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Electronic Payment Systems in European Countries

Country Synthesis Report

Final Report

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Elektronische Zahlungssysteme in den Ländern Europa – Zusammenfassender Länderbericht

Zusammenfassung

Der Bericht fasst die Ergebnisse eines Projekts des European Science and Technology Observatory (ESTO) zusammen. Er enthält länderbezogene Analysen zu vorhandenen Zahlungssystemen und laufenden und geplanten Initiativen, insbesondere zu elektronischen Zahlungsmitteln in zehn europäischen Ländern: Dänemark, Deutschland, Finnland, Frankreich, Großbritannien, Italien, den Niederlanden, Norwegen, Schweden und Spanien.

Die Länderanalysen enthalten Informationen zu den Zahlungskulturen, nationalen Rahmenbedingungen des Banken- und Finanzdienstleistungssektors, Zahlungskarten, elektronischen Geldbörsen, Internetzahlungssystemen und elektronischem Handel in jedem der zehn Länder. Für die Zwecke der Studie wurde die Betrachtung des elektronischen Handels auf den Endverbraucherbereich beschränkt. Eine länderübergreifende Diskussion der wichtigsten Fragestellungen folgt auf diese Länderberichte. Der letzte Abschnitt ist eine Zusammenfassung der wichtigsten Ergebnisse der Studie.

Der Berichte zeigt erhebliche nationale Unterschiede und Besonderheiten auf, die beträchtliche Auswirkungen auf die Verbreitung elektronischer Zahlungssysteme und auf den elektronischen Handel in den einzelnen Ländern haben dürften. Er zeigt ebenfalls, dass die Verwendung elektronischer Zahlungsmittel sich noch im Versuchsstadium befindet, und dass die bewährten nationalen „Zugangsprodukte“ auch im Internethandel des jeweiligen Inlandes verwendet werden. Obwohl der Internethandel auf nationaler Ebene eindrucksvolle Zuwachsraten verzeichnen kann, ist der grenzüberschreitende Handel erst am Anfang. Dafür werden einheitliche und klare Rahmenbedingungen benötigt, insbesondere in rechtlicher Hinsicht. Ferner gibt es Bedarf nach einer Infrastruktur, welche die Interoperabilität eines breiten Spektrums bestehender und sich noch in der Entwicklung befindlicher Zahlungssysteme gewährleistet.

Electronic Payment Systems in European Countries – Country Synthesis Report

Abstract

The report contains results from a project by the European Science and Technology Observatory (ESTO). It contains a series of country-specific analyses on existing payment systems and ongoing or planned initiatives, in particular for electronic money, covering ten European countries: Denmark, Finland, France, Germany, Italy, the Netherlands, Norway, Spain, Sweden, and the United Kingdom.

The country analyses contain information on payment cultures, national frameworks for banking and financial services, payment cards, electronic purses, Internet payment systems and electronic commerce in each of the countries. For the purposes of the report, analysis of electronic commerce is restricted to the business to consumer (B:C) segment. The country chapters are followed by a discussion of the issues raised across the countries. The final section presents a summary of the most important findings of the study.

The report reveals vast national differences and peculiarities which will have great impact on the spread of electronic payment systems and electronic commerce in the individual countries. It also shows that use of electronic money is only at the experimental stage and that traditional national "access products" are finding use on the Internet for domestic transactions. While Internet commerce at the national level is growing impressively, trans-border commerce is only just starting. Here, there will be a demand for a uniform and unambiguous framework, especially with respect to legal aspects. In addition an infrastructure is required enabling interoperability of a broad range of existing and emerging payment methods.

Preface

This report presents results from a study by the European Science and Technology Observatory (ESTO). The European Science and Technology Observatory (ESTO) is a network of 14 European organisations which share in the responsibility of providing timely access to information on the socio-economic implications of selected scientific and technological advances.

ESTO is an initiative of the JRC's Institute for Prospective Technological Studies (IPTS) which is responsible for the Technology Watch mission of the European Commission.

The project, carried out in cooperation by the European Commission's Joint Research Centre, Institute of Prospective Technological Studies (IPTS) and ESTO, has the title "EMU and Information Society: Key Questions About the Opportunity to Combine the Introduction of the Euro with New Electronic Payment Technology Options" and was requested by the Committee on Economic and Monetary Affairs and Industrial Policy of the European Parliament. At the time, the committee was debating a proposed directive on "The taking up, the pursuit and the prudential supervision of the business of electronic money institutions". The parliamentary committee provided a set of six questions related to electronic commerce and the introduction of the single European currency, which has guided the research performed for the project.

While IPTS carried out a broad mail survey aiming at key actors in December 1998[1], the ESTO partners mainly prepared country reports based on expert interviews. These country reports have been edited and are presented here as a country synthesis report. The following institutions and individuals contributed to this study, each providing material on one or more countries:

- University of Girona, E.I. Department (Jaume Valls and Anna Arbussà), covering Spain;
- TNO Strategy, Technology and Policy, Delft (Mildo van Staden and Jos Leyten), covering the Netherlands;
- Global Electronic Finance Management, S.A., Brussels (Charles Goldfinger and Philippe Herbin), covering France;

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1 Papameletiou, D. : "Study on Electronic Payment Systems for the Committee on Economic and Monetary Affairs and Industrial Policy of the European Parliament". European Commission, Joint Research Centre, Institute for Prospective Technological Studies: Technical Report EUR 18753 EN, in press

- Forschungszentrum Karlsruhe, Institut für Technikfolgenabschätzung und Systemanalyse (ITAS) (Knud Böhle, Michael Rader and Ulrich Riehm), covering Germany and acting as operating agent;
- NUTEK, Technology Policy Studies (Anna Backlund), Stockholm, covering Sweden and Finland;
- Center for Tele-Information, Technical University of Denmark, Lyngby, (Morten Falch), covering Denmark and Norway;
- Dr. Piero Bucci, Rome, covering Italy;
- Consult Hyperion (Oliver Steeley), Guildford, covering the United Kingdom.

The editors wish to thank the ESTO partners for their reports and responses to our requests for additional information, and our voluntary reviewers throughout Europe for the comment and information they have provided to improve earlier versions of this paper.

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Executive Summary

The present report is a synthesis of a series of country-specific analyses by members of the ESTO network on *existing payment systems* and *initiatives for electronic payment systems*, including those suitable for use on the Internet, in *ten European countries*. Six of them belong to the eleven EU countries which have already adopted the Euro (Finland, France, Germany, Italy, The Netherlands, Spain), three have not done so (Denmark, Sweden, United Kingdom), and Norway is a special case, since it is not a member of the EU.

The use of *cash* has been declining steadily in all ten countries. Even so, it continues to be the most important single means of payment for everyday transactions. In the past, some countries have tended to make greater use of cheques for *non-cash* payments, while others have made greater use of debit or credit transfers. These different habits led to a distinction between "cheque-oriented" countries and "giro-oriented" countries. Today, with the spread of new electronic payment instruments based on payment cards, this difference is blurring.

Recent years have seen the spread of *debit and credit cards* in all of the countries covered, although to varying degrees and following different patterns. National "preferences" may be due to pricing structures, or to familiarity with the payment instrument concerned.

During the past few years there have been enormous increases in the numbers of automated teller machines (*ATM*s) and electronic devices enabling direct funds transfers at points of sale (*EFTPOS*). Although in some countries, there were several networks for such devices, sometimes incompatible with each other, strong tendencies towards interoperability are prevailing. The implementation of an *interoperable payment infrastructure in Europe* would strengthen the competitive position of European financial industries.

In most of the countries covered, *electronic purses* are now available on a regular basis. In Norway, France and the United Kingdom, however, their use is restricted to pilot schemes. All in all, few electronic purses have yet achieved widespread acceptance. In countries with more than one purse scheme, these are often not interoperable. Most significant in view of the single currency is that the use of each purse is still restricted to a single country. This is true even for the electronic purses of Finland and Sweden, although they can be loaded via *Internet* and in the case of Avant, the Finnish purse, may even be used for payments on the Internet.

The advent of a common European electronic purse however does not only depend on successful *standardisation*, but also on strategies how to shape this new payment instrument in a way that best fits in the context of the various national payment cultures.

It is generally agreed that politics should *not impose standards*, but *support* such ongoing voluntary standardisation efforts as CEPS (Common Electronic Purse Specification). A possible exception are *safety standards*, where policy makers should ensure that proprietary standards are not misused to gain competitive advantages. There might also be a role for politics to involve not only the banking sector in standardisation activities with regard to payment systems, but to bring together players from different industries (e.g. smart card industry, networking) and application fields (e.g. digital TV, traffic, health, telcos, financial services) involved in payment technologies.

The vast number of *international retail payments* on the Internet are made using *credit cards*, usually involving the safety features coming with standard browsers (e.g. SSL), but also completely unencoded or by such means as fax or the telephone. While there is interest from the side of the credit card organisations and some merchants in the SET protocol, adoption has been very slow and it is presently difficult to convince customers of its benefits. For *domestic* purchases, Internet buyers tend to use those "national access products" which are also used most frequently for other purposes, in particular for conventional mail-order purchases. There is an astonishing variety of ways to pay within Europe and there are remarkable differences between countries.

There is a lack of widely diffused and accepted payment systems for small amounts (*micropayments*): most software-based micropayment systems are still at the pilot stage and will probably face competition from electronic purses when card-reading devices for PCs are commonly available. In some countries Internet service providers operate schemes to collect such small payments with the monthly bill and to distribute these to the merchants involved against a commission. Beyond this, small value goods and services can be delivered free to customers if sponsoring schemes, such as banner advertising, can be set up to off-set the costs.

The proportion of the population having access to the Internet varies between almost four and over thirty percent for the ten countries, with the four Nordic countries having the highest rate of *Internet "connectivity"*.

When estimating the potential volume of electronic commerce, it is helpful to bear in mind the existing volume and tendencies in conventional mail-order commerce and experience with similar technologies, such as France's Minitel. Even so, the majority of the countries covered are at a very similar stage con-

cerning the uptake of electronic commerce: people with Internet access are discovering and trying out electronic commerce, but it is not yet really anybody's preferred method of shopping and many enterprises are not yet ready for electronic commerce. Using different sources and surveys, experts estimate the amount of electronic commerce in 1998 in the covered countries at between 0.3 Euro and 17 Euro per head. In each case studied, consumer oriented electronic commerce as a percentage of the retail turnover did not even reach one percent in 1998. Among the main products traded on the Internet are airline tickets, books, CDs, software and computer components, all of which are in a sense suitable for "conventional" mail-order too. Lack of payment systems is not the main obstacle to the spread of electronic commerce at the moment. On the customer side the main barriers appear to be concerns about consumer and data protection, on the merchant side they are fear of "fake" and disputed orders.

The major share of trans-border commerce seems to go to the USA. There is a need for more detailed investigation of the actual state and the potential for *cross-border commerce*, particularly within Europe.

The majority opinion in the countries covered in this study is that only *banks* should be allowed to *issue electronic money*. Where more liberal attitudes prevail, possibly on account of experience with the issue of electronic purses by non-banks, there is agreement that such non-banks should be subjected to the same kind of *supervision* as banks. Nevertheless a minority opinion arguing in favour of more competition between payment systems exists, in most cases including technology providers and economists. The impact of electronic money on the money supply by central banks is currently not regarded as requiring intervention. More worrying to governments is possible *loss of tax revenue* due to electronic commerce.

1 Introduction

This report is an outcome of a project investigating the interrelationship between the introduction of a single currency in the greater part of the European Union (EU) and certain aspects of the emerging "information society", commonly referred to under the bracket term of "electronic commerce".

Although the main objective was ostensibly to answer very concretely a set of questions posed by the European Parliament's Committee on Economic and Monetary Affairs,[2] the project team came to the conclusion that it would also make sense to provide a background paper describing and analysing the status quo and recognisable trends in the domains concerned for a number of European countries.

The payment patterns or "cultures" existing in individual countries are the result of a historical process which may differ vastly, even in Europe. Tempting as it might be to analyse these histories in depth, the national "case studies" presented here have more of a snap-shot character, describing payment habits, national regulation regimes and the current configuration of the financial services and banking industries. While discussion in recent years has focused mainly on electronic money, an examination of the existing situation reveals that it is equally important to consider "access products" in use at the national level. The investigation of electronic commerce has been focused mainly on the business-to-customer sector. Thus some information on retail, and in particular distance selling, such as established mail order, is provided.

In view of various constraints, it was not possible to cover the whole of Europe, including the various candidate EU members from Central and Eastern Europe, or such important countries as the USA or Japan. The selection of countries covered in the report is, however, reasonably well-balanced geographically and with respect to the very different state of diffusion of data-processing technologies in the banking and financial services sectors of the countries concerned.

Experts on banking systems frequently distinguish countries according to predominant payment methods, employing such categories as "cheque oriented", "giro oriented" or "cash oriented" to label "payment cultures". The sample of countries includes examples of the first two categories. None of the

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2 Papameletiou, D. : "Study on Electronic Payment Systems for the Committee on Economic and Monetary Affairs and Industrial Policy of the European Parliament". European Commission, Joint Research Centre, Institute for Prospective Technological Studies: Technical Report EUR 18753 EN, in press

European countries is any longer classed as being “cash oriented”, despite a continued importance of cash in everyday financial transactions. The distinction is also becoming increasingly of historical nature as the diffusion and use of payment cards progress throughout Europe.

The main objective of writing country reports of this type is to point to those factors which may play a role in giving birth to technologically based innovative payment instruments, in determining the acceptance of such instruments developed elsewhere, or acting as barriers to the diffusion of payment instruments with certain characteristics. Such factors could also play an important part for the success of efforts to create a common European infrastructure for trans-border payments, which is likely to gain importance as the marketplace becomes increasingly global and monetary union and the single European market progress.

The material contained in the country chapters was the result of a limited number of interviews with important actors in the countries covered, a survey of the literature and an analysis of statistics contained in the so-called “red” (on G10 countries, published by the Bank for International Settlements) and “blue” (on the EU15, published by the European Central Bank) books, which are supplied by delegates from the central banks concerned. While these statistics initially convey a most reassuring impression of accuracy and comparability, working with them, it soon became obvious that many of the figures collected under the same headings meant different things in different countries, a legacy of the different payment “cultures” in existence. For example an ATM in some countries is only a cash dispenser while in other countries ATM are complex self service stations for cash withdrawal, account information, credit transfers and, last but not least, for cash deposits. Another example of the problems using the available statistics is “narrow money”, which for most countries uses “M1”, but for two uses “M2”, because they no longer calculate this aggregate. “M2” is larger than “M1” by mere definition. Certain statistics simply do not exist for some countries, since the payment mechanism to which they refer does not exist or plays only a minor role in the country in question because there are preferred alternatives available. Other statistics are a compound of several original statistics at the national level and one can not be sure that the same type of thing is being counted for all countries concerned. Figures given for such things as “numbers of payment cards” have been found to vary widely. This applies even more to figures on electronic commerce, for which official statistics do not as yet exist. Figures given here are frequently estimates or based on market research and may differ by as much as orders of magnitude, depending on the source providing the figure and the interests behind it. Where

there is any doubt, we have indicated this and referred to the ranges for such statistics or estimates. Even where accurate statistics on numbers of cards exist, these do not necessarily reflect their genuine importance: large numbers of a certain card can be issued for strategic reasons, while many of them are actually unused since the infrastructure for this purpose is not yet in place, or such important matters as who is going to pay how much of the costs involved in their use have not yet been resolved.

For these reasons, the report makes very cautious use of the semi-official statistics, treating them as rough indicators rather than hard or fast fact. Monetary union and the existence of the European Central Bank might have an impact on such statistics in the future, partly because national differences might be levelled as a result of Monetary Union and due to the emergence of predominant payment instruments for transactions of certain types in the European context.

It should be pointed out that while the country chapters all conform to a common structure, the depth of treatment of the individual points might vary widely according to the data available.

The present report starts with the country chapters, arranged from North to South, summarising the papers provided by the ESTO partners and highlighting the major differences. The country chapters are organised as follows:

1. Payment culture;
2. National framework;
3. Payment cards;
4. Electronic purses;
5. Internet Payment Systems;
6. Electronic commerce;
7. Main Points;
8. Sources.

The next section of the report is a cross-cutting discussion of most of the issues covered in the national case studies. The final section presents the most important findings of the study in the form of provocative statements or theses.

The report also contains an appendix with comparative tables, drawn in part from existing statistics, such as the Red Book issued by the Bank for International Settlements and the Blue Book issued by the European Central Bank, and in part from information provided by the ESTO partners in response to a standardised questionnaire developed especially for the purposes of the project.

The report reveals vast differences and national peculiarities which could have great impact on the diffusion of electronic payment systems and elec-

tronic commerce in the individual countries. It requires the cooperation within an international network such as ESTO to carry out a cross-border analysis of this type. Given the limited resources in terms of manpower and time available for the project, it was only possible to scratch the surface in analysing important issues. It is to be hoped that there will be an opportunity to go into greater depth over a longer period of time on these topics which are generally regarded as crucial for the further development of the European Union in a global economy.

2 Country summary reports

We have ordered the following country summary reports from north to south. The assumption behind this is that the geographical clusters correlate with some aspects this report is addressing (like Internet connectivity, usage of electronic purses, regulation regimes, or payment culture).

2.1 Finland

Payment culture

Finland is advanced regarding the use of electronic payment systems. There are electronic card readers installed in most shops and over 80 percent of the card transactions in shops are made using EFTPOS (Electronic Funds Transfer at Point of Sale). On average, every Finnish person makes around 50 transactions per year in shops using bank cards (cf. Appendix, Table 7). Furthermore, it is common to make payments using a personal computer, a service used for some 15-20 percent of payments from Finnish private customers and for more than 90 percent of companies' payments. Seen as share of the banks' transactions, more than 70 percent are automatic transactions.

In Finland there is the second smallest amount of cash (next to Portugal) in circulation throughout the EU, in terms of amount per inhabitant, as a proportion of the GDP and as a proportion of Narrow Money (M1, cf. Appendix, Table 2). Even so, 80 percent of households' payments in Finland are still made with cash, with half the transactions worth under FIM 30 (5 Euro). The number of cash dispensers and ATMs per inhabitant is just lower than average for EU countries, with a slight decline in the number of transactions from 1996 to 1997. However, the number of transactions per inhabitant at such machines is more than double the average for the entire EU, while the average value of transactions is about 2/3 of that for the EU (cf. Appendix, Table 6). The number of EFTPOS in relation to the size of the population is the fourth highest in Europe, with an average of more than three times as many transactions per inhabitant as the remaining EU countries. The average value of these transactions is 3/4 of the average in the EU as a whole, suggesting that such EFTPOS transactions are gradually replacing cash. Cards with a cash function are widely distributed in Finland, but the number of cards with a credit or debit function is slightly below the average for the EU countries (cf. Appendix, Table 5). The cards which have been issued are, however, used far more frequently than is

average in the EU, especially the cards with a credit or debit function. In Finland, use of cheques for cashless payments is almost negligible, while very intensive use is made of credit, debit and retailer cards. The use of credit transfers as a percentage of total number of cashless payments is among the highest in the EU. In contrast, the number of direct debit payments is below average (cf. Appendix, Tables 3).

The national framework

There is no central clearing house in Finland to clear debit card transactions between banks. Although all communications between banks are on a bilateral basis, these use multilaterally agreed standards and common procedures. In contrast, the "Automatia" company, which is owned jointly by the three major banks, has operated the Avant nation-wide electronic purse system and acted as a clearing house for these electronic transactions between the banks. The creation of this company may be traced to an initiative by the Finnish Central Bank to create a cost-effective method intending to substitute cash payments.

In November 1998, the government of Finland passed a law supporting the free trade and use of cryptography products. The motivation behind this was to ensure that national cryptography policy would not impede Finland's export industry. The Finnish parliament is debating a privacy bill which will enable citizens to use whatever technology they deem necessary to protect the privacy of their telecommunication messages.

An interesting opinion stated in the interviews was that companies other than banks issuing electronic money should not be allowed to have other business not closely related. The reason was that e-money float would be difficult to monitor. If such companies wished to engage themselves in this sector, they should be forced to set up a subsidiary for the purpose.

Payment cards

Widely diffused in Finland at present are debit and credit cards equipped with a magnetic strip for use at ATMs and EFTPOS. Credit card transactions are cleared by Luottokunta, which acts as the Finnish agent for both Visa and Mastercard, employing international standards. Debit card transactions are cleared bilaterally between the banks involved employing a domestic standard without international interoperability. There is no central clearing house.

Electronic purses

The three major banks have begun to issue magnetic strip cards also equipped with a chip embodying ATM functionality. 90 percent of Finnish cash-dispensing ATMs belong to the Automatia company, with a brand name "Otto." and these can read both magnetic strips and chips. A new generation of ATMs "Otto.2000" can only read chipcards, indicating an ongoing transition from strip technology to the chip. Automatia expects the transition from the magnetic strip technology to chipcards to be completed within the next four to five years.

The chip also embodies the Avant electronic purse. This purse, which was launched in 1993, was originally the result of an initiative by the Finnish Central Bank to create a cost-effective method of handling cash payments. It is now run by Automatia, a company created in 1995 by the three largest Finnish banks (Merita, Leonia, Okobank) to operate Avant. Since 1997, Automatia has operated the Avant nation-wide electronic purse system and acted as a clearing house for electronic money transactions between the banks. The cards are also beginning to be used to access the services of public authorities or retail chains' loyalty programmes.

The Avant purse is available both as a reloadable chipcard, which uses ATMs to transfer money from an account to the chip, or as a disposable "white" card. These are sold at 5 FIM (0.8 Euro) above face-value.

The chipcards and the Avant system are EN 1546 and ISO 7816 compliant and EMV (1996) compatible. The Avant electronic purse application is a domestic de facto standard. Avant looks forward to the possibility of international interoperability through CEPS (Common Electronic Purse Specifications) some time beyond 2002, but believes that the domestic Avant electronic cash system will remain in domestic use. In June 1998, a total of FIM 421,000 (about 72,000 Euro) was down-loaded and purchases were valued at FIM 126,000 (about 22,000 Euro). According to Automatia, 250,000 customers use the cards, which are accepted at 5,000 points of service belonging to over 300 companies. Since 1997, a gradual switch has been taking place for the terminals at retail locations or incorporated in vending machines which accept electronic money cards: there were 1,344 machines installed which accept only the chipcard.

There is another card in widespread use in Finland, issued by the Matkahuolto group, which is active in the travel, transport, catering, retail and investment sectors. The Matkahuolto bus cards (there are different options) can in most cases be used all over Finland. The card can be used not only to pur-

chase bus tickets, but also for such things as meals and drinks at bus stations. There are other bus company cards in existence, such as one valid for the Tampere transit system, with another announced soon for Helsinki. This is more of a retail card than a universally accepted means of payment.

There are also city cards based on this smart card technology that are multi-function cards, used for car parking, school meals, library card etc. The first city card scheme was introduced at Rovaniemi, Finland in March 1996 and is now also used in Seinäjoki and Nurmo.

Internet payment systems

Avant can be used for payments over the Internet, for instance to pay for classified ads in "Aamulehti", a major Finnish newspaper. The use of Avant as an *Internet* payment system is described by "Automatia" as anonymous and end-to-end secure. Its widespread use is only expected once chipcard readers for PCs have become commonplace. Since Spring 1999, it has also been possible to load the Avant card via the Internet. A special card reader is used to transfer money from the card holder's bank account to his or her Avant card.

The three major banks' credit transfer systems have been integrated to a special on-line payment system, "electronic giro", for use on the Internet. This is accepted by several hundred suppliers on the Net. Merita has some 530,000 customers using "electronic giros", and estimates that other banks have a total of 400,000 such customers. These payment systems are proprietary and can not be used between banks yet. Because of the high concentration level in Finnish banking it is in practice sufficient if an Internet shop holds an account in these three banks as they cover over 90 percent of the domestic market. This is a completely domestic system as both the customers and the merchants are required to have accounts in these banks.

In early 1999 the Internet service provider Sonera offered a micropayment system called "iNET", which was accepted by a small number of merchants selling low-price digital products. The status of this scheme is uncertain, since there have been no recent reports. There is another micropayment system called "Money-penny", which operates with a choice of a prepaid account or one based on credit. In mid-1999, this scheme lacked the backing of major banks or credit institutions and involved only two merchants.

There is some degree of Visa/EuroCard SET acceptance. The pilot phase ended in 1998 and Luottokunta has been making use of this technology since then. In mid 1999 50 shops in Finland made active use of SET, 41 of them belonging to Sonera's Ostella mall. Visa credit card holders in Finland were the

first worldwide to be offered the SET service. By December 1998, 10,000 SET wallets had been downloaded.

In 1997 Luottokunta, the Finnish agent for Visa and Mastercard had actually prohibited the transmission of credit card details over the Internet pending the introduction of the SET standard. Apparently this ban was never enforced very strictly, since the use of credit cards was permitted for telephone and mail order, making it possible to "disguise" Internet payments as one of these methods. Even so, some banks issuing Visa or Mastercards ban Internet purchases with the cards, while others permit them.

While Luottokunta no longer requires the use of the SET wallet for Internet transactions, it does require the use of the so-called MIA standard (merchant initiated authorisation), which is an extension of SET software, for the transmission of credit card details to Luottokunta. MIA works with SET, SSL, secure e-mail, phone, fax and letter order payments under the same single umbrella. Furthermore, Luottokunta recommends the use of SET wherever possible, since there have been no disputed payments under SET since its introduction. In contrast, 50 percent of all disputed payments concern transactions completed on the Internet. This number does not however indicate the percentage of fraud.

Finnish experts felt that the main solutions in the future would be giropayments and credit card payments with identification (not only SET). In the past, DigiCash's "eCash" was available from the ISP EU-Net, but this has been discontinued, presumably because of limited acceptance.

Electronic commerce

The overall impression conveyed by Finnish experts is that the lack of electronic payment systems is not the major obstacle to the widespread diffusion of electronic commerce practices. If this had been the case, there would have been greater effort invested in creating such novel payment systems.

At the end of 1998, 1.57 million people in Finland out of a total population of 5.14 million had access to the Internet, a share of over 30 percent (cf. Appendix, Table 1). While this is the 14th rank in terms of absolute numbers world-wide, it is generally acknowledged that Finland, with Sweden, is the country with the highest rate of Internet connectivity in the world today.

Despite this high level of access to the Net, Finland has been relatively slow in adopting electronic commerce (Verkkokauppa alkaa hitaasti 1997, quoted in Salo 1997). This was attributed to problems regarding the status of e-money and security concerns, mentioned above.

There has been a gradual uptake of electronic commerce in Finland, but in 1997 there were no major electronic shopping malls based in Finland, due to a lack of interest among retailers. In 1997, electronic commerce accounted for a mere 0.07 percent of the total volume of retail in Finland. By 1999, several malls, including "Keskus.net" (http://www.keskus.net) and "Solo-tori" (Solo Market Square, http://www.merita.fi/s/solotori/) with a large number of storefronts had been established. They seem geared mainly towards domestic customers, since there is little information on-site in English.

A recent survey (electronic commerce barometer by Tietoykkönen Ltd. for Electronic Commerce Finland) has revealed that 41 percent of Finns are interested in acquiring products and services through the Internet, and that six percent had already actually made purchases. The greatest interest was in information searches, banking services and ticket services. Over two thirds of the respondents regarded the Internet as a sufficiently reliable and safe communication channel. On the business side, 28 percent of Finnish companies have WWW-sites, although they do not necessarily engage in electronic commerce: nine percent of Finnish companies offered the possibility to order their products on the Internet in late 1998 (source: survey by ECF, Electronic Commerce Finland).

