclays)	Mobile	1	23,680	1	240	na	440	4%	October 2003	October 2002
	CATS Africa (Stanbic)	Mobile	1	98	1	2	4,500	5	0.016%	August 2003	July 1999
	IBS (First American)	Internet	1	150	1	na	na	na	na	October 2003	December 2002
	Epayments (Standard Chartered)	Internet	1	15	15	na	1,285	105	na	October 2003	2001
	IDC (Internet Delivery Channel) (Standard Chartered)	Internet	1	50	50	50	na	na	na	October 2003	2002
	CITIDIRECT (Citibank)	Internet	1	252	na	1,000	2,051,285	12,825	40%	October 2003	March 2001
	Co-operative	Mobile	1	7,838	na	141	na	na	na	October 2003	August 2002
Korea	Internet Giro	Internet	1	960,000	250	28,000	16,260,000	580	0.68% (estimate)	August 2003	
	K-PAY	Internet	1	104,000	1,921	1,000	145,000	145	na	August-September 2003	

Table D (cont)

Statistical data on internet and mobile payments

Country	Name of product	Type	Number of issuers	Number of users	Number of acceptance points	Volume of daily (purchase) transactions	Value of daily (purchase) transactions (in USD)	Average value of (purchase) transactions (in USD)	Market share	Memo:	
										Reporting period	Launch date of product
Luxembourg	pay@cetrel	Internet	Same as for the POS credit card scheme	na	70	16	1,522	93.50	Negligible	2002	End-2000
Malawi	CATS	Card-based	1	na	na	na	na	na	na	January-December	2003
	NATBANK		1	na	na	na	na	na	na	January-December	2003
Malaysia	Internet banking	Internet-based	13	1.3 million	na	20,851	12,801 ¹	19.81m ¹	2.11%	June 2003	2000
Mauritius	Internet banking	Personal and corporate	2 banks	12,086	na	208	1,444,721	na		September 2003	August 1999 and June 2002
Portugal	Telemulti-banco	Mobile	27	178,766	140,154 (active per month: about 25,000)	2,503.71	42,643.63	17.03	Less than 0.5%	1 January-30 September 2003	September 1996
	MB-Net	Internet	14	283,787	123 (registered on-line merchants)	283.65	49,529.41	174.61	Less than 0.5%	1 January-30 September 2003	September 2001
Romania	Internet banking	Internet banking		268	na	10,000	na	na	na	2003 end-Q2	
	Libra Web Banking	Internet banking		na	na	na	na	na	na	2003 end-Q2	
	Internet banking	Internet banking		na	na	na	na	na	na	2003 end-Q2	

Table D (cont)

Statistical data on internet and mobile payments

Country	Name of product	Type	Number of issuers	Number of users	Number of acceptance points	Volume of daily (purchase) transactions	Value of daily (purchase) transactions (in USD)	Average value of (purchase) transactions (in USD)	Market share	Memo:	
										Reporting period	Launch date of product
Romania (cont)	CitiDirect	Internet banking		na	na	na	na	na	na		2003 end-Q2
	Online banking	Internet banking		1,462	na	9,500	na	na	na		2003 end-Q2
	e-Bank	Internet banking		1,110	na	50,000	na	na	na		2003 end-Q2
	BT NET	Internet banking		385	na	3,400	na	na	na		2003 end-Q2
	EKI-Plati ROL	Internet banking		na	na	na	na	na	na		2003 end-Q2
	ING Online	Internet banking		na	na	na	na	na	na		2003 end-Q2
	i-BFR	Internet banking		93	na	12,400	na	na	na		2003 end-Q2
	MultiCash@ Office	Internet banking		na	na	na	na	na	na		2003 end-Q2
	myBanking	Mobile banking		na	na	na	na	na	na		2003 end-Q2
	MOBILE BANKING	Mobile banking		na	na	na	na	na	na		2003 end-Q2
Russia	PayCash	Internet	1	47	3	1.26	38.19	30.33	na	29 August-21 October 2003	29 August 2003
Saudi Arabia	Internet banking	Internet	8	na	na	na	na	na	na		From 2000
	Mobile banking	Mobile	2	na	na	na	na	na	na		From 2001

Table D (cont)

