

HOW TO REGULATE ELECTRONIC CASH: AN OVERVIEW OF REGULATORY ISSUES AND STRATEGIES

SIMON L. LELIEVELDT*

TABLE OF CONTENTS

Introduction	1163
I. Electronic Cash and the Challenges for Regulators	1165
II. Implementation Aspects of Electronic Cash	1168
III. Regulatory Issues	1170
IV. A Limited Comparison of Current Regulation of Financial Institutions and Payment Processes in the United States and Europe	1171
A. Regulation of Financial Institutions and Payment Products in the United States	1171
B. Regulation of Financial Institutions and Payment Products in Europe	1172
V. Future Regulatory Strategies	1174

INTRODUCTION

In recent years, we have witnessed the introduction of a large number of prepaid chipcard-based or software-based payment schemes.¹ These schemes, referred to as electronic money or electronic cash, have given rise to a variety of regulatory responses

* Senior Policy Planner, Payment Systems Policy Department of De Nederlandsche Bank. The views presented in this paper are those of the author and do not reflect in any way a formal position of De Nederlandsche Bank.

I would like to thank Heidi Richards of the Federal Board of Governors, Herman Lelieveldt of the Department of Political Science of the University of Nijmegen, and Ian Grigg of Systemics Ltd., for their reflections and comments.

1. See Justin Fox, *Cyberbunk: What's New About Digital Cash?*, FORTUNE, Sept. 30, 1996, at 50 (describing proliferation of new technologies such as digital checks, Internet cash, and smart cards).

such as legislation,² new policies,³ and the revision of current rules and regulations.⁴ As the dust of these developments is settling, it now is possible to give an overview of regulatory issues and approaches that are relevant for supervisors of financial systems. For support, this Essay will draw from the considerable amount of research conducted by public sector organizations.

This Essay will describe the challenges that regulators face with respect to electronic cash, the most important one being the appreciation of its new and fundamentally different nature. Part I will propose a functional definition that allows regulatory agencies to better focus on the subject matter of electronic cash. Based on this definition, Part II will outline the fundamental design features of electronic cash, as well as a classification of electronic cash products and the implementation aspects that are relevant for these products.

Part III will discuss the regulatory issues that are relevant from the viewpoint of supervisors of the financial system. These issues can be viewed as the goals of supervisors with respect to electronic cash as a banking or payment product. To understand the context in which these goals in practice must be achieved, Part IV will describe briefly the differences in the regulatory framework between the United States and Europe. Part V concludes that some of the differences of opinion between regulatory authorities with respect to electronic cash do not pertain to the goals achieved, but to the institutional arrange-

2. In Japan, the Prepaid Card Law was enacted in December 1989. *See* *MOF to Implement Prepaid Card Law Probably in September*, COMLINE Daily News Tokyo Financial Wire, Feb. 13, 1990, available in LEXIS, News Library, Arcnews File. The law requires that card-issuing companies register with the Minister of Finance and that deposit requirements apply to all cards worth more than 1000 yen. *See id.*

3. In Europe, the report to the Council of the European Monetary Institute on pre-paid cards (issued by the Working Group on European Union ("EU") Payment Systems in May 1994) states that issuing prepaid cards could be considered deposit-taking and therefore would be subject to supervision. *See* John Capper, *EU Curbs Urged on Cash Card Issuers*, FIN. TIMES, May 11, 1994, at 2 (reviewing study calling for limiting of authorization for electronic prepaid cards to previously authorized credit unions). Consequently, EU member states have implemented (or are implementing) this policy at the local level. *See id.* (stating that most EU states already have achieved limitation).