When asked about the methods of payment they accepted, shops mentioned traditional invoicing most frequently (89 percent), followed by cash on delivery at the nearest post office (27 percent), the Merita bank's credit transfer system (16 percent), credit cards (11 percent) and Osuuspankki's credit transfer system (11 percent) (source: survey by ECF). Conventional mail order uses traditional invoicing and cash on delivery most frequently.

An interesting development, which could have some impact on electronic commerce, involves telecommunications. By dialling a certain telephone number posted on vending machines, a customer can purchase products, like soft drinks or golf-balls and the price is added to the bill for his or her mobile phone. This is still at the experimental stage and also the subject of controversy, since many companies pay their employees' mobile phone bills and obviously have no interest in paying for such refreshments as soft drinks or luxuries as golf-balls.

Experts thought that it was unlikely that the combined effects of the Internet and the single European currency would lead to a surge of trans-border sales. They felt that domestic retailers would benefit most from growth of electronic commerce and that issues related to distribution were a greater problem than those related to payment systems.

Main points

Finland belongs to the countries in Europe that have the greatest degree of Internet connectivity and made the greatest progress toward replacing the magnetic strip card technology with chipcards. The banks are cooperating most actively to launch the "Avant" electronic purse.

The "Avant" system is being pushed by the participating banks as a substitute for cash, for Internet payments and as a smart card to access services provided by public administrations and industry. Progress has already been made in all of these fields.

Perhaps surprisingly, Finnish companies have been slow to adopt electronic commerce and it looks as though their main market will initially be domestic. Lack of payment systems is not seen as the main barrier to the spread of electronic commerce. Finnish experts felt that the main solutions in the future would be giropayments and credit card payments with authorisation. SET is being promoted actively by Luottokunta, the Finnish agent for Visa and Mastercard, with compulsory use of the MIA extension for the transmission of credit card details.

Legislation on cryptography has already been passed and a further law concerning privacy is on the parliament's agenda. There is a proposal to prohibit the issue of electronic money by companies having other business not closely related. Such companies should be forced to set up a subsidiary for the purpose.

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2.2 Sweden

Payment culture

In most respects, the payment culture in Sweden closely reflects the average for all 15 current EU member countries (cf. Appendix, Table 2-7). Only the number of ATMs and cash dispensers is below the EU average, although their use is more intensive than average. Sweden relies heavily on credit transfers for non-cash payments (of which approximately 75 percent are electronic). Cash payments are still dominant for low value payments, although their share of the total *value* of retail payments is low. EFTPOS payments are increasing rapidly, numbers of transactions having doubled from 1994 to 1997, while the average value of these transactions has slightly decreased during the same period (Blue Book 1999, p. 147, Table 6). On-line banking is also expanding rapidly.

Cash still plays an important role in Sweden, with an average amount per inhabitant compared to other EU countries and a volume of roughly 4.2 percent of GDP, which is just below the average for the EU (cf. Appendix, Table 2). 80 percent of all retail payments are still made using cash. The number of banks is moderate, with a comparatively high average number of inhabitants served by each branch of a bank. The number of ATMs and cash dispensers is fairly low in comparison with the other European countries covered, but the average number of just over 35 transactions per inhabitant and year indicates intensive use compared to the other countries covered in the study (cf. Appendix, Table 6). Sweden is served well with EFTPOS terminals, which are used an average number of 16 times per inhabitant and year (cf. Appendix, Table 7). Again, this frequency of use and also the average value of transactions (69 Euro for Sweden as against 62 Euro for the EU15) correspond closely to the EU mean value.

As elsewhere the greatest amount of money in terms of value is transferred using credit transfers (96 percent, cf. Appendix, Table 4). While the number of direct debits is increasing, their total value is declining.

The national framework

The Gemenskapen för Elektroniska Affärer (The Group of Electronic Commerce, GEA) has the overall goal to promote electronic commerce in Sweden. GEA consists of the Swedish Association of Local Authorities, the Association of Swedish County Councils, the Swedish Agency for Administrative Development, the Federation of Swedish Industries, the Swedish Federation of

Trade, the Federation of Private Enterprises, the Swedish Bankers' Association and the Swedish IT-companies' Organisation. GEA works within the following areas:

- Policy (such as legislation, certification, procedures),
- Education and awareness,
- Standardisation.

In 1998, GEA started a project SVEA (Svenska elektroniska affärer, Swedish electronic commerce), which aims to inform, educate and assist SMEs and public services in the field of electronic commerce. Its target group consists of some 50.000 SMEs and 5.000 public sector units which are to be provided with information, offers of education and the services of an e-commerce competence centre. This is to be set up during the on-going first phase of the project. The budget is 1.34 million Euro (12 million SEK).

There is also a large project on electronic public procurement, "Elektronisk Handel", which is designed to make the public sector more efficient. The work within Elektronisk Handel resulted in Single Face To Industry (SFTI), a common interface for electronic commerce between the public sector and their suppliers of goods and services.

The "postgiro" and "bankgiro" systems permit the transfer of money between accounts, regardless of the banks where these accounts are held. There is cooperation between three major banks on SET, and the Central Bank (Sveriges Riksbank) is keen to see the implementation of efficient payment systems and is prepared to offer a forum for discussion among the stakeholders. Furthermore, the electronic purse "Cash" is another of the areas where there is cooperation between Swedish banks.

The Ministry of Communications has appointed an external reference group for discussions on the European Commission's directive regarding digital signatures.

Payment cards

In 1997, there were 1.923 million credit cards and 4.188 million debit cards in circulation. The total number of cards with a cash function was 6.849 million. Again, the number of cards with a cash function in relation to the size of the population is roughly average for the EU, while the number of debit and credit cards is below average (cf. Appendix, Table 5). The significance of cards for cashless payments is increasing noticeably. As in Norway (cf. chapter 2.3), there are large numbers of payment cards issued by oil companies and retail

trade companies, which according to the Blue Book in 1994 amounted to 9 million cards. More recent figures were not available.

Electronic purses

There is a single Swedish smart card system, "Cash", which is based on Proton and being backed by three major banks, usually in combination with other cards (Visa, Maestro or banking cards). The "Cash" cards are loaded at special terminals by entering the PIN code.

"Cash" was the subject of a pilot in Uppsala and Halmstad in 1996. There were around 40,000 acceptance points for "Cash" cards in 1998, with approximately 200,000 cards in circulation. The average amount stored on the cards issued is 16.8 Euro and their monthly turnover has been estimated at about 350,000 Euro and expanding rapidly. While it is possible to load the card over the Internet using a device connected to a computer, it is not yet possible to actually make payments with the card on the Internet.

Currently, the "Cash" system is free of charge to both consumers and suppliers, but there will be an annual charge of about 4 Euro in the future. "Cash" cannot yet be termed a success, but its prospects for a breakthrough are improved by the joint backing of the major banks.

The Swedish Federation for Trade, which is actively involved with other Swedish stakeholders including the banks in an initiative to promote electronic commerce in Sweden (GEA), has issued a call for proposals for the development of an "allround" card for payments and customer feedback. The card is in response to a perceived need for a simple and cheap solution for payments and marketing. Apparently this is not intended as an alternative to "Cash" cards.

Internet payment systems

It is currently possible to make direct payments via the Internet if both the supplier and the customer have accounts at the same bank. This is not expected to become general practice. It is more likely that an intermediary will be established to handle transfers between accounts at different banks, which would facilitate domestic use of electronic commerce. This is, however, still a thing of the future and seems to be the topic of conflicting economic interests of various potential intermediaries.

If a customer holds a home-banking account, it is possible to accomplish payments via an electronic invoice sent by the supplier of services or goods.

Again this is currently restricted to domestic transactions. This payment works even if customer and client have their accounts at different banks. The transactions are completed in real-time this way. This service is currently unique in the countries covered in this report.

SET is being used in pilots, but is not yet widespread, partly because of the high costs involved.

The French company KLELine has introduced its payment system in Sweden, which is by some regarded as an alternative to SET. The KLELine system can handle SSL, SET, C-SET and its own electronic purse Klebox. The latter can also handle micro payments. KLELine is not yet widespread.

In addition, there is a system called VerifyEasy that handles on-line verification of credit cards. VerifyEasy does not require any special soft- or hardware. It is the result of cooperation with the Dutch bank PTT International. The transmission of credit card numbers between customer, shop and VerifyEasy uses SSL encryption. VerifyEasy and PTT communicate via a private connection. PTT takes care of the transactions with credit card companies and transfers money to the shops' bank accounts (in Sweden or elsewhere). The major credit cards are accepted and some 20 shops were using the system in March 1999.

The Swedish national identity card is chipcard based, potentially making it a means to authenticate Internet transactions

The Swedish postal service operates a mall, in which subscribers to its Torget portal service can purchase goods, which are charged to the customer's account for Torget. Non-subscribers normally pay cash on delivery, when they collect their purchases from the local post office.

Postgirot, which belongs to the Swedish Post, offers an electronic postal giro service (ePostgiro). Domestic and international payments can be made directly with a computer connected to the Internet or by using a mobile phone. The payments are secured through one-time-certificates by using a SmartSec card and a reader. The user inserts the card into the reader, enters the payee's account number, the amount and a personal code. He then receives a certificate number needed to pay the bill, which is typed into the computer or mobile phone.

A service called electronic invoice (eFaktura) can also be added. This makes it possible to receive invoices over the Internet. The user accepts, signs and pays the invoices together with other invoices in the electronic postal giro service. In the beginning, customers will receive electronic invoices from companies that are using this service for their invoicing. An example is Radiotjänst i Kiruna AB who collects TV charges.

Electronic commerce

At the end of 1998, somewhere between 2.6 and 3 million people in Sweden had Internet access. An April 1999 survey by Sifo Interactive Media updates this figure to 3.5 million users, or almost 50 percent of the population between 12 and 79 years of age. The growth rate from 1997 to 1998 was estimated at 36 percent and the increase from the end of 1998 to April 1999 alone was 19 percent. Among the new users in 1998 were 60 percent women, although men still represented the majority of all Internet users in Sweden. 77 percent of the Swedes between 12 and 24 years of age used the Internet in April 1999, mainly for entertainment purposes. The corresponding figure for over-fifty-year-olds in 1998 was 19 percent.

In December 1998, over 1 million people visited Internet shopping sites, with almost one third of them purchasing goods or services. Among the top ten addresses visited most frequently are two portals incorporating shopping malls: Passagen and Torget.

There is a recent survey on e-commerce from a retail trade perspective, performed by the Swedish Research Institute of Trade. The survey investigated the extent to which Swedish retailing businesses offer selling via the Internet and the primary reasons for going on the net or not going on. In summary, it shows that selling via the Internet is not a large share of the total turnover in Swedish retail trade. The turnover from Internet sales was estimated at 600 million SEK (66,6 million Euro), accounting for 0.2 percent of total turnover. Of the companies participating in the survey, 12.5 percent offered selling via the Internet. It is most common among mail-order companies. 25 percent of those asked feel worried about suppliers starting direct net-sales to customers. The same number are feeling pressure from competitors to go on the net. The reasons for not selling via the Internet are that “Internet is not a part of the company-profile” and that “profitability is low”.

Conventional mail-order in Sweden has a share of 2.6 percent of retail turnover, which is average for Europe. There was slight growth between 1991 and 1996, so that it is difficult to assess the prospects for electronic commerce in Sweden based on experience with conventional mail order.

Payment systems were not seen by the experts interviewed for the project as the major obstacle to electronic commerce. It was argued that suppliers should be prepared to handle various types of payment systems. On the other side, it was argued that shops did not wish to invest in a wide range of payment equipment and wanted to leave the problem of customer transactions as far as possible to the banks.

Main points

Like other Nordic countries, Sweden belongs to the countries in Europe that have the greatest degree of Internet connectivity.

The "Cash" system has good prospects to establish itself at the national level, due to the cooperation between major banks. The overall impression is that it is slower to take off than its Finnish counterpart, "Avant". While "Cash" could migrate to the Internet, little headway has been made in this direction. However, it is possible to use the Internet to load the "Cash" purse.

Lack of payment systems is not seen as the main barrier to the spread of electronic commerce. Swedes seem to be discovering the Internet as a place to go shopping and the Swedish retailers are increasingly setting up sites on the Net. This impression is backed up by the creation of an initiative to promote electronic commerce, GEA, which involves many of the important stakeholders in this field.

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2.3 Norway

Payment culture

Norway occupies a special position among the countries covered in this project, since it is not a member of the European Union and will not be using the Euro in the foreseeable future. It is also not a member of the G10 group of countries, so that data on payment systems is not immediately comparable to that included in the Red and Blue Books. However, the Norwegian Central Bank publishes comprehensive data on payment systems, both in printed form and on its web site. Norway is included in this study, although in less detail than the other countries, since it is outside the European Union, but has a financial market with close links with its Nordic neighbours.

The amount of cash in circulation per inhabitant is below the average for European Union countries and declining. It is comparable in this respect to Denmark, but there is more cash per capita than in Finland (cf. Appendix, Table 2).

The number of ATMs per million inhabitants is just below the average figure for the EU countries, with a slight increase in numbers from 1996 to 1997. Both the number per inhabitant and the average value of transactions are slightly higher than the EU average (cf. Appendix, Table 6).

The number of EFTPOS terminals in relation to the size of the population is well above the average figure for the EU, with a large growth in numbers from 1996 to 1997. The number of EFTPOS terminals per million inhabitants has recently overtaken the figure for Finland. Only Denmark, Greece and Austria of the EU countries have experienced more rapid increases in numbers of devices. The average number of transactions per inhabitant currently stands at about four times the average for the EU, with a distinctly lower average value per transaction (cf. Appendix, Table 7). An outstanding feature regarding the payment culture is the intensive use made of electronic card payments: Norway has 200 million transactions per year for consumers. This volume is the double of the total volume in Sweden. (The volume per capita is thus four times that of Sweden). As in the other Nordic countries, electronic payments are gaining increasing acceptance as an everyday method of payment.

A May 1999 press release from the bank of Norway deals with developments in 1998, providing more recent information than that available for the other countries covered in this report. “Norges Bank's annual report on payment system statistics shows a continued sharp increase in the use of payment cards. The number of transactions at payment terminals increased by 21 percent from 1997 to 1998, while the total value increased by 24 percent. The use

of cards at payment terminals has increased more than tenfold since 1998, measured in terms of number of transactions. The value has more than doubled since 1994. Although payments with cards represent the largest share, measured in terms of number of transactions, they account for a relatively small share in terms of value. Electronic giros, form-based giros and cheques all account for a larger share of turnover than payment cards, reflecting the fact that these services are used to transfer large amounts.

Electronic giro services have increased markedly, while form-based giro services have shown a decline. In terms of number of transactions, form-based giros still account for a slightly larger share than electronic giros, but the turnover of electronic giro transactions is more than double that of form-based giros.

The report for 1998 contains data on PC/Internet services for the first time. The first systems for making these payments were introduced in 1996, and from the beginning of 1999 most banks in Norway offer payment services using the Internet. The number of PC/Internet transactions in 1998 was relatively small, with a market share of 0.9 percent for giro transactions, i.e. 3.2 million transactions and a turnover of a good NOK 7 billion ”(824 million Euro).

The most important instrument for cashless payments, in terms of value, is the credit transfer (89 percent) while payment cards hold the first place in terms of number of transactions (50.6 percent). The use of direct debits is comparable to that of Finland, and thus well below the average for EU countries. The importance of cheques is low and declining even further (cf. Appendix, Tables 3 and 4). Cheques are still used in relation to payments by giro. Bills are put into an envelope together with a check and mailed to the giro-office. This implies the average value transferred per cheque is very high as one cheque can be used for payment of several bills.

The national framework

Although it is not a member of the European Union, Norway participates fully in the single market, with the exception of agricultural products. Norwegian banks are subject to the same requirements and obligations as those applying in the EU. All Nordic banks seem to regard all of the Nordic countries as a potential “home market” and thus Norwegian banks have an incentive to compete in handling transactions in Euros.

Norway has a centralised clearing house (Bankenes Betalingssentral), which handles most of the payment transactions. Clearing of Visa and Europay are done by others but Bankenes Betalingssentral collects the data for these trans-

actions also. All electronic card based payments are reported to Bankenes Datasentral (The Bankers Computing centre). Clearing is made in NOK. Clearing in Euro has been considered but is not planned in the short run, and at least one major Norwegian bank (Den Norske Bank) is member of the common European payment system TARGET.

There are common Norwegian standards for electronic payment transactions developed for different purposes. However, problems with interoperability mainly relate to international transactions. EDIFACT is an example of how difficult it is to impose standards. Although EDIFACT is defined as an international standard, national subsets exist. For example, the Norwegian standard can not be used for communication with a Danish company without modifications. EDIFACT has been implemented differently in the two countries and the two subsets are not interoperable.

Growth in electronic payment services is due largely to falling prices for these services, making them lower than for form-based services. Pricing policy is being used by the banks to steer demand to services which are less costly for them, such as electronic giros, mail giros and payment cards.

In the on-going discussion on electronic money, opinion is that issuers of electronic money should be regulated in the same way as banks. There should be certain requirements to reserve funds. Issuers do not need to be banks, but they must be subject to the same kind of regulation.

At present prepaid cards with a nominal value of less than 1,000 NOK (125 Euro) can be issued without restrictions. Cards with a higher value can only be issued by banks or other institutions who have applied for permission.

Again in discussion there is the dominant opinion that reporting on the amount of electronic money in circulation must be required. A safeguard against an excessive money supply due to issuance of electronic money should be made (Norges Bank, press release 19 May 1999).

While the issuing of small coin cards would not affect monetary policy making, electronic money would. Electronic money has a major impact on the international currency markets, as electronic money enables much faster transfer of money and a higher turn-over.

Payment cards

The number of payment cards in circulation is extremely high, with an average of almost two per inhabitant. An outstanding feature regarding the payment culture is the intensive use made of electronic card payments. All electronic card based payments are collected by Bankenes Betalingssentral and reported

to Bankenes Datasentral. There is a common Norwegian standard for electronic payment transactions.

The most common variety of payment cards are bank cards, equipped with a debit card function that can be used for electronic payments in shops (EFTPOS) and cash withdrawal from ATM's, followed by bank cards equipped with a international credit card functionality. Most cards are issued with both a national debit card and VISA (or sometimes Mastercard) on the same card.

Europay (Norway) is owned by most of the corporate banks in cooperation. EUROPAY and VISA are two competing systems, but partly owned by the same banks. More banks offer VISA than EUROPAY.

There are also domestic retailer cards with a credit function, the numbers of which are declining. The oil companies like Statoil, Hydro, Shell, Esso, Texaco, Fina, and Du Pont Jet issue their own cards. These are a kind of retailer cards, issued principally for use at the gasoline stations belonging to the companies issuing them, but also accepted by a number of other retailers and involving bonus and loyalty schemes (cf. chapter 2.5 Netherlands).

Electronic purses

In 1995 the Central Bank of Norway established a Cash Card Forum for activities such as information exchange and coordinating players interested in establishing an electronic purse (cash card system) in Norway. This is, however, not particularly active, having met only once in 1998 (information from the Central Bank).

Posten SDS has a franchise agreement with Mondex on introduction of their electronic purse on the Norwegian market. The electronic purse is introduced as an integrated function in "MultiSmart" – a multi-functional smart card, which also provides an electronic identification facility. Mondex is also being introduced for payment of pay per view services through a smart card based security system provided by Telenor Comax.

Internet payment instruments

Internet payment in Norway is not very developed. One reason is that the existing giro payment system has been so effective, delaying the development of electronic payments for consumers. Home-banking currently accounts for 0.3 to 0.5 percent of credit transfers.

Norway's largest provider of software and processing services – Fellesdata – claims to have developed the first fully blown on-line Internet Bank Software (NetBank) in Europe. The system was introduced in Sparbanken Hedmark in 1996 and is now used for home-banking by more than 90 Norwegian banks.

It is possible to pay with your debit or your credit card on the Internet. SET is used for both types of cards. SET payments have been introduced in Norway by VISA Norway, the Savings Bank Hedmark, HA-Nett, IBM and Fellesdata in cooperation. Europay is also introducing SET payments. At the end of 1998 20 shops in Norway were offering payments by SET. SET offers an international hierarchy of trusted third parties, who can issue certificates for SET payments. Consumers who want to pay by use of SET must first register at one of these institutions. They will then be provided with a digital signature (a pin-code). They can use this for electronic payments. Some experts foresee that this solution will be extended to include use of smart cards if card readers become widespread among consumers engaged in electronic commerce from their PC.

Internet use and electronic commerce

Like its Nordic neighbours, Norway has a high rate of home computer use and Internet "connectivity". In May 1999, Norway was estimated to have 1.6 million Internet users out of a population of 4.4 million (Business Area Stockholm estimate). This corresponds to 36.3 percent of the population, which is among the world's highest figures. An earlier estimate by IDC quotes 1 million users at the end of 1998, or 22.7 percent of the population.

There is little information on electronic commerce in Norway, but Den Norske Bank provides a platform for Internet commerce. According to the results of a survey by the web research company Intelligence, published in May 1999, the Norwegian web users are embracing electronic commerce rather more slowly than their Swedish counterparts, at a pace similar to that of Danish web users and slightly faster than the Finns.

Main points

Norway is remarkable for the large number of payment cards in the possession of its inhabitants and for the intensive use made of electronic payments at points of sale.

There seems to be no example of routine use of electronic purses, although there obviously are a number of parties interested in developing a system based on this technology and a pilot with Mondex has been launched.

Internet payment is not very developed. One reason is that the existing giro payment system has been so effective, this has delayed development of electronic payments for consumers.

There was a call from experts for issuers of electronic money to be regulated in the same way as banks. There should be certain requirements to reserve funds. Issuers do not need to be banks, but they should be subject to the same kind of regulation. Reporting on the amount of electronic money in circulation must be required. A safeguard against an excessive money supply due to issuance of electronic money should be made.

The issuing of small coin cards was not expected to affect monetary policy making, but electronic money was. Electronic money has a major impact on the international currency markets, due to much faster transfer of money and a higher turn-over rate.

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2.4 Denmark

Payment culture

The payment culture in Denmark is quite unique. According to the statistics of the ECB on payment systems (Blue Book) the amount of cash per inhabitant in circulation is comparatively low. As a proportion of GDP, the amount of cash in Denmark is also considerably lower than average in the EU (cf. Appendix, Table 2). The number of EFTPOS terminals in relation to the size of population is the second highest for the EU, with a large number of transactions per inhabitant, more than three times the average for the entire EU, but with a low average value (cf. Appendix, Table 7). This suggests that EFTPOS transactions are gradually replacing cash, becoming a rule rather than an exception. This impression is backed up by an overall increase in the number and total value of EFTPOS transactions from 1993 to 1997. The volume of EFTPOS transactions increased from 172.3 million to 304.9 million. The value of these transactions increased from 55.75 billion DKK (7.4 billion Euro) to 106.07 billion DKK (14.1 billion Euro, Blue Book, p. 17).

According to the Blue Book in 1997 the number of cards of various types in circulation was well below EU-average (cf. Appendix, Table 5), but with 102 payments per card the average use in Denmark was several times higher than the EU figure of 28 payments per card (Blue Book, p. 174). The number of card payments is also the highest in Denmark compared with the remaining EU countries in relation to all cashless transactions (cf. Appendix, Table 3) and the value of card payments holds the third place after Sweden and Finland among the covered countries (cf. Appendix, Table 4). Cheques are still used fairly frequently although their significance is minor compared to France, Italy or the United Kingdom. Looking at the tables 3 and 4 (cf. Appendix), the Danish situation is special because there are no data available on credit transfer. This reduces the comparability of the mentioned figures.

The national framework

Looking at the Danish scene it seems that this relatively small country has a highly developed and rather uniform electronic payment infrastructure. There is one dominant debit card, DanCard (Dankortet), which is widely used all over the country and the Danish have a single electronic purse, DanCoin (Danmønt), introduced on a nation-wide scale in 1993. This was in those days perhaps with Spain the first prepaid small money card in the world.

Since the 60's there have been major efforts to standardise the interbanking infrastructure. It started with the introduction of a standardised bar code at the bottom of all cheques (called CFC7-line) for the automation of the processing of cheques. Today all domestic interbank transactions in Denmark are fully standardised (the Danish UDUS standard). The development of these standards was a cooperative effort by the banks. Until now the banking branch seems to be the major driving force behind new payment innovations.

An important position in the Danish playing field is occupied by PBS (Pengeinstitutternes Betalings Systemer). Owned by the Danish credit institutes, PBS has been clearing the DanCard since 1983 and has also been involved in the development of the Danmønt-System since 1985. The company called Danmønt, which issues the Danmønt electronic purse, is a subsidiary of PBS.

It is worth mentioning that the financial services landscape was subject to dramatic changes in the early 90s. Before that, the market was dominated by a number of middle-sized banks, which had to cooperate in order to create new innovations. One means of this cooperation was PBS. After a series of mergers, two large banks emerged. The larger of the two is "Den Danske Bank", created through a merger of Handelsbanken and Den Danske Bank. Den Danske Bank has recently taken over a Swedish bank (Ôstgöta Enskilda Bank) and the Norwegian Fokus Bank. The second in size is Unibank, created as a merger between SDS Bank, Privatbanken and Andelsbanken, but its position is now being challenged by a merger between Bikuben and Giro (now BG bank), which recently has amalgamated with one of the larger building societies. Unibank has recently merged with one of the major insurance companies (Trygg). These banks are less committed to cooperation through PBS and wish to market their own electronic products, which might terminate the days with only one common debit card. The former situation has been a major obstacle to innovations related to the application of the Dancard, (e.g. chipcards or multifunction cards): The major banks did not wish to finance further development of a common infrastructure, preferring to build on their own.

Looking at the political arena we have to mention the Danish Payment Card Act. This act from 1984 is a specific Danish regulation without parallel elsewhere in Europe. In its Section 20 it prevented issuers of payment cards from collecting fees from customers and suppliers. This seemed to be a hindering factor for the development of new payment systems e.g. for the Internet. In April 1999 the act was revised and opened the possibility to impose fees on all payments in the context of distant selling.

The issuance of electronic money compared with other European countries also has a particular Danish character. Danmønt is not issued by a bank and therefore the Danish position is not in line with the majority opinion of central banks in the EU.

Last but not least, there have been some efforts to establish a regulatory framework for digital signatures. Denmark should be one of the first countries with an act on digital signatures. It was originally expected to be adopted by the parliament in February 1997. The proposal by the Danish Ministry of Research and Information Technology implied full recognition of electronic signatures as legal proof. However the Ministry of Justice stopped this first proposal and a draft law was then presented for public hearing in mid February 1998. In this draft it is suggested that an electronic signature must be issued with a certificate specifying the validity of the signature. It can, for instance, be specified that a signature is only valid for communication with public authorities, but not for payments. Following the public hearing of February 1998 it was decided to make a new draft which was hoped to be presented as a bill in Parliament in early 2000. The draft should have a more narrow scope than the previous draft and will focus mainly on how to regulate the certification service providers. Questions regarding the legal validity, evidentiary validity, obligatory usage by public authorities, etc. of electronic signatures are currently being examined by a group of experts under the auspices of the Ministry of Justice.

