

**Institute for
Prospective Technological Studies**
Directorate General Joint Research Centre
European Commission



ePayment Systems Database

– Trends and Analysis –

Electronic Payment Systems Observatory (ePSO)

March 2002

Gérard Carat

EUR 20264 EN



IPTS, Edificio Expo-WTC,
C/ Inca Garcilaso, s/n, E-41092, Seville, Spain
Tel: +34 954488281, Fax: +34 954488208
URL : <http://eps0.jrc.es/>



European Commission

Joint Research Centre (DG JRC)

Institute for Prospective Technological Studies
<http://www.jrc.es>

Legal notice

Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of the following information.

Report EUR 20264 EN

© European Communities, 2002

Reproduction is authorised provided the source is acknowledged

Abstract

This study analyses the evolution of Internet-based payment solutions offered to consumers in Europe. It is based on the observation of 100 electronic payment schemes taken from the e-Payment Systems Inventory, which is one of the deliverables of the electronic Payment Systems Observatory (ePSO) project.

The main topics monitored by the report are:

- ❑ the role of non-banks within the payment systems providers;
- ❑ the positioning of telecommunications operators against banks;
- ❑ the main trends of payment solutions according to their level of deployment;
- ❑ the increasing importance of mobile networks and virtual wallets as payment platforms;
- ❑ the comparison between e-purses and pre-paid dedicated accounts;
- ❑ the reaction of banks with respect to virtual wallets;
- ❑ the main platforms that allow micro-payments;
- ❑ how credit cards remain the main Internet payment instrument;
- ❑ the emerging alternatives to credit cards for cross-border payments;
- ❑ the role played by consumer costs in the failure of a payment system.

Table of contents

1	Introduction	1
1.1	About the database	1
1.2	Scope of the data collected for this study	2
1.3	Caveats	5
2	Analysis	6
2.1	Topics addressed	6
2.2	Cooperation vs. competition: Profile of the system providers	7
2.3	State of operation	8
2.4	Mobile payment solutions	9
2.5	E-Money	11
2.6	Virtual wallets/Accounts/Channeling systems (“VACs”)	12
2.7	Micro-payments	13
2.8	Direct vs. indirect use of banking products	14
2.9	Cross border	15
2.10	User cost	16
3	Conclusions.....	18
3.1	Further considerations.....	20
	Appendix 1: List of the 100 schemes monitored.....	21
	Bibliography	28

List of tables and charts

Chart A:	Direct hits to http://epso.jrc.es/paysys.html	2
Table 1:	Profile of the 100 e-payment solutions	4
Table 2:	Profile of the system providers	7
Table 3:	The role of the telcos.....	8
Table 4:	State of operations	8
Table 5:	Duration of terminated projects	9
Table 6:	Types of m-payment solutions.....	9
Table 7:	Profile of m-payments solutions providers	9
Table 8:	Solutions offering real and virtual POS payment	10
Table 9:	Profile of prepaid schemes	11
Table 10:	VACs Providers and functionalities.....	12
Table 11:	Micropayment capability of each payment solution.....	13
Table 12:	Breakdown of traditional access products	14
Table 13:	Cross-border schemes	15
Table 14:	Breakdown of “cross-border potential” schemes introduced in/after 2000	16
Table 15:	Type of user cost – breakdown by PSP and type of cost.....	17
Table 16:	Solutions implying user cost. Breakdown by status, platform & PSP	17

1 Introduction

We are witnessing the birth (and death) of a host of Internet-based payment solutions exploiting traditional payment solutions in innovative ways, some of which are imposing themselves as pillars of e-commerce (e.g. the PayPal phenomenon).

The present report describes the main trends observed in these new consumer e-payment solutions, based on the analysis of 100 payment systems (listed in Appendix 1) taken from the ePSO database on electronic payment systems (<http://epso.jrc.es/paysys.html>) in November 2001.

The ePSO database is one of the deliverables of the electronic Payments Systems Observatory (ePSO) project (<http://epso.jrc.es/>) which is part of the European efforts to leverage payment systems innovation in the move towards promoting e-commerce in Europe. The ePSO objectives are:

- to monitor and analyze the strategic views of market players and experts
- to strengthen communication across groups of actors, sectors, channels and countries, with a view to assisting standardization and regulatory bodies in keeping pace with the evolution of technology.

The ePSO project has been managed by IPTS, the Institute for Prospective Technological Studies and is co-financed by the European Commission DG Enterprise ISIS Programme.

1.1 About the database

While lists and databases dealing with electronic payment matters already exist worldwide, we noticed that they usually only list relevant URLs. We therefore decided to create the ePSO database with a view to aggregating the publicly available data on each payment solution, summarizing it, and integrating it under a consistent and user-friendly format, including the following fields:

- Name and creation date
- Members/parties
- Geographical scope
- Application area (eg. rPOS, vPOS...)
- State of deployment
- Description
- Usage figures (not provided in a consistent manner by PSPs)
- Comments
- References, bibliography

The ePSO database monitors electronic payment systems, related projects and initiatives. Its *geographical scope* is mostly Europe, but relevant activities outside Europe are also taken into account in a selective way in the case of innovative products. *The focus* is on European consumer payment systems but the scope has been broadened to include some interoperability, technical or strategic initiatives (e.g. EMV, PACE, WAP...).

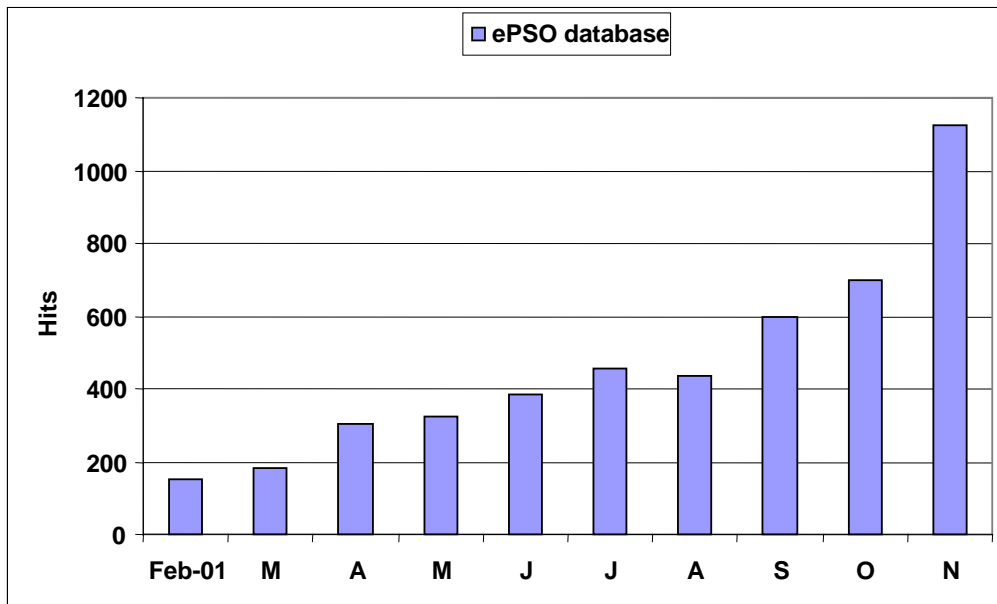
There are three search modes for the Inventory database:

1. An alphabetical list of all the payment systems

2. A free text search option
3. A “categorized search” where an explicit three-level tree structure of keywords is provided. The first column indicates the type of payment solution or initiative. When the user clicks on one of these categories, a list of the payment systems corresponding to this criteria will appear on the right hand side of the screen. At the same time, a second column appears offering additional criteria to refine the search. Once again the result can be further refined with a third column.

The data presented is based on a compilation of publicly available information sent to the PSPs for verification. With the increasing success of the database (as seen in Chart A below), Payment Service Providers (PSPs) have proactively posted updates to the ePSO team, and there have been many requests for the inclusion of new payment solutions in the database.