4. In the United States, the Board of Governors of the Federal Reserve System ("FRB") proposed amendments to the regulations regarding Electronic Fund Transfers. The FRB has suggested that certain types of electronic cash be exempt from federal regulations that currently apply to electronic fund transfers. *See* *Electronic Fund Transfers*, 61 Fed. Reg. 19,696, 19,696 (1996) (to be codified at 12 C.F.R. pt. 205) (proposed May 2, 1996). The FRB's proposal would: (1) completely exempt from regulations off-line unaccountable systems (where value is stored only on the card); (2) exempt off-line accountable systems (where value is stored in the system as well as on the card) from certain regulations pertaining to requirements of receipts and periodic statements and error resolution procedures; (3) exclude all off-line systems that have a maximum stored value of \$100 at any given time; and (4) exclude on-line payment systems from the periodic statement requirement, error resolution procedures, and change in terms notice requirements. *See id.* at 19,703.

ments through which these goals must be achieved.⁵ This would seem to bode well for future agreement on the content of regulation of electronic cash.

Table 1: Overview of Research and Policy Activities with Respect to Electronic Cash

Year	Organization	Report or Activity
July 1995	Subcommittee on Domestic and International Monetary Policy of the U.S. House of Representatives	Hearings to examine the public policy implications of electronic money and electronic cash
Sept. 1995	Financial Crimes Enforcement Network ("FinCEN")	Sponsoring of colloquium on cyberpayment systems at New York University Law School
Nov. 1995	The central banks of the G-10 countries, assembled in the Bank for International Settlements ("BIS")	Comprehensive study of relevant aspects of electronic money, resulting in publication of two reports in 1996
Feb. 1996	European Commission ("EC")	Revision of 1988 recommendation on electronic banking products
May 1996	Board of Governors of the Federal Reserve System ("FRB")	Revision of Regulation E
Aug. 1996	Federal Deposit Insurance Corporation ("FDIC")	General Counsel's Opinion No. 8; Stored Value Cards; Hearing and public comments
Aug. 1996	European Monetary Institute ("EMI")	Factfinding survey on electronic cash schemes resulting in future update of the 1994 report
Sept. 1996	United States Department of Treasury	Conference about the role of government and formation of the Consumer Electronic Money Task Force

I. ELECTRONIC CASH AND THE CHALLENGES FOR REGULATORS

One of the crucial challenges that regulators⁶ face when considering regulation of electronic cash is to acknowledge the fact that

5. See Kim S. Nash, *Cybercash at Risk: Money Laws Lacking*, COMPUTERWORLD, Dec. 23, 1996, at 1-2 (describing hands-off policy stance of U.S. regulators with respect to electronic cash); see also Tony Jackson, *Cybermoney Gains Currency, Past and Future*, FIN. TIMES, Feb. 1, 1997, at 3 (describing desired policy of the Bundesbank to regulate electronic network money).

6. The term "regulators" will be used in this Essay to refer to the authorities at the national or state level, as well as to those authorities at the supra-national level in Europe (such as the European Commission, the European Monetary Institute, and the Bank for International Settlements) and the federal level in the United States (such as the Federal Board of Governors, the Federal Deposit Insurance Corporation, the Department of Treasury, and Congress).

electronic cash constitutes a fundamentally new class of electronic payment instruments. Although electronic cash products such as Mondex,⁷ Proton,⁸ and Digicash⁹ build on current payment systems technology, this does not necessarily imply that regulation for electronic cash also should build on the current regulation for (electronic) payments. One should start by reconsidering the subject of electronic cash and the developments that influence it.

First, in electronic cash schemes, the security concept for transferring electronic value is based on the possession of a payment device, whereas for conventional payment instruments such as debit cards and credit cards, the knowledge of a secret number or the use of a signature is the key to transferring value. As a result, a different legal regime will apply to electronic cash; that is, one in which liability originates from the use of the payment device instead of the use of a Personal Identification Number ("PIN") or signature. The fact that the security and legal frameworks of electronic cash are built upon physical possession is something that must be acknowledged when regulating electronic cash.

For example, the four-digit purse-codes that are used for loading electronic cash do not have to be kept as secret as the PINs that are used in debit-card systems, because the physical possession of the device protects the value, rather than the purse-code. Prescribing that these purse-codes must be kept completely secret therefore would not make a difference from a legal or security point of view.