Payment cards

The dominant payment card in Denmark is the Dancard (Dankortet). Out of a population of 5.2 million inhabitants more than 2.8 million have a Dancard (1997). Dancard was introduced in 1985. The card can be used for cash withdrawal at ATMs and for payments in virtually all shops in Denmark (EFTPOS). All transactions are handled by PBS, except those transactions effected at devices of the card-issuing bank. Because Dankortet is the only debit card in Denmark and the clearing is done only by PBS there is something like a monopolistic situation. Dancard is based on a magnetic strip but there are some efforts to replace the magnetic strip with a chip in order to increase security (a major fraud occurred during spring 1999). It is also likely that the Dancard with a chip will include a signature function for use with Internet banking and an electronic purse (see below). A test has already started. Since April 1999 you can use Dancard via the Internet.

Other payment cards, especially credit cards, play only a minor role for the Danish people in Denmark. The figures provided by the European Central Bank (Blue Book) are not in line with figures from Denmark. The Blue Book counts only 193,000 payment cards with credit function in 1997, while other Danish sources claim 281,000 Eurocard / Mastercard, 986,000 combined Visa / Dancards and also a large number of Diners and American Express cards in 1997.

Electronic purses

Danmønt (Dancoin) was started with a pilot in 1992 and at the national level in 1993. Danmønt is a prepaid small money card, based on a chip and issued by a non-bank, the company called Danmønt, which is a subsidiary of PBS. The main areas of use are telephones and laundries, but it is gaining wider acceptance in canteens, parking lots and ticket machines at railway stations. In 1997 there were 500,000 cards issued with 5.5 million transactions at 6,000 terminals, averaging 10 DKK per transaction (1.35 Euro). Despite these figures, Danmønt has to deal in its 6th year of operation with a deficit. The outstanding amount for the Danmønt prepaid card scheme is approximately 1 percent of coin circulation in Denmark.

The technology of Danmønt has been exported to more than 20 countries and was, among other things, licensed by Visa International for the VisaCash trial in Atlanta during the Olympic Games. Up to now Danmønt is only available in a disposable form, but soon there will be a rechargeable variant. There are also plans to integrate Dancard and Danmønt into the same card. Danmønt has not really been developed for electronic payments on the Internet but there are vague plans to bring it to the domain of electronic commerce.

In contrast to electronic purse schemes in other countries (e.g. Italy, the Netherlands, Germany) there are no multi-functional cards combining the electronic purse with other applications.

Internet payment systems

The challenge of electronic commerce leads to the question of Internet payment systems. In Denmark there was strong interest to bring the well established payment cards, Dankortet and perhaps also Danmønt, to the Internet. Notwithstanding available technological solutions, PBS and the banking industry argued that they would not make any effort, if there was no possibility

of charging a fee on the payment transactions on the Internet. As mentioned above, under the Danish Payment Card Act of 1984 it was not allowed to charge any fees either to the payer or to the payee. This conflict led to a debate on this consumer-friendly regulation not only for payments on the Internet but also at points of sale. In April 1999 the Payment Act was revised. A fee on Dancard Internet transactions is now allowed. The law will be revised in year 2001 again. Till then a more competitive market for clearing of payment transactions should have emerged. (Up to now, PBS has a de facto monopoly for clearing transactions.) On this condition a fee on other Dancard transactions at the POS will be allowed. Technologically the solution for Dancard payments on the Internet is SET and since April 1999 SSL. SET users have to pay 1.95 DKK (0.26 Euro) per transaction. SSL users must pay the initial fee of 1.95 DKK per transaction plus 0.15 percent of the total amount of the purchase. The SSL solution for payments with Dankortet on the Internet could be quite widespread, but the imposed fees seem to be a major barrier for acceptance. So alternative ways for payments on the Internet may still get their chance.

Backed by major credit card organisations, IT-enterprises and banks, the SET standard seems to be the solution of first choice for international Internet payments. However, there were at the end of 1998 only seven shops in Denmark accepting payments by SET. Experts from the Bankers Association expect SET to become widespread in one to two year's time. In contrast to this assessment of SET, SSL already seems to be relatively widespread.

So-called network money like eCash or CyberCoin (CyberCash) is not available in Denmark. In 1998 Tele Danmark was running a pilot for a micropayment system on the Internet called Netcoin (also called Click-Money or Clickpay). Netcoin was technologically based on IBM's Micropayment system, formerly known as MiniPay. Three merchants were involved in the pilot: Politiken, the largest newspaper, Borsen, the largest financial paper, and the phone directory of Tele Denmark. Netcoin was generally intended to be used for intangible goods on the Internet like database searches, newspaper articles, local road maps etc. It was paid via the telephone bill. This approach is in some aspects more similar to accounting or aggregating systems than to a real E-Money scheme. A commercial roll out was planned in late 1998 but up to now Tele Danmark has not decided to do so. The project is still in the phase of investigating the market and its potential. Although inter-banking communication seems to be well standardised in Denmark, this is not true in the case of home-banking. Banks wish to market their own products by means of features distinguishing them from competitors. Incidentally, home-banking was already

common before the Internet took off and until now many banks have not adapted their home-banking systems for the Internet.

Internet usage and electronic commerce

As in other Scandinavian countries Internet penetration in Denmark is quite large. One out of two households had a PC in 1998. In November 1998, there were 1.1 million Danish people online, 22 percent of a population of 5.2 million. Although the number of Internet sites in relation to the size of the population is one of the highest in the world, e-commerce is still very limited in Denmark, compared to the retail trade which accounted for 25 billion ECU in 1992. There are estimates for mainly business-to-consumer web based trade (excluding EDI) in 1998 of 300 million DKK (26 million Euro) or 4.9 Euro per capita. According to a recent study by IDC, Denmark accounts for 123 million Euro in electronic commerce, including the business to business sector. Comparing countries from Western Europe the study pointed out that only Finland and Sweden have a slightly higher turn-over than Denmark. The leading position of Denmark in electronic commerce was also pointed out by a survey by the market research agency MORI published July 1999. MORI said that the number of people who have ever purchased a product or service online is 10 percent in Denmark as it is in Sweden, while in Britain it is just five percent.

Main points

The banking industry in Denmark is quite strong and high-tech oriented. Compared to other countries, Denmark was always quite advanced in establishing EFTPOS-systems and electronic purses. The rather monopolistic situation with respect to payment cards gave foreign and near-bank competitors no real chance. But the banks had to accept that the power of the consumers prevented them from charging any fees for transactions with payment cards. This came up for debate in the context of Internet payments and e-commerce and in April 1999 the Danish Payment Act was revised. A fee on Internet transactions with Dancard is now allowed.

Since April 1999 the widely used Danish debit card Dankortet can be used with SSL on the Internet. But the imposed fee could be a major obstacle for acceptance. Other Internet payment systems are not well established, although the Danish people have one of the highest connection rates to the Internet in the world. This seems to be influenced by the previously mentioned position of the

banking industry, not to enter the field of Internet payments as long as the payment fee problem remains unsolved. We have also to take into account the rather low rate of mail order sales to better understand the relatively low level of consumer oriented e-commerce in Denmark, which is estimated at 0.1 percent of total Danish retail turn over.

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2.5 United Kingdom

Payment culture

The past ten years have witnessed a dramatic shift in the payment culture of the UK. In 1988, cheque payments accounted for nearly 56 percent of cashless transactions and debit cards were just being introduced. During the past decade, credit card payments have doubled and automated payments including direct debits have increased by 105 percent. In addition, over the same time period, debit cards overtook credit card usage in 1994 and now exceed credit card payments by nearly 50 percent (cf. Table A).

Electronic payment systems are currently well developed in the United Kingdom, with some of the lowest levels of cash in circulation amongst the group of Ten Countries both as a percentage of GDP (2.9 percent), and of Narrow Money M2 (4.6 percent; cf. Appendix, Table 2). In addition, the UK has more debit and credit cards in issue per capita, than any other European country (cf. Appendix, Table 5) with an average of 43 card transactions per head per year (figure provided by Hyperion). Only Denmark, Norway and Finland, where very different cheque clearing infrastructures are present, have higher levels of payment card usage. Overall, card payments, credit transfers and direct debits make up nearly 70 percent of cashless payment transactions (cf. Appendix, Table 3).

Cheque usage however, remains well above the EU average and only France has a greater percentage of cheque payments (cf. Appendix, Tables 3). The cheque clearing and cheque guarantee card infrastructure builds up on a long tradition and, as a result, is well established and trusted by merchants and consumers alike. Unlike other EU countries such as Spain where consumers moved straight from cash to credit and debit cards, there has been little incentive for consumers to change behaviour and cheque payments remain an important part of UK payment culture.

These changes notwithstanding, cash remains by far the most popular method of making payments in the UK: 73 percent of all payments are made with cash (Table A only shows payments of over £ 1).

The market for retail banking in the UK is fiercely competitive, with a number of high profile new entrants including supermarkets, which in some cases are offering a full range of banking services, and most banks and building societies do not levy any charges on ‘in credit’ customers, i.e. those with a positive balance in their account. This increases the importance of interchange income for card issuers but also has put increasing pressure on cost margins. As a result, many retail banks have reduced the size of their branch networks (there

are now 3,800 fewer branches in the UK than in 1988) and are actively promoting lower cost alternatives such as call centre telephone banking and increasingly Internet banking. It is estimated by Datamonitor that there are currently 450,000 users of Internet and PC banking services in the UK and this is forecast to grow to 2-3 Million by 2003. However, the Internet web research company Euromarketing estimated that the First Direct Bank (http://www.firstdirect.co.uk) alone has 850,000 subscribers. This is a comparatively low figure and may be attributed in part to the lack of a real "forerunner" to the Internet, like BTX in Germany or Minitel in France.

Table A: Development and use of payment instruments in the United Kingdom

Total transaction volumes in the UK (millions)	**1988**		**1991**		**1994**		**1997**	
	absolute	**%**	**absolute**	**%**	**absolute**	**%**	**absolute**	**%**
Cheque payments	3 359	14.5	3 450	13.9	3 074	12.5	2 838	10.9
Paper credit transfers	481	2.1	478	1.9	414	1.7	419	1.6
Automated payments	1 384	6.0	1 848	7.5	2 196	9.0	2 825	10.9
Credit card purchases	582	2.5	661	2.7	768	3.1	1 065	4.1
Debit card purchases	10	0.04	359	1.4	808	3.3	1 503	5.8
Travel and entertainment and store card purchases	89	0.4	84	0.3	147	0.6	191	0.7
Subtotal of payments and transfers	*5 905*	*25.6*	*6 880*	*27.4*	*7 407*	*30.2*	*8 841*	*34.0*
Cash withdrawal (ATMs, counters)	1 441	6.2	1 749	7.1	2 004	8.2	2 246	8.6
Post office order book payments	832	3.6	866	3.5	841	3.4	883	3.4
Cash payments over £ 1 (est.)	14 900	64.5	15 300	61.7	14 200	58.0	14 000	53.8
Total transaction volumes	23 100	100.0	24 800	100.0	24 500	100.0	26 000	100.0

Source: Payments: Facts and Figures, http://www.apacs.org.uk/figures.html

National framework

The UK payments institutional framework is made up of 480 commercial banks, 71 mutually owned building societies and a Government-owned post office. The number of building societies still operating as such has fallen considerably as many of the larger societies have taken advantage of a de-regulation of the sector to convert to banks. This conversion involved the issue of shares to the members of the building societies, who were free to retain these or sell them. In many cases, the shares were worth far in excess of the amount the former member had paid into the building society, resulting in a "windfall" for such persons selling the shares. The amount of money resulting from these sales boosted consumer spending from private households sufficiently to have an impact on official statistics.

The Association for Payment Clearing Services (APACS) is the industry body for the UK's banks and building societies. Set up in 1985 as a non-statutory association, APACS manages both the major paper and electronic clearing systems in the UK as well as overseeing the non cooperative aspects of payments and plastic cards. APACS, through its member banks, has three operational clearing companies:

- Cheque and Credit Clearing Company Ltd. which oversees the paper clearing of cheques and credits.
- BACS Ltd. which is responsible for the bulk electronic clearing and the management of related payment services.
- CHAPS Ltd. which provides electronic same-day clearing in sterling and in Euros.

In addition to these operational roles, APACS formulates payment industry standards and is overseeing other issues of strategic importance to the payments industry such as preparations for the introduction of the Euro, the roll-out of chipcards and the "Year 2000" problem.

Whilst APACS operates as a forum for non-competitive issues such as fraud and chipcard issuance, card acquiring, i.e. recruiting businesses as acceptance points for payment cards, is a competitive business with the two biggest acquirers, Nat West Streamline and Barclays Merchant Services commanding over 60 percent of the market between them. In contrast to the issuance side, where the major banks have steadily lost market share to newcomers, acquiring has become increasingly concentrated.

There are three, currently incompatible, ATM networks in the UK:

- MINT – whose members are Midland, Natwest with TSB and now Lloyds since the TSB/Lloyds merger;
- 4 Bank – Barclays/Lloyds with Bank of Scotland and Royal Bank of Scotland;
- LINK – Founded by Abbey National, Halifax and including all other smaller banks and building societies.

It is expected that banks who are members of the other networks will also join LINK within the next year to 18 months. This is partly since all of the banks would like to charge convenience fees to customers who use the ATMs of other banks rather than their own. LINK is also in the process of implementing an EMV infrastructure suitable for use by all UK banks and building societies.

As yet, there are no banking industry initiatives for the establishment of a UK certification authority, although there are a number of organisations (notably BT, the national telco) who offer a certificate processing service on an outsourced basis. In terms of legislation, this is the only significant area where the UK is proceeding with an e-commerce bill (The Provision of Encryption Services) which was initially put before Parliament in spring 1999. The bill has been delayed due to criticism from a parliamentary committee on the ground that the government was, in its opinion, unnecessarily entangling crime prevention concerns with electronic commerce. In doing so, it was effectively working against its own commitment to make Britain the most conducive country in the world for electronic trade.

The regulatory situation covering encryption-based services in the UK is in a state of overhaul. At present, there are no restrictions on using encryption or providing encryption-based services, such as issuing digital certificates or providing timestamping or other third party services. If the encryption software comes from overseas, or is to be exported, then the relevant export regimes will apply. At present the UK export regime is more difficult to traverse and slower than that which operates in Ireland, for example. The UK government's policy, which was put out for public consultation during March 1999, is that the provision of encryption-related services should be subject to a voluntary licensing scheme. In principle this should amount to no more than an accreditation scheme, but the Government would like to attach other elements to the regulatory framework to give the licence meaning. This licensing scheme is to be implemented by legislation which the government hopes to introduce in 1999. As a result of this proposal, a state of uncertainty remains in the market as the eventual regulatory regime which will apply.

Payment cards

Payment cards account for over 30 percent of all non-cash transactions in the UK and on average each member of the population has rather more than one card and the highest number for all of the countries covered in this study, although there are more in circulation in both the US and Japan (cf. Appendix, Table 5). The major banks issue both Visa and Mastercard credit cards and scheme debit cards, Delta and Maestro respectively. In addition to this, there is a bank-owned private label debit card scheme called Switch. More recently both Visa and Mastercard have issued their own on-line debit cards Electron and Solo, although these can only be used in environments, such as points of sale, where on-line authorisation can be achieved. Roughly 40 percent of all retailer transactions with credit or debit cards are currently authorised on-line. In mid 1999 there was no possibility for on-line authorisation on the Internet. Retailer Cards (which use their own clearing infrastructure) are also popular with a level of ownership approaching 0.3 per capita.

Against a background of major concerns over increasing counterfeit and fraud losses in the early 1990s, APACS members formed an ICC (Integrated Chip Card) project to provide an infrastructure to replace all magnetic stripe based debit, credit and ATM cards with chipcards using the UK ICC specification, UKIS (a sub-set of the wider EMV global standard).

The UK is among the first EU countries to agree to roll-out EMV-compliant chips on debit and credit cards after successful public trials. The roll out commenced in spring 1999 with a view to replacing the 72 Million credit and debit cards already in issue over the next 3 years as well as upgrading nearly 24,000 ATMs. Progress has been good and over 12000 ATMs will be capable of reading chips by the summer. Upgrading the UK's 530,000 EFTPOS terminals to accept chipcards has also commenced, although some of the larger retailers are expressing concerns, not only regarding the costs of upgrading their own terminals (particularly in the light of the costs already anticipated from the introduction of the Euro) but also regarding the speed of transactions in some of their high-throughput locations. This is because the UKIS-compliant chipcard also authenticates the issuer of the card, resulting in a transaction lasting at least one second more than those involving magnetic strip cards.

Electronic purses

There are no nation-wide electronic purse schemes operating in the UK. However, there are two systems which are or were the subject of pilot trials and thus are worthy of discussion.

Mondex, owned since 1997 by Mastercard International, commenced its first pilot with Nat West Bank in Swindon in 1995. 14,000 cards were issued and 600 Retailers took part and it is estimated that Mondex reached a 30 percent penetration of consumers in the town. The trial came to an end in 1998, when Mondex ceased all operations in Swindon also dismantling the infrastructure set up for the trial. Since then Mondex has been involved with six different Universities, running trials as a closed user group. There are no publicly-available roll out plans although it has been strongly rumoured that a roll out would happen in the next 18 months inside the City of London.

The first UK trial of Visa Cash commenced in Leeds in October 1997. The Visa Cash electronic purse can be issued either as a stand-alone disposable product, or as an additional feature on a debit-, credit- or ATM-card. In total over 60,000 cards were issued by six participating banks (Abbey National, Barclays, Co-operative Bank, Lloyds TSB Halifax, and Royal Bank of Scotland) with over 1,000 acceptance points around the town and surrounding area. Findings have never been made public although it is understood that usage levels remain low. However, the cards proved particularly popular in unattended locations as an alternative to coins. The trial has now been extended until September 2000.

In addition to the bank-sponsored deployment of electronic purses, other sectors have been experiencing considerable success with electronic purse-like applications. These include disposable telephone cards for public call boxes, pre-payment cards for utility companies, electronic ticketing for transport and most significantly, pre-pay mobile phones. Increasingly chipcards are also being used as the platform for loyalty applications and it is postulated that the growth in electronic purse transactions will come not from banks but from brand owners wishing to combine payment with loyalty on one multi-application card. However, there are not yet any examples of single-purpose cards that have been developed into more universal payment systems.

Internet payment systems

Neither of the electronic purses were designed with the Internet in mind although considerable effort is underway within Mondex and the Phase 2 Visa-

cash trial in Leeds to accommodate Internet purchases, with Barclays Bank already having achieved successful Visa Cash load via a GSM mobile phone.

There are also currently two "micropayment" services being offered specifically for payments over the Internet. Barclays Bank commenced a pilot micropayments service for its Barclaycard customers called BarclayCoin in October 1997 based upon the Cybercash technology. Consumers can pay for small value items such as recipes, conference papers, handicraft designs and competitions. No official results have been published but the trial was extended in April 1998 to allow non-Barclaycard users.

British Telecom until recently operated BT Array, a trial micropayments service with over 10 merchants selling a variety of small value goods including music, magazine articles, conference papers, and company financial reports. No official results have been published. The project came to and end on 28 May 1999. As a monopoly, British Telecom is prevented by the government regulator OFTEL from operating any kind of accounting system, such as that offered in Germany, whereby small value payments for Internet purchases are added to the phone bill.

SET has been piloted by a number of UK banks, although there are currently no UK roll out plans or bank-approved certification authorities to issue digital certificates. As is the case in many other EU countries, SET is considered an expensive solution and currently requires a level of involvement of the card-holder that is considered inappropriate. Most on-line payments involving the communication of credit card or debit card information across the net are handled, either within a secure SSL session or in some cases in the clear. As in the case of the physical world, Barclays and Nat West dominate the market for Internet acquiring, both offering E-commerce services to merchants. In addition to this, there are a number of other suppliers (BT "Buynet", Trintech "Payware", Worldpay and Datacash) who specialise in the provision of E-commerce services or non-bank software to merchants not wishing to connect directly with the bank.

Electronic commerce

At the end of 1998 the UK was the largest European market in absolute terms for e-commerce with over 27 percent of UK households owning a PC, and 11 percent with access to the Internet from home. Internet use has grown dramatically over the past 12 months with the introduction of subscription-charge free ISPs from major brand owners such as Dixons Freeserve, Virgin, Tesco and BT. This indicates that there might be virtually no revenue for ISP providers in

the long term. However, call charges remain high and in particular BT is pricing ISDN lines considerably higher than their equivalents in other EU countries. More recently Tempo, a major electrical retailer that competes with Dixons, has offered subscription free Internet connectivity with free local calls at off-peak times. With an increasingly competitive telephony market, it is anticipated that prices for connectivity and calls will continue to fall and that major brand owners will subsidise the costs associated with Internet access in order to preserve customer relationships they fear the Internet might damage.

Although Internet growth has been dramatic in the UK, ESTO partner Hyperion feels that it is in the areas of digital TV and GSM mobile phones where E-commerce will reach mass market penetration. Mobile phone ownership in the UK is already over 3 times larger than Internet access and the Government plans to switch off analogue TV broadcasts by 2009 migrating all TV viewing to digital. Sky Digital Satellite and On Digital are already distributing set-top boxes free of charge. The box is equipped with a slot for EMV cards and it is likely to take Mondex soon. There has already been a demonstration to show that GSM phones can be used to load Visa Cash cards.

NOP Research estimate quite optimistically that in the second half of 1998 alone, 1.3 million UK Internet users shopped on-line making a total of 4.8 million purchases and spending £470 million (723 million Euro). According to Datamonitor electronic commerce in the business to consumer sector accounted for 50 million USD (44.6 million Euro) in 1998, and Fletcher Research estimated the total online sales, excluding financial services, at around £230 million (329 million Euro) for the same year (cf. Appendix, Table 8).

Of the products sold, hardware and software were very popular, closely followed by books and music, although on-line travel and event bookings are becoming increasingly important.

Both Barclays (Barclaysquare) and Nat West (Buckingham Gate) have their own on-line malls although consumers are favouring specialist Internet retailers and foreign stores, rather than the on-line version of a UK high street retail store which the acquiring banks have typically targeted for their malls. Of greater importance than such malls are broker and portal sites.

The overall importance of mail-order in the United Kingdom is on the rise.

Main points

Electronic payments and especially card payments are well established in the UK although there is still a considerable role for cheque payments, which benefit from good clearing infrastructure and both customer and merchant ac-

ceptance. Transaction clearing (although not card acquiring) is undertaken under the umbrella of APACS, which oversees non-competitive industry issues including transition to the Euro and the "Year 2000" problem.

The UK is the first EU country to commit to a roll out of chipcards based upon the EMV specification and progress to date is encouraging, although retailers are expressing concerns regarding the costs of upgrading both for the Euro and for chipcards.

There remains no national electronic purse scheme sponsored by banks. It is increasingly likely that non-banks might take advantage of this situation, with large brand owners and telcos innovating in key areas to further develop E-commerce within the UK.

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2.6 The Netherlands

Payment culture

If we use the well established distinction between giro countries, cheque countries and cash countries, the Netherlands, with Germany, belongs to the giro countries. The figures of the European Central Bank (Blue Book) indicate that 51.6 percent of all cashless payment transactions take place by customer initiated credit transfers. This is the second highest value among the countries covered in this study and with data available (cf. Appendix, Table 3; to compare the payment culture between countries the data of the Blue Book are the best available but raise many methodological problems, see remarks on Table 3). But we have to keep in mind that the label "giro country" has a meaning beyond these pure figures. It should be viewed as a set of country specific conditions like the regulatory governance, the degree of competition in the finance sector, the dominant settlement infrastructure and consumer payment habits.

If we follow further the figures of ECB, we see a comparatively large amount of cash circulating in the Netherlands, in terms of the amount per inhabitant, as a percentage of GDP, and as a percentage of narrow money (M1) (cf. Appendix, Table 2) . One factor determining the amount of cash in circulation is so-called cash-hoarding (as in Germany and Switzerland). Overall, there has been a decline in the importance of cash in the last years and an increase in the importance of card based payments. The number of cashless transactions with payment cards (in share of all cashless transactions) increased from 3.1 percent in 1993 to 18.2 percent in 1997, while the value of transactions with payment cards (as a share in all cashless transactions) is still tiny at 0.2 percent (cf. Appendix, Table 3, 4).

The number of cash dispensers and ATMs is rising, with an average number of 33 transactions per inhabitant and year in 1997, a top rate in the European context comparable with those for Finland, Sweden and the UK (cf. Appendix, Table 6). With 7,715 EFTPOS terminals per one million inhabitants the Netherlands are near the average value for the EU (7,146). The number of EFTPOS transactions (31.1) is above the EU average (15.7) and is comparable to France (39.3), although Denmark (57.7) and Finland (50.9) are the clear leaders (cf. Appendix, Table 7). According to figures from the European Central Bank (Blue Book) and national sources there is an extremely high number of cash and payment cards in circulation (24 millions in 1997), roughly an average of 1.5 cards per inhabitant. Credit cards are not as popular as other payment cards

(4 million credit cards and 20 million debit cards). The use of cheques has typically been low in the Netherlands and is rapidly declining further.

The national framework

The Netherlands banking industry is concentrated on few institutions, with each branch catering for more than twice as many customers as in Spain (453 compared to 960 branches per 1 million inhabitants).

Each bank processes its "on-us" or "in-house" payments (i.e. both parties to the payment have their accounts at the same financial institution) and passes the other payments through for clearing and settlement to Interpay Netherlands. Interpay sorts and redistributes the payment information, performs netting of gross obligations and sends settlement payments to the central bank. There is only one processing centre for the PIN Card (Interpay Nederland BV, owned by the banks) and one network for EFTPOS (since 1993, previously there were two EFTPOS networks). Retailer Cards are (partly) processed outside this environment.

There is an ongoing discussion about pricing strategies for payment services. Clear competition with respect to pricing of products could be observed in the period 1990-1995 when at first a transaction based fee structure was introduced, only to be partly abolished later on. Currently a mix of pricing arrangements can be observed, ranging from indirect pricing (no fees, no interest) to partly direct pricing (some fees, some lower interest). Full transaction based pricing cannot be observed for the consumer market but is general practice in the business segment.

Payment cards

The dominant debit card in the Netherlands is the "PIN Card" (20 million cards), which is supported by the whole banking sector. Six to seven million have been issued by Postbank, five million by RaboBank, four to five million by ABN Amro, and smaller banks have issued the rest. You can use the PIN Card at ATMs and at POS. As 60 percent of the population has more than one giro account, the ratio for the number of cards to the size of population is larger than one. There are also about four million credit cards (2.2 million Eurocard holders, 1.6 million Visacard holders, 200,000 Amex card holders and 120,000 Diners Club card holders). The number of retailer cards is marginal with about 250,000 in total.

Electronic purses

The early history of the electronic purses in the Netherlands can be traced back to the late 80s (a chipcard trial in Woerden). Nowadays there are two electronic purse systems, Chipknip and Chipper. The chips for these purses are normally integrated on the PIN Card.

Chipknip started with a pilot in Arnheim in 1995 and was launched nationwide in 1996. There are (figures from October 1998) 12 million cards issued with Chipknip, 120,000 terminals and 7.000 specific loading devices. 15 percent of the 12 million owners of Chipknip are using it. ABN-AMRO, Rabobank and other banks are backing the Chipknip system. Technologically Chipknip is based on the Belgium Proton system, as is the Swedish Cash Card. Since the decision of the ING Group, a global financial institution of Dutch origin active in the field of banking, insurance, and asset management, of September 1998 only to support Chipper, ING Bank is no longer issuing Chipknip. ING Bank was the only bank that issued the Chipknip on a separate card, and did not integrate it on the PIN Card.