Chart A: Direct hits to <http://epso.irc.es/paysys.html>



1.2 Scope of the data collected for this study

As so many e-payments solutions are offered in the marketplace, a number of criteria have been identified in order to define the scope of our study. We have selected those consumer payment solutions that:

- allow for Internet payment. Only those transactions initiated online are included and methods such as cash on delivery or prepayments by cheque are excluded. E-purses or m-payment solutions are considered if they offer or envisage Internet payment.
- are introduced/announced/piloted/terminated in Europe
- integrate a degree of innovation that goes beyond the SSL-encrypted credit card transaction (the most widespread scenario to date).
- are offered directly to the end users: We have chosen to cover payment solutions that are advertised directly to the consumer, and which the consumer may choose to use or not. We have not considered consumer payment solutions developed by Payment Service Providers (PSPs) for merchants, financial institutions or telcos

which are offered as a package to the final consumer. The rationale for limiting our scope to solutions where the consumer arguably has more visibility/awareness, is to identify the factors that could increase the take-up of electronic commerce. Although the frontier between what the consumer can and cannot see is a moving one, the criterion for selection remains a payment solution that the consumer has voluntarily decided to use.

Using these parameters, we have shortlisted a sample of 100 payment solutions out of the 180 records that had been compiled in the ePSO inventory in the month of November 2001. Their main characteristics are summarized in the table on the next page.

Table 1: Profile of the 100 e-payment solutions

State of deployment	Brief definition
Commercially deployed	These represent 70% of a total of 100 payment solutions monitored in the study.
Pilots / Announced / Terminated	This other category represents the remaining 30%. Each deployment status (Pilot/Announced/Terminated) is separately treated within the study, particularly in chapter 2 “State of operation”

Within these two groups, we identify the following categories:

Categories	Brief definition
Bank / near bank electronic access products	The difference is made between access products used directly , i.e. as the immediate payment mechanism (eg. SET, dual slot phone, or within an e-banking solution), and indirectly when used as the ultimate payment instrument to feed the new, Internet-specific e-payment systems.
VACs	<i>Virtual wallet, Accounts and Channeling systems:</i> A server-based, virtual wallet facilitates traditional forms of payment (e.g. credit transfers, credit card); often combined with a virtual account which has the same function as a normal bank account i.e. to transfer value from a virtual account to another or from a virtual account to a bank account or credit card account. A channeling system is conveying a payment instruction directly to the bank on behalf of the user (e.g. Paybox). If the user wishes to send money (not to receive it), VACs must, in some instances, be pre-paid (e.g. Nochex), but in other cases (such as PayPal) no pre-payment is required and the system acts as an intermediary between the payer's bank access product and the payee. This is why VACs are in an intermediary position between "Electronic access products" and "pre-paid solution".
Prepaid e-purses	Electronic purses, card-based or software-based, as defined by the EMI directive.
Prepaid dedicated accounts	Prepaid scratch cards or virtual accounts. Work only with registered merchants. Distinct from VACs insofar as they do not allow for P2P and do not rely on traditional payment methods (Payments are often made independent of an existing bank or credit card account).
Loyalty schemes	Includes money surrogates such as consumer incentives and bonus points e.g. Beenz, Maximiles
Microbilling & micropayment	For amounts below 5 Euros
Micro & larger payments	For amounts below and above 5 Euros
Mobile payment	Refers to a wireless-specific system where the absence of a mobile device precludes its use as a payment solution (e.g. mobile phone indispensable with Paybox, but optional with Paypal)
Extended over mobile	Initially implemented over a fixed platform, extended to a mobile device.
Real & VPOS	Payment solutions for real Point of Sales i.e. <i>brick and mortar</i> shops and also Virtual POS i.e. Internet merchants
Virtual POS	Payment solution for Virtual Point of Sale i.e. for Internet merchant. Are also included real POS schemes with <i>plans</i> to expand their solution to Internet payment (e.g. some e-purses)
Combined with e-banking	When the payment solution is part of an electronic banking solution.
User cost involved	Either hardware (eg. card reader), software, or subscription fee
Bank / near bank initiative	PSPs are banks, credit card companies or payment processors created by banks such as SSB in Italy, PBS in Denmark...
Non-bank initiative	When the implementation of the payment solution does not involve strategic partnership nor mixed shareholding between the PSP and a financial institution, even if a bank is “contracted” for the clearing & settlement.
Mixed profile	When the payment solution derives from a strategic partnership and/or mixed shareholding between a financial institution (bank, near bank, payment processor...) and a “non-bank”.
Potential for cross-border	Allowing <i>in principle</i> international payment eg. through multiple country presence.

Remarks:

- Definitions and explanations for each category are further developed in the following chapters
- A full table of the 100 payment schemes is shown in Appendix 1.
- We chose to be mostly consistent with the classification used in ePSO Background Paper 4 on Internet Payments (<http://epso.jrc.es/Docs/Backgrnd-4.pdf>), but added the so-called ‘VACs’ category (Virtual wallets / Accounts / Channeling systems) to reflect in a single block the variety of server-based e-payment solutions that are not exclusively prepaid.
- The data was taken from the ePSO database on e-payments in November 2001. Information updates since that date appear in the online version of the database.

1.3 Caveats

The objective of this report is to identify emerging trends. The fact that ePSO database consultations have risen consistently (cf. Chart A) illustrates that industry actors, analysts and consumers appreciate empirical information in their attempt to understand this complex industry and the present study is a first step in this direction.

However, the reliability of the conclusions has inherent limitations, given that:

- We monitor the number of schemes rather their actual usage figures, as this information is not released in a consistent manner by PSPs (Payment Service Providers). The reader should therefore remember that in terms of usage, credit cards remain the dominant instrument and that this report aims at showing characteristics of the alternatives offered in the e-payment marketplace.
- The list of e-payment systems monitored is not all encompassing (see “scope of the study”), and there is no specific (balanced) breakdown of types of payment solutions by country or by type.
- The categories are not exclusive of one another: some payment schemes can overlap into more than one category (e.g. some mobile payment systems are also virtual wallets such as mPay or PayitMobile), which does not allow for a clear-cut profile for each payment system, nor for the trends derived.
- Finally, as ePSO Background Paper No. 4 suggests, country-specific payment cultures play an important role and cannot be “homogenized” in our sample.

The reader should therefore keep in mind these caveats when reading our tentative conclusions. These are only an indication of potential trends, which would need to be confirmed through further research.

2 Analysis

2.1 Topics addressed

Based on the information collected, and the limited consistency of information released by the PSPs, the research was structured to investigate a limited set of questions deriving from the following topics:

Cooperation vs. competition (profile of the Payment System Providers -PSPs)

What is the relative importance of non-banks within the PSPs?

Are telcos positioning themselves as the main competitors of banks?

State of operation

What can we learn from the evolution of the projects' status?

Mobile payment solutions

Are mobile solutions becoming a winner?

e-money

Do pre-paid dedicated accounts have better prospects than vPOS-enabled e-purses for Internet payments?

Wallets/VACs

How do banks react to the growing success of virtual wallets?

Micropayments

Which platforms allow for micropayments?

Direct vs. indirect use of bank access products

Are credit cards here to stay?

Cross-border

Are there alternatives to credit cards emerging for cross-border payments?

Consumer cost

Is cost a determining factor in the failure of a project?

2.2 Cooperation vs. competition: Profile of the system providers

Definitions:

Bank and near banks include banks, credit card companies and payment processors created by banks such as SSB in Italy, PBS in Denmark...

Non-bank: when the implementation of the payment solution does not involve strategic partnership or mixed shareholding between the PSP and a financial institution, even if a bank is “contracted” for the clearing and settlement.

Mixed profile: When the payment solution derives from a strategic partnership and/or mixed shareholding between a financial institution (bank, near bank, payment processor...) and a “non-bank”.