Second, developments in information technology will continue to influence strongly the design of future electronic cash systems. Consequently the technical implementations of electronic cash systems will change frequently. It is required that the regulation of electronic cash should not be based on the actual technical imple-

7. Mondex is a smart card invented by National Westminster Bank. The card stores amounts of money that can be used like cash. See Nick Gardner, *High Tech Cards Poised to Render Cash Obsolete*, TIMES (London), Dec. 12, 1993, at 16.

8. Proton, a Belgian smart card affiliated with American Express, can store and transfer monetary value. See *American Express Plans Smart-Card Project*, N.Y. TIMES, Nov. 15, 1996, at D6.

9. Digicash, an on-line system developed by David Chaum, allows an Internet user, with credit cards or other conventional banking forms, to purchase a certain amount of E-cash that can be used to purchase goods and services on the Internet without the need for exchanging credit card information with each vendor. See Peter Lewis, *Attention Internet Shoppers: E-Cash Is Here*, N.Y. TIMES, Oct. 19, 1994, at D4.

mentation of an electronic cash product but on its essential design features.

Third, as information technology will account not only for rapid changes in technological implementations but also for changes in other areas of the system design, regulators might want to investigate specifically the future changes in system design and the resulting consequences in terms of any proposed regulation. Such an investigation or exploration is best performed in a systematic way, for example by using the model described by the Committee on Payment and Settlement Systems and the Group of Computer Experts of the central banks.¹⁰

The model distinguishes the following three domains: (1) *the clearing and settlement domain*, in which financial institutions, clearing houses, and the central bank fulfill the interbank financial obligations resulting from electronic value transactions; (2) *the issuing/acquiring/operating domain*, in which a structure is established for issuing and acquiring electronic value as well as for interacting with the clearing and settlement domain; and (3) *the retail domain*, in which the following actual value transfers between users take place: loads (transfers of value from the issuer to users), payments (transfers of value between users and retailers), and deposits (transfers of value from retailers to acquirers).¹¹

This model would seem to provide for a useful exploration of policy issues in each of the domains:

- Would a given scheme have to be supervised if the settlement structure were based on the debit card or credit card settlement system?
- Would deposit insurance apply to the electronic value in the scheme if the scheme operator resides offshore?
- Should a separate regulatory framework be developed for scheme operators of electronic cash, regardless of the acquiring and issuing or clearing and settlement arrangements?
- What would be the consequences of cross-border acceptance of the electronic value, represented on the devices, distributed to consumers?

Fourth, the legal classification of electronic cash schemes should not originate only from the observed system design because the developers of new schemes may want to apply new and different legal

10. COMMITTEE ON PAYMENT & SETTLEMENT SYSTEMS & GROUP OF COMPUTER EXPERTS, CENTRAL BANKS OF THE GROUP OF TEN COUNTRIES, BANK FOR INTERNATIONAL SETTLEMENTS, SECURITY OF ELECTRONIC MONEY 35 (1996).

11. *See id.*

concepts to their schemes. For example, if we suppose that the representation of value is present not only on the payment device, but also at the facility of the scheme operator, classifying either record as the money is an arbitrary legal choice. It even might be decided that the representation of value does not constitute money in a legal sense but still serves to fulfill irrevocably a legal obligation.¹² Although there will be a relationship between the system design and the legal regime applied, this regime should not be derived from the system design alone.

In summary, the challenges facing regulators of electronic cash are substantial. Regulators should observe the fact that the key to transferring electronic cash is the possession of a payment device, instead of the knowledge of a secret or a signature. Furthermore, regulators should expect a variety of technically different electronic cash schemes. As a result, regulators will have to decide on more functionally defined regulations to prevent developments in information technology from rendering regulations obsolete within a short period of time. If one defines electronic cash as "the electronic representation of prepaid value on a device," regulators may be able to design rules and policies that allow for a more unconstrained technological development of electronic cash schemes.