Also in 1995, a pilot started in Groningen, Enschede, and the Province of Seeland with Chipper. Chipper not only provides a payment function but also multifunctionality and in the meantime Chipknip has taken over this approach. In 1997 the national roll-out took place with 225.000 cards, 20.000 terminals and 18.000 loading devices, which are the PTT telephones. In 1998 there were 5 million Chipper cards issued, 45.000 (according to other sources 20,000) terminals installed and you could load Chipper at about 20,000 phone booths and from home with specific loading devices attached to the phone. Chipper is backed by KPN Telecom, Postbank and since September 1998 by all other banks of the ING Group.

Initially there was a joint commitment by the banks to issue a single electronic purse product on the basis of the Proton technology. But later on the Postbank announced its intention to develop its own product. This was done to be able to add some services on to their chipcard (Chipper), which was not agreed upon according to the issuers of Chipknip. Although the two competing issuers did not intend to build separate infrastructures, it started to happen. But recently they officially confirmed their original intention and committed themselves to comply with the CEPS-specifications in the future.

Today millions of people have a Chipper or Chipknip on their PIN card, but usage nevertheless is still quite low (exact figures are not available at the moment). Experts guess that only 15 percent of the issued electronic purses are used. This would amount to 2.5 to 3 million active cards. The reported e-

money float (that is the amount loaded on electronic purses) to the Dutch National Bank was 55 million guilders or 25 million Euro (Source: Quarterly Report of DNB from March, 1999). This would indicate that the loaded amount is be somewhere between 18 to 22 guilder (10 Euro) per active purse. The average value of each transaction is about 5 Euro.

The main areas of use are retail, vending machines and recently parking machines and payphones. Despite the fact that the parties have ended their conflict, some applications still only work with either Chipper or Chipknip, e.g. parking machines and payphones. However, this is more for technical reasons. KPN Telecom has made its payphones suitable for Chipper devices. Because they have the leading edge in the technical development of Chipper, payphones were initially not equipped for Chipknip. Since March 1999, all KPN Telecom phones accept Chipper and Chipknip. Another Telco provider, Telfort (partially owned by the Dutch railway), has recently announced that their payphones, which are located at railway stations, will also accept both Chipper and Chipknip devices. Also, all new parking meters accept both schemes.

Payments on the Internet

Chipper and Chipknip were not initially designed for the use on the Internet but for local use at POS, parking meters, vending machines etc. But nowadays there are some developments to make the electronic purses available on the Internet. KPN Telecom is working hard on an Internet version of the Chipper, called *CyberChipper* (with a pilot trial within the ADSL project in Amsterdam, commissioned by KPN Telecom). Rabobank is working on an Internet version of Chipknip. Pilots are also on the way.

I-Pay is the only payment system on the Internet available and operational, although it is restricted to domestic payments. I-Pay was developed by Interpay Nederland BV, the same enterprise responsible for payment networks and clearing interbank payments (e.g. for the PIN Card), along with several banks. I-Pay is technologically based on the IBM 3kP or iKP protocol. I-Pay is supported by all Dutch banks. To use I-pay, a consumer has to use certified software (distributed by her or his bank) and a hardware token (like TeleChipper a home reloading device from the Dutch PTT). I-pay has an international SET-application and a domestic debit card application under the brand name Maestro. This means that a user can choose to pay either by means of credit card or by means of a direct transaction from his bank account. Processing of the transactions is done by Interpay too. By the end of 1998, nearly 90 suppliers could be identified. Compared to other countries, this is quite a good figure in

an evolving market. Although I-Pay is the only operable payment system especially for the Internet we have to assume that it is seldom used. 20,000 users have been reported but exact usage statistics are not available at the moment.

Apart from some general difficulties associated with on-line payments and e-commerce SET is not widely used in the Netherlands, because of the minor importance of credit cards and relatively high costs for transactions. I-Pay has been adapted to comply with SET and SET will be introduced in several phases in 1999. VSB international, issuer of Visa cards in the Netherlands, is piloting SET with 2,000 users in 1999.

KPN Telecom introduced in 1998 the 0900 Internet Connect payment service, where the user has the possibility of paying for Internet services by telephone, a mechanism that actually works outside the Internet. 0900 Internet Connect can be seen as one approach to solving the problem of paying small amounts of money. Real micropayment systems are not in use in the Netherlands.

"Airmiles" loyalty points are quite popular in the Netherlands. Buying tickets from the Netherlands Airline and goods at a lot of well known and nationally widespread shops you can get discount or loyalty points (Airmiles). Out of an "Airmiles catalogue" you can purchase goods and services. This has currently nothing to do with Internet payments. But the large supermarket chain Albert Heijn is looking for opportunities to apply the popular Airmiles card to the Internet and to make the "Airmiles catalogue" available for purchases on the Internet. This could lead to the evolution of a "near money" scheme for payments on the Internet.

Internet usage and electronic commerce

According to various sources there were about 1.0 to 1.9 million Dutch Internet users in 1998. The National Internet Monitor 1998, conducted by Pro Activ, estimated that the Dutch had spent 1.1 billion guilders (500 million Euro) online. 14 percent of all 7,000 Internet users surveyed had made at least one online purchase during the two weeks the research was being conducted. Two thirds of a total of 7 million purchases were under 100 guilders (45.38 Euro). Business purchases are included in this study. They account for 40 percent of all purchases. At the top of all products is software, which accounted for 2.6 million purchases and represented 330 million guilders (150 million Euro). Next follow hardware (500,000 purchases and 150 million Euro), and books (1 million purchases and 29.5 million Euro). General retail such as travel, clothing

and durable goods accounted for 2 million purchases, valued at 300 million guilders (136 million Euro).

It is interesting to note that half of the 500 million Euro was spent outside of the Netherlands and half of the software purchases were downloaded from outside the country.

The study found that users making online purchases outside the Netherlands used their credit cards while those making purchases within the country used traditional means.

These figures by Pro Activ are in sharp contrast to a study by Blauw New Media. They found that Dutch Internet users were expected to spend a total of only 39 million Euro on online purchases by the end of 1998.

The retail sector in the Netherlands has a turnover of 69.3 billion ECU (figures from 1992). Mail order purchases in 1996 accounted for 2,223 million guilders (1,009 million Euro) a share of 1.8 percent of the retail sector, which is quite a low value compared to Germany, the UK or the USA.

The share of consumer oriented electronic commerce of the retail sector based on the available figures is hard to estimate (cf. Appendix, Table 8). Based on the figures of Blauw New Media the share is about 0.05 percent. If we take into account the figures of the National Internet Monitor by Pro Active and assume the volume of consumer oriented Internet trade at 250 million Euro, the share is about 0.35 percent. This means that every single purchaser in 1998 (about 200.000) would have spent 1,250 Euro. It is likely that this is an overestimation. According to these surveys the range of consumer oriented Internet trade in Euro per capita and year (1998) is from 1.5 up to 16.9.

Main points

The payment culture in the Netherlands is characterised by a dominance of cash payments. As for the non-cash remote payments, direct debits and inpayments (i.e. pre-processed bill-payments forms, which are mostly attached to the bill) are the preferred (giro) payment instruments; at the point of sale the PIN Card is preferred and its usage is still increasing. Cheques and credit cards are not so popular.

Besides a quite high concentration in the banking sector and a monopolistic infrastructure for EFTPOS systems there are two competing electronic purses which are not quite successful yet. Possibly this is due to weakness in the “co-opetition” of the banking sector. New technologies and the Internet could have a major effect on the development of interbancarity.

Despite the fact that I-Pay is at an early stage of market penetration, it is worth mentioning that it is supported by all Dutch banks and integrates different payment instruments. 90 suppliers at the end of 1998 is a small number, but it could be a good starting point for e-commerce with Internet payments.

Special consideration has to be given to activities backed by the retail sector. The Airmiles system could evolve to a near-money system which might be supported by many well known merchants. There are plans to make it available on the Internet.

In the context of purchases outside the domestic market there are some surprising (and rare) figures. Half of the amount of purchases on the Internet are made outside the Netherlands. If we assume that this observation could be generalised for other countries, this would be an important finding for the development of e-commerce.

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2.7 Germany

Payment culture

According to the figures of European Central Bank (Blue Book) there is in comparison to other European countries a large volume of cash in circulation, both per inhabitant and as a percentage of the GDP. In 1997 Germany ranked first place of the covered countries with 1,532 ECU per inhabitant (the figure for all EU-countries is 972 ECU) and a share of 26.3 percent cash of narrow money (EU 29.2 percent, while Ireland, Austria and Greece are the countries with values higher than the EU mean). Germany holds the second place after Spain with 6.8 percent of notes and coins in circulation as a percentage of gross domestic product (EU 5.2 percent; cf. Appendix, Table 2). One factor determining the amount of cash circulating is the fact that the DM, like other stable currencies e.g. US Dollars, Swiss Francs or the Dutch Guilders is hoarded in countries with weak currencies. Apart from this, cash is dominant for payments in the retail sector. According to a study by EuroHandelsinstitut in 1997 76,5 percent of turnover in German retail trade corresponds to payments in cash, 14.5 percent by payment cards, 5 percent by credit transfers and 3,5 percent by cheques.

The density of ATMs and cash dispensers is high, with a fairly low average number of transactions per inhabitant (cf. Appendix, Table 6). However, the average value of these transactions is among the highest in Europe (ca. 146 ECU in 1996; figures for 1997 were not available).

The statistics for Germany indicate a relatively low diffusion rate for EFTPOS terminals: 1,984 per 1 million inhabitants in 1997 compared to 7,146 in EU countries (cf. Appendix, Table 7). Figures are only available for two kinds of EFTPOS procedures, named “electronic cash” and “POZ”. Because other procedures are widely used (e.g. ELV), which are not backed by the banks, it is safe to say that the exact figures would be considerably higher. The number of payment cards has increased massively over the past five years from 44,8 million in 1993 to 85.2 million in 1997. The significance of cards for cashless payments is increasing, but still minor. The data by EuroHandelsinstitut say that in 1994 6.2 percent of all retail payments were effected by payment cards, while in 1997 this share had increased to 14.5 percent.

Looking at the use of cashless payment instruments in general, cheques were never of great importance, and their use is declining still further (cf. Appendix; Table 3 and 4). Although 42.0 percent of all cashless payments are made by direct debit, these do not account for more than 2.5 percent of the value of all cashless transactions. Credit transfers and direct debits are the most

important cashless payment instruments with regard to the number of transactions, but credit transfers are obviously used mainly for larger payments, since 95.9 percent of all cashless money transfers correspond to credit transfers. If we divide the value of credit transfers into the sector of interbank and large value transfers on the one side and customer initiated transfers on the other side, then 80.2 percent of all cashless transactions belong to the first and 15.7 percent to the second category. Compared with the other countries covered, a share of 15.7 percent customer initiated credit transfers on all cashless payments leads the field. Overall these figures indicate that the payment culture in Germany belongs to the so called giro-countries.

The national framework

In absolute figures there is a very large number of banking institutions (3,409 in 1997), presumably because of a dense network of local or regional "Volksbanken", "Sparkassen" (savings banks), each of which operates as a separate institution. 42 banking institutions per one million inhabitants in Germany (figures for 1997, sources from Blue Book) is the fourth highest value in the EU after Luxembourg (520), Austria (123) and Finland (68). There is also quite a high number of banking branches compared to other European countries. Even so, Germany holds only the seventh position with 727 branches (including post offices offering payment services) per one million inhabitants in 1997.

The banking industry is organised in five main associations which jointly established the ZKA (Zentraler Kreditausschuß). ZKA is the top level committee for all major decisions dealing with payment systems (e.g. in the last years decisions on the EFTPOS-systems "electronic cash" and "POZ", the electronic purse "GeldKarte", and the "Homebanking Computer Interface" standard, HBCI). These decisions are backed by the "bank privilege" under German cartel law (GWB, Gesetz gegen Wettbewerbsbeschränkungen), which permits agreements in the banking sector concerning payment methods. Despite the fact that there are several processing centers for interbank payments and also several networks for EFTPOS and ATMs, we observe a relatively high degree of uniformity in standardisation of payment infrastructure in Germany. Each German debit card can be used for cash withdrawal at all German ATMs without any problem, and at all EFTPOS-terminals too. Using it at ATMs other than of the card issuing bank causes fees and acts as a barrier to more frequent use. The drawback of the ZKA regime is, however, a certain deceleration of innovation dynamics, since decision making by ZKA depends on

a consensus of all participating associations. Against this background "rapid" and "daring" decisions are not to be expected. However, deviation of individual banks (or near-banks) from the ZKA consensus has happened several times in the past, but usually with only limited success. There is one exception: in the case of EFTPOS-systems the ZKA-methods "electronic cash" and "POZ" did not achieve the dominant position compared to "wild" methods ("ELV") based on the German "Lastschrift" (direct debit) which were introduced by some payment service providers (non-banks) and supported by some sectors of retail. Part of the banking industry is tolerating these systems.

Quite early on, German politicians dealt with a number of new laws related to electronic money and e-commerce. In 1997 an Amendment of Kreditwesengesetz (KWG, German Banking Act) passed legislation. It came into force in 1998 and rules that only banks are allowed to issue electronic money (electronic purses or prepaid cards and so called net-money). Again in 1997, the German Information and Communication Services Act (IuKDG, Informations- und Kommunikationsdienstegesetz) was passed. This act deals with the duties of ISPs, privacy, digital signatures etc. The new Act on Digital Signature (Signaturgesetz, part of IuKDG) regulates the infrastructure and security standards for digital signatures. But it does not force anyone to rely on digital signatures conforming to the law and does not prohibit alternative digital signature schemes. Both acts have their counterpart in proposals for directives at the EU level. It is too early to determine the impact for these directives on German law.

Payment cards

The dominant payment card in Germany is the Eurocheque Card with about 60 million cards issued. It was introduced in the 70s as a cheque guarantee card to "defend" the German market against credit card organisations. While the use of cheques is declining, Eurocheque Cards (and bank cards, usually without the guarantee function) are now used mainly at ATMs for cash withdrawal and at POS. Traditionally the card is equipped with a magnetic strip and must normally be authenticated for use with a PIN. Since the beginning of 1997 most of these cards have additionally been equipped with the German electronic purse chip, called GeldKarte.

Because of banking policy in former years, credit cards are not so widespread in Germany. There were about 15.2 million credit cards in 1998 and they are getting more and more popular. There is also a growing number of retailer cards with a payment functionality (about 5 million in 1997). Most

broadly diffused are payment cards by Quelle (mail order), Douglas (perfume chain) and Hertie/Karstadt (department store). Altogether we found about 20 different systems of some importance.

The usage of payment cards compared with other European countries is fairly low. In Germany the share of transactions with payment cards of all cashless transactions is 4.1 percent, while the European mean is 18.2 (cf. Appendix, Table 3).

Electronic purses

GeldKarte is the German electronic purse system supported by the whole banking industry and based on a formal agreement between the five banking associations within ZKA. One main advantage of GeldKarte is that it is based on an open standard, so that every interested provider fulfilling the requirements of the specification can contribute with hard- and software to the system. GeldKarte was tested during a pilot in 1996 in Ravensburg and Weingarten while the introduction at the national level started in 1997. At the end of 1998 about 45 million GeldKarte had been distributed. Nearly all of them are integrated in the Eurocheque Card or bank customer cards. This impressing figure has to be qualified by the fact that only about 0.5 million of these cards are really used. 13.6 million purchases with a value of 175 million DM (89.5 million Euro) were processed in 1998. This averages at 12.87 DM (6.5 Euro) per transaction.

The retail industry complains about the transaction fees which are 0.3 percent of the transaction value with a minimum of 0.02 DM (0.01 Euro). Normally GeldKarte is rechargeable at special terminals against the bearer's own giro account. The GeldKarte is also available as "white card" that can be loaded against cash and does not require a banking account. It appears that the banking industry is doing little to promote this variant. The GeldKarte chip is capable of multiple functions such as loyalty schemes or electronic parking tickets. It was announced that in 1999 or 2000 GeldKarte could be used at all 100,000 card telephones owned by Deutsche Telekom.

Worth mentioning are two further electronic purse schemes, the prospects of which are quite unclear. These are the P-Card and the PayCard/T-Card. P-Card was issued by a consortium of technology providers and some retailers with a pilot in 1997 in the small town of Höxter. As far as we know there are no ongoing further activities. PayCard/T-Card is being backed by Deutsche Telekom in conjunction with some public transport companies. In 1998 there were about 150.000 cards issued. One can load PayCard/T-Card from all 100,000 card

telephones of Deutsche Telekom. It is possible to pay with PayCard/T-Card at all card telephones and at some public transport ticket machines. PayCard/T-Card is still in operation but new cards are not being issued by Deutsche Telekom at the moment. Its future is quite unclear.

Internet payment systems

The main trend is the use and the adoption of the well established payment systems on the Internet. But without doubt, most payments for Internet orders are still done outside the Internet by methods like credit transfer, direct debit, credit card or cash on delivery (in order of importance). Debit cards, however, are neither used in Germany for mail order purposes nor for Internet orders. Some payment technology providers have been offering solutions for the use of GeldKarte on the Internet since 1997. In 1999 SIZ, the technology centre of the saving banks, is running a public trial. But up to now no single bank has dared to push Internet use without backing from ZKA and the whole banking sector.

SET is available at some German Internet malls (like My-World or Bodensee Mall) and some banks and payment providers are supporting it. But SET is not well established in the Internet payment culture in Germany. However, we have to consider that SET is at a very early stage of diffusion so its prospects remain open. In contrast to SET, credit card payments with a secured transaction channel (mainly via SSL) are becoming more popular.

Another activity is aiming at an electronic direct debit system (in the context of the CyberCash trial). But again, it is too early to talk about success or failure. CyberCash, a consortium of Dresdner Bank, Sachsen LB and other bank institutes with CyberCash USA, is also an example of a system trying to integrate different payment solutions under a single umbrella. CyberCash integrates payments by credit card, “Lastschrift” (electronic direct debit, edd) or CyberCoin. The intention to integrate SET has also been announced.

Deutsche Bank has been promoting DigiCash’s eCash system since 1997, stepping up support in 1999. Both ECash and CyberCash are not broadly diffused.

An alternate method of payment is offered by accounting systems backed by some ISPs. The customers of T-Online, CompuServe or Germany.net can purchase and pay with this method at a variety of electronic shops. Settlement is done by the regular telephone bill or ISP invoice. These systems are useful for both intangible goods and micropayments. Surprisingly plans of Deutsche Telekom (with their subsidiary T-Online) to bring its Videotex-accounting

system (Btx) to the Internet were cancelled at the end of last year. The reasons were not published, but presumably security and costs raised major problems.

The comparatively large number of home-banking accounts in Germany (more than 5 million in 1999) also has to do with the Btx-System (now T-Online), introduced in the 80's. The majority of these online accounts is still available within T-Online only, but there is a growing number of banks that also support online banking via the Internet. The new ZKA online banking standard, Homebanking Computer Interface (HBCI), should speed up this process.

Internet usage and electronic commerce

Internet usage is still increasing. Six million private households have access to the Internet (1998) and a growing number of persons is using the Internet for shopping and purchasing. According to a recent study by GfK there were at the beginning of 1999 8.5 million online users, of ages between 14 and 59 years. 2.2 million of them (27 percent) had purchased something online during the last twelve months. Most frequently purchased products were books (purchased by 400,000 persons in 1998), Software (by 300,000), CDs (by 200,000), clothes (by 200,000) and sports products (by 100,000).

No exact figures are available for e-commerce so we have to guess. While the overall retail sector in Germany accounted in 1997 for 715 billion DM (366 billion Euro) and the mail order sector, which ranked high in the international context, accounted for 60.7 billion DM (31 billion Euro), eco, the German Electronic commerce forum, estimated the business to consumer e-commerce sector at about one billion DM (0.5 billion Euro) in 1998, certainly with high growth rates. According to W3B, a well-known periodical Internet survey, during 6 months in 1998 Internet purchases in Germany and abroad added up to 340 million DM (174 million Euro) which adds up to 680 million DM (348 million Euro) for the whole year. These figures are in line with other sources saying that in 1998 1.7 million Germans had purchased goods and services on the Internet with a value of 500 million DM (256 million Euro). In a recent study, Axel Springer Verlag gives a picture of the Internet market, estimating 251 million DM (128 million Euro) for product purchases by private households. As mentioned, the main share of these is due to orders of tangible goods like books, CDs, hardware, software (not delivered electronically), and tickets. But there is also a considerable sector of digital goods, mainly database information. All in all we guess that in 1998 the share of Internet commerce in the business to consumer sector did not account for more than 0.1 percent of the

overall turnover of the entire retail sector. According to the cited studies, in 1998 between 1.6 and 6.1 Euro per capita was spent in the consumer sector of electronic commerce (cf. Appendix, Table 8).

Main points

Looking from the viewpoint of the banking industry there are some interesting payment innovations taking place, but one is left with the impression that its main interest is not to foster innovation but to control the ongoing development. Viewed from the angle of the merchants and suppliers it seems that they can do e-business by means of the conventional payment methods as far as e-commerce of the mail order type is concerned.

Among the countries covered in the study only in Germany were there ongoing efforts to bring micropayment systems and "net money systems" like eCash or CyberCashs CyberCoin to the market.

The great power of the banking industry and the early and relatively restricted regulation of e-money could be discussed as one hindering factor for innovation. Initially there were three electronic purse systems on their way, but now only the banking industry's and ZKA's GeldKarte is left. But we have also to take into account, that this strong regime is still a factor safeguarding stability, security and compatibility in the payment sector.

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2.8 France

Payment culture

The figures for cash in France are among the lowest in Europe, regardless if measured as cash in circulation per inhabitant (673 ECU in 1997), in relation to the Gross Domestic Product (3.2 percent 1997), or with respect to its share of M1 (13.5 percent 1997, cf. Appendix, Table 2).

Cheques and payment cards reach very high scores in France. 46.3 percent of transactions are made by cheques, while 21.6 percent of the total number of transactions are already made using payment cards (cf. Appendix, Table 3). It is worth mentioning that all French credit cards are also debit cards. To be more concise: 780,000 out of 30 million debit cards (1997) are at the same time credit cards.

The number of POS-terminals in relation to the population is clearly above the average of the EU (absolute number 560,000 in 1997), while the number of ATMs is slightly below the average (cf. Appendix, Table 6 and 7). Even the number of payment cards per inhabitant is surprisingly a bit below average (cf. Appendix, Table 5). *But* the usage of these devices is extremely high. Each payment card is used 83 times a year for payments and 28 times for cash withdrawal (following data provided by Groupement des Cartes Bancaires. The data of the Blue Book gives a similar impression on a different basis: there are 39.3 EFTPOS transactions per capita in France compared with 15.7 in EU-15, cf. Appendix, Table 7). If we compare these figures to the use of cheques, we see firstly that payment cards, especially debit cards, are used more or less with the same frequency. On average about 80 cheques per adult are used for payments each year. Secondly, this comparison makes clear that payment cards are challenging payments by cheque. Compared to their neighbours French individuals are quite unaffected by credit transfer instruments in the context of shopping. This can be explained by the strong competition of the cheque. However, in the context of permanent orders credit transfers are used (cf. Appendix, Table 3).

France is one of the leading countries regarding retail electronic payment systems. Here we find the most successful case world-wide of a widespread deployment of chip-based bank cards.

Electronic banking constitutes the largest business-to-customer service of Minitel. Its penetration is considerably higher than in other European countries, such as UK or Germany or in the United States (although lower than in Scandinavian countries). Videotex and audiotex home-banking services are used by

close to 20 percent of French households, a percentage four to five times higher than those of the above mentioned countries.

National infrastructure

Interbancarity in France regarding electronic payments takes place at three different levels: at the professional level (e.g. inter-bank exchanges), at the level of common economic interests and at the level of "bank clubs", where common commercial services and hence the competitiveness of banks within financial industries can be defined. Those three levels of co-operation regulate the French banking sector in a flexible way. The high level of interbancarity and the efficient clearing system have allowed France to define multiple standards and to impose them. The deployment of an interoperable smartcard system (the debit card of Groupement des Cartes Bancaires) in France is one major success story for this type of co-operation. The willingness to reach interoperability makes it difficult for a single financial actor (and for newcomers too) to launch new payment systems.

The regulation of e-money in France strengthens the position of banks even further. The French Central Bank began to study e-money in 1989, when La Poste decided to develop its electronic purse project. According to Banque de France e-money does not represent a new kind of money, but only a new payment instrument. The French central bank would like e-money to be classified as a segment of scriptural money. Therefore it seems logical for the French Central Bank that only financial institutions should be allowed to issue it.

Payment cards

In 1989 French banks took a collective decision to introduce the chip in all banking cards. The ensuing process was completed in 1992. Hence on the one hand the French payment card market is characterised by a large number of bank issued cards bearing the CB logo and on the other hand by a significant number of private label cards (often retailer cards) which give access to a line of credit. While in 1998 the number of "CB" cards in circulation was approximately 30 million, the number of private label cards presumably reached a similar figure.

The CB card is widely distributed and can be used at all French ATMs and at all POS terminals. The CB card is primarily a debit card (only 3 percent of CB cards have a credit function). It is issued by French banks and regulated by

the Groupment des Cartes Bancaires which also acts as the network operator. In sharp contrast to smartcards in the rest of Europe the CB card does not conform to ISO 7816-2. This part of the ISO-standard determines the position of the chip. The unique position of the chip on the CB card might be regarded as an important handicap for its use at non domestic terminals and at the same time the particular terminal design is a hindrance for payment cards from abroad to enter the French market.

The CB smart card was developed very early at a wide scale involving the French smart card industry (Bull, Gemplus and Schlumberger). French banks' primary objective was fraud decrease and to reduce costs thereby. This aim has been successfully met. This early compromise towards smart cards may be seen as an advantage for the development of new secure payment systems such as payments over open networks.

There are few systems using the CB card for remote payments. Two of them are running on the Télétel platform, but they remain marginal.

Electronic purses

The launch of electronic purses in France is taking place later than in other countries, maybe because the CB smartcard is already in use for applications such as parking meters and public phones. As far as we know three pilots will soon be launched. One pilot in Tours will be run by SEME (Société Européenne de Monnaie Electronique), building on the German GeldKarte technology. SEME was founded by BNP, Crédit Agricole and other French banks such as Banques Populaires, CCF, CIC, Crédit Lyonnais and Crédit Mutuel. In a second pilot, financial institutions and transport operators will work together focusing on contactless technology and ticketing/payment applications. The system will be called Modeus and run by a firm of the same name. Modeus was founded by Groupe Caisse d'Epargne, La Poste, la Société Générale, la RATP et la SNCF. The pilot will be carried out in parts of the Paris region (Noisy le Grand and Montparnasse). The third pilot involves the Mondex technology. The purse will be issued by Crédit Mutuel.

Internet payments

Minitel is the adequate starting point to discuss Internet payments in France. There are three types of payment methods in operation:

The *Kiosk* system uses connection time as its billing unit. France Telecom plays the role of intermediary between the customer and the merchant. The system is not suitable for the trading of tangible products. To fill this gap payment systems based on the CB debit card emerged, as mentioned above. One system was not very successful, because of security weaknesses, another needed a smart card reader connected to the minitel terminal. This is a secure solution, but apparently could also not attract many customers.

