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Study Of Electronic Cash: Its Impact On The Economy And Society, And Its Future

Sanjana Prasad
University of Georgia School of Law
STUDY OF ELECTRONIC CASH: ITS IMPACT ON THE ECONOMY AND SOCIETY, AND ITS FUTURE

by

SANJANA PRASAD

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LL.B., University of Delhi, India, 1996

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by

SANJANA PRASAD

Approved:

[Signature]

Major Professor

May 28, 1998

Date

[Signature]

Chairman, Reading Committee

6 June 1998

Date

Approved:

[Signature]

Dean of the Graduate School

July 7, 1998

Date
Dedicated to my Samir, whom I always knew even before we met.
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CHAPTER 1
INTRODUCTION

With the advent of the information age, and an advance in the electronic technologies the world is increasingly becoming a smaller place. Optimists have started dreaming about oneness and uniformity throughout the world where national barriers will no longer be a bar. The Internet too has been a major contributor in making this oneness possible. More and more people are aware about what is going on around the world and this has opened up avenues for business and other opportunities for businessmen around the world. It is now easier to evaluate what the possible and diverse investment opportunities are and the world economies are proceeding towards a virtual merger.

The increasing connection amongst world economies gives rise to the need for some kind of uniformity in the currency used in the economic and business transactions. The concept of such a form of money has been the dream of technologists and economists, and together with scientists they have increasingly endeavored to develop such a technology. Their combined effort has given rise to the concept popularly known as electronic cash or electronic money. This thesis attempts to study the concept of electronic cash, and its implications and future.

The progress in the development of money since the very beginning evidences an approach towards the development of an electronic form of cash. Electronic cash is a private form of money. A brief review in the history of money in the United States will help in a more comprehensive understanding behind the logic of electronic money, and it will reveal that though the concept is revolutionary, its foundation was laid a long time ago.

Private money, that is, money issued by a private entity rather than a governmental organization, has been a part of the U.S. monetary history since the
founding of the republic, and electronic transfer of bank credit began with the advent of
the telegraph. ¹ After the American Revolution, the federal government had a limited role
in the issuance of paper currency and notes issued by banks chartered under the laws of
the states served as a form of private money or currency. ² The federal government did
not become involved with money matters until 1861 when they issued federal currency
called ‘greenbacks’ (called so because of their color). ³ The ‘greenbacks’ were granted
‘legal tender’⁴ status in 1862 but this did not displace the privately issued notes in the
nation’s money supply. ⁵ With the advent of telecommunications came the concept of
‘cable transfer’ of money⁶ and with the onset of computers and other electronic means of
communication this concept metamorphosed into electronic cash. Therefore we can see
that this concept has been growing for a very long time.

Among the most important uses of the computer technology was electronic
commerce and this gave rise to the necessity of electronic payment systems. Therefore
the concepts of credit cards and debit cards were born. However the need to have a
quicker and less cumbersome form of electronic payment system gave rise to the concept
of electronic cash. Electronic cash became most popular in Europe with versions like the
Mondex⁷ system and DigiCash⁸ system. While Europe was pioneering the growth of
electronic cash, the United States was not too far behind and they came up with versions
like Visa Cash.⁹ After taking the developed world by storm, the concept of electronic

¹ Task Force on Stored-Value Cards, A Commercial Lawyer’s Take on the Electronic Purse: An Analysis of
Commercial Law Issues Associated with Stored-Value Cards and Electronic Money, 52 Bus. Law. 653,
² Id. at 665.
³ Id. at 666.
⁴ When the sovereign government provides that only certain types of paper or objects, if tended to an
obligor will discharge indebtedness, that concept is known as ‘legal tender’. More detailed explanation
will be provided in the subsequent chapters.
⁵ Task Force on Stored-Value Cards, supra note 1, at 666.
⁶ Id. at 667.
⁷ Mondex is a smart card product and has been developed by Nat West, Midland and British
Telecommunication. This concept will be discussed in detail subsequently in the thesis.
⁸ DigiCash was founded in 1990 by an Amsterdam company. Detailed discussion on the same will be
made subsequently in the thesis.
⁹ Visa Cash is a pilot program which was sponsored by Visa and three regional banks during 1996 Atlanta
Olympics. Detailed discussion will be found in subsequent chapters.
cash is trying to enter the developing world, and the time is not so far when this private form of international currency will have spread to all corners of the world.

Electronic cash is an attempt to construct an electronic payment system modeled after the paper money system.\textsuperscript{10} Paper money has such features as, portability (easily carried), recognizability (as legal tender) and acceptability, transferability (without involvement of the financial network), anonymity (no record of who spent the money), and the ability to make "change."\textsuperscript{11} Electronic cash is defined to be an electronic payment system that provides, in addition to the above security features, the properties of user anonymity and payment untraceability.\textsuperscript{12}

Due to the inherent complicated nature of the concept, a lot of questions arise which leaves people in doubt about its working, its advantages and disadvantages and if it is a technology good enough to survive in the future. A lot a problems and regulatory concerns also arise which makes one wonder whether the concept is safe, secure and reliable. This thesis is going to attempt to develop an understanding of the concept by reflecting upon its position with regard to other forms of cash, discussion of the various types of electronic cash, regulatory concerns, vices and virtues of the concept, its position if the world and finally a reflection on its possible future. Please note that the terms "cash" and "money" will be used interchangeably in this thesis.

\textsuperscript{11} Id.
\textsuperscript{12} Id.
CHAPTER 2

ELECTRONIC CASH AS A PART OF DIFFERENT FORMS OF MONEY

To understand, appreciate or criticize electronic cash, it is important to be familiar with the other forms of money. This involves an understanding of the traditional, common and popular forms of money, as opposed to electronic cash, which is comparatively a very novel concept. Such a discussion will help in evaluation of existing regulations, benefits and risks of electronic cash and thus will strive to provide an estimate of its future.

2.1 Cash

Cash, as understood commonly, as well as in this article, is money in the form of paper or coin that is readily available for use as a medium of exchange, all around the world.

2.2 Checks

A check is a draft drawn on a bank, payable on demand. In the commercial world, checks are used by buyers as a form of payment. The Federal Reserve Board defines a check as a draft or order upon a bank or banking house purporting to be drawn upon a deposit of funds for the payment at all events of a certain sum of money to a certain person therein named or to a bearer and payable instantly on demand.13

A typical transaction involving a check includes an individual who has an account in a bank, issuing a check to the merchant. The merchant then presents the check to his bank which may not be the issuing bank (i.e., the bank of the buying individual), in return for the cash. The merchant’s bank then presents this check to the individual’s bank in
exchange for the amount of its value; subsequently the individual's bank deducts this value from the individual's account.

Such transactions are regulated by law and regulations by official and government agencies around the world. In the United States of America, state and federal regulations and institutions such as the Federal Reserve Board, regulate such activities.

Checks may be of different types including personal checks and bank checks like certified check, cashier's check, teller's check, or bank money order. A Traveler's check is also a form of check which is as reliable as cash. Traveler's checks do not become bearer paper until they are countersigned in the presence of the acceptor, and therefore they are not cash equivalents until that time; they are also safer than cash because of the issuer's promise to replace them if they are lost or stolen. The various bank checks are thought of as cash substitutes, that is, the equivalent of cash. The use of such checks avoids the risk of insufficient funds, since a bank is holding the money and it is unlikely that a bank will become insolvent, particularly since the federal government insures such deposits.

2.3 Electronic Check

The electronic check system is part of the electronic payments system and is still under development. The electronic check is similar to the paper check, however it is created and settled electronically. An electronic check transaction is initiated by the completion of an electronic check on the computer screen. The drawer of the check places its "digital signature" on the check and then sends the check over the Internet to the payee. To receive payment, the payee endorses the check by placing a digital signature on the check and depositing the check at the bank. The interbank settlement

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15 Id.
16 Id.
17 Id.
is similar to the procedure for paper checks; the payee bank presents the electronic check to the drawee bank for payment. Electronic check payments are almost identical to current check processing procedures, including settlement procedures, making the application of existing law less difficult.

2.4 Credit Cards

A credit card is a type of payment card which is made of plastic and has a magnetic strip. Credit cards are a means whereby one can pay for goods and services and/or obtain cash. These may be issued by both the financial and non-financial institutions, that is, banks as well as shops and fuel companies. Credit cards have three main functions which may not be common to all types of credit cards. First, they can be used as a means of paying for goods and services almost all around the world, thanks to credit card companies like VISA and MasterCard. In some ways it can be regarded as a form of international currency due to its widespread and universal use. The second function of credit cards is as a source of cash in almost any currency in the world. Credit cards give access to cash 24 hours a day, 365 days a year, through the banks’ cash dispenser operations which are linked via VISA, MasterCard, and the like. The third function is that they are a source of revolving credit which works in a similar way to a bank overdraft. This implies that a cardholder is allowed to borrow money from the card issuer up to a certain limit, and after all or part of the amount is paid back, the cardholder can borrow again, up to his credit limit.