II. IMPLEMENTATION ASPECTS OF ELECTRONIC CASH

Building on a definition of electronic cash as an electronic representation of prepaid value, one could define the basic design features of electronic cash as twofold: (1) the way in which the value is represented—as a balance only, a balance in combination with a series of certificates (electronic checks), or coins and notes; and (2) the possibility to transfer value between users without mandatory interaction with the issuer of electronic cash (one-time respectively multiple circulation). The fundamental technical requirements for both devices and payment protocols in an electronic cash scheme are dictated to a large extent by these two design features. These design features also serve as a good basis for classification of electronic cash schemes.

12. See R.E. de Rooy, *De chipknip: een (juridische) verkenning*, NEDERLANDS JURISTENBLAD, Apr. 5, 1996, at 509-13 (explaining that this solution has been chosen by both card schemes in the Netherlands and describing other possible legal qualifications).

Table 2: Classification of Electronic Cash Schemes

		Value Representation		
		Balance	Balance and Certificates	Notes or Coins
Value circulation	One time circulation:	Avant, Visa-cash Cash, Clip Chipknip Chipper, SIBS Danmont Geldkarte, Mastercard Proton	CAFE-Wallet	Cybercash Digicash
	Multiple circulation:	Mondex	EMS (Citibank) NTT system	—

The actual technical appearance of electronic cash systems also is determined by additional implementation decisions that include the following: (1) the physical form of the device (card, software on a PC, a wallet); (2) the possibility that part of the device will be used for other purposes (multifunctionality); (3) the limitation of value transfers between certain types of users (consumer-retailers, any one user to the other); (4) the possibility of currency conversion and currency exchange; (5) the possibility of storing more than one representation of value (multiple currencies); (6) the registration of all transactions in either the device, the operator database, or both; (7) the existence of duplicate representations of the value on each device elsewhere in the payment scheme (shadow administration); (8) the traceability of payments to one particular device; and (9) the registration of personal information on the device (privacy).

As the technical appearance easily may be changed during the lifetime of an electronic cash scheme, the use of these additional characteristics for classification or regulation purposes poses a certain risk. The proposed amendments of Regulation E by the FRB, for example, distinguish between on-line and off-line systems.¹³ The European Commission has proposed a similar technology-dependent approach by formulating rules that do or do not involve the use of a card as a payment device. Both proposals have the tendency to be oriented too much toward the implementation of the electronic cash product. It will be interesting to observe how these proposals develop further.

13. See *Electronic Fund Transfers*, 61 Fed. Reg. 19,696, 19,699 (1996) (to be codified at 12 C.F.R. pt. 205) (proposed May 2, 1996).

III. REGULATORY ISSUES

This Essay focuses on the question of how electronic cash should be considered and treated by supervisors of the financial system.¹⁴ The regulatory issues involved are the safety and soundness of electronic cash schemes, the applicability of deposit insurance schemes, and the cross-border provision and use of electronic cash.¹⁵

There seems to be consensus among regulators that supervisory authorities should be concerned particularly with the safety and soundness of electronic cash.¹⁶ Their primary role, therefore, would be to investigate whether an electronic cash scheme is being developed and operated in a safe and sound manner. The focus of these investigations would be to determine how a scheme operator is establishing and managing the risks involved with the system. For instance, the legal and contractual relationships of participants in an electronic cash scheme should be defined adequately. A loss-sharing arrangement may have to be agreed on by all participating institutions to manage the effects of a default of one participant in the scheme. As for the technical operations, scheme operators should be able to provide both a security policy and a thorough risk analysis. The risk analysis could be done by an external expert to prevent the commercial interests of project participants from interfering with security interests.