Today the switch to the Internet is unavoidable. But it is not yet clear which payment systems will emerge. Different payments systems are currently in use and developed in France for transactions taking place over Internet. They include:

- Cyber-COMM project, which, since June 1998, has brought together two previously competing initiatives: on the one hand, e-COMM, launched in 1996 by BNP, Société Générale, Crédit Lyonnais, France Télécom, Gemplus and Visa International, on the other hand, Cybercard, based on the C-SET specification defined by Groupement des Cartes Bancaires, and launched in 1997 by Europay France and a number of French banks. Cyber-COMM seeks to integrate the Secure Electronic Transaction (SET) protocol for secure payment over the Internet with the existing smart card-based debit card. Cyber-COMM aims to become operational by mid-1999. Representatives of the project hold that "all French banks agree that this solution should be the French banking solution".
- KLELine, a subsidiary of the bank Paribas, serves as a financial and technical intermediary between Internet buyers and sellers by protecting confidential data, authenticating the participants, and providing back office services to the merchants (acquisition, authorisation, settlement and clearing linkages, accounting including multicurrency treatment, technical support). KLELine offers both card account debit (covering the range of cards, bank cards, American Express and retailers' cards) and a virtual e-purse, based on proprietary technology. Since KLELine was launched in September 1996, dozens of virtual shopping malls and Web merchants across eight countries in Europe, Asia and America have chosen it. 80,000 consumers, from over 130 countries, have downloaded Klebox software.
- ShopperLine, developed by Atos, a leading French processing and system integration company, combines merchant front office applications such as cross selling, up selling, and stock selling, with secure payment functions based on the Secure Internet Payment System (SIPS). In this way, a merchant using ShopperLine can manage its customer-, product- and payment-functions, making them available across various remote distribution chan-

nels. Customers can browse, select, order and pay in complete security from any remote terminal, whether it is a computer, Minitel or telephone.

Like in all other countries, SET is a topic in France and there is an interesting discussion going on arguing that SET, although relying on certificates, would not be appropriate. In the paper of our ESTO partner GEF there is a distinction drawn between four security levels for payments over the Internet. First, there is an obvious lack of security involved in sending sensitive transaction data over the net. Second, to improve security, systems based on digital certificates and digital signatures evolved. SET is the best known outcome of this approach. A double problem remains unsolved: SET is basically a software solution and the identification procedures are not related to individual cardholders/customers but to computers only. This risk can be avoided by using smartcard technology as in projects such as C-SET and Cyber-COMM. Systems like this are as secure as POS-terminals and ATMs. But there still remains a problem that even a solution of the Cyber-COMM type could not solve: the customer-merchant relationship of e-commerce is no longer balanced, e.g. the customer has always to pay in advance, prior to the delivery of goods and services.

Interestingly the next step, the “fourth solution”, has been proposed by some French banks. We cite the GEF-paper: “One solution would be to develop a payment system involving two trusted third parties, namely banks and product delivery companies. Such system involves the creation of an omnibus (escrow) account at the customer's bank. When the customer wants to pay on the Internet, his bank transfers the required amount to the omnibus account and informs the merchant the money is available. When the customer receives the product in accordance with his order, he notifies the bank, which then transfers the amount of the transaction to merchant's account. This system has the major advantage to restore the balance in the customer-merchant relationship but may be complex to implement and is likely to require well-defined clearing and settlement arrangements, which may require service charges.” It is important to note that this point of view is not the opinion of *the* French banking sector, but one existing opinion. The “fourth solution” clearly has to be interpreted as a model and not as a concrete project.

Electronic commerce

Although France might be termed a latecomer in terms of Internet access and Internet commerce, it looks as if the French are undertaking a serious catch-up effort:

- Annual increase in micro-computers sales exceeded 21 percent and 25 percent of all households are now equipped with PCs.
- The number of Internet users has doubled in a year and is now in excess of four million people.
- There were in the first half of 1999 2 million PCs with Internet access.
- Internet traffic has increased by 240 percent.
- The number of Web sites has multiplied by 2.5.
- The volume of sales over Internet has been estimated to triple since 1997. The estimates however vary. According to Datamonitor business to consumer electronic commerce in 1998 accounts for 20 million USD or 17.8 million; according to IDC business to consumer electronic commerce accounts in 1998 for 390 million FRF or 59,5 million Euro. With respect to e-commerce in a broader sense IDC reported for the same year 2.6 billion FRF (400 million Euro) and Mediangles Institute came up with 3.3 billion FRF (500 million Euro) (cf. Appendix, Table 8).

French Internet and electronic commerce growth is now equal or even superior to that of other European countries but France has not closed the gap: it has considerably fewer Web sites than either United Kingdom and Germany.

Minitel in France is the forerunner of commerce on the Internet, but it is not very well adapted for selling tangible products and high added-value services. SME are not well represented in the Minitel Service and the market is mature. So the necessary shift to the Internet has already started. Eighty percent of the most active companies on the Télétel network are already offering their services on the Internet, including major French banks, remote selling companies and others.

Looking at the consumer side, we get a picture citing (cf. http://www.Euromktg.com/eng/ed/art/eur.ecommerce.html) the results of a recent survey of 5,000 French people online and their online buying habits carried out by L'institut d'Etudes de Marché Motivaction (www.motivaction.fr): 44 percent of have visited an online merchant, and 40 percent have already bought something online. Of those who have bought online, 80 percent said that they paid by sending their credit card number via the Net. 40 percent of those interviewed had bought software, 27 percent books, 22 percent CD-ROMs, 22 percent

computer equipment, and 18 percent audio CDs. The survey also asked them what they wanted to see developed, and they replied theatre tickets (50 percent), travel tickets (46 percent), banking services (33 percent), and publication subscriptions (33 percent).

Main points

France is one of the leading countries regarding retail electronic payment systems. The French payment card market is characterised by a large number of bank issued cards bearing the CB logo and a significant number of private label cards (often retailer cards) which give access to a line of credit. The CB smart card was developed very early at a large scale and involving the French smart card industry. The launch of electronic purses in France is happening later than in other countries, maybe because the CB smartcard is already in use for applications such as parking meters and public phones. Three electronic purse pilots will soon be launched. Different payment systems are currently developed for transactions taking place over Internet, namely Cyber-COMM, KLELine, and ShopperLine. The integration of SET and the CB-debit-card (in Cyber-COMM) is a very interesting approach to Internet payments as it contrasts to those approaches that favour electronic purses for Internet-payments.

After a period of relative neglect of the Internet and of Internet-based electronic commerce and the resulting usage and deployment lag, both the French government and the private sector have taken steps to accelerate the migration of existing electronic financial and banking services to the Internet. This is still a gradual and evolutionary process, seeking to achieve consensus among major existing players rather than to encourage the emergence of radically new schemes and new players. France has serious assets to make a transition to the Internet successful and, in some areas, to achieve international leadership. This is particularly the case for the use of the smart card in electronic financial transactions. Electronic banking is highly developed and provides a potentially strong basis for rapid adoption of Internet banking. The Banque de France wants to ensure that electronic money development remains under banks' control and its prudential regulatory supervision.

The effective interbancarity cooperation at different levels and the clear position of Banque de France to safeguard the right to issue e-money exclusively for banks make the banking sector the key to the introduction of new electronic payment means. France Telecom obviously plays on another playing field.

Last but not least a consideration that arose within the French banking sector is worth further discussion, namely that even SET is too risky for consum-

ers as it does not guarantee a balance in the customer-merchant relationship, and that new payment mechanisms are required to re-establish a new balance.

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2.9 Italy

Payment culture

Compared to the other countries covered in the report, Italy has a medium level of cash in circulation, in absolute terms (969 ECU per inhabitant), as a percentage of the GDP (5.5 percent), and as a percentage of narrow money M1 (16.1 percent, cf. Appendix, Table 2). The Italian banking market is today based on about 935 bank institutions with more than 25,000 branches, employing in total more than 300,000 people for an Italian market of 57 million people. The number of ATMs and cash dispensers per inhabitant is nearly exactly the EU average (cf. Appendix, Table 6). However the average value of transactions at ATMs is very high, although the number of transactions per inhabitant is fairly low. Also the number of POS-transactions is comparatively lower than in most other countries covered in this study, with an average 4.4 transactions per inhabitant and year (cf. Appendix, Table 7). The use of the ATM- and POS-infrastructure thus remains quite low, despite the strong increase of the non-cash payments systems during the last years. This goes together with a strong share of cash-less payments made by cheque (28 percent, cf. Appendix, Table 3).

Home-banking has been around for many years with little interest from customers and, as a result, little success for financial institutions. In the last two years, however, on-line banking (at this moment about 100,000 accounts) has emerged as a key strategy for banks to attract and retain customers.

Like in most European countries, electronic purses, electronic commerce over the Internet, Internet payment systems, and the establishment of a certification infrastructure are still in the beginning, but there is no doubt that these subjects are of growing importance.

National framework

The introduction of new payment instruments relies heavily on the established financial sector. This includes banks and credit card companies, but excludes newcomers such as Digicash or Cybercash. It is interesting to observe the close relationship of more or less all banks to *one* processing centre, SSB (Società per i Servizi Bancari SpA). This close relation makes it difficult to decide if the Italian banks or SSB is the driving force for payment innovations in Italy. Both the main electronic purse scheme and the most widespread Internet payment

system (MINIpay and TELEpay) stem from this alliance. At present SSB is also the Certification Authority operating in the Italian banking system.

The legal situation restricts the issuance of e-money in Italy to credit institutions. This practice coincides with the position held in the banking sector. But there is much discussion about that point in Italy too. Especially outside the banking sector other opinions might be found.

Looking at digital signature activities, the Government is going to publish the technical specifications for the digital signature. Hereafter the implementation of the law (n. 59/97, DPR 513/97) will follow. AIPA (Italian IT in the Public Administration Authority) is responsible for the "technical specifications". AIPA could also be the top level CA. As far as can be determined, the Italian law can be considered substantially in line with the European proposal.

Looking at the introduction of multi-functional electronic purses one gets the impression that the role of the public authorities is especially important in Italy, because there are significant projects they are involved in.

Although it is not an electronic money project in the strict sense, the smart card project SANICARD is receiving a great deal of attention. The SANICARD experiment is carried out in three major Italian regions. The pilot involves 10 million people, including 10,000 physicians, 400 hospitals and 2,500 pharmacies. The card will contain the name of the bearer and data on this person. It will be used for social services inquiries and accounting, payments for medical services, medical certification, medical record keeping, etc. The main objective is to extend SANICARD nation-wide by the end of 2000.

National solutions seem to be important in Italy. National consumer on-line services (Telecom Italia, Italia On Line et al.) are far more important here than companies operating world wide.

Payment cards

Cheques are dominant in the retail sector, but the importance of payment cards is slowly increasing. Looking at consumer transactions in general, cheques are leading by percentage of transactions (ca. 44 percent) while credit transfers are leading by percentage of transaction volume (ca. 66 percent). Looking particularly at the retail segment, cheques are surprisingly more important than cash in terms of turnover as well as number of transactions. The growing importance of credit cards and debit cards at the Point of Sale is slowly diminishing the importance of cheques and cash. Debit cards are more important than credit cards at the moment: According to the 1997 annual report of the Bank of Italy there were 8,828,000 credit cards (5,160,000 of which were used at least once

in the year). The Italian brands in this area are: CartaSI (Servizi Interbancari), TopCard (Banca Nazionale del Lavoro), Moneta (Cariplo) and Bankamericard (Deutsche Bank); and there were 17,317,000 debit cards PagoBancomat predominantly used for cash dispensers and the POS.

Electronic purses

There is at this moment no electronic purse scheme operating nation wide. With its intention to operate on a national basis, MINIpay seems to be most important. The MINIpay project was activated by SSB SpA (the Italian interbanking company for payment systems) together with 55 Italian banks and in collaboration with the Local Public Administrations. One of the main objectives of the project is to distribute more than 2,000,000 cards as an Electronic Purse for small payments. MINIpay was launched in Turin in June 1996. During spring 1997 MINIpay was also installed in Brescia, Firenze, Padova and Siena. To date more then 30 000 POS terminals have been installed, about 4,000 loading devices and 850,000 cards have been delivered to customers. The number of transactions per month is about 10,000 with an average amount per transaction of 7,500 Lira (3.75 Euro). As in many other countries, the operational results are not satisfying.

Two characteristics of MINIpay have to be underlined: first it was introduced as a prepaid "white card", and, optionally with an account relationship, but in both cases providing anonymity of the payment, allowed by a non direct (on line) interconnection between the MINIpay card and the bank account during the settlement. Secondly, the denomination in Euro has been available from 1.1.1999 in some of the projects.

By the way, as 2,000 LIT are more or less one Euro, electronic purses are per se micropayment systems in Italy. Therefore the Italians do not have to pay too much attention to the micropayment systems issue of units smaller than the smallest denomination of the given currency.

Visa is piloting Visa Cash in Italy, but with a considerably lower base of acceptance points than MINIpay. SSB has been involved from the start. In addition, Visa International and SSB have signed an agreement to develop the "Italian Electronic Purse" starting from the intended interoperability of MINIpay and Visa Cash (cf. similar agreements by Visa and ZKA in Germany, and the activity of the CEPS group).

Apart from these major schemes, today there is a considerable number of other important Italian projects, but limited in functionality or geographically, e.g. the Italian Postal Service's Portafoglio Elettronico, which is suitable for

automated postal services, or Carta Moneta issued by the City of Milano in collaboration with other authorities. But prototypes like this should not be neglected, because local schemes might be successful and may provide interesting mixes of functionality (e.g. tickets, public administration, purse, credit points). The legal status of these trials is not quite clear.

Internet payments

It seems that the so called TELEpay system by SSB is the system of choice in Italy at the moment. At the end of 1998, 49 Italian banks were offering the TELEpay system to their customers and 38 Italian merchants had an active virtual mall using TELEpay. The TELEpay system allows different secure payment methods to be chosen on the Internet. It provides a secure interface for customers and merchants between the Internet and the SSB processing centre and hence the Italian banking system. In the current first phase credit cards and direct debits can be processed (cf. the approach of e.g. Cybercash, Telecash and BROKAT in Germany). SSB is also going to integrate MINIpay as one of the payment systems within TELEpay on Internet as CyberCash Germany has integrated CyberCoin in the CyberCash-Wallet along with electronic direct debit, and credit card payments.

Concerning SET, the Italian situation is at a very early stage. As far as could be determined early 1999, the only limited trials are related to the SSB, Banca Antoniana Popolare Veneta (Banca Antonveneta) and Banca Nazionale del Lavoro (BNL) that are experimenting with SET-based Internet payment software to carry out the first real-time SET-based transaction using an Italian payment gateway. SSB is going to implement SET in the TELEpay- as well as in the MINIpay-system.

Banca Antonveneta, BNL and SSB are taking part (together with 45 other banks from 18 different European Countries) in the pan-European pilot VSEC (Visa Secure Electronic Commerce), which is being promoted by Visa to develop a payment service based on SET specifications.

SSB is supplying Banca Antonveneta and BNL with an Internet payment gateway service using VeriFone's SET-based vGate product, providing the link between the Internet and the Visanet network. Visanet handles the authorisation of payments for outlets subscribing to the Visa circuit as well as the accounting processes of the operations between participating banks. SSB adopted the Internet payment solution, released by VeriFone for the SET 1.0 standard and integrated it into its own systems of secure payments for electronic commerce.

At the same time BNL is also experimenting with VSEC (SET 1.0) by the use of its Topcard for purchases of ICT products offered by Siemens Nixdorf Informatica in the virtual mall realised and managed by Inferentia SpA. The service is currently only available to the BNL Group's employees.

Payments on the Internet via electronic purses are planned, but like in most other countries, these are still not operational.

Electronic commerce

23.7 percent of Italian private households own a PC, 4.2 percent have access to online-services and 3 percent of households have access to the Internet (2,043 million users).

According to Osservatorio Internet Italia, conducted by SDA Bocconic, in May 1998, roughly 2,6 million Italian adults declared that they had used the Internet during the previous month. The figures of this survey concerning online shopping are interesting: approximately 128,000 Italians have bought goods or services online at least once. They bought mostly software (25 percent of shoppers), books and CDs (21 percent), gift articles (12 percent) and computer hardware (10 percent). Other categories of online shopping are starting to make their weight felt since 6 percent of buyers bought tickets and made show reservations online, 5 percent bought vacation products, and 4 percent bought financial services.

The bulk of payments was for goods of less than 100,000 lire (51,65 Euro) and for those between 900,000 and 1,000,000 lire (465 to 516 Euro). This spread of payments corresponds to the two most important categories of online shopping behaviour:

- to buy products whose high unit price justifies transportation cost;
- to buy products that most likely are hard to find locally, and whose low unit price keeps the total value of the transaction and therefore the perceived risk rather low.

The main reason why users do not buy anything is simply because they don't find anything they're interested in (24 percent). The lack of credit cards and perceived difficulty in making the purchase seem to be less important barriers.

Following a forecast of Gemini Consult the total turnover of electronic commerce should reach approximately 160 million Euro in 1998 (including B2C and B2B, but excluding EDI and Financial EDI).

There are at least three shopping malls where banks are in some way involved: *Mall Italy Lab* (http://www.mall.it) is at the same time a sport infor-

mation centre and a shopping mall. TELEpay is the system to make safe electronic payments at this mall. *Banca Antoniana Popolare Veneta* authenticates the virtual traders. *Cybermercato* (www.mercato.it) is one of the most important Italian virtual malls with a catalogue of about 25,000 products offered online. As a joint venture of Italia On Line (Olivetti Telemedia Group) and BPN (Banca Popolare di Novara) and others, it was the first virtual mall in Italy, started in February 1996. Stores that have joined the Italian mall include: La Rinascente department stores, Franco Maria Ricci, McGraw-Hill publishers, Apple, Olivetti, Vobis, Dessilani wines and Parmado delicatessen. More than 90 merchants are participating. *Il Milione* (www.milione.com) is another important Italian network for Electronic Commerce, both for the business to business and the business to consumer segment. Milione is a site where it is possible to realise commercial transactions between companies or between companies and the final consumers. It is an Italian project involving an industrial partner, Enter SpA, together with BPM (*Banca Popolare di Milano)*.

Main points

The use of the ATM- and POS-infrastructure is relatively low, although non-cash payments are increasing. Cheques still play a major role for payments in the retail sector.

Banks and the associated processing centre SSB operate on many playing fields of electronic payment instruments in a broad sense, and it looks as if this alliance is going to dominate the scene. It is striking that banks in Italy are also heavily involved at the operational level of shopping malls. Nevertheless, it would be wrong to overlook smaller competitors and projects.

The role of local public authorities in the introduction process of electronic purses should not be underestimated. Also the government considers the deployment of electronic purses an important component for electronic commerce. As in other countries, it is eager to establish a security infrastructure based on digital signatures and certification authorities, not only for electronic commerce but also for the interaction between citizens and the administration.

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2.10 Spain

Payment culture

Data for 1997 taken from the Blue Book of 1999 indicate that Spain is particularly well equipped, and among the covered countries the leader, with ATMs (863 per million inhabitants, cf. Appendix, Table 6), POS-terminals (16,691 per million inhabitants, cf. Appendix, Table 7), and purchase terminals for electronic purses (1,960 per million inhabitant). The number of payment cards in circulation to use these facilities is also quite high (ca. 900 per 1,000 inhabitants). At the same time the Blue Book indicates that the usage of these electronic means is relatively low compared to other member states of the EU. While the importance of electronic payments is slowly growing, the importance of cash remains very high in Spain with cash forming about 11 percent of the GDP, or 23.6 percent of narrow money M1(cf. Appendix, Table 2). Even the use of payment cards underlines this cash orientation. On average, a Spaniard uses his payment card 15 times a year for cash withdrawal, but only 9 times for payments (cf. Appendix, Table 6 and 7).

The use of cheques for customer payments is not as widespread as in other EU countries, a fact which again underlines the role of cash. The direct move of many consumers from using cash to using payment cards, partially skipping the intermediate stage of frequent use of cheques, favoured extensive installation of ATMs by Spanish banks.

The dominance of cash goes well together with ATMs as a means of cost reduction of cash handling. The high importance of cash can also to some extent explain the relatively rare use of payment cards at POS terminals. Even so, the comparatively low use of payment cards given the highly developed POS-infrastructure remains a surprising finding. There might be one major explanation for this contradictory situation: the financial institutions have pushed the installation of POS terminals as they bear the costs of the POS terminals and of their maintenance, but at the same time the merchants complain about the high commissions, which reduce their interest in pushing cashless payments.

National framework

One characteristic of the general situation in Spain is the existence of three groups of banks with corresponding processing and networking service providers.

- *Sistema 6000* payment system network corresponds to the savings banks which are members of the Confederación Española de Cajas de Ahorros (CECA). The infrastructure of Sistema 6000 comprises 14,169 ATM and more than 300,000 terminals at point of sale. CECA reached an agreement with Europay in 1996 to issue cards with the logos Maestro (debit functionality) and / or MasterCard (credit functionality). More recently, some major savings banks members of CECA also reached an agreement with Visa Electron by which the former debit cards of Sistema 6000 (Tarjeta 6000) are being substituted by Visa Electron cards.
- *Sistema 4B* was established in 1974 by the, at the time, four main commercial Spanish banks. Today's members of Sistema 4B include Banco Santander Central Hispano, Banesto, Banco Popular, Banco Sabadell, and others, totaling 38 financial institutions which account for around a quarter of the Spanish banking market and have over 11,000 branches in Spain. Sistema 4B is a member of Visa International and MasterCard / Europay International.
- *Servired* is owned by financial institutions including 35 banks (Argentaria, Banco Bilbao Vizcaya, Deutsche Bank, Citibank España and Barclays Bank España etc.), 51 Rural Savings Banks (Cajas Rurales) and 11 Professional and Popular Saving Banks (Cajas Populares y Profesionales). The company is also in charge of administering the programmes of bank payment cards with the trademark Servired (combined with the trademarks Visa and Visa electron), and is also in charge of the CECA-Visa cards.

The interoperability of the different ATM- and POS-networks is complete, although, like in Germany, commissions are charged at ATMs when operating with networks different from that of the issuer of the card.

The situation of standardisation of electronic payment systems in Spain is clearly influenced by the market leadership of Visa España and the technological leadership of its subsidiary company SERMEPA. SERMEPA is owned by Visa España and other financial institutions. The company developed the electronic purse called TIBC ("tarjeta inteligente para bancos y cajas") in 1993. TIBC has been the "basis" for the Visa Cash e-money card, being able to manage multiple functions and multiple currencies (technically it supports different currencies but their use is up to now restricted to Spain). Visa España has also played an active role in the definition of standards like EMV and CEPS.

Visa España/SERMEPA is a member of the CEPS group (also including Europay International, Visa International and ZKA Germany), that in December 1998 announced the agreement of a Common Electronic Purse Specification (CEPS).

Until now, in Spain there is no experience with non-financial institutions trying to issue e-money. The Bank of Spain holds that its position is the same as that of the ECB. With regard to institutions other than banks that can issue electronic money, the Bank of Spain does not consider them a problem, as, first they are non-existent in Spain at the moment, second, they would be subject to prior authorisation by the Bank of Spain in order to operate in Spain, and, third, they would be subject to oversight from the Bank of Spain.

In relation to Spanish monetary policy, one has to have in mind that electronic money is expected to evolve slowly as long as cash is by far the outstanding means of payment. The Bank of Spain is of the opinion that electronic money is not a big concern for monetary policy in the short run.

Looking at the field of digital signatures, there is no specific legislation on this topic in Spain at the moment. But public notaries and related groups have worked on a proposal for a Spanish law on digital signatures. It has been also made public that if a common position could be reached for a European directive on digital signatures, Spain would immediately adopt it, and start legislation. As the proposed directive passed the European Council of Ministers of Telecommunications in April 22nd 1999 legislation in Spain should develop within the near future.

It is possible to identify four institutions issuing (or planning to issue) electronic certificates: 1. ACE (Agencia de Certificación Electrónica – "Electronic Certification Agency"), which is, among others, supported by Telefónica, Visa and Europay; 2. Consejo Superior de Cámaras de Comercio – "The Council of Chambers of Commerce", which has developed its own project FIRMA; 3. Fábrica Nacional de Moneda y Timbre – "The National Factory of Coins and Notes", which has also developed its own project CERES; 4. Public notaries and related groups (among which are the Consejo General de la Abogacía – "General Council of Lawyers", University of Zaragoza and Intercomputer), which have established FESTE (Fundación para el Estudio de la Seguridad de las Telecomunicaciones – "Foundation for the Study of Security in Telecommunications"). FESTE, owing to the nature of its members, also deals with legal aspects of electronic commerce in a broader sense.

Payment cards

Again, the three sections of the banking sector determine the variety of payment cards available in Spain.

Sistema 6000 issues Mastercard or Visa credit cards. Debit cards are branded Visa Electron. Electronic purses issued by savings banks in Sistema 6000 are branded either Euro 6000 or Visa Cash.

Sistema 4B issues Mastercard and Visa credit cards. Debit cards bear the trade marks 4B or 4B Mastercard, and Sistema 4B has developed its own electronic purse trade mark Monedero 4B, which bears either technology Euro 6000 or TIBC.

Servired administers the programmes of banking payment cards with the trade mark Servired, combined with the trade marks Visa and Visa Electron. Credit cards are Visa and debit cards are Visa electron or Servired. Servired has issued Visa Cash electronic purses.

The influence of Visa across the different systems is striking. Worth noting is that all payment cards are basically debit cards, with about one third additionally being provided with a credit function. The combination of different functions into a single card is decided by the bank or savings bank issuing the card. You can find for example credit function with debit function, and debit function with electronic purse, and all the three functions combined into one single card. This sometimes leads to problems when analysing statistics. All payment cards, regardless of their type, can be used at ATMs and POS; no special cash cards are available.

The use of cashless payment instruments following the Blue Book can be characterised by the percentage of the total number of transactions: Direct debits are leading with more than 45 percent in 1997, followed by payment cards with approximately 21 percent, 14,4 percent credit transfers and 13 percent cheques (cf. Appendix, Table 3). Although the use of payment cards is not exceptional compared to some other European countries, 21 percent are equivalent to a position in the middle, and the growth rates (comparing figures from 1996 to 1997) are remarkable, being 18 percent (number of transactions) or 17 percent (value of transactions) respectively.

There are also retailer cards in use in Spain, but the exact number of cards issued and details of their use are not available. There is an estimation of about 11 million retailer cards with payment function by Barbara Devin in a recently published book (see Other Sources below, pp. 261-266). She indicates as most widely distributed ones the Corte Inglés card (> 4 million), the Galerías Preciados card (> 4.3 million) and the Cortefiel card (> 1.2 million) all designed for purchases in department stores. But other cards e.g. ACESA (highways) or cards for oil stations (with the trademarks Mastercard or Visa) are significant too. It is interesting to note that some of these retailer cards are issued directly without the intermediation of a bank or a savings bank.

Electronic purses

From a technological point of view there are two competing systems: Euro 6000 and TIBC. They are not interoperable at the moment. These two systems are issued under three trade marks: Euro 6000, Visa Cash and Monedero 4B.

Initially Sistema 6000 launched its own electronic purse, Euro 6000, and 22 savings banks developed specifications and procedures to ease the participation of suppliers / merchants.

In 1997, Visa Cash was adopted by some major saving banks, members of Sistema 6000, to substitute for Euro 6000. Banking institutions in Servired have also issued Visa Cash electronic purses.