Table 2: Profile of the system providers

	Initiated by banks / near banks	Non-banks	Mixed profile
All schemes = 100	39	41	20
Introduced before 2000	20	9	5
Introduced in or after 2000	19	32	15

Includes terminated schemes, pilots and announcements

- 39 of the payment systems are initiated by banks or near banks. However, an even larger proportion (41) are initiated by other market actors, which indicates that, in the sample monitored, non-banks are taking more innovative initiatives than banks in interfacing with the consumer for Internet payment.
- When we compare older with more recent schemes, the above trend is strongly confirmed (32 non-bank vs. 19 bank schemes) and indicates that this is a recent development.
- Although most e-payment solutions ultimately rely on bank or near-bank payment instruments, it could be argued that banks are being “dis-intermediated” in cases where the payment solution is proposed by a newcomer who controls the direct interface with the consumer (implications on contractual relation, branding...)¹. One factor to take into account, however, is that a fraction of the “non-bank” systems currently “under trial” or “announced” may opt for a partnership with a bank when they are commercially deployed.

The role of Telcos

One of the main *non-bank* protagonists among the new PSPs is the telecom operator with its ability to carry out payment over the mobile phone².

¹ Relate this with chapter 2.8: “Direct vs. indirect use of banking products”:

² See an overview of the mobile payment initiatives as well as their competitive and regulatory implications in the IPTS report <http://www.jrc.es/pages/iptsreport/vol49/english/ICT2E496.htm>

Table 3: The role of the telcos

	Schemes run by non-banks	Schemes run by mixed profiles
When telcos are involved	27% (11 schemes/ 41 offered by non banks)	60% (12 schemes/20 offered by mixed profiles)
Main payment solution when telcos are involved	Microbilling: 82% (9/11)	Mobile payment: 67% (8/12)

NB: In all the tables, statistics are presented either by number of payment schemes or by their corresponding percentage. Where the percentage given is not of the total number of schemes (=100 schemes), the calculation details deriving from the number of schemes considered are provided between parenthesis.

- Telcos are involved in over 1/4 of the systems initiated by non-banks, but almost 2/3 of the projects are run in partnerships between telcos and banks (mixed profile).
- This tends to show that partnership with banks is the preferred path chosen by telcos, and should be weighed against the recent hype about the potential threat to banks by telcos.
- Interestingly, telco activity does in fact complement that of banks: banks have not offered cost effective solutions for Internet micropayments - precisely the field where telcos are more active when they initiate a “non-bank” payment. When, on the other hand, they have chosen to collaborate with the banks, it is to integrate bank access products into their mobile platform. This hints at a pragmatic complementarity pattern rather than upfront competition.

2.3 State of operation

Although distinct in their nature, we have grouped announcements with pilots, with the objective of identifying a single group of “forthcoming” schemes.

Table 4: State of operations

	Announced/Pilots	Ongoing	Terminated
Within the 100 schemes	19	70	11
Profile of the PSP			
Bank-driven	7	29	3
Non-banks	4	31	6
Mixed profile	8	10	2
Type of payment scheme offered			
VACs ³	6	12	5
e-purses	3	11	3
Dedicated accounts	4	10	1
MPayments	8	10	1

Start-ups and failures are quite common in sectors where rapid innovation takes place, but some interesting patterns can be observed.

- Terminated and ongoing payment solutions were mostly initiated by non-banks (although for the ongoing systems, non-banks are only slightly more numerous with 31 non-bank vs. 29 banks schemes). On the other hand, the schemes “in the pipeline” (planned or under pilot) are mostly initiated by mixed profiles (8 of 19 schemes) immediately followed by banks and near banks (7 of 19 schemes).

³ Virtual wallets, Accounts and Channeling systems.

Keeping in mind that the absence of banks as shareholding or strategic partners in a planned payment system may evolve into their active participation once this payment solution is commercially deployed, one tentative conclusion is that payment systems are increasingly built upon a cooperative pattern between banks and non-banks, evolving from a majority of non-bank for terminated projects to a majority of mixed profiles for planned projects.

- The majority of the announced payment solutions schemes are m-payment (followed by VACs). Most of the ongoing or failed schemes are also VACs. This indicates that these two payment platforms are generally attracting more interest from the payment systems innovators, arguably because these platforms may be preferred by consumers.
- Over 2/3 of the terminated projects did not survive longer than 2 years, which hints that this “darwinistic” sector sorts winning from losing solutions quickly.

Table 5: Duration of terminated projects

Breakdown of the 11 terminated projects		
2000		2001
18% (2/11)		82% (9/11)
Average duration of the terminated projects		
1 year	2 years	3 years and more
27% (3/11)	45% (5/11)	27% (3/11)

2.4 Mobile payment solutions

Definition:

We distinguish between 1) mobile-specific payment systems and 2) solutions initially introduced for “fixed” Internet sessions, and later extended to the mobile platform, either (a) enabling their use over a WAP phone (to replicate the Internet session) or (b) using solutions such as PIN sent via SMS for a server-based transaction. This distinction allows us to see whether a payment solution uses the mobile phone in an “original” manner or whether it is merely an extension of an existing service to the mobile platform (eg. Paypal).

In our definition, laptops with a wireless data connection are not considered to fit within m-payments.

Table 6: Types of m-payment solutions

Mobile-specific payment solutions	Initially fixed, extended over mobile	Total
19	15	34

If we add the above two categories, the mobile platform is used in a third of the payment solutions (34 of 100 schemes). This fast progression (they were mostly introduced in the last 2 years) tends to indicate that mobile devices could potentially evolve into a component of most e-payments in the next few years.

Table 7: Profile of m-payments solutions providers

	banks/near-bank	Non-banks	Mixed profile
	16% (3 of 19 mobile schemes)	32% (6/19)	47% (9/19)
<i>Involving telco</i>	<i>Not applicable</i>	<i>33% (2 of the 6 non bank schemes)</i>	<i>89% (8 of the 9 mixed profile schemes)</i>

- Non-banks providing m-payment are not necessarily telcos: 4 of the 6 non-banks which are not telcos are Mint (an independent PSP backed by venture capital), Payline (by Experian, a customer management firm), Phonepaid (a privately held company whose shareholders are not disclosed), Streetcash (by Inatec, a payment technology provider).
- Almost half of the mobile payment solutions are offered by mixed profiles; they all involve a telco (except EMPS which involves a manufacturer: Nokia).
- The 2 blocks with bank involvement (banks⁴ + mixed profiles) represent almost two thirds of the 19 m-payments systems, which tends to modulate fears that mobile operators are becoming the biggest competitive threat to banks.
- This “partnership” argument is reinforced by the fact that telcos are involved in almost all (8 of 9) of the mobile schemes initiated in partnership with banks, and are marginally involved as sole initiators of m-payment schemes (only 2 cases: Gismo, which was terminated, and Sonera Mobile Pay which started as a real POS payment schemes, with plans to expand to Internet payments).

The best of both worlds?

Table 8: Solutions offering real and virtual POS payment

Within the 23 schemes offering virtual <i>and</i> real world POS payment	
Mobile schemes	35% (8/23)
E-purses	48% (11/23)

- Notwithstanding increasing concerns on m-payment security, one of the factors strengthening the m-payment business case vs. the other new e-payment systems, is that mobile phones have the advantage of offering a cheap additional layer of security. Hackers will not only have to intercept the PIN entered on the PC (in the case of Internet payment) but also to steal the mobile phone itself. Another factor is that mobile phones often allow for real as well as virtual POS payments (over a third of the 23 real & virtual POS schemes monitored are mobile). Also, nearly half (8) of the 19 m-payment schemes in the database allow for Real and Virtual POS payments.
- Only e-purses⁵ perform better than mobiles in providing both real and virtual POS, but e-purses’ virtual POS payment capability does not mean actual usage. Indeed, Background Paper 4 on Internet Payments suggests that only 1% of e-purse payments would be used for Internet payment.
- When compared to traditional payment instruments, this good performance of m-payment solutions for both the real and virtual worlds does not fundamentally change the order of things, as credit cards have done this since the introduction of Internet payment. However, one could argue that, with the exception of dual-slot phones, the user interface varies between real and virtual POS, and that the mobile terminal presents the advantage of potentially integrating both worlds conveniently on a single platform, with a unique interface (if PSPs succeed in making this mobile phone interface user-friendly, fast, and intuitive). Indeed, there are different steps and payment procedures when the consumer pays with a credit card in a street shop with a card reader and when he pays on the Internet. In this respect, the user may find it cumbersome to go through two distinct procedures,

⁴ Banks using the mobile as a neutral platform on which their payment solution is being implemented

⁵ We have used in the sample only the e-purses that may also be used (or planned) over Internet.

and *may* arguably find it more user-friendly to learn a single payment procedure for both environments.