The applicability of deposit insurance rules to electronic cash will depend on the specific laws and regulations of a country. The applicability of these rules often requires that the funds involved remain under the control of the customer in his or her personal account. Electronic cash systems, however, mostly involve the use of numbers instead of names. Furthermore, electronic cash might be loaded anonymously by the physical deposit of notes. It therefore is quite probable that in most countries deposit insurance would apply only to those prepaid cards that draw directly on a personal account instead of on a pooled account of funds.¹⁷

14. Other issues that are relevant for regulators are consumer protection, interoperability of products, and possible use of electronic money for criminal purposes. See Paul Howcroft, *Future Law and Regulation of Pre-Paid Cards*, EUROPEAN FIN. SERVS. L., Apr. 1996, at 113-16.

15. See generally BANK FOR INTERNATIONAL SETTLEMENTS, IMPLICATIONS FOR CENTRAL BANKS OF THE DEVELOPMENT OF ELECTRONIC MONEY (1996).

16. See *id.*

17. See FDIC General Counsel's Opinion No. 8; Stored Value Cards, 61 Fed. Reg. 40,490, 40,494 (1996) (setting forth FDIC's legal opinion regarding proper treatment of funds underlying stored value cards for purposes of qualifying for federal deposit insurance).

Finally, the cross-border provision for the use of electronic cash constitutes a future issue of concern for supervisors. To date, most electronic cash schemes are limited to single countries in which local banks manage the float of the scheme. This allows for a clear determination of applicable laws and supervisory agencies. A more complicated situation could arise, however, if a credit institution established in country A provides electronic cash to citizens of country B and manages the float of that scheme in country C, and the operator of that scheme resides offshore in country D.¹⁸

IV. A LIMITED COMPARISON OF CURRENT REGULATION OF FINANCIAL INSTITUTIONS AND PAYMENT PROCESSES IN THE UNITED STATES AND EUROPE

Regulators generally are in agreement that electronic cash should be subject to supervision.¹⁹ Because of the differences in existing institutional frameworks, however, supervision has taken different forms. As an illustration, this section provides a limited comparison of the regulatory framework in both the United States and Europe with respect to banking and payment products.

A. *Regulation of Financial Institutions and Payment Products in the United States*

The regulation of the financial industry in the United States focuses both on banking institutions and on payment products, such as money orders. A wide range of laws and regulatory and supervisory agencies exists, depending on the intended goals of such legislation.²⁰ Although the number of laws and rules may be quite confusing, they often are confined to a clearly outlined purpose.²¹

18. It will not be easy to determine which banking supervision law applies to such a transaction. The definitions used in these laws also may vary among countries, which may result in requiring the scheme operator to be a bank under the banking supervision law of country B, although the operator would not have to be a bank under the supervision law of country C.

19. See A. Michael Froomkin, *Flood Control on the Information Ocean: Living with Anonymity, Digital Cash, and Distributed Databases*, 15 J.L. & COM. 395, 496 (1996) (pointing to tension between free speech, anonymity, and electronic cash regulation); see also Henry H. Perritt, Jr., *Legal and Technological Infrastructures for Electronic Payment Systems*, 22 RUTGERS COMPUTER & TECH. L.J. 1, 30-31 (1996) (stating that law must respond to risk of dishonor and forgery in electronic payment systems).

20. See, e.g., 15 U.S.C. § 1601 (1994) (stating that Congress intended to strengthen financial institutions and to give consumer protection of various credit terms available by informed use of credit); 31 U.S.C. § 5330 (1994) (requiring registration of any money-transmitting business with Secretary of Treasury even if licensed in state).

21. For examples of such laws, see the National Bank Act, the Federal Reserve Act, the Banking Act of 1933, the Banking Act of 1935, the Federal Deposit Insurance Act of 1950, the Financial Institutions Reform, Recovery and Enforcement Act of 1989, the Federal Deposit Insurance Corporation Act of 1991, the Depository Institutions Disaster Relief Act of 1992, and

A superficial survey of the regulation of financial instruments in U.S. law illustrates that rules have been established for specific violations.²² As for payment system risk reduction, a separate provision exists to eliminate systemic risk as a result of netting systems.²³ Under consumer credit protection, there are rules for credit cards,²⁴ regulations for transferring electronic funds,²⁵ and limitations on federal credit unions.²⁶