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19 Id.
20 Id.
21 Id.
22 Id.
23 Id. at 13.
24 Id.
The relationship between the bank issuing the credit card and the merchant is usually not direct.\textsuperscript{25} Most situations involve a merchant in an arrangement with his or her bank, which in turn has an agreement with an issuing bank.\textsuperscript{26} There is a written agreement between the merchant and his bank. The merchant’s bank coordinates the merchant’s participation in the credit card system, collecting receipts from the merchant and transferring them to issuing bank for credit on its own account at that bank.\textsuperscript{27}

\section*{2.5 Debit Cards}

The debit card, like the credit card, is a type of payment card made of plastic. The credit card accesses a line of credit, whereas, a debit card usually accesses either a current account or a debit account. The debit card is the heir apparent to the personal check as an access device to the cardholder-depositors’ accounts, through an automated teller machine (ATM) for cash withdrawal and through a point of sale (POS) terminal to pay for purchase of goods or services.\textsuperscript{28} Originally credit cards provided access to ATMs, then debit cards were developed for the checking account customers without credit cards.\textsuperscript{29} The parties involved in a debit card transaction are the customer-user; recipient, who accepts the debit card as a cash like payment; facilitator and the financial institution that issued the debit card.\textsuperscript{30}

Debit cards theoretically differ from credit cards in the fact that they result in the issuing bank charging the card holder’s deposit with the issuing bank rather than the issuing bank extending credit to the card holder.\textsuperscript{31} Debit cards however are similar to credit cards in that they can be financed from a line of credit and therefore the two types

\textsuperscript{26} Id.
\textsuperscript{27} Id.
\textsuperscript{28} James V. Vergari, \textit{Checks, Payments, and Electronic Banking}, at 519 (1986).
\textsuperscript{29} Id.
\textsuperscript{30} Id.
\textsuperscript{31} Henry H. Perrit, Legal and Technological Infrastructures, supra note 25, at 23.
of cards converge in practice. Merchants usually get a better rate on debit cards and therefore refer them.  

2.6 Electronic Cash

Electronic cash implies cash in the form of stored value either on a card or on a computer. It refers to stored value represented by a digital computer code that consumers use for payments through a computerized financial network. A consumer executes these payments using stored value card in conjunction with a personal computer, an ATM, a television cable connection, an enhanced telephone, or some other form of telecommunications equipment.  

Different forms of electronic cash systems are currently being developed and experimented upon around the world at the moment and the subject of electronic cash will be dealt with in detail in this thesis.

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32 Id.
34 Id.
CHAPTER 3
WHAT IS ELECTRONIC CASH? PROPERTIES AND CHARACTERISTICS

After the comparison of electronic cash with various forms of money a discussion on the unique properties and characteristics of electronic cash is necessary. Electronic cash systems are similar in many ways to the paper money system. Paper money has the characteristics of portability, recognition as legal tender, and therefore acceptability, transferability, anonymity, untraceability and the ability to be broken down into smaller denominations. The designers of electronic cash tried to incorporate the given security features in addition to user anonymity and payment untraceability, as features of electronic cash.

However when digital signatures are used to achieve the above features of security, questions may arise regarding money laundering and counterfeiting. These problems will be dealt with subsequently in the thesis. The present discussion to determine the features of electronic cash will facilitate a subsequent study of the related problems, solutions, advantages and disadvantages.

3.1 Form of Electronic Payment

Electronic cash is a form of an electronic payment scheme which has superficial resemblance to money and is defined by certain cryptographic properties. This electronic payment is a special kind of electronic commerce. The device popularly used is a card with an appearance very similar to debit and credit cards. However such a “card” could also be a computer memory. An electronic payment usually involves three people, the payer, the payee and the financial network with which the payer and payee have accounts, that is the bank.
3.2 The Security and Cryptographic Properties

Since such electronic payments of cash may be achieved over the Internet, they are not under the financial regulatory structure, which gives rise to the need for steps to secure such payments. The same can be achieved by imparting the following properties to electronic payments of cash.

Privacy is important for transactions involving cash especially when on the Internet because otherwise there would be a fear of breakthrough in the system.35

The next three properties are collectively known as authentication.36 User identification is another feature that should be attributed to electronic cash so as to prevent impersonation. Message integrity would ensure that the message sent by the sender is the same as the message received by the receiver. Non-repudiation would provide that nobody could deny that the transaction occurred. These are the security features which would make electronic cash more reliable in the absence of specific regulatory provisions.

These security properties can be attained in many ways. Privacy can be achieved by encryption technology where each message is encrypted using a private key known only to the sender and the receiver.37 Authenticity is attained via key management, that is, the system of generating, distributing, and storing the users’ keys.38 The features of authenticity and anonymity can be achieved by using public-key cryptography. Such a system uses various tools. The first tool is one way function(s), that is a function that can be computed in one direction but not the other. Other tools are signature and identification, and secure hashing. Signature and identification can be achieved using digital signatures,39 which is also a common use of secure hash functions.40

36 Id.
37 Id. at 1134.
38 Id. Key management is carried out using a certification authority or a trusted agent who is responsible for confirming a user’s identity.
39 A digital signature plays the same role as a handwritten signature identifying the author and authenticating the author’s message.
3.3 Paper Anonymity and Payment Untraceability

The features of paper anonymity and payment untraceability are available with the conventional form of paper money or cash. Paper anonymity implies that there would be no record of who spent the money. Payment untraceabilty implies that there is no record of where the money is spent. These features are not available with others forms of electronic payment namely credit and debit cards. However David Chaum and others have introduced these features into electronic cash.41

3.4 Invisibility

Electronic Cash is an invisible form of money, that is the value can be stored on cards or on the computer but it is not tangible like paper money. This feature may make users uncomfortable and may also result in some form of uncertainty. However hopefully with increased usage of the different forms of electronic cash in an increasingly modern world, the invisibility of this form of cash should not be so much of a problem, given of course that the security features are worked and improvised upon.

3.5 Lack of Transferability

This characteristic makes electronic cash lose in comparison to paper money. Paper money is popular because it is transferable and therefore convenient to use. Electronic money on the other hand is not transferable in many cases and therefore not so convenient. For example, if one were to use an electronic coin then for it to be transferable the coin must accumulate value every time it is used. In such a case the bank

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40 For more information on cryptographic techniques refer generally, Law, Sabeti, Solinas, How to Make a Mint, supra note 35.
42 Law, Sabeti, Solinas, How to make a Mint, supra note 35, at 1135.
43 A form of electronic cash. A digital “coin” is a unique serial number that is related to a specific amount or denomination of electronic value. When a user requests electronic cash value, the user’s bank will ordinarily debit an account of the user on the bank’s books and credit an electronic cash liability account on the bank’s books. The user’s computer generates a set of random serial numbers with associated values in convenient denominations, which are encrypted and communicated electronically to the bank for validation. The “coins” are stored in the user’s computer until the user decides to use them.
would have to identify as to who used the coin and for what amount so that each receiver may receive the appropriate amount. In such a case though the transferability property would be achieved, the property of anonymity would be lost. However it might be to the advantage of security of electronic cash systems to do away with anonymity, to tackle potential problems like money laundering and counterfeiting. Then again electronic cash may not be so desirable anymore if it lost such a property. We may note here however that some stored value cards, for example, the off-line unaccountable stored value card, have the potential of being transferred because they simply have value stored on a magnetic strip with no digital signatures or PIN numbers attached. Therefore they may be simply gifted to a person. Subsequently the problem which arises, is regarding the legal implications of such a transfer. These are related problems, which will be dealt with in detail in the subsequent chapters in this thesis.

3.6 Lack of Divisibility

This is another troublesome factor which makes electronic cash less desirable than paper money. Divisibility implies the ability to be broken down in smaller denominations which is a feature present in the conventional form of money, that is, paper money can be measured in smaller values of paper money and metallic coins. Electronic cash does not have such a property that makes it less convenient and therefore not so popular. This feature may be compared to the lack of divisibility of the traveler’s check. Although a traveler’s check may be exchanged for smaller denominations of different forms of money, the physical instrument constituting the traveler’s check itself cannot be divided into smaller denominations. A $100 traveler’s check will always be a $100 traveler’s check and the information that results in a traveler’s check being valuable, that is the direction to pay, always remains with the instrument itself.

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44 An example of such a card is the copy card used in universities. Such cards are prepaid in nature.
3.7 Lack of Legal Standing, and Accountability in Some Cases

Electronic cash systems can be off-line unaccountable\textsuperscript{45} in nature as discussed previously. In such a case where there is no payment traceability or any such record of occurrence of an electronic transaction there is no accountability and therefore if the card is lost, the value on it cannot be redeemed. This property is shared with paper money, unlike credit and debit cards where value is stored in a central database with the bank and therefore in event of a loss of the card, nothing else is lost to the owner of the card and the account. As a result of unaccountability and untraceability many legal questions arise and there is lack of consensus, and reliable legal standing on the issue.

3.8 Finality

A very important characteristic of electronic cash is that it lacks the finality of physical cash. Finality implies if A has an obligation to pay $10 to B then such an obligation would be discharged with finality if A were to pay $10 to B in paper money. If we compare this to the working of a check then we see that a check has to be finally converted to cash. A single transaction is not enough to lend finality or to attain discharge of the obligation, instead there has to be a series of transactions culminating in a final step of conversion to physical cash. Electronic cash shares this property with the check in that the electronic value has to be redeemed as physical cash in the final step after a series of transactions. However, the issue of finality is an ongoing discussion whether it should be treated as analogous to cash or to a check.\textsuperscript{46}

3.9 Fast Form of Cash

Electronic cash is also popularly known as “fastcash” because of the involvement of a quick and convenient transaction. One may conduct cash transactions via the

\textsuperscript{45} Id.

\textsuperscript{46} Id.
Internet at the touch of a button across international borders. Money can be transferred at the swipe of a stored value card. Such a form of money facilitates commerce because it enables quick decisions, which are a key factor for success and development in the financial, and the business world. This feature makes the electronic cash systems alluring to people involved in commercial transactions.