2.5 E-Money

Definition:

According to the EMI directive (see Bibliography), Electronic money is a “monetary value as represented by a claim on the issuer which is: (i) stored on an electronic device; (ii) issued on receipt of funds of an amount not less in value than the monetary value issued; (iii) accepted as means of payment by undertakings other than the issuer”.

Prepaid dedicated accounts include scratch cards. Payments are often paid in cash, independent of an existing bank or credit card account and therefore allow for anonymous shopping. These accounts cannot be used for P2P payments.

Table 9: Profile of prepaid schemes

	Smartcard-based (EMI directive)	Software-based (EMI directive)	Dedicated account
Out of 100 schemes	15	2	15
<i>Ongoing</i> ⁶	11	0	10
<i>Terminated</i>	1	2	1
<i>Pilots/announced</i>	3	0	4
Year of introduction			
Within each category			
2000-2001	20% (3/15)	0	100% (15/15)
1993-1999 ⁷	80% (12/15)	100% (2/2)	0

- 17% of the schemes correspond to e-money, as defined in the EMI Directive. If we choose to extend the definition of e-money to prepaid dedicated accounts, we double this proportion to a third of all payment schemes.
- Prepaid-dedicated accounts were all introduced within the last 2 years, whereas 80% of the e-money schemes were introduced within the last 8-9 years. For card-based e-purses, this illustrates that they correspond to a first generation of payment systems originally created for real world transaction and later extended to allow (in some cases) Internet payments. Prepaid accounts, however, were created for the virtual world and offer the advantage of avoiding the use of a card-reader (cheaper and more convenient). For software-based e-purses, this illustrates that there is a general trend towards server-based solutions as opposed to the download of a resident payment software, as argued in ePSO Background Paper 3 (2001).
- This does not mean, however, that prepaid accounts have no drawbacks. Scratchcards, like e-purses, have high physical card costs, distribution costs, retailer commission, and limited interoperability. For users with a credit card or online banking access, the first three of these drawbacks can however be overcome with a new generation of prepaid virtual cards which can be paid for over the Internet such as Cybertarjeta or VirtualCash+. Time will tell if the teenage market (without bank account) and the market for "adult content" (requiring anonymity) may create sufficient demand for these schemes to be successful.

⁶ We consider Mondex and Visacash as deployed products

⁷ We consider here the date of introduction of an e-purse, not the date when virtual POS payment facility has been introduced.

2.6 Virtual wallets/Accounts/Channeling systems (“VACs”)

Definition:

VACs use existing bank access products, and merely add value in the form of the access channel (eg. transaction confirmation with a PIN over a mobile phone (Mpay), email (PayPal, Nochex)... In other words, VACs are a new channel between the payer’s bank and the merchant, but ultimately rely on a traditional payment instrument. They are therefore a new intermediary appearing between the bank and the consumer, and represent a risk of “dis-intermediation” of the bank⁸ (except, of course, when deployed by banks).

A server-based wallet facilitates traditional forms of payment such as credit transfers, debits and credit card payments. In many cases, the virtual wallet is combined with a “virtual account”. Basically, virtual accounts have the same functions as normal banking accounts, i.e. to transfer value from one virtual account to another or from a virtual account to a bank account or credit card account. What distinguishes virtual accounts from traditional accounts is the fact that (a) they may be offered by non-banks and near-banks, (b) they are apparently Internet-based (using e-mail and access to a server connected to the Internet) and (c) they ultimately rely on traditional accounts for feeding the virtual account or for clearing and settlement purposes. In most systems the virtual wallet and the virtual account functionality are combined.

Prepaid dedicated accounts are treated as a separate category, although it is sometimes tricky to draw a clear distinction between both (for instance the virtual wallet Nochex used for online auctions in the UK needs to be pre-paid). One differentiating factor between VACs and Prepaid is the P2P functionality for the virtual wallet/account.

Also included in the VACs category are the so called “channeling systems”, channeling a payment instruction to the bank on behalf of the user, like Paybox who acts as messaging service between bank direct debit and merchant.

We grouped the virtual wallet/account and channeling systems together, insofar as a wallet includes the channeling function, although this messaging function does not necessarily include a wallet (as in the case of Paybox).

Table 10: VACs Providers and functionalities

<i>Offered by:</i>	banks/near banks	non-banks	mixed partners
<i>From a total of 23 VACs in the 100 schemes</i>	5 (22% of 23 schemes)	11 (48% of 23 schemes)	7 (30% of 23 schemes)
Terminated (6)	2	3	1
Announced/piloted (6)	2	0	4
Ongoing (11)	1	8	2
Combined with e-banking	2	0	0
Offering P2P	2	5	3
Part of m-Payment scheme	1	2	5
Cross-border potential	0	5	2

- The largest part (48%) are initiated by non-banks, but banks are involved in the other half, either directly (22%) or in partnership with others (30%). In other words, a minority have been initiated by banks/near banks on their own, as banks

⁸ Relate this with the chapter “Cooperation vs. Competition” where we monitor the profile of the service provider (bank, non-bank, mixed profile) to see who controls the interface with the consumer.

would presumably work on enhancing their own products, including home banking. This trend is even more visible when we narrow the field to ongoing schemes only: the biggest proportion of VACs (8 schemes = 35%) are offered by non-banks.

- Given that only a minority (1 of 11 ongoing VACs) of the schemes have been initiated by banks on their own, and by mixed partnerships (2 of 11 ongoing VACs), VACs may be seen as a new generation of payment solutions. They have been introduced by newcomers positioning themselves as new intermediaries between the bank and the merchant for the benefit of the consumer in areas where traditional bank accounts are generally weak, such as integration into online-shopping processes (especially online auctions), or online P2P payments (mainly offered by non-banks in table 10).
- This may be seen as a sign of healthy competition, forcing the banks to enhance their offering, and it seems that banks have indeed followed this innovation track. All the announced or piloted VACs are offered by banks or mixed partners. The majority of announced/piloted mobile VACs are also offered by banks or mixed partners (mostly in partnership with telcos), suggesting that banks have realised that they need to be present in this field, following a first wave of non-bank innovators.

2.7 Micro-payments

Definition:

Some definitions of micropayment imply amounts inferior or equal to 25 Euros. With this limit, all e-payment solutions (except loyalty schemes) include micropayments. Given that all bank access products allow for the top of this range in a cost effective manner, we narrowed the definition of micropayments to schemes which allow for payments up to 5 Euros.

Although traditional bank access instruments technically allow for micropayments, their cost is relatively high for such low transactions. To reflect this cost aspect, we therefore did not consider bank access products as micropayment-enabled.

Quantifying micropayments can be difficult as the minimum possible amount is not always clearly mentioned by the payment system provider. We therefore considered that 1) e-purses (and software-based e-money), 2) pre-paid dedicated accounts, or 3) microbilling solutions aggregating the amounts (eg. in a phonebill) are micropayment-enabled by default, and tried to identify which other schemes enable micropayments.