Regulation of payments exists not only at the federal level but also at the state level.²⁷ In fact, forty-five states regulate businesses that wire-transfer cash or sell travelers checks, money orders, or other instruments for the transmission of money.²⁸ These businesses must obtain a state license to conduct business.²⁹ To be licensed, the applicant must demonstrate that the business will operate in a safe and sound manner.³⁰ In addition, fourteen states require that licensees maintain investments such as cash, CDs, or bonds equal to the amount of outstanding payment instruments, and many require that the investor is of a minimum net worth.³¹

B. Regulation of Financial Institutions and Payment Products in Europe

The regulation in Europe focuses mainly on banking institutions and in some cases on payment products. Regulation of payment products is not so elaborate as in the United States, which could be due to the fact that in Europe, in contrast with the U.S. tradition of statutory regulation by independent boards and commissions, the primary mode of economic regulation historically has been public

the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994. For an example of a state law that establishes a system of safe and reliable banking by creating secure depositories as needed by the business public, see N.Y. BANKING LAW § 1 (McKinney 1990).

22. For example, Postal Service employees may not issue money orders if they have not received payment from the purchaser. See 18 U.S.C. § 1713 (1994) (imposing fine for officer or employee of Postal Service who issues money order prior to receiving payment).

23. See 12 U.S.C. § 4401 (establishing legally binding netting procedures to reduce risk found in banking system and financial markets).

24. See 15 U.S.C. § 1666f (forbidding card issuer from prohibiting retailer from offering discount to cardholder by contract or other means). The debate on this issue in Europe still has not been resolved.

25. See *id.* § 1693.

26. See 12 U.S.C. § 1759 (restricting membership and its rights to groups that share common bond of occupation, association, or community).

27. See Ezra C. Levine, *The Regulation of Check Sellers and Money Transmitters*, CIVIL REMEDIES IN DRUG ENFORCEMENT REPORT, (Nat'l Ass'n of Att'ys Gen.), Mar./Apr. 1993, at 12-13. Ezra C. Levine, *New Laundering Concerns: Safety in Cyberspace*, MONEY LAUNDERING L. REP., Oct. 1995, at 1, 1-3 [hereinafter Levine, *New Laundering Concerns*].

28. See Levine, *New Laundering Concerns*, *supra* note 30, at 2.

29. See *id.*

30. See *id.*

31. See *id.*

ownership.³² Many European governments have in the past provided payment and savings facilities to the public through the government-owned and operated "giro-systems." By actively owning and operating these giro-systems, governments achieve regulatory goals such as a safe, inexpensive, and widely available payment and savings products for their citizens.

Although many of these government-owned giro-systems have been privatized, the governments of countries in which this privatization has taken place have not established regulation to ensure, through a system of supervision, that their regulatory goals remain to be achieved in the future. As a result, separate supervisory laws with respect to the safety and soundness of payment instruments have not developed fully.

Table 3: Classification of the Regulatory Framework in European Countries with Respect to Supervision of Payment Instruments

Type of Regulation:	No explicit supervision of payment instruments defined in legislation.	Defined (or plan to define) issuance of payment instruments as a banking activity.	Separate supervision of payment instruments defined in legislation.
Countries:	Austria, Denmark, Greece, Ireland, Luxemburg, Netherlands	Belgium, Finland, France, Germany, Sweden	Italy, Portugal

Source: EMI, Apr. 1996.