There is also the trade mark Monedero 4B of Sistema 4B that embodies one of the two technologies above, i.e. Monedero 4B sometimes is Euro 6000 compliant and sometimes TIBC/Visa Cash compliant.

Visa Cash and Euro 6000 cards issued in Spain are only of the re-loadable type, no disposable purses are available. Visa Cash purses are re-loadable at some Sistema 6000, Sistema 4B, and Servired ATMs. Euro 6000 purses are re-loadable at some of Sistema 6000's ATMs. Electronic purses with trade mark Monedero 4B can be loaded at ATMs of the Red Telebanco 4B (Sistema 4B). The maximum amount that can be loaded on to the Monedero 4B cards is 25,000 ESP (Euro 150.25) for multi-purpose cards, and 5,000 ESP (Euro 30.5) on cards for use at phone booths.

Most chips embedded in the electronic purse cards can also function as a telephone card. The product is clearly being pushed to the market by banking institutions, but acceptance and use by consumers is still low. There exists a possibility that consumers' acceptance might boost with the introduction of Euro coins and banknotes. By the end of 1998, Visa Cash was available in 37 cities, more than 4.3 million cards had been issued and could be used at more than 75,000 terminals at point of sale and 84.000 phone booths (source: Visa España).

One generalisable observation that can be derived from the Spanish case is that novel payment technologies have the tendency to weaken the traditional and well established structures of the financial services industries. In other words: once established familiar boundaries embracing brand names, specific technologies, service providers and banking groups tend to dissolve. Now there is a weaker correlation between the choice of e.g. purse technology on the one hand and the group of banks and network providers on the other hand. This is also true for products other than electronic purses. Increasingly, the overall picture of memberships and agreements gets intricate as a result of growing

competition. In the end, decisions on which cards to issue and with which trade marks are up to the issuers of the cards, i.e. the banks or the savings banks.

The great majority of banks and savings banks are members of one of the networks (Sistema 6000, Sistema 4B, Servired). These banks and savings banks, together with the few that are not in one of the three networks, can also deal directly (without intermediation of the network) with Europay or Visa for instance. As a very general rule, Servired deals mainly with Visa, Sistema 4B deals with both Visa and Europay, and Sistema 6000 with Europay. As mentioned before, this does not prevent savings banks in Sistema 6000 from, for example, dealing directly with Visa España and issuing cards with the trade mark Visa.

Internet payment systems/instruments

The major trend is the migration of "access products" into the Internet. For banking institutions, the Internet can serve as a new distribution channel to complement the traditional network of branches. For Visa / Mastercard, Sistema 6000, Sistema 4B and Servired, it might also help to compete against companies developing new technologies providing new means of payment like eCash or CyberCash. At present, such companies are non-existent in the Spanish market.

The main banks in Spain have developed on-line banking solutions which allow credit transfers. But in some cases credit transfers are already integrated into electronic commerce solutions. There are a few virtual malls set up by specific banks. If customers have accounts at these banks, then they might pay for goods brought at the mall directly by credit transfer. The majority of payment schemes however are credit card oriented with SSL or SET.

The establishment in May 1997 of the Agencia Certificación Electrónica with memberships of Grupo Telefonica de España (40 percent), SERMEPA (20 percent), CECA (20 percent) and Sistema 4B (20 percent) was an important step, because ACE deals with certificates under the SET Protocol, associated to the use of credit cards. ACE issues certificates to card holders, retailers / merchants, payment gateways, and to both the issuer and acquiring financial institutions.

Credit cards are the payment means preferred in Spain by companies and consumers when paying on the Internet. Cash on delivery and bank transfers come second and third in the ranking. In Spain, SET is clearly accepted by credit institutions, while merchants have been found to be concerned about the

costs (e.g. of certificates), but the main problem for the dissemination of SET remains on the consumer side.

Electronic commerce

According to data for 1997 and 1998, the volume of electronic commerce on the Internet amounted to about 800 million ESP (Euro 4.81 million) in 1997 and climbed in 1998 to the amount of 3,500 million ESP (Euro 21.04 million). This figure certainly includes turnover by incomplete electronic commerce (trade volume originated from on-line orders), and possibly part of the business to business segment.

The aim of Spanish firms currently on the Internet is mainly oriented to promotion / publicity (71 percent of companies). Second in the ranking are sales (35 percent). Finally 25 percent of companies value their presence on Internet as a means to improve the attention of customers ("atención al cliente"). Additionally, a wide majority of firms already on the Internet declare that they will start selling their products on-line during the next year.

It is interesting to note that the main platforms for electronic commerce in Spain are promoted by banking institutions, telecommunication companies or a combination of both. This points to the strong position of banking institutions and telecommunication companies as technology agents of change.

A study by the association of Internet users ("Asociación de Usarios de Internet") found out that the use of the Internet does not differ significantly from that in other highly industrialised countries. According to this study 7.1 percent of the population use the Internet. 33 percent of these Internet users have already bought something over the Internet. Software, books and music are the products most frequently purchased.

Since summer 1998 there have been some "strikes" of Internet users complaining of the price level for Internet access which has been increasing due to a rise in prices of local phone calls. In reaction to this unrest, the Spanish government has announced that it will introduce during the next three years a flat rate for Internet usage. There is also a proposal of the Spanish and French governments to the EU to include Internet access in the framework of universal services, allowing access to Internet to be subsidised. In this context, linked to the flat rate, it has to be noted that there is a strong pressure to implement ADSL technology for Internet access. According to Ministerio de Fomento (the Ministry of Fomentation deals with telecommunications, communications, traffic and other sectors of infrastructure) ADSL should reach 30 percent of

Spain's Internet users in 1999, 70 percent during year 2000, and cover the whole Spanish market during the first half of 2001.

Another debated issue is security. A study by AIMC (Asociación para la Investigación de los Medios de Comunicación – Association for Research on Communications Media) of April – May 1998 revealed that 37 percent of people interviewed said they distrusted merchants / retailers on Internet, and 58.5 percent consider that the degree of security is low when sending card numbers through the Internet. Nevertheless about 68 percent of the actual payments were credit card based. It is interesting too that experts in this field regard existing methods of payment as providing satisfactory security levels for use on Internet, while consumers on the Internet express distrust towards these same methods. It is possible that the newly created certification agencies, which are owned by the main payment systems providers in Spain, will contribute to enhance consumers' trust.

Main points

Cheque payments are not as widespread in Spain – outside business-to-business transactions – as in Italy, UK, and France. Partly because of that, Spain entered the stage of payment cards quickly. The dominance of cash despite the abundance of POS terminals and payment cards is however a surprising finding. There are some explanations for this contradictory situation: the large number of terminals may be due to the fact that the financial institutions bear the costs of the POS terminals and of their maintenance. Commercial policies of banking institutions often lead to a situation where several POS-terminals can be found at a single store. On the other hand, as merchants complain about the high commissions, their interest in pushing cashless payments might be restricted.

Spain is quite advanced in the implementation of electronic purse schemes. Currently, two incompatible purse schemes are marketed under three trademarks. Broad acceptance on the users' side has not been observed. What can be stated however is that the relations between providers of payment networks and services, issuing banks and chosen purse technology are no longer a given thing. This pattern is observable in the sector of payment cards in general following increased competition in the area.

The role of Visa España (SERMEPA) in the standardization process of electronic purses is outstanding. SERMEPA is member of the CEPS group (Visa España, Europay International, Visa International and ZKA) and the work of the CEPS group has already led to Common Electronic Purse Specifi-

cations (CEPS). This standard is clearly an initiative with a European dimension.

Internet users and Internet use do not differ significantly from those of other countries. But there are some remarkable political activities towards implementation of advanced technologies, namely the fomentation of ADSL as a prerequisite for charging a flat rate for Internet access, thus improving Internet usage and e-commerce. At the moment the driving forces behind e-commerce in Spain are mainly financial institutions and telecommunications companies.

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3 Comparison of major payment issues

3.1 Payment culture

The impressions presented in this report are mainly based on statistics contained in the so-called Red and Blue Books, which have been compiled by experts from the banking sector in the G10 and the EU countries respectively. These statistics do not fully reflect the richness of payment cultures. For instance, cash is not used only as an instrument to pay for retail purchase, but also as a "nest egg" as insurance against bank failures or for times of hardship. Thus it is quite common for people in Eastern European countries to hoard considerable amounts of cash in denominations other than that of their own country for emergencies or luxury purchases. Cash may also be more abundant in countries which have a flourishing "grey economy", or in certain sectors of industry, such as used car sales. Retail payment practices also vary a great deal: while it might be acceptable to use a credit card or a cheque in a supermarket in one country, cash might be the only acceptable method of payment in another.

It is thus quite conceivable that developments reducing the amount of cash circulating in the Euro countries might be offset by a demand arising from habits and practices of the kind described above.

Experts on payment systems customarily distinguish between "giro countries", "cheque countries" and "cash countries". According to this distinction, none of the EU countries is any longer "cash oriented", as they might have been in the past, or as Asian economies are still. Of the countries represented in this report, the United Kingdom, France and Italy are traditionally characterised as "cheque countries", while most of the others are among the "giro countries" (cf. Appendix, Table 3).

Notwithstanding these remarks, cash, in the shape of coins and bank notes, continues to be of major importance in Europe for households' payments. Even in a country like Finland, which has a low volume of cash in circulation and which is regarded as progressive with respect to the use of electronic payment instruments, 80 percent of households' payments are still made with cash. Many of these cash payments throughout Europe are of very low value, and thus costly for merchants and the banks to handle. The motive of reducing these costs for handling and dealing with cash is one of the main drivers for the introduction of electronic money in Europe.

In the countries covered in this report, cash per inhabitant is still of greater than average importance in Spain, Germany and the Netherlands (cf. Appendix, Table 2). With the exception of the United Kingdom, France and Italy, the

significance of cheques, in particular for cashless payments, has never been great, and is declining even further. The only other EU country with use of cheques comparable to that made in France and the United Kingdom is Ireland, a case not covered in the study.

Credit transfers are an important instrument for the cashless transfer of large sums throughout the European Union. The major proportion of these in terms of volume involves interbank transfers (cf. Appendix, Table 4). Credit transfers initiated by customers are most significant in Germany, where they account for close to 16 percent of all cashless transactions in terms of value. In the Netherlands and Italy the corresponding value is almost 10 percent, while in all of the other countries covered in the study, credit transfers account for less than 5 percent of value, or statistics on this means of payment are not sufficiently detailed to assess their importance, if any, for private customers. Greater use of direct debits was made in the Netherlands and Germany than in all of the other countries covered, or indeed, throughout the European Union. In France, credit transfers are virtually used only for regular large payments, such as wages.

These existing "payment cultures" are the result of historical processes, during the course of which giro accounts have become commonplace following different diffusion patterns in different countries. The infrastructure of the banking system, e.g. the existence of single or multiple ATM or EFTPOS networks, single or multiple clearing houses and procedure for interbank payments reflects former, or still existing, competitive relationships and alliances among the actors of the national banking and financial services industries concerned (see for example Revell, J.R.S: Banking and electronic fund transfers. Paris: OECD 1983, pp. 108-110). While it is quite likely that the increasing use of technology, such as "smart" payment cards, will exert an influence towards the creation of a common infrastructure marked by interoperability of competing solutions for similar banking services, it is also possible that individual actors or groups of actors will prefer proprietary solutions for the foreseeable future, at least.

The importance of payment cards (debit and credit cards) is increasing in the ten countries, although to varying degrees. For instance, in France such payment cards are challenging cheques. In the Netherlands and Germany credit cards were in the past not widely used and accepted. In Germany, this was due to the widespread use of the Eurocheque card for many of the purposes for which credit cards can be used. In the Netherlands and France there continues to be a complete dominance of debit cards over credit cards.

The number of ATMs and EFTPOS is generally increasing in all ten countries, but the numbers do not reflect the actual use of these devices by their in-

habitants. While the number of both ATMs and EFTPOS is well above average for the EU, inhabitants of Spain make little use of this infrastructure. In contrast, the numbers of ATMs for the Nordic countries are below average for the size of populations, but the numbers of transactions at the devices are well above average. Similarly, people in the Nordic countries tend to have fewer payment cards at their disposal, but make more use of them for transactions which have a lower than average value. This indicates that cards are gaining acceptance as an everyday means of payment to the extent of beginning to substitute for cash for lower value payments. It might also indicate a concentration of card users on their preferred and usually established brands, rather than experimenting with a variety of cards with overlapping functionality. This seems to apply to France and the Nordic countries.

Another important factor for the diffusion of payment systems is the degree of cooperation between banks, in particular with regard to clearing payments between parties having accounts at different banks, on such matters as electronic purses or with regard to the interoperability of payment systems. This currently seems to be greatest in France, Italy and Germany, while most relationships between banks in the Nordic countries are on a bilateral basis, albeit based on multilaterally agreed standards and common processes. However, in Finland, Denmark and Sweden there seems to be a sufficient degree of consensus between the banks to produce a single electronic purse, and in Norway there is a common forum for the discussion of such a purse.

Again, there are very different organisational solutions toward such "interbancarity": in Germany there is a joint committee (ZKA) of the various banking associations set up specifically for such purposes, while in other countries, separate organisations with a degree of independence, but jointly owned by banks fulfil such functions as clearing payments between parties holding accounts at different banks, or issuing electronic purses (e.g. Interpay, PBS, SBB).

3.2 Electronic purses

In all countries covered by this report, there is some experience with electronic purses (cf. Appendix, Table 9), although this is sometimes, as in the United Kingdom, Norway or France, only in the shape of pilot schemes. Interestingly France is comparatively late in experimenting with electronic purses despite at one time in the 80s leading the introduction of chip based payment cards (carte bancaire, CB). It would be interesting to discuss why France is not leading the

deployment of electronic purses. Maybe there is less need for an electronic purse in a market dominated by debit cards secured with a chip, which can, after all, be used for many of the purposes foreseen for electronic purses, such as parking or telephony. This indicates that pre-paid schemes for electronic purses could be made obsolete in general by debiting systems able to handle very small payments.

The driving forces behind the electronic purse systems are the banks. In addition central banks, for instance in Finland, have actively supported such projects. In Finland, Sweden, Denmark and Germany there is only one, or at least only one *dominant* electronic purse scheme operating. In the Netherlands and Spain we have two competing systems and, in Italy, besides a dominating purse, a large number of regional and local pilot systems. The situation in Germany and Denmark can be explained by their level of inter-bank cooperation in the field of standard setting, while in Finland the cooperation of actors to agree on a common electronic purse could be seen as a door opener for further common standardisation activities at the national level.

When we state that the driving forces stem from the banking system this is not strictly true in every case. Danmønt (Denmark) and Automatia Electronic Purse Ltd. (Finland), which issue the Danmønt and Avant electronic purses respectively, are clearing houses owned jointly by several competing banks, but do not have the status of financial institutes.

There was some fear or some hope (depending on viewpoints) that near-banks or non-banks (like telecom or network enterprises) would have a chance of getting involved in the financial business with electronic purse projects and competing against the well established banking industry. Quite likely there are no successful examples of such activities. In Germany the quite well piloted electronic purse system (Pay-Card/T-Card) by Deutsche Telekom in conjunction with some public transport operators has almost stopped. One reason may be that a business case for electronic purses is quite hard to achieve. The oldest and quite well established Danmønt system has still to cope with a deficit. The Mondex trial in Swindon, while regarded as successful, has come to a complete end and Mondex appears to be targeting more closed environments, such as University campuses.

So the question arises if an approach aiming at the potential multifunctionality of electronic purses (e.g. electronic ticket, access key, loyalty schemes or digital signatures) is more promising. Avant, Geldkarte, and Chipper are examples of purses with added functionality.

Another way to push electronic purses is to integrate them on well diffused payment cards, in most cases debit or cash cards. The German, Finish, Swedish

and Spanish systems are going this way of hybrid payment cards, while in Denmark and Italy we are dealing with "stand alone" electronic purse cards. The hybrid approach is likely to show a great difference between cards issued and cards used.

With the rare exception of Avant in Finland (for loading and purchasing) and Cash in Sweden (for loading) no electronic purse can be used on the Internet. But in most places there are plans and technical solutions for Internet payments with electronic purses. It is difficult to find out why these solutions are not better promoted.

The different approaches to electronic purses in European countries have to do with different payment cultures, regulation regimes and national frameworks. At present we are able to recount some observations and produce some hypotheses. Much research on this topic remains to be done. But it seems clear that the advent of an European electronic purse has not only to do with technical standardisation but with the integration of different national payment cultures.

3.3 Internet payment systems

Examining possibilities for Internet payments we have to deal with a large number of different approaches in each country and between the countries (cf. Appendix, Table 10).

Overall payment instrument of first choice, mainly for international purchases, is the credit card. There are different levels of security, but the widely promoted SET-Standard has not yet taken off. We will see in the future if there is a favourable outcome or if SET does not fit the circumstances of consumer-oriented electronic commerce.

It should be mentioned that it is possible to purchase any goods on the Internet using a credit card outside the Internet, e.g. by phone or fax. Besides credit cards, other conventional payment methods are well suited for tangible goods in all countries. It is a matter of the specific payment culture, whether credit cards (as in Spain), or credit transfers and direct debits (as in Germany), cash on delivery (as in France) or credit and debit cards equally (as in the United Kingdom) are the most frequent payment means.

When we are dealing with intangible goods we first have to mention two "old" systems in France and Germany, which enabled electronic commerce before and outside the Internet. In the context of the French Minitel system, the Kiosk accounting system, which was based on connection time, had been es-

tablished, and in the context of the German Btx system (now called T-Online) an accounting system based on page views or connection time was used. These systems are well suited for payments of small amounts. The idea behind these schemes is that a payment intermediary having well established and stable connections with its customers (e.g. an ISP) keeps track of the individual sums, adding them to the regular invoice for the customers and settling the payments with the suppliers. The migration of these accounting systems from a closed network to the open Internet seems to be more problematic than was expected. More recent approaches to micropayment systems on the Internet worthy of mention are NetCoin in Denmark, and the accounting systems of the online service providers Torget in Sweden and Germany.net in Germany.

Another possibility for paying on the Net are credit transfers. Besides pure online or Internet banking systems there are some systems where one can immediately initiate the credit transfer while purchasing goods on the Internet. Naturally these systems are backed by banks. Among these systems are the Finish "electronic giro" or similar systems in Sweden. The constraint of this approach is at present that all partners must have their accounts at the same bank. Bundling different payment methods within a single software wallet for the customer and with one processing centre (or payment gateway) for settlement is another possibility. Examples of these are CyberCash in Germany (with credit card, direct debit and CyberCoins) and Telepay in Italy (with credit card and direct debit). In both cases, these schemes are backed by a group of banks and processed by an intermediary institution (CyberCash GmbH, SSB). By this means, payments can take place between accounts held at different banks.

There are activities and announcements in all countries to bring electronic purses to the Internet. But only in Sweden (for loading) and Finland (for loading and paying) it is already a reality (see section above).

In sharp contrast to the broad discussion in the past (e.g. in the context of the regulation of electronic money) that was dominated by so called net-money, you have to search high and low to find even trials. Finland had an early eCash trial in 1996 run by Eunet and involving Merita Bank, but this has since been abandoned. In Germany, Deutsche Bank started an eCash trial in late 1997 and it seems as though Deutsche Bank wishes to push eCash further, having opened it for all customers with a giro account with any German bank in 1999. However, there are only a dozen suppliers who accept eCash in Germany and the value of transactions is quite small. In no other country covered were similar "net-money" payment systems under way.

We reported above about new electronic payment instruments for scriptural money and net-money as a new kind of money. Finally, we wish to draw attention to developments outside the regular monetary regime. It could well be that loyalty schemes, like Air miles in the Netherlands or "MTs" (bonus points issued by MediaTransfer in Germany), could become an attractive means of payment for consumers on the web.

3.4 Internet connectivity and electronic commerce

Europe is estimated to have an "Internet population" of about 36 million users. Sweden and Finland are the countries whose inhabitants have by far the highest degree of Internet connectivity, followed by Norway and Denmark. It is important to bear in mind that "Minitel" is in widespread use in France and that its availability and acceptance among the consumers has probably hampered the diffusion of the Internet in France.

Perhaps surprisingly, Internet access figures are not an indicator for the spread of electronic commerce in the ten countries covered. In fact it is safe to say that the situation is very similar in all of the countries examined: those who had access to the Internet were gradually discovering it as a market place, were making trial purchases, but did not use the Internet as a major supply channel. In all of the countries, there were examples of Internet "malls" and many major merchants, in particular the large chains, have set up shops on the Internet. In the majority of cases, this is probably to "show the flag", rather than to make profits immediately or move the major part of the business onto the Internet. However, there are successful pioneers of e-commerce. The airlines are a case in point. The main products traded on the Internet are airline tickets, books, CDs, software and computer components, which were traditionally a niche for mail order in the first place. In addition, intangible products and services, which can be efficiently exchanged via computer networks, account for a small, but increasingly important segment of Internet trade.

Many of the sites set up for electronic commerce in the ten countries concerned are targeted at domestic markets rather than aiming at trans-border commerce. A possible exception is the United Kingdom, where suppliers can target larger markets due to the role of English as an internationally accepted language. Even so, Internet consultants caution that it is not sufficient to offer English language information to stimulate cross border-trade. Expectations are that the introduction of the Euro will initially do little to change this situation, but that greater price transparency provided by monetary union might lead to

an acceleration of trans-border commerce when electronic commerce has become more widespread. At present we assume that North American suppliers clearly benefit most from cross-border electronic commerce. One of the few studies to include figures on trans-border Internet trade was conducted by Pro Activ on the Netherlands. Among its findings was that half the money spent by Dutch consumers on the Internet went outside the Netherlands and half of the software downloaded was imported.

The overall global growth of electronic commerce has lagged behind most of the forecasts which expected very rapid acceptance and use. But the expectations for future growth continue to be rather high. Nevertheless the estimates vary a lot between analysts. Spending in 1997 was estimated between 45 million US dollars and 1.2 billion and these figures were expected to increase to anywhere between 580 million and 775 billion dollars in 2000 (cf. the comparison of various electronic commerce estimates in: Organisation for Economic Cooperation and Development – Committee for Information, Computer and Communications Policy: Measuring electronic commerce. Paris: OECD 1997 (OCDE/GD(97)185) p. 25).

The OECD cautions that Internet commerce is the area with the greatest discrepancy between the current situation and the expectations of politics and industry. According to their analysis, the main barriers to growth are lacking bandwidth, high telephone charges, the language barrier, different currencies and high level taxation. At best it could be said that electronic commerce in Europe is still at the experimental stage. It is still a matter of speculation when it will really gather momentum.

3.5 Regulation policy

There are two main topics which we will briefly comment in this section: the regulation of issuing electronic money and the regulation of digital signatures.

The main trend in the regulation of issuing electronic money in all countries is that only banks should be allowed to do so. This is in line with the position of the ECB and the EU Commission. But there are still some differences between the covered countries and within these countries. Mainly those countries with an early introduction of electronic purses issued by non-banks (Denmark and Finland) wish to retain this regulation. Apart from this they all agree that more or less strong surveillance measures are essential. But it is also true, that in all countries one can find spokesmen who argue for more competition in the field of payment systems and more chances for non-banks too. These positions

are held mainly by technology providers and merchants. However, in our impression, they have no great impact on the ongoing policy measures.

Looking at the field of digital signatures, we found two countries which have so far passed special laws: Italy and Germany. In Denmark, first attempts to establish strong digital signatures (with recognition similar to that of handwritten signatures) were stopped and a new moderate approach has been developed. In Spain there is no regulation at this moment concerning digital signatures but the EU proposal (15.5.1998, KOM(1998)297) has already stimulated preliminary activities such as the establishment of FESTE. In the other countries too there is an ongoing debate on this issue but at the moment no concrete legislation.

4 On Payment, E-Commerce, Standardisation and Regulation

Fourteen hypotheses

The country reports of the ESTO partners contained information describing the situation of their particular country, but also contributed to the more general debate about payment innovations, e-commerce, standardisation and regulation. With the idea of stimulating further discussion, we have decided to present this information as hypotheses. Four of them will mainly deal with payment innovation, four will focus on cross-border e-commerce, four will contribute to the standardisation issue, and the concern of the final two is the regulation of e-money.

1: At this early stage of e-commerce, electronic payment systems for the Internet are a less crucial factor than awareness and trust.

The general impression about e-commerce today can be summed up as follows: supply and demand are at an embryonic state and far from their full potential. But at the same time it has to be stated that apparently nobody is of the opinion that e-commerce could grow substantially faster than it does. There are obvious obstacles to a faster growth of e-commerce, such as the small ratio of individuals with Internet-access (ranging between 4 percent and 33 percent). It will take time to overcome this bottleneck. More interesting than quantitative data on connectivity obtained is the observation that many enterprises are still not ready for e-commerce. They are not aware of the emerging market potential and frequently have not understood sufficiently that e-commerce requires to adapt products and logistics to the new market. Others argue that there is a lack of knowledge on the users' side, that user education might be helpful as well as more user-friendly and simple systems.

What might also be an obstacle to e-commerce at present is a lack of trust from the customers' point of view. Surveys, e.g. those carried out in Spain or the Netherlands, support this assumption. The unanimous answer to this lack of confidence of users is the establishment of a security infrastructure based on digital signatures and certification authorities. This general issue applies to electronic payment systems too, but the more specific question whether the lack of safe and widespread Internet payment systems is a major issue, has to be approached differently.

2: There is no generalised lack of payment systems.

Firstly it has to be maintained that if we talk about tangible goods, the range of conventional payment instruments used for the traditional mail-order sector (credit transfers, cash on delivery, sending a cheque etc.) is working very well for e-commerce too. Secondly, national as well as cross-border payments can be made using credit cards. User-studies carried out in different countries indicate that maybe some 75 percent of Internet payments are credit card based. In addition, national "access products" have begun to migrate to the Internet. They will be used mainly domestically.

3: Safe, widespread, interoperable, electronic money schemes on the Internet with low transaction costs could be a great advantage for commercial suppliers of intangible goods, for small and medium enterprises, and maybe for the man on the street who wishes to sell something on the Internet.

First of all, payments for intangible products and services are rare today. Although the Internet is ideally suited for the delivery of software and digital documents of all kinds – textual, audio and multimedia – there is no adequate payment mechanism for them. The same is true for the new breed of Internet-related services like "search engines", "html-checkers" and so forth, that require transaction based micropayment systems. And there is no adequate payment system for SMEs and private persons, who occasionally would like to offer goods on the Internet, but are not willing or are not able to accept credit cards. In some cases the creation of virtual malls may ease access for SME to the facilities of electronic commerce.

The new payment instrument called "electronic money" would be of great use, if it were available with the desired properties. Electronic money, as understood by ECB or BIS and as implemented in various e-purse schemes, could potentially be a solution to some aspects of the problem. But, first, those schemes existing are anything but widespread with respect to the Internet, second, most of them are mere pilots, third, they are not compatible and cannot be used for cross-border payments, fourth, the smart card readers some of them require are not readily available, and fifth, the transaction costs of these systems are probably too high for micro-payments.

4: The lack of "electronic money" does not lead to a stifling of e-commerce, because alternatives are at hand.

As long as "electronic money" is not available for e-commerce, suppliers are looking for alternative methods of income, such as banner-advertising or businesses indirectly derived from Internet offerings. In addition, Internet Service Providers, Telcos and others could establish accounting systems and thus establish an intermediary level between customers, merchants and banks. These alternative approaches do not cover all cases but alleviate the problem – at least for the customer.