Table 11: Micropayment capability of each payment solution

	Smartcard+s oftware eMoney	Prepaid dedicated accounts	Microbilling	VACs	Mobile payment
Micropayment s <5 Euros	17	15	19	15	8
% of each category	100% (of the emoney schemes)	100% (of the prepaid dedicated accounts)	100% (of the microbilling schemes)	65% (15 of 23 VACs)	42% (8 of 19 m-pay schemes)

Micropayments are not limited to e-money, prepaid accounts and microbilling solutions. 23 micropayments schemes also turn out to be enabled on other platforms: 15 VACs and 8 m-payments schemes. This extends the plurality of use -and the

business case- offered by VACs and mobile phones, and increases their appeal as an alternative to traditional electronic access products which, to date, do not cater for Internet micro-payments in a cost-effective manner.

2.8 Direct vs. indirect use of banking products

Definition:

Direct: when the solution uses a bank/near bank electronic access product as the immediate payment mechanism, eg. SET, SSL, dual slot phone. This is the case when the e-payment is part of an e-banking solution, deployed by the bank itself.

Indirect: when bank electronic access products are used as the ultimate payment instrument to feed the new, Internet-specific electronic payment systems, usually offered by non-banks.

Table 12: Breakdown of traditional access products

	Debit card	Direct debit	Credit trsf	Credit card
Within the 100 payment systems	37	14	22	52
DIRECT use	9	3	7	17
INDIRECT use (channelled by, or to load/feed e-payment payment systems)	28	11	15	35
Indirect use: VACs	14	7	6	21
Indirect use: Prepaid accounts	4	1	6	6
Indirect use: M-payments	8	4	3	13
Indirect use: Billing	1	4	3	7

Note: Overlaps exist eg. within indirect use, there are some m-payment schemes which are also VACs

One of the difficulties of distinguishing among bank access products is that the frontier between a debit and a credit card (revolving credit) is a moving one. European banks mostly use charge cards debited at the end of the month rather than credit cards providing revolving credit. Another caveat is that the use of a given access product is not always clearly defined: for instance, although we choose to link e-purses with debit cards, it can be argued that their reload (via ATMs, merchant terminal or PC reader) should actually be considered as a credit transfer, insofar as the user is actually ordering money to be transferred from his/her current account into the e-purse.

For this reason, rather than offering a detailed analysis of the type of banking instruments combined with e-payment systems, this chapter aims at illustrating the extent to which the bank (or near bank) payment mechanism is being displaced at the end of the payment process, and is being “instrumentalised” or “dis-intermediated” to the profit of the new intermediary (i.e. indirect use).

- Credit cards, followed by debit cards, are the most used Internet payment instrument either *directly*, or *indirectly*.
- This shows that the usage patterns of the “old” access products (ie. the dominance of credit cards) remain the same when they are instrumentalised within a “new” Internet payment system (although in some cases, it could be argued that the new platforms themselves are being instrumentalised by credit cards, for instance in the case of Visamovil or Paiement CB sur mobile which are displacing the mobile platform as a mere instrument for a “traditional” credit card transaction). This reflects the dominance of credit card usage and hints at the fact that new

technologies will not be so easily emancipated from traditional solutions that have been present in the market for decades (for real POS transactions).

- Even when used indirectly, the dominance of credit card as the ultimate payment instrument remains constant for all payment systems (VACs, Prepaid, Mpayments, Billing).

2.9 Cross border

Definition:

PSPs do not always have the same definition when they say their solution allows for cross-border payment. Some mean that their system technically allows for international Internet payments, but omit to say whether foreign merchants actually use it, etc.

For this reason we have created two definitions to further define the notion of international payment:

- **Cross-border potential** when the payment system website says so or implies it.
- **Multiple country presence** when the solution is deployed in more than one country, or when the PSP has offices in more than one country.

It should be noted that multiple country presence does not necessarily imply that international payments are actually facilitated by a given system (legal hurdles are sometimes involved for cross border payment), but this can nevertheless serve as a starting point to analyze the potential for cross-border interoperability⁹.

Table 13: Cross-border schemes

Scheme status	Cross border potential	Multi-country presence
<i>Within the 100 schemes</i>	36	33
Introduced before 2000	13	14
Introduced in/after 2000	23	19

- In both columns the data *roughly* coincides; “Cross-border potential” is slightly larger as it takes into account, when applicable¹⁰, payment with credit card, the platform ‘par excellence’ of international payment.
- A third of the e-payment schemes have cross-border potential.
- The majority of ongoing or announced schemes allowing for cross-border payments have been introduced since 2000. This indicates that the recent systems are and will be less and less confined to national payments, shifting Europe away from a dominantly domestic pattern, given that 3/4 of EU eCommerce still remains within national borders (EITO 2002).

⁹ (eg Paysafecard between Germany and Austria for prepaid dedicated accounts, Paybox for mobile payments, and Webmiles for loyalty schemes).

¹⁰ The direct use of a credit card in the case of bank schemes does not necessarily imply that the scheme can be used across borders. For instance *Paiement CB sur mobile* does not allow international payments.

Table 14: Breakdown of “cross-border potential” schemes introduced in/after 2000

VACs	35% (8 of the 23 schemes introduced in or after 2000)
e-money	17% (4/23)
m-Payment	13% (3/23)
Prepaid accounts	9% (2/23)
Micropayments enabled	78% (18/23)

Note: Pilots and announced projects included

- After credit cards, the data shows that VACs are the main platform for the provision of international Internet payments.
- The mobile payment cross-border performance is surprisingly low, considering in particular the high profile given to the international roaming capability of GSM and in general the high mobile penetration.
- As a general comment, one could argue that cross-border purchases are not used more (only about a third of the schemes potentially allow for it) because there are few foreign items that cannot be bought nationally.
- However, an area where there is a stronger need for international purchase is content and information. If we exclude the subscription option for content payment, and if we accept the hypothesis that most micropayments are mostly content-related, we could argue that solutions supporting Internet micropayment should offer cross-border capability. This should be related to the fact that a large majority (78%) of the cross-border schemes deployed (or announced) since 2000 are micro-payment enabled.

2.10 User cost

Definition:

When the payment solution is not free for the consumer.

Consumer cost is not always clearly specified. For instance extra equipment could sometimes be subsidised (fully or partially) by the solution provider (eg. card reader paid by the banks / near banks¹¹ or new SIM card paid by the mobile telco), but most of the time it will be paid by the consumer. For consistency, we will therefore consider that new hardware implies user cost¹².

In the case of prepaid scratchcards/accounts, the cost of the solution may be hidden in the prepaid amount or the prices of the associated merchants and therefore in such cases, we choose to consider that there is no (visible) customer cost. In cases where the consumer calls premium numbers (eg. PaybyTel), we also consider there is no consumer fee, although it is not clear whether a consumer fee is added to the price.

¹¹ Amex started by giving away the card readers with its Blue Card.

¹² In the case of e-purses, hardware at a cost will consist of PC card-readers needed for Internet payment. The notion of cost is counted only once: be it subscription fee or card reader.