3.10 International Popularity and Acceptance

The above mentioned features and characteristics of electronic cash, especially one dealing with fast cash and convenience makes it an internationally popular form of cash. This is because since there are no problems of conversion, which is usually the problem with physical cash, electronic cash is widely accepted as an international form of currency. The usage of electronic cash is already quite popular in Europe and though it is still in its nascent stages in the U.S., it is definitely gaining quick popularity especially as we draw closer to the 21st century.

3.11 Concluding Remarks

A determination of the features and characteristics of electronic cash while clarifying its meaning also paves the way for legal implications and therefore questions about its future. This also necessitates a discussion on the various forms of electronic cash existing in the world today. An understanding of the same can be made from the following chapter.

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CHAPTER 4
TYPES OF ELECTRONIC CASH SYSTEMS

There are various types of electronic cash systems with new versions arising continuously. For a better understanding of the subject it is important to be familiar with these systems and their characteristics. Electronic cash systems can be broadly classified into three categories. There are stored value cards, which can be carried around like a credit card.47 There are computer-based systems, for example, those involving payments over the Internet.48 There is also talk of hybrid systems, which allow smart cards and network-based payments to work together.49 We may now discuss the existing and upcoming electronic cash systems in detail in the following.

4.1 Stored Value Card

Broadly defined, the term stored value card implies either a card with a magnetic strip or with a computer chip charged with a fixed amount of economic claims or value.50 This may be used instead of actual paper money and coins in making purchases or can be transferred to individuals and/or merchants.51 Stored value cards are being marketed in a wide variety of formats. Some types of cards contain features that make them unlike other payment devices like credit cards and debit cards. Others, however, operate in ways that are similar to the debit card.52 Depending upon the system adopted by the

48 Id.
49 Id.
51 Id.
vendor. Stored value cards can operate as debit cards or more like the functional equivalent of electronic cash.

In many ways stored value cards do not represent new technology as such cards with magnetic strips created for a single vendor have been in production for quite a few years. Some good examples are the prepaid card used for mass transit and the campus copying machine. With the new technology the stored value cards can be used by various vendors and for various purposes.

4.2 Smart Cards

A smart card, which can be used as a stored value card looks similar to a credit card, and has a magnetic strip or microprocessor, embedded in the card. Depending upon the capacity of the integrated circuit, the smart card may hold limited information, or may have the ability to perform complex computing functions. For stored value smart cards, an electronic device is used to read the existing value of electronic cash and to load or deduct electronic cash stored on computer chips. Smart cards are being developed for a number of uses. In addition to acting as a form of electronic money, it is being used by airlines, universities, hospitals and the government for electronic ticketing, the delivery of electronic welfare benefits and the storage of vital personal information. Smart cards, functioning as stored value cards, can operate within existing and future technologies, for example, retro-fitted ATMs, augmented telephones such as screen phones and smart phones, electronic purses (stand alone dedicated devices), or PCs.

54 Id.
55 Id.
56 Williams and Gillespie, Recent OCC Materials, supra note 50, at 12.
57 Id.
59 Williams and Gillespie, Recent OCC Materials, supra note 50, at 12.
4.3 Cybercash

The Cybercash\textsuperscript{60} system is an Internet Payment System. In this model, sensitive financial information is sent over the Internet. In this system, a user initiates a transaction by filling out an order form on the merchant’s website. Cybercash prompts the user for a payment option, which would be a choice of credit cards or a bank account withdrawal. This information is encrypted and sent to the merchant upon completion of the order form. Upon receipt of this information, the merchant adds its merchant ID and forwards user’s information and the information added by the merchant (which is also encrypted) to Cybercash. The user’s information remains encrypted throughout the process so that the user’s billing information is invisible to the merchant at all times. Cybercash receives this information and passes it through a firewall.\textsuperscript{61} Once the transaction and billing information is behind the firewall it is decrypted. The user’s billing information is then sent to the merchant’s bank, who in turn sends it to either user’s bank or credit card issuer via existing secure networks for authorization. The user’s bank either confirms or rejects the transaction, and this information is sent back to both the user and the merchant via the merchant’s bank. If the transaction was rejected, Cybercash offers the user the chance to select another payment method or cancel the transaction. If the transaction is confirmed, the order is shipped and the account is settled.

4.4 Closed Systems

In “closed” systems, the value on the smart card or stored value card can be used only for goods or services provided by the card issuer (such as fares on a particular mass-transit system, or food, photocopying, books, and vending machine items within a

\textsuperscript{60}Taken from www.cybercash.com.
\textsuperscript{61}Id. All the information is received through a narrowly defined firewall system by the Cybercash Gateway Server as a charge authorization request. The gateway server decrypts the message in an ATALLA hardware encryption device and authenticates user’s information and the merchant.
particular university’s system). In a pure “closed” system the stored value card is accepted only by a single merchant or entity. Among other functions, closed stored value card systems are used to pay for public transportation and telephone calls. The issuer distributes the cards to customers of a single merchant and redeems all payments.

4.5 Open Systems

In contrast to the “closed” systems, in “open” systems, the issuer is not necessarily the provider of the goods and services but could be one of several issuers whose stored value cards are mutually acceptable. For example, three separate banks issued VISA Cash cards during 1996 Olympics, and approximately 1,500 merchants were equipped to receive payments made with such cards. The promise of open systems, in which one card can be used for transactions with a wide variety of different merchants, has led to the characterization of stored value cards as “electronic purses” or “electronic wallets”. In the open system there are one or more electronic cash issuers of stored value cards that are accepted by multiple merchants. These systems require a valid payment systems network for collecting and processing the electronic cash payments received by merchants.

It should be noted here that the line between closed and open systems is a fuzzy one. Clear distinctions can certainly be drawn among truly closed environment systems such as subway cards and store gift certificates, in which the stored value is redeemed only for products or services of the issuer, and closed systems involving several issuers (for example, university cards acceptable at retail shops outside the campus boundary and ‘gift certificates’ or cards usable at all stores in a single mall, ...[as well as] cards

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63 Williams and Gillespie, Recent OCC Materials, supra note 50, at 13.
64 Id.
65 Id.
66 Task Force on Stored-Value Cards, supra note 62, at 660.
67 Williams and Gillespie , Recent OCC Materials, supra note 50, at 13.
68 Id.
accepted at various private companies doing business within the university, e.g., bookstores [and] restaurants.\textsuperscript{69} Yet there are those who question whether there can be a viable middle category between “truly closed” and open systems: \textit{If the university card can be used off-campus, is it an open system?}\textsuperscript{70} In theory, smart cards and magnetic strip cards could each be used for either closed or open systems. Yet in practice, magnetic strip cards, perhaps because of their limited memory capacity, are usually associated only with closed systems.\textsuperscript{71}

4.6 Disposable Cards

Disposable cards are those that have only a one time use with a fixed amount of electronic cash, and are thrown away after that one time use.\textsuperscript{72}

4.7 Reloadable Cards

In contrast to the disposable card the reloadable card can have new electronic cash value loaded on after the original value is used.\textsuperscript{73} This can be done by storing electronic cash on a computer chip and interface by special loading devices enabling the customer to load electronic cash on the card.\textsuperscript{74} The card may carry special features like having a limit on the maximum amount of electronic cash that can be stored on a card at a given period of time and there may be a time after which it expires.\textsuperscript{75} During the 1996 Olympics, three regional banks, First Union, NationsBank and Wachovia issued reloadable smart cards to customers and connected hundreds of merchants to a payment system.

\textsuperscript{69} Comment Letter of Nessa E. Feddis, Senior Federal Counsel, American Bankers Association 13, 9 (Sept. 5, 1996).
\textsuperscript{70} Task Force on Stored-Value Cards, supra note 62, at 658 n.4.
\textsuperscript{71} John Wenninger and David Laster, \textit{The Electronic Purse}, 1 Current Issues in Econ. and Fin. 7, 8(1995).
\textsuperscript{72} Williams and Gillespie, Recent OCC Materials, supra note 50, at 12.
\textsuperscript{73} Id.
\textsuperscript{74} Id.
\textsuperscript{75} Id. at 13.
network. In contrast to the Olympic trial, Chase Manhattan and Citibank planned to issue only reloadable stored value cards.

4.8 Off-Line Accountable Systems

These are systems where there is no authentication or authorization for a transaction, but a central database recording values and transactions is maintained apart from the card. Transaction data are periodically transmitted to and maintained by a data facility. As in the case of the traditional consumer deposit account accessed by a debit card, in these stored value systems a consumer has the right to draw upon funds held by an institution. An example of such a system is the New York Metropolitan Transit Authority’s MetroCard system, in which the balance of funds available is recorded on the card. In addition, the current system maintains a central database that creates a record of every transaction associated with every card during the period that the card is valid.

4.9 Off-Line Unaccountable Systems

Off-line unaccountable systems do not require the authorization for a transaction and no central database maintains information about card balances or transactions. Transaction data for debits to the card’s “stored value” are recorded on the card and captured at merchant terminals (where they are maintained for a limited period of time). Only the aggregate amount of transactions for a given period of time is transmitted by the merchant to the financial institution or other entity so that the merchant can receive credit. Common types of cards such as photocopy cards and some forms of transit cards fall within this group. These are often, but not always, the magnetic strip cards and the “memory” type of smart cards that are intended to be discarded after use.