5: The introduction of the Euro will have an overall positive effect on cross-border commerce and particularly cross-border electronic commerce.

The foreign exchange risks, although not very important for normal consumers, are no longer existent within the monetary union and there is more transparency of prices. This may lead to more competition and lower prices. Some experts also expect that the fees and commissions for financial services will be subject to the same logic: more transparency, more competition and lower commissions as a result.

Today cross-border commerce constitutes only a marginal part of the retail segment and therefore the influence of the Euro on cross-border trade should not be overestimated. But at the same time it should not be underestimated because of the great potential of trading intangible goods world-wide. The introduction of the Euro could ease cross-border retail trade, but the essential preconditions of its success are security, trust, harmonised laws, and consumer protection. These are issues at the national level too, but they become even more important on the world-wide web.

6: The introduction of harmonised means of payment within the European monetary union is a political task in first place, while the significance in economic terms comes second.

When talking about the Euro, the EMU and electronic payment systems, it is important to remember that a whole range of expectations goes together with European integration. With regard to electronic payment systems, people expect all payment instruments to work within the European Monetary Union: the

multitude of "access products" as well as new "e-money products". Actually it is more of a political and psychological task to fulfil these expectations and to avoid frustration than a short term economic necessity. The political efforts in the fields of cross border credit transfers and electronic purses show the awareness of the European Commission on this topic (for an overall picture see the "action plan" of the European Commission for a single financial market at http://Europa.eu.int/comm/dg15/en/finances/general/action.htm).

Experts warn against overestimating cross-border retail commerce, which on average might reach a share of one or two percent of total business to consumer trade. But at the same time, experts point out that the cross-border trade of intangible products might develop rapidly and that a common currency and interoperable retail payment systems might stimulate that process. But cultural differences (e.g. language) should not be neglected as a barrier to this segment of cross-border trade.

It could be worthwhile to analyse the cross-border segment of commerce in more detail, taking into account the importance of tourism, a mobile work force and border regions. An assessment of this type could also determine the relation of give and take with respect to intangible goods between the United States and Europe.

7: Although the immediate benefits of establishing a common payment infrastructure for "national" retail payment instruments are supposed to be moderate, it appears to be the appropriate strategic decision.

It is exactly in the area of a common security infrastructure and a common payment infrastructure that the experts are asking for regulation and responsible policies. Against the background that the international credit card organisations are already operating world-wide and have started to conquer the Internet, it has been argued that it would be important to make the "national" payment products interoperable and establish a common infrastructure for them within the European Union. This demand refers to "access products" like credit transfers, direct debits but especially to "electronic money" (electronic purses). The longer it takes to implement an interoperable European infrastructure for "national" payment instruments, the greater the advantage of the credit card organisations will be. In other words: the implementation of interoperable payment instruments in Europe would strengthen the competitive position of European financial institutions. It should be taken into account that this type of competition also maintains the freedom of choice of consumers and may also

imply all in all a less risky structure of payment systems, because the risk is distributed and potential damage reduced.

Therefore there is a pressure on European banks to move towards this common infrastructure. National actors afraid of competition from abroad might be in some way reluctant to accelerate this process. But on the other hand regarding electronic purses it has to be taken into account that these payment products are not yet widely accepted at the national level, and therefore the perspective of international deployment and use on the Internet could hold a promise to achieve a "business case" for "electronic money products".

Although there is competition and there are different strategic interests between "national/European" and "international" actors this should not lead to a simplistic idea of opposition. In the field of "electronic money" as well as in the field of secure payments over the Internet we find important cooperative efforts.

8: E-commerce means global commerce and can not be dealt with as a European Union affair alone.

The increase of cross-border payments is not so much a matter of the Euro and EMU alone, but more generally speaking a matter of "multi-currency"-systems. For cross-border trade, it is important to have multi-currency systems that can exchange Euros for US Dollars, Danish Crowns for Euros and so on. E-commerce means global commerce. But at the same time it is held that the introduction of the Euro has already stimulated the development of "multi-currency" systems and that such systems capable of handling Euros are making the Euro attractive for countries outside the Euro-zone.

Acknowledging that e-commerce has to be approached from a global perspective leads to the assumption that the strength of European e-commerce has to show not in the European context alone but at the global level. In other words: The growth of e-commerce in Europe depends a great deal on the attractiveness of European products and services world-wide and on the presence of European interests where global decisions are taken, e.g. development and deployment of security related browser add-ons or participation in the development of Internet standards.

9: Politics should not try to impose standards.

With regard to the standardisation of "e-money products", the European policy of stimulating and moderating the process is obvious, bearing in mind the work of the FIWG and the influence on the work of the ECBS. Most conspicuously the work of the ECBS has led to the concept of a multi-currency European Electronic Purse. The CEPS-group took the next step. In December 1998 it agreed on a Common Electronic Purse Specification. Europay, Visa International, Proton, ZKA Germany, Sermepa Spain, and American Express are participating in this group. At the national level, various agreements between credit card companies and issuers of national purse products indicate the dynamics of standardisation.

It is generally agreed that politics should not try to impose standards. Standards are understood as a result and not as something to be set from the start. Standards usually result from bargaining between different interests and technical solutions. Regulators may take the role of stimulator, catalyst or moderator of standardisation processes, but should refrain from public intervention. That is common sense according to the experts interviewed by ESTO.

Regulators may even promote standards by using them, by supporting pilot projects, and by financing research, but should never impose them. The Italian country report, in particular, illustrates how important the role of local authorities can be when introducing a multifunctional smart card. This example also makes clear that the success of electronic purses does not depend on their international deployment alone. Locally added value should not be underestimated.

10: Standardisation of payment infrastructure – not of payment products – is required. Co-opetition is the appropriate way to standardise payment infrastructure.

Most observers agree that several payment systems will co-exist fulfilling different needs. The strategic point concerning standards is to distinguish payment products from the payment infrastructure. At the level of the payment infrastructure interoperability is the main aim and cooperation the way to reach it. At the level of payment products and services, competition is desired. The expression "co-opetition" has been coined to give a name to this approach. Some compare the situation to the deregulated telecommunications market, where any company fulfilling certain basic requirements has free access to the infra-

structure. Even the idea that the infrastructure might be leased to the banks came up.

With regard to "access products" the SET standard launched by the credit card companies Visa and MasterCard with the support of major software and IT-companies is a significant case in point. Although this "would-be standard" is not in widespread use right now – some say because of its complexity and costs, others say that infrastructure building takes time and that it is too early to judge – it is at least a paradigm for secure payments over the Internet. Even if SET does not become the future de-facto standard, it will be the point of reference for further standardisation of this kind. The country reports reveal that the use of SET is not limited to credit card payments and that it might also be used for electronic direct debits. In other words, SET is not to be seen as a special payment product, but as a standardised component of a secure payment infrastructure.

11: Security standards are different.

Although public intervention is neither wanted nor generally needed, this is different when it comes to security standards. These must be subject to some regulation. Politics and regulators should regularly enable competition among different standards in a way that strong companies can not impose inferior, proprietary standards. With regard to security, they particularly have to ensure that no one offers lower prices and achieves higher competitiveness at the expense of lower security.

12: The internationalisation of finance and the Internet require new forms of standardisation.

There is a consensus that the game of standardisation of payment services is undergoing a substantial change. Standard setting at the national level has worked quite well within the financial industries. Cooperation and a well established structure of interbancarity have led to highly elaborated standards, provided with a high degree of commitment for compliance, excluding outsiders and making "wild" and new solutions rather unlikely.

The internationalisation of finance and the Internet challenge this model and require new forms of standardisation. On the one hand, we observe the emergence of interbancarity at a trans-national level. The ECBS is a good example of this. But we have to admit that the issue of Internet payments is not a matter

for credit institutions alone. We have to think of strategic partnerships and new actors. There are new intermediaries like telcos, Internet service providers, portals, software giants and others who are able to play a role in accounting systems, micropayments, payment software and the like. In addition, we have to take into account that standardisation takes place at the level of the Internet too. The IETF or the W3C are major standardisation bodies to be mentioned here. It is not well understood how "banking club"standardisation and Internet standardisation can come to terms. In any case, the relation of Internet infrastructure standards and banking standards should be further analysed.

13: A more liberal regulation of the issuance of electronic money suffers from a lack of articulated interests by potential competitors.

Central banks and the banking sector in general stick close to the position that only banks should be allowed to issue electronic money. There are slight differences within the banking sector too. Thus it appears as if some bankers would be satisfied if a level playing field between non-banks and banks issuing e-money could be established. In a way, the type of regulation regarded as adequate depends on the definition of e-money. Those who classify electronic money as an integrated part of scriptural money are more reserved towards a new type of credit institution.

Those who want more competition within the financial service industries and those who believe that more competition leads to better services and lower prices for customers are in favour of new institutions issuing electronic money. So maybe representatives of telecommunications and of consumers will form a kind of "virtual" alliance. However, at the moment there are no elaborated position papers of industries or consumers articulating their interests to be discussed. Maybe it is worth stimulating such position papers, so that the discussion can be more open and comprehensive.

14: While only minor short term challenges are envisaged for monetary politics there are inherent risks to be watched carefully.

With regard to the effect of e-money on monetary policy the most widespread opinion is that the process of substitution of fiduciary money by e-money will be so slow that it will cause no problems for monetary politics. The maximum share of e-money is not expected to exceed 5 percent of cash. Many central banks had to cope with a more substantial decrease of cash demand earlier,

when current accounts and EFTPOS systems became popular. The instruments of monetary policy at present do not rely in the first place on the control of money supply (although it remains an important indicator), so, even from this point of view, no danger can be seen.

If there are rules for the issuers of e-money and basic requirements are fulfilled – like the inclusion of e-money in the central bank statistics – no major problems are foreseen. This peaceful picture shared by the majority has some underlying assumptions that may change over time.

The fear of e-money issued by private unregulated companies circulating within electronic networks seems to have been exorcised by the current efforts of regulation. Money of this type does not exist and the ghost of true electronic cash has been domesticated. Furthermore, there is the underlying assumption that e-money is limited to smaller amounts. If this condition changes and high values can be transferred, the risks of anonymous e-money would have to be defined anew. Finally, even if e-money were safer and more secure than any other payment instrument, the risk of a worst case accident, a system breakdown, has always to be taken into account and appropriate risk assessments have to be foreseen.

Appendix

A1 Comparative tables

Table 1: Basic data on countries

Country	Inhabitants 1997 (Millions)	GDP per inhabitant 1997 (ECU)	Percentage of inhabitants with access to the Internet 1998
Denmark	5.3	26 427	22
Finland	5.1	20 145	31
France	58.7	21 130	6
Germany	82.1	22 497	9
Italy	57.5	17 508	4
Netherlands	15.7	20 398	11
Norway	4.4	30 817	23
Spain	39.3	11 966	6
Sweden	8.9	22 166	33
United Kingdom	59.0	19 587	16
EU-15	374.6	(1998) 19 948	8
Japan	126.2	29 984	9
United States	267.9	27 524	30

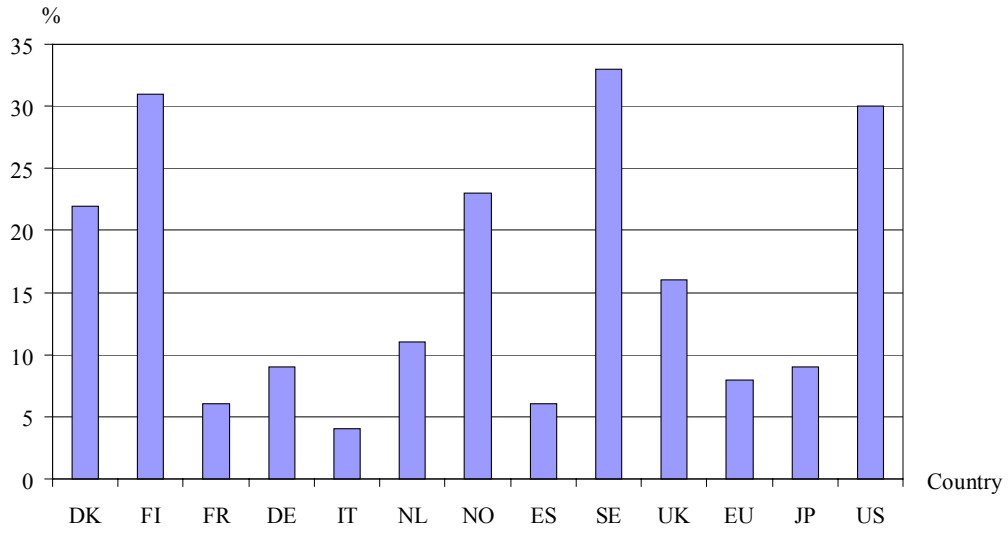


Figure 1: Percentage of inhabitants with access to the Internet 1998

Sources: Bank for International Settlements: Statistics on payment systems in the Group of Ten Countries. Figures for 1997. Basle: 1998 (Red Book); European Central Bank: Payment systems in the European Union. Addendum incorporating 1997 figures. Frankfurt: 1999 (Blue Book); for Norway Statistics Norway http://www-open.ssb.no/english/; EUROSTAT http://Europa.eu.int/Eurostat.html; http://www.nua.ie/surveys/how_many_online/Europe.html; other sources.

Exchange rates per ECU 1997: 7.5 DKK, 5.9 FIM, 6.6 FRF, 2.0 DEM, 1.9 ITL, 2.2 NLG, 8 NOK, 165.9 ESP, 8.7 SEK, 0.7 GBP, 134 JPY, 1.134 USD

Table 2: Notes and coins in circulation outside credit institutions 1997 in ECU

Country	Value per inhabitant	As a percentage of GDP	As a percentage of narrow money
Denmark	840	3.2	n.a.
Finland	480	2.4	6.7
France	673	3.2	13.5
Germany	1 532	6.8	26.3
Italy	969	5.5	16.1
Netherlands	1 121	5.5	18.5
Norway	812	4.8	6.3
Spain	1 284	10.7	23.6
Sweden	972	4.3	n.a.
United Kingdom	571	2.9	4.6
EU-15	972	5.2	29.2
Japan	3 159	11.6	28.7
United States	1 426	5.3	39.5

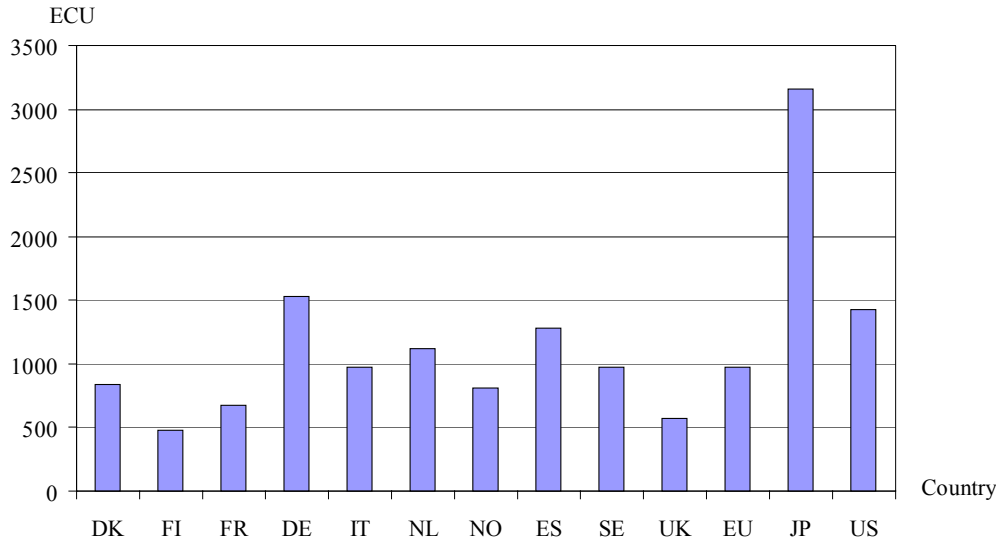


Figure 2: Value of notes and coins in circulation per inhabitant outside credit institutions 1997 in ECU

Sources: European Central Bank: Payment systems in the European Union. Addendum incorporating 1997 figures. Frankfurt: 1999 (Blue Book); Bank for International Settlements: Statistics on payment systems in the Group of Ten Countries. Figures for 1997. Basle: 1998 (Red Book); for Norway: Norges Bank http://www.norges-bank.no/english/statistics/.

Remarks: Percentage of narrow money relates to M1 with the exception of Norway and United Kingdom, which relates to M2. Percentage of narrow money for EU-15 without Denmark, Norway, Sweden and United Kingdom. Ireland (30.3 percent), Austria (32.3 percent), and Greece (45.3 percent) are those countries not covered in this study with a share greater than the EU average.

Exchange rates per ECU1997: 1.134 USD

"n.a." = not available or not applicable

Table 3: Use of cashless payment instruments as a percentage of total number of transactions 1997

Country	**Cheques**	**Pay-ment Cards**	**Credit transfer total**	*Credit transfer customer initiated*	*Credit transfer in-terbank/ large value*	**Direct debits**	**Others**
Denmark	15.3	62.6	n.a.	*n.a.*	*0.08*	21.0	1.1
Finland	0.4	38.2	58.0	*n.a.*	*n.a.*	3.4	neg.
France	46.3	21.6	17.4	*17.4*	*0.1*	13.4	1.3
Germany	5.7	4.1	48.1	*47.9*	*0.2*	42.0	neg.
Italy	28.0	11.2	41.6	*41.2*	*0.3*	8.6	10.6
Netherlands	3.0	18.2	51.7	*51.6*	*0.1*	27.1	n.a.
Norway	1.7	50.6	44.6	*n.a.*	*n.a.*	3.1	-
Spain	13.0	20.9	14.4	*14.2*	*0.2*	45.2	6.5
Sweden	n.a.	19.3	n.a.	*73.5*	*n.a.*	7.2	-
UK	30.5	31.1	19.6	*19.4*	*0.2*	18.7	neg.
EU	23.1	18.2	34.1	*n.a.*	*n.a.*	26.3	2.3
Japan	n.a.	n.a.	n.a.	*n.a.*	*n.a.*	n.a.	n.a.
United States	73.2	23.0	2.5	*n.a.*	*n.a.*	1.3	n.a.

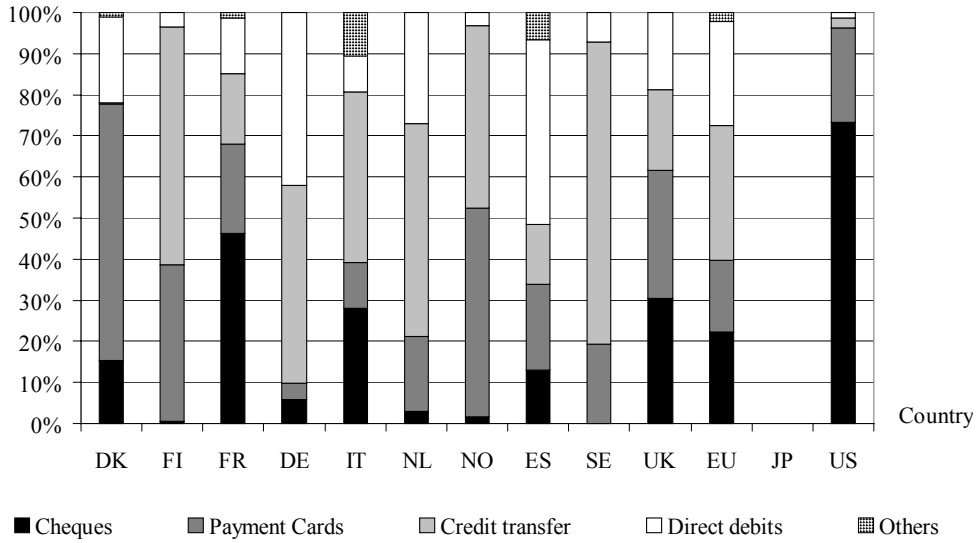


Figure 3: Use of cashless payment instruments as a percentage of total number of transactions 1997

Sources: European Central Bank: Payment systems in the European Union. Addendum incorporating 1997 figures. Frankfurt: 1999 (Blue Book); Bank for International Settlements: Statistics on payment systems in the Group of Ten Countries. Figures for 1997. Basle: 1998 (Red Book); for Norway: Norges Bank http://www.norges-bank.no/stat/betaling/payment.html.

Remarks: "Credit transfers" includes large value and interbank payments; "Others" includes "electronic money payments" and others. Figures for Sweden are not really comparable because they do not include cheque payments and interbank, large value credit transfers. Figures for credit transfer in UK do not differentiate between customer initiated and interbank, large value credit transfers; row customer initiated credit transfer includes inter-branch items, row interbank, large value credit transfers includes only large value credit transfers. Table 3 and Table 4 give no indication on the payment instrument used by consumers for retail.

"-" = Nil; "n.a." = not available or not applicable; "neg." = negligible

Table 4: Use of cashless payment instruments as a percentage of total value of transactions 1997

Country	**Cheques**	**Pay-ment Cards**	**Credit trans-fers**	*Credit transfer customer initiated*	*Credit transfer in-terbank/ large value*	**Direct debits**	**Others**
Denmark	6.4	0.6	n.a.	*n.a.*	*91.6*	1.2	0.3
Finland	10.2	0.8	88.1	*n.a.*	*n.a.*	0.9	0.02
France	4.4	0.2	93.5	*3.8*	*89.7*	1.0	n.a.
Germany	1.6	0.03	95.9	*15.7*	*80.2*	2.5	neg.
Italy	3.2	0.06	95.4	*8.8*	*86.6*	0.3	1.0
Netherlands	0.0	0.2	98.8	*9.8*	*89.0*	1.0	n.a.
Norway	4.2	4.2	89.0	*n.a.*	*n.a.*	2.5	-
Spain	2.1	0.05	96.8	*3.4*	*93.4*	0.5	0.56
Sweden	n.a.	1.7	n.a.	*95.8*	*n.a.*	2.5	-
UK	4.2	0.3	94.6	*3.8*	*90.8*	1.0	neg.
EU-15	n.a.	n.a.	n.a.	*n.a.*	*n.a.*	n.a.	n.a.
Japan	n.a.	n.a.	n.a.	*n.a.*	*n.a.*	n.a.	n.a.
USA	10.5	0.2	88.5	*n.a.*	*n.a.*	0.8	-

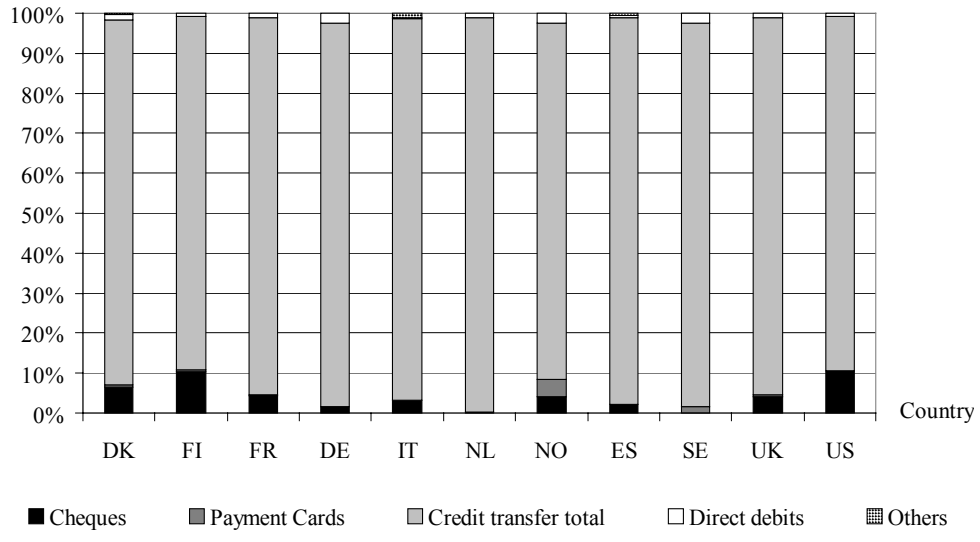


Figure 4: Use of cashless payment instruments as a percentage of total value of transactions 1997

Sources: European Central Bank: Payment systems in the European Union. Addendum incorporating 1997 figures. Frankfurt: 1999 (Blue Book); Bank for International Settlements: Statistics on payment systems in the Group of Ten Countries. Figures for 1997. Basle: 1998 (Red Book); for Norway: Norges Bank http://www.norges-bank.no/stat/betaling/payment.html.

Remarks: see remarks on Table 3.

"-" = Nil; "n.a." = not available or not applicable; "neg." = negligible

Table 5: Number of debit or credit cards per 1,000 inhabitants

Country	With a cash function	With a debit or a credit function	With a cheque guarantee function	Retailer cards
Denmark	583	583	10	n.a.
Finland	1 002	693	1	308
France	515	473	n.a.	n.a.
Germany	n.a.	1 038	508	61
Italy	301	426	16	n.a.
Netherlands	1 540	163	26	n.a.
Norway	n.a.	(1 376)	n.a.	n.a.
Spain	910	897	-	n.a.
Sweden	774	691	-	n.a.
United Kingdom	1 641	1 271	903	298
EU-15	741	786	354	n.a.
Japan	2 243	1 945	-	480
USA	2 548	2 628	n.a.	2 233

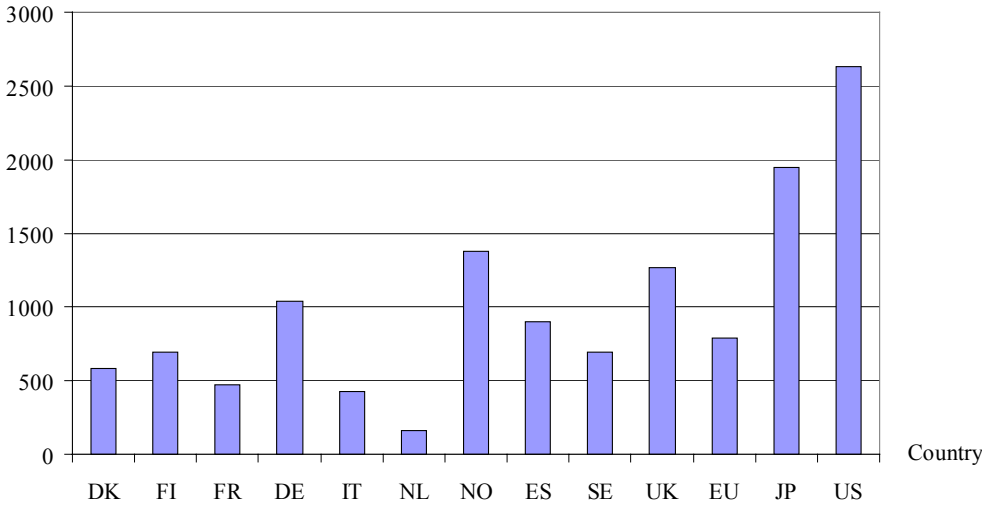


Figure 5: Number of debit or credit cards per 1,000 inhabitants

Sources: European Central Bank: Payment systems in the European Union. Addendum incorporating 1997 figures. Frankfurt: 1999 (Blue Book); Bank for International Settlements: Statistics on payment systems in the Group of Ten Countries. Figures for 1997. Basle: 1998 (Red Book)

Remarks: for Norway no comparable data available; according to Norges Bank (http://www.norges-bank.no/stat/betaling/payment.html) there are 6.1 million payments cards issued by banks, card companies and oil companies, i.e. 1,376 payment cards per 1,000 inhabitants. National sources indicate other figures for several countries.