Statistical data on internet and mobile payments

Country	Name of product	Type	Number of issuers	Number of users	Number of acceptance points	Volume of daily (purchase) transactions	Value of daily (purchase) transactions (in USD)	Average value of (purchase) transactions (in USD)	Market share	Memo:	
										Reporting period	Launch date of product
Singapore	eNETS Debit	Internet	2	Internet banking account holders of DBS and UOB	38	180	19,400	107.8	na	1 May-28 October 2002	30 April 2002
	eNETS Credit	Internet and mobile	Banks and credit card companies (eg Amex, Diners) worldwide	Anyone with a Visa, MasterCard and American Express card	108	300	11,600	38.7	na	1 August-28 October 2002	1 August 2002
	eNETS CashCard	Internet	3	Any CashCard holders with a personal computer and "type-approved" smart card reader	124	2,900	3,920	1.35	na	January-September 2002	January 1998
	eNETS VCard	Internet and mobile	3	10,000 VCard accounts	na (trial)	na (trial)	na (trial)	na (trial)	na (trial)	na (trial)	na (trial)
	TeleMoney	Mobile	1	6,000	25	50	650	13.00	na	2002 H1	2001 Q2
Spain	Mobipay	Mobile	51	na	na	na	na	na	na	} 2003	February 2003
	Visa Móvil	Mobile		na	na	na	na	na	na		December 2000
	Paybox	Mobile		na	na	na	na	na	na		November 2000
	Epagado.com	Internet		na	na	na	na	na	na		2001
Sri Lanka	Internet banking ¹	Internet	8 ²	20,460 ²	Note I	446 ³	2.07 ³	4,639 ³	0.4% ²		
	Mobile Banking ⁴	Mobile	9 ²	526,472 ²	Note II	293 ³	0.06 ³	220 ³	0.01% ²		
Switzerland	yellowbill	Internet	1	9,400	1	na	na	na	Less than 0.5%	September 2003	February 2002

Table D (cont)

Statistical data on internet and mobile payments

Country	Name of product	Type	Number of issuers	Number of users	Number of acceptance points	Volume of daily (purchase) transactions	Value of daily (purchase) transactions (in USD)	Average value of (purchase) transactions (in USD)	Market share	Memo:	
										Reporting period	Launch date of product
Switzerland (cont)	PayNet	Internet	1	na	na	na	na	na	Less than 0.5%	September 2003	October 2002
Taiwan, China	FISC Internet Banking	Internet	39	2,000	na	234	414,172	1,770	0.002% by value	September 2003	February 1999
	FISC Mobile Banking	Mobile phone	13	70,000	na	504	517,330	1,179	0.001% by value	September 2003	June 2001
	TCH-E-Cheque	Proprietary line	1 (additional 13 later)	na	na	na	na	na	na	September 2003	29 September 2003
Thailand	Internet banking	Payments via internet	12	254,989	na	27,373	46,546,390	1,700		December 2002	2000
	Mobile banking	Payments via mobile	6	na	na	na	na	na		December 2002	2000
Turkey	biz.card	Mobile/internet payment system	1	4,067	50	25	35,000	1,400	0.12%	March-September 2003	31 January 2003
	Mobil Ödeme (Mobile Payment)	Mobile	2	720 (as of September 2003)	103	32	450	14	0.0015%	10 April-30 August 2003	10 April 2003
	IsMobil+	Mobile	2	1,500	500	2	7	3	na	January-September 2003	April 2002
	Aria Kontür Yükleme (Aria Counter Recharging)	Mobile	2	10,000	na	100	600	7	na	March-September 2003	1 March 2003
United States	PayPal	Internet	1	35 million	na	na	na	na	na	na	1999

Table D (cont)

Statistical data on internet and mobile payments

Note: "na" indicates that data are not available.

Belgium ¹ Anybody executing payments at one of the acceptance points can use it.

Chile ¹ Information gathered for the entire banking system. ² Volume of *monthly* transactions.

Greece ¹ There are no data available for e-business services. ² Average volume and value.

Malaysia ¹ In MYR. USD 1 = MYR 3.80.

Sri Lanka Note I: Can be accessed from any PC with internet access using a domain name. Note II: Can be accessed from any mobile or fixed phone by dialling a number. ¹ Total internet banking usage in Sri Lanka. ² End-September 2003. ³ Average for January-September 2003. ⁴ Total usage of mobile, phone and telebanking in Sri Lanka.