76 Going for Olympic Gold Cards, The Economist, Mar. 30, at 67.
77 Chase, Cit to Pilot NY Purse, Cards Int’l, April 15, 1996, at 1.
4.10 On-Line Systems

On-line systems rely on on-line verification and authorization for transactions and record all transaction information into a central database.\textsuperscript{82} This implies that when a card is used at an ATM or a POS terminal, the transaction is authorized by means of on-line communication with the data facility where the transaction data are stored (including information such as merchant identification, amount, date, and card number). The balance of funds available to the consumer is not recorded on the card itself, as in off-line stored-value systems; instead, the balance information is maintained in the data facility.\textsuperscript{83}

4.11 Electronic Wallet

Electronic money technology has a wide array for potential applications. One such application is in the case of an electronic wallet. To prevent abuse of electronic cash by multiple spending, one has to use a tamper resistant device such as the smart card.\textsuperscript{84} But there is a drawback that one must put a great deal of trust in the device, because the user loses the ability to monitor information entering or leaving the card. David Chaum and Torben P. Pedersen came up with the idea of embedding a tamper resistant device into a user controlled outer module in order to achieve the security benefits of a tamper resistant device without requiring the user to trust the device.\textsuperscript{85} This combination is called the electronic wallet. The outer module is accessible to the user. The inner module, which cannot be read or modified, is called the observer.\textsuperscript{86} All information that enters or leaves the observer must pass through the outer module, allowing the user to monitor information that enters or leaves the card. The outer module, however, cannot complete a transaction without the cooperation of the

\textsuperscript{81} Proposal, supra note 79, at 19,699.
\textsuperscript{83} Proposal, supra note 79, at 19,699.
\textsuperscript{86} Law, Sabett, Solinas, How to Make a Mint, supra note 84, at 1156.
observer. This gives the observer the power to prevent the user from making transactions that it does not approve of, such as spending the same coin more than once.

4.12 Purse to Purse System

Some complex stored value card systems permit transfer from one storage device to another without restrictions. As the electronic cash can move from one consumer electronic purse to another such a system is called a purse-to-purse system. In such systems the electronic cash is allowed to circulate for an indefinite period of time before it can be redeemed.

4.13 ECash

ECash is a part of a pilot program operated by Mark Twain Bancshares of St. Louis, Missouri. The participants in this program used a currency called “cyberbucks” and downloaded the DigiCash software after opening an account with Mark Twain Bank. Cyberbucks are loaded onto the hard drive of a personal computer through a series of messages between the consumer and the bank. Once the Cyberbucks are created, the consumer may use Cyberbucks to make purchases on the Internet.

4.14 DigiCash

DigiCash was founded in 1990 and has been a leader in the development of technologies using public key cryptography. The Amsterdam company developed ECash with help from American cryptology expert Dr. David Chaum. ECash utilizes digital signature technology and the ability to encode and decode messages with the help

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87 Id.
88 Id.
89 Williams and Gillespie, Recent OCC Materials, supra note 50, at 13.
90 Id.
91 Catherine Lee Wilson, Banking on the Net, supra note 53, at 686.
92 Id.
93 Id.
94 Id. at 685.
of two numeric keys - a “private key” and a “public key”. One key is public and the other is kept private; consumers and merchants use the public key.\textsuperscript{95} If the message received by such decoding is a ‘meaningful message’ the decoder is assured that it is an authentic message from the bank. In the DigiCash system such a message is a string of numbers representing a “note” or electronic value.\textsuperscript{96}

4.15 Visa Cash

At the time when the 1996 Olympics were held in Atlanta, Georgia, a pilot program was sponsored by Visa and three regional banks, First Union, NationsBank and Wachovia, to promote the use of Visa International’s stored value card, called VisaCash.\textsuperscript{97} In this trial stored value cards were given to each of the Olympic athletes to purchase goods and services in the Olympic village.\textsuperscript{98}

4.16 Mondex

Mondex is a smart card product and is being tested in the town of Swindon, England, as well as Wells Fargo Bank, in the institution’s headquarters office. Mondex, developed by Nat West, Midland and British Telecommunication, is based on the storage of ECash on a smart card.\textsuperscript{99} Cash can be transferred from one card to another and to or from a bank account using a variety of Mondex devices or compatible British Telecommunication phones.\textsuperscript{100} In Swindon, Mondex officials say that 10,000 consumers are using the card, a figure that represents 21 percent of Midland and Nat West’s combined customer base in the community. In a survey of consumers, 90 percent found

\textsuperscript{95} Id.
\textsuperscript{96} Id.
\textsuperscript{97} \textit{Going for Olympic Gold Cards}, The Economist, Mar. 30, 1997, at 67.
\textsuperscript{98} Id.
\textsuperscript{100} Id.
the Mondex card easy to use and 76 percent reported that the card represents an extremely fast way of payment.\textsuperscript{101}

\textbf{4.17 Concluding Remarks}

It is important to note that new and upcoming programs like VisaCash, DigiCash, Mondex, ECash, are pilot programs, and are currently being tested for efficiency and feasibility around the world.

\textsuperscript{101} Id.
CHAPTER 5
LEGAL AND REGULATORY CONCERNS AND ISSUES RELATED TO
ACCEPTANCE AND DEVELOPMENT OF ELECTRONIC CASH

Though the concept of electronic cash is revolutionary, modern, and enticing, it brings with it several regulatory and legal concerns and issues that raise a question as to whether it is a viable concept. The following is a study into this subject related to problems and concerns of the business world, the government and the consumer.

5.1 Is Electronic Cash, Money and Legal Tender?

“Money” as defined by the UCC is a medium of exchange authorized or adopted by a domestic or foreign government as a part of its currency. Money is a medium that people are willing to accept for the goods, securities and services they sell. It serves as a medium of exchange, a standard of value, and also functions as a store of value, which can be saved and used in the future. The characteristics of money that enable it to function as the same are durability, wide acceptance by people, anonymity and inability to counterfeit.

In the commercial law context, money is defined by its ability to serve as “legal tender.” When the sovereign government provides that only certain types of paper or objects, if tendered to an obligor, will discharge indebtedness, that concept is known as “legal tender”.

To determine if electronic money is equivalent to conventional money and if it is a legal tender we have to refer to the nature and features of electronic money. This will

102 U.C.C. §1-201(24) (1994).
also clarify the need for its regulation. The Constitution has granted the Federal government the power to coin money and regulate its value.\textsuperscript{104} In spite of this power the Federal government has not been the sole issuer of currency, as prior to the Civil War there was the existence of paper money issued by states and private banks.\textsuperscript{105} Subsequently there was the passage of the National Bank Act of 1863, and in the Legal Tender Cases\textsuperscript{106} the Supreme Court of U.S.A. upheld the Legal Tender Act. The result was that Congress became the sole power able to create legal tender.\textsuperscript{107} The statutes, declaring paper currency issued by the Congress to be legal tender, were also held constitutional.\textsuperscript{108} However the Federal government has not adopted stored value cards or electronic cash as a medium of exchange as money for commercial law purposes. Therefore electronic money remains as a private form of money which may be accepted instead of legal tender. The reasons why it has not been accepted as legal tender are:

1) Electronic cash does not have the finality of cash as it has to go through a complex system before the transaction is complete.

2) Second, all current electronic money developments allow the holder of the stored value to redeem it for the national currency.\textsuperscript{109}

3) Further, as the withdrawal of cash in exchange for electronic money is not so easy due to the complex process involved, and as electronic cash is not federally insured the confidence of the holder is lacking. This is so because the holder cannot be sure what would happen in the event of a bank failure, and cannot be assured of the strength of the issuers.

There have been a lot of arguments as to whether electronic cash should be granted legal tender status. The reasons why it has not been done so far have been

\textsuperscript{104} U.S. Const. Art. I, §8, cl. 5.
\textsuperscript{105} Henry H. Peritt, Jr., Legal and Technological Infrastructures for Electronic Payment Systems, 22 Rutgers Computer 4 Tech. L.J. 1 (for more information on the role of money in the payment systems) (Hereinafter, Henry H. Peritt, Jr., Legal and Technological Infrastructures).
\textsuperscript{106} 79 U.S. 457 (1870).
\textsuperscript{108} The Legal Tender Cases, 79 U.S. 457 (1870).
enumerated above. But for development of electronic cash it is important that it should be legal tender, so as to facilitate confidence and wide acceptance.\footnote{110} A legal tender would further provide for a single system of regulation to govern electronic cash transactions and therefore reduction in risk for parties involved in such transactions.\footnote{111} Further the legal tender status would enable a natural monopoly and an efficient operation by economies of scale and related efficiencies.\footnote{112}

However it is important to evaluate if the electronic cash systems are in the stage where they can be substituted officially for cash. According to Federal Reserve Board Chairman Alan Greenspan, the speculation that electronic money products may soon replace paper money appears to be premature.\footnote{113} This is mainly because electronic cash is a concept which is still developing and even though popular in Europe, its limited use in the U.S. and mainly as pilot programs\footnote{114} evidences that it has a long way to go. Therefore it is not fit to be treated as legal tender.

Electronic cash systems have yet to deal with problems of security, anonymity, seignorage, privacy, and similar issues, to be reliable enough to qualify for legal tender. The problems enumerated above will be dealt with in detail later in this thesis.

Therefore while electronic money facilitates commerce, it is not appropriate to consider it as money or legal tender. Accordingly, electronic money should be subject to regulation based on its relationship to products and entities traditionally subject to federal banking regulations.

\begin{footnotes}
\item[110] Coins, Notes, and Bits, Supra note 107, 333-335.
\item[111] Id. at 332-333.
\item[112] Id. at 335-337.
\end{footnotes}
5.2 Should Electronic Cash be Considered as a Deposit, and therefore is the Issuer a Bank?