"-" = Nil; "n.a." = not available or not applicable; "neg." = negligible

Table 6: Cash dispensers and ATMs 1997

Country	Number of machines per 1 million inhabitants (end of year)	Number of transactions per capita	Average value per transaction (ECU)
Denmark	253	n.a.	n.a.
Finland	445	43.3	67
France	462	19.9	62
Germany	504	15.3 (1996)	146 (1996)
Italy	444	7.2	163
Netherlands	410	33.4	78
Norway	430	24.0	114
Spain	863	15.4	82
Sweden	268	35.3	92
United Kingdom	393	29.6	74
EU-15	488	19.5	97
Japan	1 115	5.0	255
USA	616	40.7	60

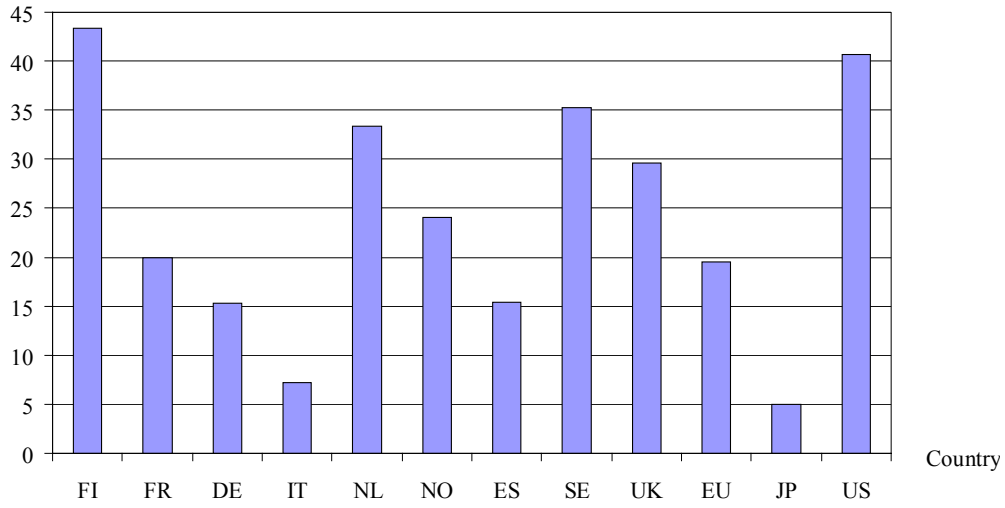


Figure 6: Number of transactions per capita at cash dispensers and ATMs 1997

Sources: European Central Bank: Payment systems in the European Union. Addendum incorporating 1997 figures. Frankfurt: 1999 (Blue Book); Bank for International Settlements: Statistics on payment systems in the Group of Ten Countries. Figures for 1997. Basle: 1998 (Red Book); for Norway: Norges Bank http://www.norges-bank.no/stat/betaling/payment.html.

Remarks: “n.a.” = not available or not applicable;

Exchange rate per ECU 1997: 8 NOK, 1.134 USD;

Table 7: POS terminals and EFTPOS transactions 1997

Country	Number of POS terminals per 1 million inhabitants (end of year)	Number of transactions per capita	Average value per transaction (ECU)
Denmark	11 923	57.7	46
Finland	10 506	50.9	45
France	9 555	39.3	46
Germany	1 984	2.8	65
Italy	4 896	4.4	94
Netherlands	7 715	31.1	43
Norway	10 589	58.4	52
Spain	16 691	8.8	48
Sweden	7 778	15.9	69
United Kingdom	8 984	n.a.	n.a.
EU-15	7 146	15.7	62
Japan	155	0.004	50
USA	4 853	5.4	30

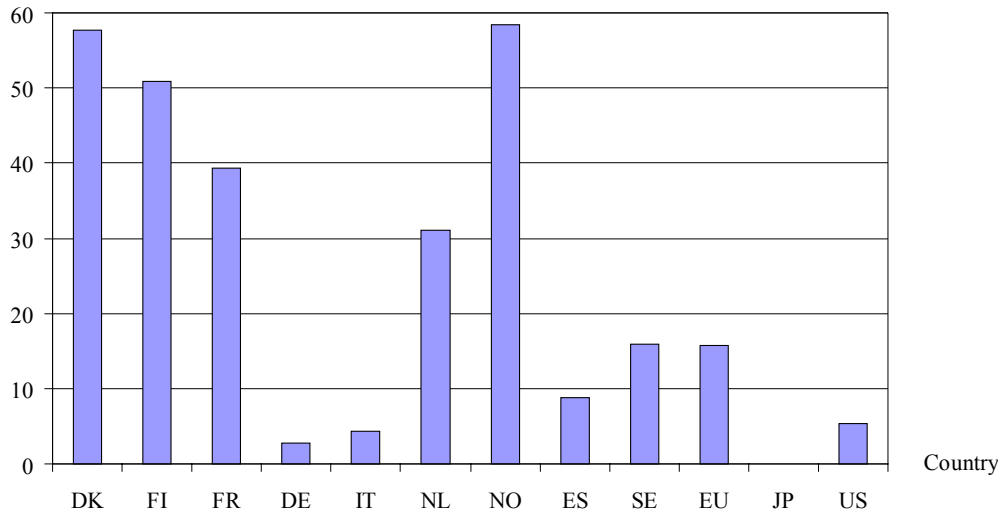


Figure 7: Number of transactions per capita at POS terminals 1997

Sources: European Central Bank: Payment systems in the European Union. Addendum incorporating 1997 figures. Frankfurt: 1999 (Blue Book); Bank for International Settlements: Statistics on payment systems in the Group of Ten Countries. Figures for 1997. Basle: 1998 (Red Book); for Norway: Norges Bank http://www.norges-bank.no/stat/betaling/payment.html.

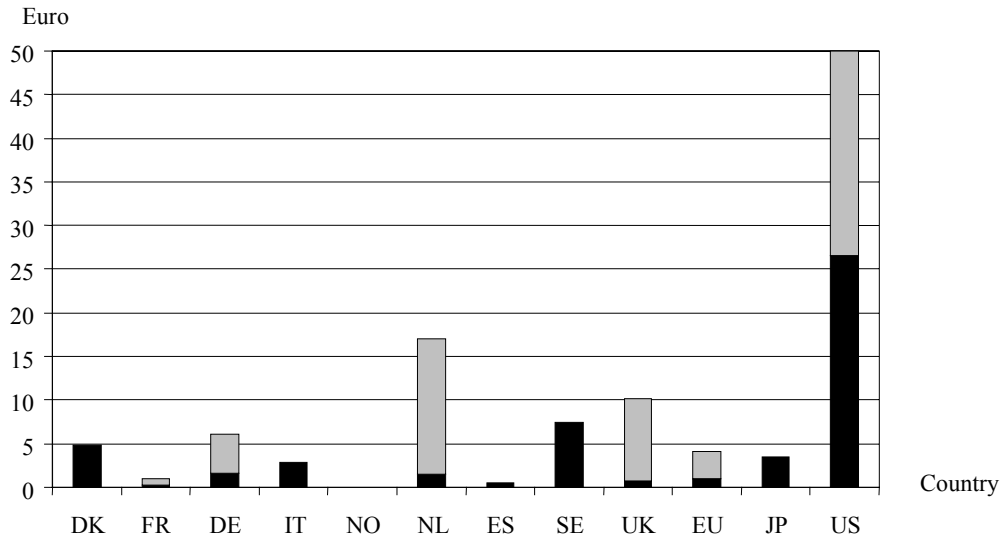
Remarks: Germany “electronic cash” only.

“n.a.” = not available or not applicable

Exchange rate per ECU 1997: 8 NOK, 1.134 USD

Table 8: Indicators for European retail trade including mail order and Internet trade

Country	Retail trade as a percentage of GDP 1991	Shops per 1.000 inhabitants 1990	Mail order commerce as percentage of retail trade 1996	Internet trade 1998 in Euro per capita
Denmark	12.3	10.0	2.5	4.9
Finland	8.9	7.9	1.9	n.a.
France	12.6	9.7	2.4	0.3 - 1.0
Germany	10.5 (West)	8.5 (West)	5.8	1.6 - 6.1
Italy	15.5	17.1	0.3	2.8
Nether-lands	12.8	8.0	1.8	1.5 - 16.9
Norway	24.5 (1996)	n.a.	n.a.	n.a.
Spain	15.4	13.4	n.a.	0.5
Sweden	12.0	8.5	2.6	7.5
United Kingdom	11.5	8.1	3.7	0.8 - 10.2
EU 15	12.7	11.3	n.a.	1.0 - 4.1
Japan	n.a.	n.a.	1.5 (1995)	3.5
USA	n.a.	n.a.	3.0 (1995)	50.0



If more than one figure is available we quote the minimum and the maximum estimate.

Figure 8: Internet trade 1998 in Euro per capita

Exchange rate per Euro 1998: 7.5 DKK, 8.5 NOK, 0.7 GBP, 146.4 YEN, 1.121 USD

"n.a." = not available

Sources for column "retail trade" and "shops per inhabitants": Europäische Kommission: Grünbuch "Handel". Brüssel: 1996 (KOM(96)530 endg); for Norway: 1996 retail trade counts for 250 billion NOK compared to 1,020.051 billion NOK GDP (Statistics Norway http://www-open.ssb.no/english/)

Source for column "mail order": Bundesverband des Deutschen Versandhandels: Versandhandel in Deutschland. Frankfurt: 1997

Sources and remarks for column "Internet trade":

There is no established method and procedure for counting Internet trade. So we had many problems with the data because of different methods and delimitations. The figures in the table can only be a rough indication for the amount of Internet trade. In our opinion, some figures are not very trustworthy. We see the urgent need to establish some sort of international standardised statistics in the context of electronic commerce.

Denmark: estimates for mainly business-to-consumer web based trade (excluding EDI) in 1998 of 300 million DKK or 26 million Euro. Total retail trade accounted for 25 billion ECU in 1992.

Finland: Unfortunately the latest data available are for 1997, electronic commerce accounted for a mere 0.07 percent of the total volume of retail.

France: According to Datamonitor business to consumer electronic commerce in 1998 accounts for 20 million USD (17.8 million Euro) or 0.3 Euro per capita (http://www.datamonitor.com/dmhtml/tc/tcpr06199914.htm); according to IDC in 1998 business to consumer electronic commerce accounts for 390 million FRF or 59,5 million Euro (http://www.idc.fr/presse/cp_ce99.htm).

Germany: According to a market survey, "Telekommunikation" by Axel Springer Verlag in 1998, 251 million DM (128.33 million Euro) had been spent online by private households (http://www.wuv.de/links/1999/w&v_data_studien.html, 31.5.1999); Datamonitor: 1998 business to consumer electronic commerce accounts for 160 million USD or 142.7 million Euro or 1.7 Euro per capita (http://www.datamonitor.com/dmhtml/tc/tcpr06199914.htm).

Italy: According to ESTO partner Piero Bucci the total turnover of electronic commerce is estimated at 160 million Euro in 1998 (estimation based on data by Gemini Consulting including B2C and B2B, excluding EDI and financial EDI).

The Netherlands: 39 – 250 million Euro in 1998 according to different sources. We are of the opinion that 250 million Euro in 1998 in the business to consumer sector is a clear overestimation; see chapter on The Netherlands.

Norway: Unfortunately no data on electronic commerce and Internet trade are available.

Spain: According to ESTO partners Jaume Valls and Anna Arbussà and an announcement by Jose Manuel Villar, Secretary General of Communications (http://www.emarketer.com/enews/enews_intere37.html#4) in 1998 electronic commerce amounts to 22.5 million USD or 21.04 million Euro. This figure surely includes turnover by incomplete electronic commerce (trade volume originated from on-line orders), and maybe part of the business to business segment.

Sweden: According to ESTO partner Anna Backlund (e-mail may 31, 1999) referring to a study conducted by the Swedish Research Institute of Trade in 1998, electronic commerce in the business to consumer sector was estimated at 600 million SEK or 67 million Euro, accounting for 0.2 percent of total turnover.

United Kingdom: According to Datamonitor, in 1998 electronic commerce in the business to consumer sector accounts for 50 million USD (44.6 million Euro) or 0.8 Euro per capita (http://www.datamonitor.com/dmhtml/tc/tcpr06199914.htm); Fletcher Research estimate total online sales, excluding financial services, at around 230 million GBP (329 million Euro) in 1998, or under 0.2 percent of the total market in the sector analysed; Verdict Research calculated that in 1998, over 666.5 million USD (594.6 million Euro) was spent online, also representing also just 0.2 percent of overall retail sales (http://www.nua.ie/surveys/?f=VS&art_id=905354621&rel=true).

EU 15: According to International Data Corp. (IDC) the business to consumer sector accounts for 1.85 billion USD (1.53 billion Euro) or 4.1 Euro per capita. Total turnover of electronic commerce including business to business was estimated at 5.6 billion dollars or 5 billion Euro (The Global Reach Express, 8 July, 1999); GfK cites figures for Europe of 7 billion USD electronic commerce in the business to business sector and 400 million USD (357 million Euro) in the business to consumer sector, representing 0.02 percent of total retail trade and mail order commerce (E-Commerce nicht immer von Erfolg gekrönt, July 13, 1999, http://www.gfk.de/).

Japan: According to a study by Japan's International Trade and Industry Ministry and Andersen Consulting in 1998, the consumer e-commerce market acccounts for 65,000 million Yen (444 million Euro) or 3.5 Euro per capita, representing 0.2 percent of total household expenditure (http://cyberatlas.Internet.com/big_picture/geographics/japan_ecom.html).

USA: According to eMarketer's eRetail Report, in 1998 consumers in the United States have spent 8 billion USD (7.136 billion Euro) on the Internet (http://www.emarketer.com/estats/092799_retail.html). This counts for 26,6 Euro per inhabitant. According to shop.org, the trade association for online retailers, based on a report conducted by The Boston Consulting Group, in 1998 US Internet users spent 14,900 million USD (13,291 million Euro) representing 0.5 percent of all retail sales or 50 Euro per capita (http://www.shop.org/nr/99/071999.html).

Table 9: Characteristics of main European electronic purses 1998

Country	Name	Disposable/ reloadable	Use on Internet	Multi-functionality	Purses per 1.000 inhabitants	Purchases per 1.000 inhabitants and year (Euro)
Denmark	Danmønt	disposable	No	no	95 (1997)	1 400 (1997)
Finland	Avant	both	for purchases and loading	yes	48	51
France	-	-	-	-	-	-
Germany	GeldKarte	reloadable	No	yes	536 (issued cards); 6 (active cards)	1 090
Italy	Minipay	reloadable	No	yes	14	(35) (1997)
Netherlands	Chipknip	reloadable	No	yes	764	n.a.
	Chipper	reloadable	No	yes	318	n.a.
Norway	-	-	-	-	-	-
Spain	VisaCash	reloadable	No	yes	87	(153) (1997)
	Euro 6000	reloadable	No		n.a.	
	Monedero 4B	reloadable	No		n.a.	
Sweden	Cash	reloadable	yes for loading	?	23	475
UK	-	-	-	-	-	-

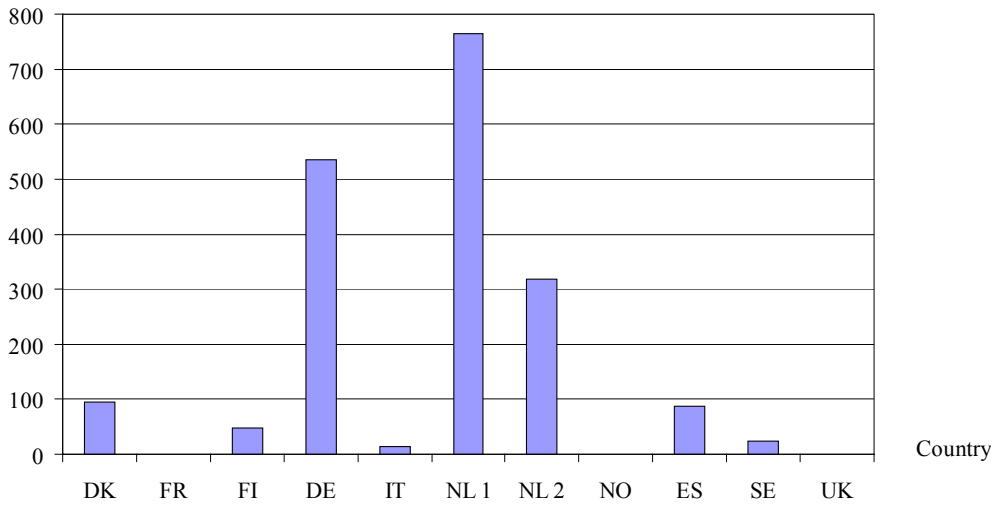


Figure 9: Electronic purses per 1.000 inhabitants 1998

Sources: ESTO-Project-Partners; ECB: Payment systems in the European Union. Addendum incorporating 1997 figures. Frankfurt: 1999 (Blue Book); ECBS: Overview of European electronic purse projects. Brussels: ECBS 1997 (TR 102, Version 2); other sources; column 6 and 7 based on own calculations.

Remarks: We have included only such electronic purse schemes of some importance which have left the pilot stadium.

Finland: Figures are related to the new multifunctional card introduced in March 1997 that replaced previous products. These products accounted in 1995 and 1996 for about 550 Euro purchases per 1.000 inhabitants.

France: There are trials announced for 1999, see chapter 2.8 on France.

Italy: Figures in brackets from the Blue Book for 1997 not related to MINIpay alone. In Italy there are also some local electronic purse systems.

Spain: Figures in brackets from the Blue Book for 1997.

United Kingdom: There are no nation-wide electronic purse schemes operating in the UK. However, Mondex and Visa Cash are or were the subject of pilot trials. See chapter 2.5 on the United Kingdom.

"-" = Nil; "n.a." = not available or not applicable

Table 10: Main Internet payment systems in Europe 1998

Country	Net-money	E-Purse on the Internet	SET	Integra-ted sys-tems	debit	credit transfer	Aggre-gating systems
Denmark	-	-	□	-	□ (1999)	-	⧟
Finland	⧟	□	□			■	
France	-	-	□	■□	[□□]	-	[■]
Germany	□	-	□	□□	-	-	[■□]□
Italy	-	-	□	■	-	-	-
Netherlands	-	-	□	□	-	-	□
Norway	-	-	□	-	-	-	-
Spain	-	-	□	-	-	□	-
Sweden	-	-	□	□	-	□□	□
UK	-	-	-	-	-	-	⧟ □

Symbols: □ = minor importance; ■ = some importance; ⧟ = cancelled pilot; [ ] = operational within the limits of consumer online services (e.g. Minitel, Btx, CompuServe), but not on Internet. Number of different systems is indicated by number of symbols.

Remarks: Again, trials are not included.

Netmoney means software-based token systems (e.g. eCash); integrated systems are normally offered by processing companies able to handle multiple payment instruments (e.g. credit cards, debit cards, and which sometimes offer new payment instruments for smaller amounts; e.g. CyberCoins by CyberCash GmbH); aggregating systems in this sense are typically able to aggregate payments before they are settled.

Denmark: the debit card Dankortet can be used on the Internet since April 1999; Netcoin pilot 1998.

Finland: Net-money “eCash” was abandoned; e-purse Avant for loading and purchasing on the Internet; “electronic giro” for credit transfer.

France: Integrated systems are KLEline and Shopperline; two systems of minor importance for the use of the debit card in the context of Minitel’s shopping market; the important aggregating system in the context of Minitel is the Kiosk system.

Germany: Netmoney is DigiCash’s eCash by Deutsche Bank; CyberCash integrates payments via credit cards, direct debit, and CyberCoins (micropayments); aggregating systems outside the Internet are the Btx/T-Online accounting system and a similar system by CompuServe; Germany.net offers such a system in the Internet.

Italy: Telepay integrates payments via credit cards and direct debits.

The Netherlands: I-Pay integrates payments via credit cards or a bank account; 0900 Internet Connect is a kind of aggregating system using the phone bill system.

Norway: SET is used for credit and debit card payments.

Spain: In some cases opportunities to use credit transfers are integrated into electronic commerce solutions.

Sweden: the electronic purse Cash can be loaded on the Internet; KLEline integrates various payment methods; credit transfers can be done by ePostgiro and other bank specific methods; purchases at Torget's mall are charged to Torget's regular subscriber account.

United Kingdom: BT Array, a sort of micropayment and aggregating system, was terminated, while BarclayCoins are still available.

A2 List of Abbreviations

ABI
Associazione Bancaria Italiana (Italian Bankers' Association)

ACE
Agencia de Certificación Electrónica (Electronic Certification Agency)

ACESA
Autopistas Concesionaria Española, S.A. (Spanish motorway company)

ADSL
Asymmetrical Digital Subscriber Line

AECE
Asociación Española de Comercio Electrónico (Spanish Association for Electronic Commerce)

AIMC
Asociación para la Investigación de los Medios de Comunicación (Association for Research on Communications Media)

AIPA
Autoritá per l'Informatica nella Pubblica Amministrazione (Authority for IT in the Public Administration)

APACS
Association for Payment Clearing Services (United Kingdom)

ATM
Automated Teller Machine

BACS
Bankers' Automated Clearing Services

BIS
Bank for International Settlements

BNL
Banca Nazionale del Lavoro

BNP
Banque Nationale de Paris

BPM
Banca Popolare di Milano

BPN
Banca Popolare di Novara

BSI
Bundesamt für Sicherheit in der Informationstechnik (German Federal Agency for Safety of Information Technology)

BT
British Telecom

Btx
Bildschirmtext (German videotex service)

CA
Certification Authority/Agency

CB
Cartes Bancaires (France)

CCF
Crédit Commercial de France

CD
Compact Disc

CECA
Confederación Española de Cajas de Ahorros

CEPS
Common Electronic Purse Specifications

CFC7
standardised bar code at the bottom of all cheques for the automation of the processing of cheques in Denmark.

CIC
Crédit Industriel et Commercial (French banking group Crédit Mutuel-CIC)

C-SET
Chip-Secured Electronic Transactions

DE
Germany (Deutschland)

DK
Denmark

DKK
Danish Crown

DM
Deutsche Mark

DNB
De Nederlandsche Bank

DPR
Decreto del Presidente della Repubblica (Decree of the president of the republic, Italy)

ECF
Electronic Commerce Finland

ECB
European Central Bank

ECBS
European Committee for Banking Standards

ECF
Electronic Commerce Finland

ECU
European Currency Unit

edd
electronic direct debit

EDI
Electronic Data Interchange

EDIFACT
Electronic Data Interchange for Administration, Commerce and Transport

EFTPOS
Electronic Funds Transfer at Point Of Sale

ELV
Elektronisches Lastschriftverfahren (electronic direct debiting process)

EMV
Europay, Mastercard, Visa

EMU
European Monetary Union

EN
European Norm

ES
Spain

ESP
Spanish Peseta

ESTO
European Science and Technology Observatory

EU
European Union

FDIH
Forening for Dansk Internet Handel (Danish Association of Internet Traders)

FESTE
Fundación para el Estudio de la Seguridad de las Telecomunicaciones (Foundation for the Study of Security in Telecommunications)

FI
Finland

FIM
Finmark

FIWG
Financial Issues Working Group

FR
France

FTI
Forum per la Tecnologia della Informazione (Forum for information technology)

FZKA
Forschungszentrum Karlsruhe (Research Center Karlsruhe)

GDP
Gross Domestic Product

GEA
Gemenskapen för Elektroniska Affärer (Group of Electronic Commerce)

GEF
Global Electronic Finance Management (Brussels)

GfK
Gesellschaft für Konsumforschung (Company for Consumer Research, German market research company)

GSM
Global System for Mobile Communications

GWB
Gesetz gegen Wettbewerbsbeschränkungen (German cartel law)

HBCI
Homebanking Computer Interface

ICC
Integrated Chip Card

ICT
Information and Communication technology

IDC
International Data Corporation (IT consultants)

IETF
Internet Engineering Task Force

ING
Internationale Nederlanden Group (Netherlands banking group)

IPTS
Institute for Prospective Technological Studies

ISDN
Integrated Services Digital Network

ISI
Fraunhofer-Institut für Systemtechnik und Innovationsforschung (Fraunhofer Institute for Systems Technology and Innovation Research, Karlsruhe)

ISO
International Standards Organisation

ISP
Internet Service Provider

IT
Information Technology

IT
Italy

ITAS
Institut für Technikfolgenabschätzung und Systemanalyse (Institute for Technology Assessment and Systems Analysis)

IuKDG
Informations- und Kommunikationsdienstegesetz (German Information and Communication Services Act)

JP
Japan

JRC
Joint Research Centre (European Commission)

KWG
Kreditwesengesetz (German Banking Act)

KPN
Koninklijke KPN NV (Royal Dutch Telecom)

M1
Narrow Money, defined as cash in circulation and sight deposits held by non-banks. Used in this report for all countries except Norway and the UK.

M2
Narrow Money (Norway, UK in this report), defined as volume of cash in circulation (outside the banks) and balances in national currency in the settlement and current accounts and deposits of resident non-financial enterprises, organisations and individuals. It does not include foreign-currency deposits.

MIA
Merchant Initiated Authorisation (Finnish extension of SET)

MORI
Market Opinion Research International

NL
The Netherlands

NO
Norway

NOK
Norwegian Crown

NUTEK
Närings- och teknikutvecklingsverket (Swedish National Board for Industrial and Technical Development, Stockholm)

OFTEL
Office of Telecommunications (OK)

PBS
Pengeinstitutternes Betalings Systemer (Danish clearing house)

PC
Personal Computer

PIN
Personal Identification Number

POS
Point of Sale

POZ
Point of Sale ohne Zahlungsgarantie (without payment guarantee)

PTT
Poste, Télegraphe, Téléphone

RATP
Régie Autonome des Transports Parisiens (Parisian Urban Transit Authority)

SDA
Scuola di Direzione Aziendale (College of the Finance Direction)

SDC
Sparkassenes Datacentraler (Danish Savings Banks' IT Centre)

SDS (DK)
Sammensluttede Danske Sparekasser (Association of Danish Savings Banks)

SDS (N)
Statenes Datensentral (Norwegian Post Office Data Centre)

SE
Sweden

SEK
Swedish Crown

SEME
Société Européenne de Monnaie Electronique (European Society for Electronic Money/ Coinage)

SET
Secure Electronic Transaction

SFTI
Single Face To Industry

SIPS
Secure Internet Payment System

SIZ
Informatikzentrum der Sparkassenorganisation (IT-Development and Coordination Center for the German Savings Banks Organization)

SME
Small and Medium Enterprises

SNCF
Societé Nationale des Chemins-de-Fer Français (French national railway company)

SpA
Società per Azioni (shareholder company)

SSB
Società per i Servizi Bancari SpA (Italian company for banking services)

SSL
Secure Sockets Layer

SVEA
Svenska elektroniska affärer (Swedish electronic commerce)

SWIFT
Society for Worldwide Interbank Financial Telecommunications

TARGET
Trans-European Automated Real-time Gross settlement Express Transfer

TIBC
tarjeta inteligente para bancos y cajas (smart card for banks and savings banks)

TNO
Nederlandse Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek (Netherlands Organisation for Applied Scientific Research)

UDUS
Danish standard for domestic interbank transactions

UK
United Kingdom

US
United States

VSEC
Visa Secure Electronic Commerce

W3B
Large European opinion poll on the World Wide Web, run by the Fittkau & Maass company of Hamburg.

W3C
World Wide Web Consortium

ZKA
Zentraler Kreditausschuß (Germany)