Table 15: Type of user cost – breakdown by PSP and type of cost

	Total	offered by banks/near banks	non-banks	mixed profile
Total	34	16	7	11
Hardware cost	21	9	4	8
<i>Card reader:</i>	16	10	3	4
<i>SIM/WIM/dual slot:</i>	5	0	1	4
Subscription &/or transaction fee (*)	17	8	6	4

(*)*Hardware+others can exceed the total in case of double count, for instance when the card reader price is included into the yearly subscription (counted as hardware **and** as fee).*

- A third of the sampled systems charge the consumer (34/100).
- A majority involve hardware cost (a card reader or a new SIM card) rather than subscriptions or per-transaction fees. This hardware cost is mainly related to card readers, justifying the recent evolution of the market towards server-based solutions

Table 16: Solutions implying user cost. Breakdown by status, platform & PSP

	Total	offered by banks/near banks	non-banks	mixed profile
Announced/pilot	8 (42% of 19 schemes announced)			
Terminated	3 (27% of 11 terminated schemes)			
Ongoing	22 (31% of 70 ongoing)			
VACs (% of all VACs)	8 (35%)	0	4	4
Dedicated accounts (% of all dedicated accounts)	1 (7%)	1	0	0
e-purses (% of all e-purses)	15 (100%)	9	2	4
Billing (% of all billing solutions)	0			
M-payment (% of all mpay schemes)	7 (37%)	0	1	6

- Interestingly, a minority of the terminated schemes (3 of 11) involved user cost. At this stage, this suggests that cost may not be the determining factor in the failure of a scheme and that the user is not unwilling to pay, provided the payment solution matches his/her requirements.
- A minority of the solutions offered at a cost are initiated by non-banks, probably because these new entrants cannot acquire market share by charging from the start and therefore make their business model by charging merchants rather than consumers.
- Most of the solutions charged are offered by banks or near banks, but exclusively for card readers (mainly e-purses and marginally for some SET payment).

3 Conclusions

This monitoring of a list of new e-payment solutions extracted from the ePSO e-payment systems inventory aimed at, in general, a better visibility on how payment providers and customers are evolving, and in particular, to answer the questions identified in the “*topics addressed*” chapter:

What is the relative importance of non-banks within the PSPs?

Although banks are ultimately involved in the clearing and settlement, they are overtaken by non-banks when it comes to interface with the consumer. This “interface dominance” of non-banks has potential implications for contractual relations, branding etc., and appears with even more strength for recent e-payment systems (launched within the last 2 years).

Are telcos positioning themselves as the main competitors of banks?

Contrary to recent fears that telcos would become the main bank competitors, the results suggest not only that they mainly act in partnership with banks, but that they follow a complementarity pattern. Banks have not offered cost effective solutions for Internet micropayments - precisely the field where telcos are more active when they initiate a “non-bank” payment. When, on the other hand, they choose to collaborate with the banks, they do so by integrating bank access products on their mobile platform.

What are the main trends of the announced, ongoing and terminated projects?

The evolution of the PSP profile hints at an increasing cooperative pattern between banks and non-banks, evolving from a majority of non-banks for terminated projects to a majority of mixed profiles for planned projects.

Are mobile solutions becoming a “winner”?

The mobile platform is used in a third of the payment solutions. The fast progression of these systems, mostly introduced over the last two years, tends to indicate that mobile devices could potentially evolve into a component of most e-payments in the next few years, especially as they often allow for *real* as well as *virtual* Point of Sale payments.

Do pre-paid dedicated accounts have better perspectives than vPOS-enabled e-purses for Internet payments?

Prepaid-dedicated accounts were all introduced within the last 2 years whereas 80% of the e-money schemes were introduced within the last 8-9 years. This illustrates that e-purses correspond to a first generation of payment systems originally created for real world transaction and later extended to allow (albeit not extensively) Internet payments. Prepaid accounts, however, were specifically created for the virtual world and offer the advantage of avoiding the use of a card-reader, which is cheaper and more convenient.

How do banks react to the growing success of virtual wallets?

A *minority* of VACs were initiated by banks/near banks on their own, as banks would presumably work on enhancing their own products, including homebanking. This trend is even more visible for ongoing VACs, largely offered by non-banks. This hints that VACs are newcomers positioning themselves as new intermediaries between the

bank and the merchant for the benefit of the consumer, in areas where traditional bank accounts are generally weak such as integration into online-shopping processes (especially online auctions), or online P2P payments. It seems, however, that banks have realized they need to be innovative or become involved in the virtual wallets, as all the announced or piloted VACs are offered by banks or mixed partners.

Which platforms allow for micropayments?

Micropayments schemes are not limited to e-purses and prepaid accounts. They are also enabled on two thirds of the VACs and almost half of the m-payment schemes. This increases the appeal of these platforms as an alternative to traditional access products which, to date, do not cater for micro-payments in a cost-effective manner. The potential appeal of these platforms may explain why a majority of the “announced/piloted” schemes are precisely mobile and VACs.

Are credit cards here to stay?

Credit cards are the dominant type of bank access product, whether used directly in the case of bank/near-bank or mixed profile initiative (eg. SET, SSL, dual slot mobile phone), or indirectly - mostly in the case of non-bank PSPs (i.e. as the ultimate payment instrument to feed the new, Internet-specific electronic payment systems). This shows that the usage patterns of the “old” access products (ie. the dominance of credit cards¹³) remain the same when they are being “instrumentalised” or “dis-intermediated” by the new generation of Internet payment systems.

Are there alternatives to credit cards emerging for cross-border?

A third of the e-payment schemes monitored have cross-border potential, and a majority of these have been introduced or announced since 2000, indicating that the new systems are and will be less and less confined to national payments. VACs are to date the main cross-border alternative to credit cards for Internet payment, while the mobile payment cross-border performance remains low. A large majority of the cross-border schemes deployed (or announced) since 2000 are micro-payment enabled. It is interesting to link this trend with the assumption that micropayments are/will be mostly content-related, and that an area where there is a strong need for international Internet trade is precisely content and information.

Is cost a determining factor in the failure of a project?

A third of the sampled systems charge the consumer for hardware (card reader or SIM card) rather than subscriptions or per-transaction fees. This hardware cost is mainly related to card readers, justifying the recent evolution of the market towards server-based solutions. Only a minority of the terminated schemes involved user cost, which hints that cost may not be the determining factor in the failure of a scheme and that users may not be unwilling to pay, provided the payment solution matches their requirements. A minority of the solutions offered at a cost are initiated by non-banks, probably because new entrants cannot acquire market share by charging from the start and therefore make their business model by charging merchants.

¹³ On average, as credit card usage can be relatively low in some countries eg. Germany

3.1 Further considerations

A German banker interviewed in the ePSO Newsletter No. 10 (<http://epso.jrc.es/newsletter/vol10/3.html>) stressed that the decisive measure leading to the recent reduction of charge-backs after they reached historic heights, was not improved technology but economic penalties imposed by credit card organisations.

This illustrates that beyond the monitoring exercise carried out in this report, we should keep in mind that technological solutions are not the only answer to the smooth take up of Internet commerce.

Indeed, electronic payment systems are never only about payments. They also involve technical security measures, a clear legal framework, contractual definition of liabilities, effective dispute resolution mechanisms, and above all, trust.

Appendix 1: List of the 100 schemes monitored

A full description of each payment system is available at:

<http://www.jrc.es/cfapp/invent/list.cfm>

Remarks:

- Overlaps are shown (for instance, mobile payments that are also VACs are counted in each category).
- The data from the following table was taken from the ePSO database on e-payments in November 2001. Subsequent updates are shown on the online version of the database.