Section 21 of the Glass-Steagall Act\textsuperscript{115} differentiates between commercial banks and investment banks by stating that only commercial banks may engage in deposit banking, that is, investment banking and deposit banking cannot be undertaken by the same institution simultaneously. The problem that arises if we consider electronic cash as a deposit is that non-banks or investment banks then may not engage in issuing electronic cash. So let us first evaluate if electronic cash is a deposit.

There is a lot of speculation whether electronic cash is a deposit under the Federal Deposit Insurance Act given that electronic value does not constitute money or legal tender. The Federal Deposit Insurance Act specifies what qualifies as a deposit under the Act.\textsuperscript{116} It provides that a deposit arises whenever:

(1) An unpaid balance of money or its equivalent is received or held by a bank,
(2) In the usual course of business,
(3) For which the bank:
   (i) is obligated to give credit to a commercial, checking, savings, time or thrift account, or
   (ii) must hold for a special or specific purpose.\textsuperscript{117}

The Federal Deposit Insurance Corporation (FDIC) addressed these prerequisites for a deposit in relation to electronic cash and found that it fell short of being considered a deposit.\textsuperscript{118} This was because the money was neither held on behalf of a customer nor a special purpose.\textsuperscript{119} The FDIC’s analysis appropriately focused on the location of the funds and the ability to identify the party who could claim the funds.\textsuperscript{120}

\textsuperscript{115} 12 U.S.C. 378.
\textsuperscript{116} 12 U.S.C. §§1813, 1812.
\textsuperscript{117} Id.
\textsuperscript{118} Federal Deposit Insurance Corporation General Counsel’s Opinion No. 8; Stored Value Cards, 61 Fed. Regs., at 40,494.
\textsuperscript{119} Id.
The FDIC opinion, even though limited in its application, has relieved the non-banks from having to leave the electronic cash industry. The issue that arises from the above discussion is that by holding stored value or electronic value not to be deposits, the non-bank therefore would escape FDIC regulation. The method therefore to regulate electronic cash would be to identify the electronic cash issuing entity as a “bank”. There is a lack of consistency regarding definition of a bank. While the National Bank Act defines a bank in terms of its functions, the Bank Holding Company Act (BHCA) defines a bank as any FDIC insured bank or any institution that accepts both demand deposits and engages in the business of making commercial loans. Then again if the BHCA were to identify electronic cash as “deposit” it would effectively preclude most non-banking organizations from owning companies that issued electronic cash. The status of electronic cash as a “deposit” is not clear but an expansive reading of “deposit” might encompass electronic cash issuers as “banks” under BHCA. Thus non-banking organizations would have to avoid “engaging in the business of banking”.

Getting back to Section 21 the Glass Steagall Act, the effect of the same on non-banks that would engage in electronic money activities is uncertain. This is so because it is not clear whether a non-bank that sells or issues electronic cash in exchange for real cash is thereby engaged in the business of receiving deposits subject to check or to repayment upon presentation of a passbook, certificate of deposit, or other evidence of debt, or upon request of the depositor.

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121 Federal Deposit Insurance Corporation General Counsel’s Opinion No. 8; Stored Value Cards, 61 Fed. Reg. at 40,493.
122 Fein, 15 No. 5 Banking Pol’y Rep. at 10.
125 Id.
127 Williams and Gillespie, An Introduction to Electronic Money, supra note 124 at 134.
As far as commercial banks are concerned, Section 21 of the Glass Steagall Act should not affect their ability to issue electronic cash. This is so because Section 21 only prohibits banks from issuing, underwriting, selling, or distributing “securities” and issuing electronic cash in all probability is not a “security”. Besides if it is found that electronic cash is a part of the “business of banking”, commercial banks would not be prevented from issuing the same by Section 21.

Involvement by non-banks in the field of electronic cash presents a lot of problems and questions due to security concerns. The lack of regulation definitely gives rise to doubts about the effectiveness and future of the system. Therefore there certainly is a need for regulation. However since the electronic cash systems are in the process of development, regulations should not have the effect of stifling its growth. To quote Federal Reserve Board Chairman Alan Greenspan the private sector will need the freedom to experiment without broad interference from the government.

The policy implications of electronic money extend beyond the realm of banking law, as acknowledged by the banking industry itself. The rules, the regulations, the technology, and the different issues [banks] have to deal with have transcended what normally would confront [a banking] institution.

There are many rewards for the issuer of electronic money. The issuer earns the interest on the value stored as well as the remaining value on any lost or destroyed card. The issuer also collects transaction fees for services provided and license fees for equivalent supplies. The issuer sells ancillary services including advertising on the cards and any frequent-buyer schemes that are used to build and maintain users loyalty.

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131 Id. at 7.
133 Id.
134 Id.
A financial institution, a commercial bank, both fit the bill as an issuer, but there is no reason why a non-bank institution cannot perform the task.\textsuperscript{135}

Therefore what is inferred from the above discussion is that in the absence of a clear consensus whether electronic cash is a "deposit" or activity within the "business of banking" it is difficult to specify whether the issuer is a bank. And even though it is risky to let non-banks also engage in issuance of electronic cash, as there is absence of regulation, it is important to allow them to do so, to facilitate the development of electronic cash. There is no contention however that there has to be the presence of some form of effective regulation.

\section*{5.3 Application of the Electronic Funds Transfer Act (EFTA), and Regulation E to Electronic Cash}

The Electronic Funds Transfer Act (EFTA) is the federal legislation which governs electronic fund transfers (EFTs). The definition of an electronic transfer is not very clear in the EFTA. The EFTA also serves as the enabling legislation for Federal Reserve Regulation E. The EFTA, and therefore the Regulation E, cover only transactions between a "consumer" which means an individual\textsuperscript{136} and an "account".\textsuperscript{137}

If there were any regulation under which electronic cash would be covered, it would be EFTA. This is so because credit, debit and ATM cards are regulated by EFTA, and if stored value cards (SVCs) are similar they would be under the same regulation. However the problem with this approach is that under Regulation E, banks and others offering EFT services subject to EFTA must provide extensive disclosures to consumers.\textsuperscript{138} This includes giving extensive information to consumers about the

\begin{flushright}
\textsuperscript{135} Id.
\textsuperscript{136} Regulation E, 12 C.F.R. § 205.2(c).
\textsuperscript{137} "Account" is defined as a "demand deposit (checking), savings or another asset account (other than an occasional or incidental credit balance in a credit plan) held either directly or indirectly by a financial institution and established primarily for personal, family, or household purposes." 12 C.F.R. §205.2(b)(1).
\textsuperscript{138} Williams and Gillespie, An Introduction to Electronic Money, supra note 124, at 124.
\end{flushright}
liability involved, preparing a report and providing receipts.\textsuperscript{139} This concept seems to defy the objective of "fastcash" as electronic cash is popularly known. A process that involves disclosure information and receipts every time an electronic cash transaction occurs, will be no more advantageous than the credit and debit card system and also have to bear additional transactional costs. This makes one wonder if the system would then retain its popularity, if consumers would be ready to pay extra costs, and if the system will be as fast as it is now.

There is no doubt that the system needs at least some form of regulation to instill confidence in the system via security and consumer protection. The regulation which deals with consumer protection in an electronics fund transfer is Regulation E. Regulation E was promulgated to implement the EFTA, and defines electronic fund transfers as \textit{any transfer of funds...that is initiated through an electronic terminal, telephone, or computer or magnetic tape for the purpose of...authorizing a financial institution to debit or credit an account}.\textsuperscript{140} This broad language could include a customer account maintained at a non-bank institution organized for the purpose of issuing electronic money. Regulation E protects an account holder absolutely (except for some statutory amounts),\textsuperscript{141} and shifts the burden of proof that a withdrawal was authorized to the financial institution.\textsuperscript{142}

There is protection even when the card has been misused by an unauthorized person due to the negligence of the cardholder. To accommodate electronic cash under electronic funds transfer regulation, the Federal Reserve Board (FRB) proposed amendments to Regulation E on May 2, 1996.\textsuperscript{143} The amendments proposed to divide stored value cards (SVCs) into three categories, namely, off-line unaccountable, off-line accountable, and on-line accountable.\textsuperscript{144} The proposal provided that off-line

\textsuperscript{139} Id.
\textsuperscript{140} 12 C.F.R. § 205.2 (g).
\textsuperscript{141} 12 C.F.R. § 205.6 (b).
\textsuperscript{142} Id at § 205.11 (c) (1).
\textsuperscript{144} Id at 19,702.
unaccountable cards would not be regulated by Regulation E, off-line accountable cards would be regulated minimally with only a disclosure to consumers required, and on line accountable cards would be regulated under the current Regulation E, with modifications. In addition, any card capable of storing a maximum of $100 would be exempted from the regulation.

At the end of the public comment period for the proposed amendments, there was no finality and there were mixed reactions. While some banks and bank-led organizations favored the proposal, others questioned the idea of regulating something that was still evolving. Congress shared the second opinion and forbade the FRB to finalize any amendments under EFTA until at least July 1997. This was so that FRB could prepare a complete report as to whether the proposed amendments would adversely affect the costs, development and productions of such electronic cash products.

The current Regulation E probably applies to electronic debit system, but not to electronic cash systems. At this time it is uncertain as to what the final amendments to Regulation E will look like and how it will affect the development of electronic cash.

5.4 Legal Issues Related to Digital Signatures and Cryptography

There are lots of risks associated with a transaction involving electronic cash, which will be discussed later in this thesis. The solutions will also be discussed; however there are some proposed solutions which are worth mentioning here, so that the related legal problems may be discussed.