When the first pre-paid, multi-purpose card schemes began operating in 1993, European central banks were faced with the question of whether these schemes would fall within their supervisory authority. Given a regulatory framework in which supervision of payment products had not been designated explicitly to independent institutions or to central banks, and given the desire to control and monitor the developments with respect to pre-paid cards,³³ a solution

32. For informative papers on the differences between regulation in Europe and in the United States, see GIANDOMENICO MAJONE, MUTUAL RECOGNITION IN FEDERAL TYPE SYSTEMS (EUI Working Paper No. 93/1); GIANDOMENICO MAJONE, CONTROLLING REGULATORY BUREAUCRACIES: LESSONS FROM THE AMERICAN EXPERIENCE (EUI Working Paper No. 93/3); GIANDOMENICO MAJONE, WHEN DOES POLICY DELIBERATION MATTER?, (EUI Working Paper No. 93/12); and GIANDOMENICO MAJONE, UNDERSTANDING REGULATORY GROWTH IN THE EUROPEAN COMMUNITY (EUI Working Paper No. 94/17); see also REGULATING EUROPE (Giandomenico Majone ed., 1996).

33. In a lecture for the IBIT Forum in Basle on June 11, 1996, Wendelin Hartmann, a member of the Directorate of the Deutsche Bundesbank, stated: "Consequently, the EU central banks have agreed as an initial step to ensure, above all, that this development is subject to

was found that is described in the 1994 EMI report.³⁴ Based on the argument that every pre-paid, multi-purpose card scheme by definition involves the process of taking deposits, the supervisory authority of central banks and supervisory agencies with respect to electronic cash was established or re-confirmed.

V. FUTURE REGULATORY STRATEGIES

The actual policies of regulators with respect to electronic cash will vary from country to country. Regulators in nations that currently do not have a legal basis on which they can supervise payment instruments may be in a position such that existing banking laws allow electronic cash to be subject to supervision. The alternative would be to enact separate laws governing the supervision of electronic cash.

For regulators who have a legally firm basis for supervision of payment instruments (such as most of the regulators in the United States, Canada, Italy, and Portugal), the basic question will be how to read, adapt, interpret, change, or reformulate the existing rules.³⁵ These countries may need only to reword or eliminate the rules that are based on technical solutions rather than on functional processes.

The particular form of the regulatory strategy therefore will differ as a result of the countries' various regulatory backgrounds. The following regulatory strategies may be chosen: (1) *the ad hoc strategy*, in which a separate law or regulation will be established to regulate electronic cash; (2) *the goal-oriented strategy*, in which separate laws and regulatory agencies serve to achieve separate supervisory goals; or (3) *the integrated strategy*, in which different supervisory goals are achieved by the use of the same regulatory framework.

control. In all EU countries, therefore, legal initiatives have been set in motion, as a result of which only credit institutions which are subject to banking supervision will be allowed in future to issue multi-purpose prepaid cards."

34. WORKING GROUP ON EU PAYMENT SYSTEMS, REPORT TO THE COUNCIL OF THE EUROPEAN MONETARY INSTITUTE ON PREPAID CARDS (May 1994).

35. In his testimony before the Subcommittee on Domestic and International Monetary Policy of the Committee on Banking and Financial Services of the U.S. House of Representatives, Eugene A. Ludwig, Comptroller of the Currency, formulated four guiding principles to direct appropriate government responses with respect to technological developments: (1) the government should intervene only when there is a clear need to advance the public interest; (2) the government should articulate the public policy goal and permit the private sector to develop the means to pursue that goal; (3) the government should be extremely wary of imposing requirements solely for its administrative convenience; and (4) the regulatory infrastructure must be maintained and modernized to remain up-to-date. See *The Future of Money, Part II: Hearing Before the Subcomm. on Domestic and Int'l Monetary Policy of the Comm. on Banking & Fin. Servs.*, 104th Cong. 9 (1995) (statement of Hon. Eugene A. Ludwig, Comptroller of the Currency) (summarizing desired attitude for regulators that operate in well-regulated environment).

Despite these different implementation strategies, the content of future regulation will have to be similar. The future international nature of electronic cash schemes simply does not allow for applicable regulations to be too different. International cooperation between regulators therefore should focus on the formulation of a set of minimum requirements to be implemented through one of the above strategies.³⁶

36. See Henny van der Wielen, Deputy Director of the Central Bank of the Netherlands, *Electronic Money: A European Perspective*, Address Before the London Bankers Club (Feb. 4, 1997).