	Commercially deployed	Pilot / Announced / Terminated	Access products <i>(indirect use between parenthesis)</i>			VACs	Pre-paid	Smart-card (EMI directive)	Software-based (EMI directive)	Dedicated account	Loyalty schemes	Microbilling (b) / micro-payment <5 euros (p)	micro & above	Mobile payment	Extended over mobile	Virtual POS	Real & virtual POS	Combined with e-banking	User cost	Bank/near bank initiative	Non-bank initiative	Mixed profile	Potential for cross-border
			Pay now	Pay later	Credit card																		
(Status:	Nov.	2001)	Debit card	Direct debit	Credit transfer																		
ABN-AMRO eWallet	x		x			(x)									x		x		X				
AvA	x										b	x			x					telco			
Avant	x		(ATM card)				x				p	x			Not much used	mainly real POS		reload fee+card reader	x			Planned	
Balcard		A: trial to start in 2002			(x)		x				p	x			x			card reader			x	x	
Bankpass Mobile		A	(x)			(x)	x						x		x				x				
Bankpass Web		A	(x)			(x)	x								x				x				
Banxafe	x		x		x	x								mobile pilot until early 2002	x			card reader	x			"With SET-accepting merchants"	
Beenz		Terminated in Aug. 01								x					x					x		x	
Bezahlen	x			mandate											x				Postal Savings Bank			x	
Boing		P until mid Dec01.				(x)									x		For "Bol's Banking 365 online"		Trintech solution for Bank			x	
Caixamovil	x					(x)							x		x	x			x				
CartaFacile		A							x		p	x			x				x				
Cartio	x			(Postpaid option)	(Prepaid)	(Prepaid)	x				p+b	up to \$10			x					NetActuals NewGenPay, IBM		x	
Cash	x		(x)				x				p	x		with card reader	x			card reader	x				
Chargit DIAL	x										b; on phonebill	x			x					x		x	
Chipknip	x		(x)				x				p	x			no figures on internet use	x		card reader			KPN shareholding		
Clickpay	x					x									x				Bank of Ireland				
CLIP		Pilot started Jan01.	(x)				x				p	x			with card reader	x		card reader	x			x	
Coulomb	x										b	?			x					x			
Cybercash		T: end 2000 in DE	(x)	(x)		(x)	x				P (the wallet)	x			x				Germany (in US: non-bank)				
Cyber	x		x			x								x	x			card reader	x				
CyberMut	x					x								under pilot	x				x				
Cybertarjeta	x		(x)			(x)			x	Punto estrella	p	x			x				x			x	
Directe Card	x					x									x	x		39 Euro/year	x			x	
Earthport	x		(x)		(For P2P)	(x)	x				p	x		x	x	With SMS via mobile		for P2P "send cash"		Eircom (minority holding)		x	
Easybuy		A: only data from 2000	(x)		(Option for utility bills)	(x)	C								vPOS only		x	New SIM			TIM & participating banks		
Easyclick	x										b	x			x					Telco: 9-telecom			
Ecash		T: D (01), USA (98)		(x)				x			p	x			x				DB				

	Commercially deployed	Pilot / Announced/ Terminated	Access products <i>(indirect use between parenthesis)</i>				VACs	Pre-paid	Dedicated account	Loyalty schemes	Microbilling (b) / micro-payment <5 euros (p)	micro & above	Mobile payment	Extended over mobile	Virtual POS	Real & virtual POS	Combined with e-banking	User cost	Bank/ near bank initiative	Non-bank initiative	Mixed profile	Potential for cross-border
			Pay now	Pay later	Credit card	Credit transfer																
(Status:	Nov.	2001)	Debit card	Direct debit	Credit transfer		Smart-card (EMI directive)	Software-based (EMI directive)														
electronic giro EMPS	x	P			x									x		x	x	x				
eTopup.com	x						(via Mondex)			p	x			airtime reload over			16EUROS: Card reader & soft		x		Merita, visa, Nokia	
Firstgate Click&Buy	x			(x)		(plans)				b	x		x	x					x			
Fortress GB	x				(x)		x		option	p	x			With card reader	x		x		x			
Fun Homepay		Pilot (started Aug.01)			x									x		Fun acts as 3rd party			x			
Geldkarte	x		(x)				x		Option	p	x			with class III reader	x		To load + card reader	x			x	
Genion	x		(x)			(x)	c					x		vPOS only. rPOS						x		
Gismo		Terminated in mid 2001	(x)	(x)		(x)	c: credit account for micro & larger payments			p	x	x		vPOS only							Millicom cellular	
iMinitel	x									b	x			x							telco	via VAC prepaid in FRF
I-Pay		T (mid 2001)	x		x	x								x		x	x			x		
Ipoinits	x								x					x	hightreet vouchers				x		Deal with Webmiles	
K-Wallet		T in 2000	(x)			(x)	For creditcard payment	for micro-payment		p	x			x				x				
Magex	x					(x)	x (allows for P2P)			p	x		x	x							x	
Maximiles	x								x					x							x	
Micromoney		P (Oct 2001)							x	p	x			combined with phonecard							DTelekom	
MiniPay	x		(x)			(x)		x		p	x			with card reader	x		card reader	x			agreement with VisaCash	
Mint		A: internet payment option	(x)			(x)			MintCash: Prepaid via cred.transfer	x	b: Mint credit	x	x		planned for 2002					x		
MinutePAY	x				(x)	(x)	Fed with cred.card, cheque or giro			b	x			Planned				x			P2P if both have French bank account	
Mondex	Pilot & deployed		(x)					x		p	x			x	x		card reader	x			x	
Moneo		P: (transport & e-payment as pilot)	(x)	(x)	(Modeus +Moneo)	("carte verte")		x	Modeus	p	Below 30 Eur			Moneo plans for 2002	x		year fee (reader if vPOS deployed)				France Telecom + RATP	cf. PACE
Moneta Online	x								Virtual Visa Electron number	p	x			x			x	x			as Visa cards	
Movercard		T: Website "in revision" since July 2001					(users give call center CC details)	x						x			annual fee (card reader comprised)		x			x

	Commercially deployed	Pilot / Announced/ Terminated	Access products <i>(indirect use between parenthesis)</i>			VACs	Pre-paid	Dedicated account	Loyalty schemes	Microbilling (b) / micro-payment <5 euros (p)	micro & above	Mobile payment	Extended over mobile	Virtual POS	Real & virtual POS	Combined with e-banking	User cost	Bank/ near bank initiative	Non-bank initiative	Mixed profile	Potential for cross-border
			Pay now	Debit card	Direct debit																
(Status: Nov. 2001)																					
Mobipay / Movilpago		A	(x)			(x)	c + VA				x		x	x		Depends on the financial entities selling the service			Banks + Mobile Telcos	x	
mPay		P	(x)			(x)	C: Mobile solution				x		vPOS only			SIM toolkit 2+			FT+PBS		
net900 Click&Pay	x								b	x			x					DT			
net900 Kontopass	x			(x)					b	x			x					x			
Netels	x							x				x	x					Verisign			
Nochex	x		(x)				x (P2P possible)		p	From 1 penny to to £9999			x			99p for wallet/bank transfers		x		plans	
O-Card (CPN)	x					x						x	x						FT	x	
Odysseo		T: July 2001				(x)	x		b	x		x	x					x		x	
Omnipay	x					(OnPhone option)		"prepagato" Scratch card option	P. (scratchcard option)	onphone option	x		vPOS only (rPOS planned)						Vodafone		
Paiement CB sur mobile	x		x			x					x		vPOS only (includes mail order)			dual slot phone			FT + GIE carte bancaire		
Payback	x							x					x	x				x			
Paybox	x			(x)			c				x		x	x		in spain			Telco	x	
PayByTel	x								b			x	x					Creanet			
Payhound	x		(x)	(x)		(x)	x		p (minimum: 1GBP)	x			x			loading from/to credit card			x		
Payitmobile		P (until end 2001)		(x)		(x)	c	option	p (microbilling planned on phonebill)		x		vPOS only (rPOS planned)						Eplus, GZS		
Payline GSM	x		x			x					x		x			dual slot phone		x			
PayPal	x				(x)	(x)	x		p	x		x	x					x		x	
Paysafecard	x							x	p	x			x						x		
PBS SET	x		SET-based			SET or SSL							x				PBS				
Phonepaid	x		(x)		(x)	(x)	x		p (minimum: 1 GBP)	x	x		x	x				x			
PMB	x		(x)					x	p	x			x	x		card reader	x				
Premium Key		T							b	x			x					x			
Proton	x		(x)				x	option	p	x			x	x		annual fee+card reader	x			X	
Qpass	x					(x)			b	x		in the US	x						x	Planned	
S-itt	x				x								x			x	x				
Safedoor	x		(x)			(x)	c: (not prepaid)						x					x			
Sampo web bank	x					x							x		x		x				
SmartAxis		T						(x)	p	x			x			card reader			x	x	
Smart creds	x		(x)		(x)	(x)		x	p	x			x					x			