It is being popularly agreed upon that digital signatures may provide solutions to problems related to electronic commerce. Digital signatures are used to authenticate

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145 Id at 19,701.
146 Id at 19,700.
147 Id at 19,702.
148 Id at 19,703.
the accuracy of a message that has been transmitted via insecure communication facilities, such as the Internet.\textsuperscript{152} Further they are used to authenticate the sender of a message, thus providing protection to the recipient.\textsuperscript{153}

Utah was the first state to pass a law authorizing the use of digital signatures in commerce.\textsuperscript{154} Many other states followed the example and others started studying the idea. Methods are also being developed to apply digital signatures as a means to identify and register objects of value. This technology does not need a new legal infrastructure and courts are expected to give importance to such evidence in cases of forgery and theft. This seems to be a good option as there are no extra costs and therefore an idea worth adopting.

The use of cryptography, which until recently was presumed to have primarily military application (with special accommodation to the banking industry), has become a fundamental requirement of electronic commerce.\textsuperscript{155} Cryptography involves encryption technology and strong public key encryption technology is important to conduct banking, cash transfers, and other commerce over the Internet.\textsuperscript{156} However, the same encryption technology can be used to conceal money laundering, other fraudulent or illegal transactions, or even espionage and terrorism. The solution to this problem may be that the government can bar powerful forms of encryption that the government cannot break, or completely ban the operations. The present Clinton administration has taken a middle path between banning and strong government regulation. But if we refer to an incident in June 1997, we may have serious doubts about the technology. A group of programmers and researchers, using tens of thousands of computers across the Internet, mounted a successful attack on the encryption technology when they were able to decode a message that had been scrambled using the Data Encryption Technology, used by most banks to

\begin{itemize}
\item \textsuperscript{152} Richard Raysman, \textit{Digital Signatures: Time-Saving Technology at your Fingertips}, Trusts and Estate, Apr. 1996, at 5.
\item \textsuperscript{153} Henry H. Peritt, Jr., Legal and Technological Infrastructures, supra note 105.
\item \textsuperscript{155} John C. Hoag, \textit{Oasis a Mirage of Reliability}, 134 Fort. 1 (1996).
\end{itemize}
Therefore while some favor looser controls on encryption technology, others oppose the idea.

5.5 Jurisdiction Issues

The characteristics of electronic cash can raise questions regarding application of the jurisdiction of state, and choice of law. If we take the example of off-line unaccountable stored value cards, there is no accountability as they cannot be traced, therefore once something happens to the card, the value is lost forever. Besides if a card cannot be traced, there is no proof as to where it was accessed and therefore it is difficult to specify as to which jurisdiction it falls under. With regard to the off-line accountable cards and on-line cards, problems may arise if something goes wrong because even though they can be traced the existing laws may not be sufficient and then again the cards may have been used in a state in which the users are not resident. Such problems are more possible in the case of transactions over the Internet as in the case of Cybercash. The users of Cybercash may not be physically present in the same state as their place of usage or business. Such cases have been litigated in many states but with varied results. In Maritz, Inc. v. Cybergold, Inc.,\textsuperscript{158} the court ruled that it had personal jurisdiction over the defendant, whose only contact with the state of Missouri was the accessibility of its Web page to Missouri residents.\textsuperscript{159} On the other hand, in McDonough v. Fallon McElligott, Inc.,\textsuperscript{160} and in Bensusan Restaurant Corp. v. King,\textsuperscript{161} intellectual property actions were dismissed under similar circumstances for lack of personal jurisdiction.\textsuperscript{162}

\textsuperscript{158} 40 U.S.P.Q 2d (BNA) 1729 (E.D. Mo. 1996).
\textsuperscript{160} 40 U.S.P.Q. 2d (BNA) 1826 (S.D. Cal. 1996).
5.6 Issues Related to Intellectual Property

The issues that can arise related to intellectual property could be issues related to copyright, trademarks and patents. The question often raised is whether cyberspace needs a new copyright law and there is no specific answer to this question. The current copyright law allows copyright owners to retain a number of on-line rights with respect to a work. These include reproduction, adaptation, distribution, public performance and public display. Banks increasingly are creators and users of software. This necessitates a better understanding of permissible on-line uses and protection for the software. Questions also arise with respect to on-line information. The courts have not clarified this issue sufficiently. In Lotus Development Corp. v. Borland International, Inc., the First Circuit held that the Lotus menu command hierarchy structure was not an uncopyrightable method of operation, contrary to the holdings by other circuits. The Supreme Court affirmed this Lotus decision in early 1996, but not in a way to resolve the uncertainty.

Trademark issues arising from the Internet involve domain names and infringement. Concerns over the rush for, and the misuse of, domain names have prompted the state of California to act. The California Senate introduced a bill in 1995 that would expose an unauthorized user of another’s trademark as a domain name or e-mail address to penalties under unfair competition laws.

Many of the early patents are broad and their enforceability is unclear. Patents that are recognized widely as enforceable create their own problems. Payment systems, for example, optimally should be low cost and not subject to transaction level royalty payments.

\[\text{163 For more information on Cyberspace laws, patents, copyrights and trademarks refer, Ian C. Ballon, The Emerging Law of the Internet, 507 PLI/ Pat 1163, Feb. (1998).}\]
\[\text{165 49 F 3d 807 (1st Cir. 1995).}\]
5.7 Choice of Law

Another problem that may arise is related to choice of law. In a country like the U.S., where the federal structure of the Constitution defers to differences in laws in each state, a dispute arising due to electronic cash technology may be subject to different standards. There is non-uniformity of standards of law with regard to a common problem, for example, legal differences in Utah, Florida and Washington regarding digital signatures.\(^{168}\) It is important to consider which state’s law will apply when disputes arise involving the new payment products. Each state can adopt its own rules concerning a conflict of laws.\(^{169}\) These rules are used by the courts to determine which state’s substantive laws should be applied to a dispute between parties with contacts in multiple states.\(^{170}\)

5.8 Stamp Payments Act and Electronic Cash

Another issue relevant under the discussion of regulatory concerns regarding electronic cash is with the relation to the Stamp Payments Act of 1862.\(^{171}\) Although electronic cash has the potential to reinvent the definition of “money”, hurdles such as the Stamp Payments Act may stand in the way. The Act was a product of monetary and economic circumstances, unique to the era of its enactment.\(^{172}\) It was meant to impede the proliferation of alternate currencies that occurred as metallic coins disappeared from circulation.\(^{173}\) But its drafters could not have contemplated that this Act might influence the development of electronic commerce more than 136 years later.\(^{174}\) However the whole issue again boils down to whether electronic cash is considered as “money”, for example, if an intangible electronic coin falls in the same category as conventional cash

\(^{168}\) Task Force, Electronic Purse, supra note 103, at 720-722.

\(^{169}\) Id.

\(^{170}\) Id.

\(^{171}\) Act of July 17, 1862, ch. 196, Sec. 2, 12 Stat. 592.


\(^{173}\) Id.

\(^{174}\) Id.
and coins. Only if electronic cash was considered as money would it fall under the prohibition of the Act, and therefore give rise to the necessity of creating a new legal infrastructure suited to the needs of electronic cash.

The government may try to use the Act as a weapon against private issuers, or a subset thereof, to discourage or to shape their entry into the electronic cash market. On the other hand, Congress may pre-empt this possibility by enacting new legislation, which would almost inevitably require it to consider and balance the wide range of monetary concerns such as safety and soundness, money laundering, privacy and consumer protection, associated with electronic cash.175

5.9 State Laws, U.C.C. Articles 3 and 4

Finally, state laws are also worth a mention in this discussion. The most mature payment system legislation, U.C.C. Articles 3176 and 4177 govern commercial paper, with an emphasis on (non-electronic) negotiable instruments, bank deposits and collections.178 Although each state has adopted a version of the U.C.C. there is no longer complete uniformity. In addition, Articles 3 and 4 were redrafted recently to accommodate a number of changes, such as check truncation and electronic presentment. Although the majority of the states have adopted these provisions, some including New York have not.

The recipient generally assumes the risk of a forged instrument under Article 3.179 However, the negligence of the parties may be a factor in determining liability and this process may be applicable to electronic cash and commerce non-repudiation.180 Article 3 also establishes the rules and principles of negotiability, and various groups, including the

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175 Id.
177 Id. at 4.
179 Id.
180 Id.
American Bar Association, Electronic Commerce Payment Committee (Section of Science and Technology), have begun to study issues in electronic negotiability. 181

5.10 Concluding Remarks

From the above discussion it is easy to note that the development of electronic cash has a long way to go, since there are so many related regulatory issues which need to be taken care of. There are other related issues like state laws related to electronic cash, which also need to be addressed. The subsequent chapter will discuss the present and expected role of the government, which will further help to clarify the situation.

181 Id.
CHAPTER 6
ROLE OF THE GOVERNMENT

Since we have now discussed what the expected regulatory concerns are, we may now discuss what the present role of the government is and what it should be. The major topics under which we may discuss the same are the roles of the federal banking agencies and the role of the Congress. This topic will also cover the issue whether electronic cash should be insured under the Federal Deposit Insurance Corporation, which is the offshoot of the discussion under the previous chapter.

6.1 Role of the Federal Banking Agencies

Under this topic we may discuss the role of the Office of the Comptroller of the Currency (OCC), the Federal Deposit Insurance Corporation (FDIC), and the Federal Reserve System. None of these agencies are clear as to the position of electronic cash with regard to the current regulatory structure available, and therefore we have engaged in an endeavor to find answers.

The OCC has maintained that the “business of banking” must be construed broadly, and this attitude of the OCC is reflected in its repeated attempts to remove barriers for usage of new technology by banks. Over the past years, the OCC has authorized banks to use technological developments in providing bank services and a review of OCC’s recent activities reflects its intention to allow national banks to redesign their delivery systems for new financial services related to electronic cash. The OCC took major steps in this direction by approving the Mondex system usage in the United States, the limited liability corporation, the operating subsidiary rule; and most importantly

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182 Catherine Lee Wilson, Banking on the Net: Extending Bank Regulation to Electronic Money and Beyond, 30 Creighton L. Rev. 671, 710 (Hereinafter, Catherine Lee Wilson, Banking on the Net).
interpreting “incidental powers” in section 24 (Seventh) of the National Bank Act to include banking on the Internet.\textsuperscript{184} Therefore while identifying factors that provide potential risk and therefore raise the necessity of ensuring safety and soundness in engaging in electronic cash activities, the OCC is definitely patronizing the system for usage by banks.

The next federal banking agency is the FDIC. The question often asked is whether electronic cash should be insured under the FDIC. The answer to this question lies in the deposit analysis by the FDIC, which provides that electronic cash must qualify as a deposit to be insured by the FDIC. The Federal Deposit Insurance Act specifies what qualifies as a deposit under the Act.\textsuperscript{185} However electronic cash falls short of the requirements to do so and therefore does not qualify for this kind of insurance.\textsuperscript{186} The way around this is that banks may structure the stored value systems to create a deposit to qualify for insurance, by maintaining funds in the consumer’s account until payment is made to a merchant and the transaction is recorded with the card.\textsuperscript{187} This approach however raises privacy and confidentiality concerns.\textsuperscript{188} The FDIC’s stand on the electronic money issue, as compared to the stands of the various other government offices, will have the most immediate impact on the industry. FDIC’s actions will be most vital to ensure safety and soundness of the electronic cash systems and therefore determine its future.

The position of the Federal Reserve System is also important in determining the present and future of electronic cash. The Federal Reserve System is charged with the most important responsibilities regarding the U.S. payments system. It is also the largest provider of retail electronic clearing services through the automated clearing house (ACH), and the largest provider of wholesale electronic payments clearing services

\begin{itemize}
\item \textsuperscript{183} Id.
\item \textsuperscript{184} Id. at 712-715.
\item \textsuperscript{185} 12 U.S.C. §§ 1813, 1812.
\item \textsuperscript{186} Federal Deposit Insurance Corporation General Counsel’s Opinion No.8; Stored Value Cards, 61 Fed. Regs. at 40,494.
\item \textsuperscript{187} Catherine Lee Wilson, Banking on the Net, supra note 182, at 717.
\end{itemize}
through Fedwire.\textsuperscript{189} Electronic money transactions would fall partially under the oversight of the Fed, so long as they involve payments settled between banks.\textsuperscript{190} The future of electronic cash systems under the Federal Reserve System is quite uncertain even though it has been informally indicated that bank issued electronic cash on stored value devices would be treated as transaction account "deposits" subject to reserve requirements.\textsuperscript{191} This policy would however provide an advantage to non-banks via cost effectiveness due to absence of reserve requirements thus producing unfair competition between banks and non-banks. Therefore we must wait and see what the future brings in this aspect regarding electronic cash.

\textbf{6.2 Role of the Government and Congressional Action}

With the increasing popularity of electronic cash, Congress is turning its attention to electronic cash issues. At the end of 1996, Congress approved legislation prohibiting any further action by the Federal Reserve Board on its proposed amendments to Regulation E, requiring the Federal Reserve to conduct a study on electronic money to be presented to Congress by March 31, 1997.\textsuperscript{192}

There is a lot of debate about the role of the government in the world of electronic money. Opinions vary from suggesting that the government should provide the least interference, to the fact that the government should set the standards for regulation, issuance and usage for electronic cash. While some feel that it is necessary that government provide consumer protection, law enforcement and protection against financial crimes, others feel that such governmental regulatory activities should not have the effect of stifling a still developing concept. Another question that yet arises is whether such regulatory oversight by the government will be good enough to provide the

\textsuperscript{188} Id.
\textsuperscript{190} Id.
\textsuperscript{191} Id.
\textsuperscript{192} Catherine Lee Wilson, Banking on the Net, supra note 182, at 722.
desired protection. Many such related questions may arise and as the concept of electronic cash and the related regulatory options are still in a stage of development, it is still quite premature to try to find answers to such questions. Whereas some existing provisions may provide adequate support to the electronic cash systems, others may be outdated.

6.3 Concluding Remarks

Therefore the role of the government with regard to electronic cash is still in a stage of development with quite a long way to go. While we cannot negate the importance of governmental intrusion with regard to the issue, we also may note that too many regulations and a strict oversight would only have the effect retarding the growth of this novel concept of the future called electronic cash.
CHAPTER 7
POLICY CONCERNS, PROBLEMS, VICES AND VIRTUES OF ELECTRONIC CASH

We have dealt with what constitutes electronic cash as well as examined the various characteristics and types of electronic cash, the related regulatory issues and the role of the government in the regulatory process. What remains is an analysis regarding the perception of it.

While some people see electronic cash as replacing regular money, others feel insecure about exposing themselves to a concept about which they do not have much knowledge, and therefore voice concerns regarding related possible risks. It will be interesting to note however that whereas we are insecure of declaring personal information on, for example, the Internet, we do not think twice about handing our credit cards to the waiter in a restaurant or declaring our social security numbers on the telephone while installing various services. This difference mainly exists because of the lack of knowledge and the novelty of the concept. We may note that like any other system that had to go through a stage of development, the concept of electronic cash is still developing, and therefore bound to raise policy concerns, and display imperfections. It has its advantages too and therefore we need to be fair in the evaluation. In the following discussion an attempt will be made to note the concerns, vices and virtues to facilitate such evaluation.

7.1 Concerns, Problems and Vices

While evaluating the negative character of the concept of electronic cash, we might encounter the possibility of finding more points against than in favor of the concept. But we must note that this being a concept still being worked upon, such a
phenomenon is understandable; besides they still may not outweigh the positive character of electronic cash.

The concerns mainly raised are regarding security, which is an overwhelming concern, consumer protection, money laundering, counterfeiting, fraud, law enforcement, privacy and the like. There are questions about cost effectiveness, its feasibility in the developing countries and acceptance by customers. The list is numerous but not endless, and most of the problems are related to security.

7.1.1 Consumer Protection and Related Issues

The issue of consumer protection is of prime importance regarding security issues. Community groups worry about the impact on consumers stuck holding a pocket full of bad stored value cards. Security and consumer protection issues are paramount to the integrity of an electronic payment system, and its economic vitality, according to Donet D. Graves Jr., vice president of policy and programs for the Organization for a New Equality. Consumers are concerned with the issue of privacy and if a third party can have access to the information contained in their personal information "profile." Existing constitutional and statutory provisions place many restrictions on government access to confidential information, and a body of statutory and common law restricts third party access to such information. However, current legislation that caters to the needs of the past does not address the privacy threats presented by electronic currency directly. Many times stored value cards may carry this personal information of the consumer on the card itself instead with the issuing agency. Therefore what would stop an intelligent infiltrator or criminal from accessing that information when such a card is lost or stolen. Consumers are also prone to harm via fraud and counterfeiting. There is

194 Id.
196 Id.
no dearth of intelligent criminals and computer hackers which makes the offense of fraud and counterfeiting easily committed, therefore not only anonymity and privacy are lost, there is also a financial crime susceptibility. This is so because not only anonymity and privacy are lost by fraud and theft, but also in an attempt to remedy such a crime.

Besides the above, who is to vouch for acceptance by the consumer? As mentioned earlier, due to the lack of knowledge and newness of the concept there is a lot of apprehension among the consumers and therefore a lack of ready acceptance. Such a problem can only be mitigated with time because even after complete knowledge is made, such a factor is highly dependent on consumer psychology. Whereas some people take time to adjust to a new concept, others simply refuse to change their existent way of life. In this electronic era, we can still find people who refuse to make use of an ATM (Automated Teller Machine) to withdraw or deposit cash. These are the people who still feel safe in handling their financial accounts within the strong walls of a bank. While these people are still grappling with the idea of using an ATM, there is no telling how much time they will take to get use to the idea of cash stored on the card or in the hard drive of a PC (Personal Computer).

Other problems consist of availability of funds, that is, whether funds made available to consumers by banks via electronic cash will be subject to the same reserve requirements which exist regarding funds made available via conventional money.197 Furthermore there are concerns regarding disclosure and documentation requirements by banks, that is whether or not there is protection under Regulation E.198 Yet another problem consists of consumer awareness, that is, many times stored value cards resemble debit and credit cards, an consumers may not be able to differentiate. Therefore banks and issuing institutions need to make the consumers aware of such issues.

197 Id. at 1123.
198 Id. at 1121.
All these issues raise questions about consumer protection and acceptance and therefore present a difficult road for development of electronic cash. Then again any revolutionary concept has a difficult path, when dealt with on such a large scale.

7.1.2 Privacy

Privacy is an issue in itself and not just a consumer concern, but a concern of the user of electronic cash. Such users may be merchants, as well as the government. Electronic commerce and finance creates new opportunities for unauthorized access to and manipulation of private information. The extension of electronic cash systems to the Internet presents additional risks. Data traveling through the open network of the Internet is more susceptible to interception and can be copied or modified. Such transactions may jeopardize sensitive information of the government or a merchant’s business. Therefore the issue and risk to privacy will depend on the design of the systems to protect such intrusion. According to Federal Reserve Board Chairman Alan Greenspan, security and privacy will be very important if confidence is to be established in the new payments system.\(^{199}\) The problem of security and privacy is aggravated by decryption technology, which is the opposite of encryption technology. Encryption technology is used to provide security to electronic cash transactions usually by the use of numbers. Such a technology has the potential of being reversed and therefore causes security and privacy concerns.