	Commercially deployed	Pilot / Announced/ Terminated	Access products <i>(indirect use between parenthesis)</i>			VACs	Pre-paid	Smart-card (EMI directive)	Software-based (EMI directive)	Dedicated account	Loyalty schemes	Microbilling (b) / micro-payment <5 euros (p)	micro & above	Mobile payment	Extended over mobile	Virtual POS	Real & virtual POS	Combined with e-banking	User cost	Bank/ near bank initiative	Non-bank initiative	Mixed profile	Potential for cross-border
			Pay now	Pay later	Credit card																		
(Status:	Nov.	2001)	Debit card	Direct debit	Credit transfer																		
Solo	x		"accept direct debit"	x										with WAP	x		x	x	x			Scandinavia with multiple Nordea accounts	
Sonofon		vPOS payment planned	x	x									plans for 2002		planned for 2002		x				Telco +20 banks		
Sonera Mobile Pay	x		(x)		(x)				if prepaid GSM		b -aggregated on CredCard or phonebill	"no exact limit defined"	x		plans. Today rPOS only					Sonera Telco			
SPA		A			x										x				x		As credit card payment		
Splash Plastic	x			(x)					x		p	p			x					x			
Streecash	x			(for registered user)	(for registered user)				For pre-paid (Paysafecard)		p (with Paysafe)	p	x		x	x					Inatec		
Switch Point	x										b	x			x						Telco: KPN		
TELEpay Light	x				x										x					SSB			
Telia PayIT		Terminated the pilot in Febr 01 A.		(x)					Prepaid account option		b	x			x						Telco		
Verified by Visa					x										x				x			x	
VirtualCas	x		x												x		x			x			
Virtual Cash+	x		(4B ATM= any bank)	(Banesto e-banking)					x		p	x			x					x			
Visa Cash	Deployed eg. in Spain				(x)		x				p	x			with reader	x		card reader for vPOS	x			x	
Visa Movil	x		x		x								x		x	x			x				
Webc@rd		A							x		p	x			x						x		
Webmiles	x									x					x						x	x	
W-HA (iPIN)	x				(x) (if iPIN account opened)	When telco/ISP is not participating to wHA					b: by default (when telco participates to wHA)	below 15 euros		x	x						telco	planned	
Win-commerce	x				using SET or SSL										x		x		x				
WWWbon	x			(for online voucher)					scratch or virtual voucher		p	x		onlinevoucher p/w by SMS	x						IC Company		
Zaki	x									x					x						Bankinter		
Total =100	70	30	37	14	22	52	23	15	2	15	15	59	57	19	15	100	23	13	34	39	41	20	36

Bibliography

Böhle, Knud; Rader, Michael; Riehm, Ulrich (Eds.)

Electronic Payment Systems in European Countries. Country Synthesis Report. An ESTO Project Report. Prepared for the European Commission - JRC Institute Prospective Technological Studies Seville. Seville 1999. <ftp://ftp.jrc.es/pub/EURdoc/eur19062en.pdf>

Böhle, Knud

Integration of Internet Payment Systems – What's the Problem? ePSO-Newsletter No. 11– Dec 2001 <http://epso.jrc.es/newsletter/vol11/5.html>

Böhle, Knud

The Potential of Server-based Internet Payment Systems - An attempt to assess the future of Internet payments - Background Paper No. 3 <http://epso.jrc.es/Docs/Backgrnd-3.pdf>

Böhle, Knud; Kruger, Malte

Payment Culture Matters – A comparative EU-US perspective on Internet payments. ePSO Background Paper No. 4 <http://epso.jrc.es/Docs/Backgrnd-4.pdf>

Bucci, Piero

Internet Payment Systems in Italy. ePSO-Newsletter No. 5 (February 2001). <http://epso.jrc.es/newsletter/vol05/4.html>

Carat, Gerard

Mobile Payments: Alternative Platforms and Players. IPTS report Vol 49, Nov. 2000 <http://www.jrc.es/pages/iptsreport/vol49/english/ICT2E496.htm>

Carat, Gerard; Krueger Malte

M-Payments and the role of telcos. ePSO-Newsletter No 2 (October 2000) <http://epso.jrc.es/newsletter/vol02/2-2.html>

CardTechnology.com

Danish Operator to Rollout Browser SIMs with Mobile Banking Service <http://www.eventshome.com/Manual/ManualPageRedirect.asp?pageId=6957&eventId=7145>

DG Internal Market

Payment by e-purse over the Internet. Second Sub-group meeting of the PSTDG and PSULG held on 9 October 2000. Working document. Brussels 2000

EITO - European Information Technology Observatory 2002 – 10th edition

<http://www.eito.com>

EMI Directive (a)

Directive 2000/46/EC of the European Parliament and of the Council of 18 September 2000 on the taking up, pursuit of and prudential supervision of the business of electronic money institutions. In: Official Journal of the European Communities of 27 October 2000, L 275, 39-43. http://europa.eu.int/eur-lex/en/lif/dat/2000/en_300L0046.html

EMI Directive (b)

Directive 2000/28/EC of the European Parliament and of the Council of 18 September 2000 amending Directive 2000/12/EC relating to the taking up and pursuit of the business of credit institutions. In: Official Journal of the European Communities of 27 October 2000, L 275, 37f

ePSO inventory

<http://epso.jrc.es/inventory>

Falch, Morten

Use your mobile phone as your payment card – the Danish way. ePSO-Newsletter No. 6 (March 2001). <http://epso.jrc.es/newsletter/vol02/2-4.html>

Godschalk, Hugo (a)

Genesis of the EU-Directive on Electronic Money Institutions
Electronic Payment Systems Observatory- Newsletter. ePSO-Newsletter – No. 7– May 2001 <http://epso.jrc.es/newsletter/vol07/4.html>

Jones, Russ

Prepaid Cards: An Emerging Internet Payment Mechanism. CommerceNet 2001

http://www.commerce.net/research/ebusiness-strategies/2k1/2k1_10_r.html

Krueger, Malte

Innovation and Regulation – The Case of E-Money Regulation in the EU –. Background Paper No. 5. Electronic Payment Systems Observatory (ePSO)

Lelieveldt, Simon

New Payments Authentication Methods for Use on the Internet.

ePSO-Newsletter No. 8 (July 2001).

<http://epso.jrc.es/newsletter/vol08/2.html>

Lelieveldt, Simon

E-Purses and Chip Cards in the Netherlands. ePSO-Newsletter No. 3 (November 2000).

<http://epso.jrc.es/newsletter/vol03/4.html>

Rader, Michael

Scratch Cards: Here to Stay? ePSO-Newsletter No. 6 (March 2001).

<http://epso.jrc.es/newsletter/vol06/3.html>

Schürer, Tito; Riehm, Ulrich; Weber, Arnd

Interview: Largest German Credit Card Issuer on Massive Reduction of Charge Backs. ePSO-Newsletter No. 10– November 2001

<http://epso.jrc.es/newsletter/vol10/3.html>

Salste, Tuomas

Internet Payment Systems in Finland. ePSO-Newsletter No. 5 (February 2001).

<http://epso.jrc.es/newsletter/vol05/3.html>

Sint, Peter Paul

E-money Solution from Austria: Paysafecard.com. ePSO-Newsletter No. 6 (March 2001).

<http://epso.jrc.es/newsletter/vol06/4.html>

Van Hove, Leo

Electronic Purses, Interoperability, and the Internet. First Monday Vol. 4 No. 4 - April 5th. 1999

http://www.firstmonday.dk/issues/issue4_4/vanhove/index.html

Van Hove, Leo

Electronic Purses: (Which) Way to Go? First Monday Volume 5, Number 7 - July 3rd 2000

http://www.firstmonday.dk/issues/issue5_7/hove/index.html

Weber, Arnd

Worms, Disputes and Rolling Blackouts – Protecting the Citizen. ePSO-Newsletter No. 11– Dec 2001

<http://epso.jrc.es/newsletter/vol11/3.html>