7.1.3 Anonymous Cash and Strong Encryption

The solution to privacy and security concerns is usually the provision of encryption as discussed earlier. Merchants and consumers feel safer when stronger encryption technologies are used and would probably feel safest if such encryption were impenetrable. However, the same security that allows private transactions, prevents tampering by unauthorized parties, and authenticates participants’ identities, also can be

used to thwart the interests of the government. Such an issue would arise and give rise to security concerns if there is an impenetrable encryption in case of a criminal activity concerning such an encrypted device. The government and the law protection agencies would not be able to decipher such information and so be unable to provide protection.\textsuperscript{200}

The prospect of anonymous cash raises a number of public policy issues because it allows for the private, untraceable exchange of money, which is a new concept in the history of money.

7.1.4 Risk of Forgery, Fraud and Counterfeiting

Critics of electronic payments systems often identify the risks of forgery, fraud and counterfeiting. A risk of forgery also brings with it the risk of repudiation.\textsuperscript{201} First one cannot rule out the possibility of a real forgery. On the other hand there may not have been any forgery, but just repudiation by the purchaser.\textsuperscript{202} The purchaser might simply deny that a certain signature belongs to the purchaser. Such problems may be dealt with strong encryption technology but then we just identified the problems related to a strong encryption technology, which leaves us in a vicious and confused cycle of risk and security related risk.

A related problem is one of fraud. There is always a possibility that someone will try to defraud a party by creating and transferring an obligation that was not issued by the issuer, giving rise to the question as to who would bear the loss for these fraudulent obligations.\textsuperscript{203} Such a problem is intertwined with the problem of counterfeiting. We need to identify how an obligation can be fraudulent.\textsuperscript{204} Verification of an obligation too


\textsuperscript{202} Id.


\textsuperscript{204} Id.
can be made by encryption technology. However this gives rise to the problem of counterfeiting, that is, such encrypted information can be counterfeited or duplicated, and if it is done so perfectly then the original is indistinguishable from the fake. Therefore electronic cash technologies would face a problem if it did not have the capacity to detect such fraud. Such fraud may also happen not purposefully but due to technology malfunctions, which may result in erroneous information to be transmitted. Therefore systemic risk is possible both by counterfeiting or accidental replication of electronic cash.

According to attorney Thomas P. Vartanian, a partner in the law firm of Fried, Frank, Harris, Shriver, & Jacobson, Washington, D.C., an issuer of billions of dollars worth of electronic cash could face a serious case of illiquidity, or even insolvency, should the system be flooded with bogus e-bills. In raising the question as to how a bank would respond to such fraud he suggested that, in the extreme, the bank would invalidate all of the value on all of its cards with the attendant consequences for customer trust, etc., or that it could honor both the true value and the fraudulent value, with the possibility of bankrupting the issuer. Either of the alternatives do not look good for the future of electronic cash.

Two abuses of an electronic cash system are analogous to counterfeiting of physical cash, namely token forgery and multiple spending. Token forgery implies creating a valid looking coin without making a corresponding bank withdrawal. Multiple spending means using the same coin again and again. Because an electronic coin consists of digital information, it appears as valid after it has been spent as it did

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205 Id.
207 Id.
210 Id.
211 Id.
Therefore such threats of counterfeiting, fraud and forgery should not be underestimated.

7.1.5 Risk of Dishonor

A similar problem to the discussion made above is the risk of dishonor. Payment systems function because trading partners are willing to trust the promise of the issuer of some kind of token. With regard to currency or conventional money this problem was dealt with by granting it the legal tender status. But we know that such a status is not available to electronic cash. Therefore the reliability on such a system would either depend on mutual trust of users, which does not seem like an alluring option in this highly competitive world, or else the legal infrastructure would have to find solutions to the possible dishonors. Both the purchaser and the merchant must be satisfied that each has a legal right to payment directly or indirectly by the electronic cash issuer. Each also must be assured that some kind of fund exists to cover a claim against an issuer in the event of issuer insolvency or disappearance.

7.1.6 Risk of Money-Laundering

The risk of money-laundering is a problem that is similar to that of conventional cash. As electronic money products proliferate, concerns are mounting among regulators, who fear that digital cash could fall back decades of progress in the fight against money-laundering. There are concerns to determine how criminals may use electronic money in money-laundering schemes. Money-laundering is perhaps the biggest hurdle facing an anonymous electronic cash system and though it has been around for a long time, only

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212 Id.
213 Henry H. Perritt, Jr., Legal and Technological Infrastructures, supra note 201, at 31.
214 Id
215 Id.
217 Id.
recently was it made illegal in the United States. This has been made possible with the passage of the Money Laundering Control Act of 1986 and electronic money laundering transactions seem to be totally covered by the Act. However the problem is that of enforcement. The unique characteristics of electronic cash, namely, the rapidity of exchanges, the inability to mark bills in an anonymous transaction system, and the inability of the law enforcement officials to witness the transfer of large amounts of cash, create this problem.

7.1.7 Law Enforcement Concerns

Law enforcement concerns are not just peculiar to money laundering but to all kinds of criminal activity. Agencies are concerned that certain electronic money technologies would be used for counterfeiting, money laundering, tax evasion, as well as to invent new kinds of financial crimes. Electronic cash is anonymous and this is the feature which gives rise to enforcement problems. Conventional cash is anonymous too but exchanges are not as rapid as electronic cash, enforcement officials could possibly trace exchanges of large amounts of cash, and it is physically tangible. To trace financial crimes in the past officials have relied on some kind of document or record. The digital nature of electronic cash, which not only makes it physically intangible, but also able to cross jurisdictions without any trace, pose obvious problems of determination of a payment, therefore what jurisdiction is applicable, and therefore the problem of law enforcement. Conventional cash is easy to move but hard to hide, that is, even if there was no trace of an illegal exchange of cash, the effort to move it in bulk, for example in a suitcase, makes it detectable and therefore susceptible to law enforcement officials. Treasury officials, in the fall of 1996, talked about a tunnel in Arizona used by narcotics

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219 Id.
220 Id.
traffickers to move truck loads of cash across the border. Since this is a feature not peculiar to electronic cash, it raises law enforcement concerns.

7.1.8 Taxation and Tax Evasion Concerns

The rapidly expanding new worlds of the Internet and electronic money are stirring deep concern at the Internal Revenue Service (IRS). The IRS Commissioner Margaret Miller said we know that some foreign banks are using the Internet to solicit new customers with promises of complete anonymity and a haven from all taxes. She also cited a World Wide Web (WWW) advertisement offering a “one-of-a-kind” book covering topics such as “Banking in Silence” and offering information on setting up an offshore trust that could include protection from a large IRS assessment.

While tax evasion is a problem, tax considerations or determining taxes, is another. When both the buyer and the seller reside in one state, it is easy to determine the taxes and the merchants would be responsible for assessing sales tax at the time of purchase, and submitting it to the state treasury. However, a problem arises when in electronic cash transactions, the buyer is in one state, the seller is in the other, and a network of hosts in still other states. In Quill Corp. v. North Dakota ex rel. Heitcamp, the Supreme Court held that the states may impose taxes on out-of-state vendors only if they have a “physical presence” within the state. One wonders how these standards will be met in electronic cash transactions. There is substantial uncertainty over whether and how to apply conventional tax conventions to the Internet.

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224 Id.
225 Id.
226 Joshua B. Konvisser, Coins, Notes, and Bits, supra note 218, at 351-352.
227 Id.
229 Joshua B. Konvisser, Coins, Notes, and Bits, supra note 218, at 352.
However the state and local governments are coming to see on-line computer networks as a rich, new revenue source.

Another potential problem with the electronic cash system is with regard to determining income taxes. For example, while people may earn electronic cash in the U.S., but store it in overseas accounts, the idea of collecting income tax seems inconceivable.

7.1.9 Antitrust Problems

Antitrust law is sometimes thought of as a counterweight to intellectual property protection, as it is intended to promote competition and minimize market dominance. However in the antitrust area one must cope with shifting and somewhat vague standards of enforcement. While intellectual property protection gives rise to monopoly, which may be the problem especially with new technologies being developed almost every day by software companies, antitrust law may be the anecdote. One may refer to the recent issue of such an allegation by various software companies, against Microsoft Corp.; the discussion could be watched on C-SPAN in February 1998. However the problem with the anecdote is that enforcement standards are not clear therefore this problem persists. The financial industry also continues to be under antitrust scrutiny, particularly as it consolidates within geographic regions, for example, Visa and MasterCard have been subjects of federal and state investigations.


7.1.10 Escheat

Escheat is the reversion of abandoned tangible personal property to the state after a period of general dormancy.\(^{233}\) In order to determine amounts of funds subject to escheat, it must be possible to ascertain the total amount of funds outstanding and then to assign all these funds to two categories, dormant and non-dormant.\(^{234}\) A determination of dormant funds requires knowledge of the last transaction and if there is no date or time restriction for usage of the value on the card, especially when the user is anonymous such a determination is difficult.\(^{235}\)

No state has passed any rule on escheatment of unused value on a stored value card yet, although New York has begun to study the issue.\(^{236}\) The problem of an issuer avoiding escheatment obligations by contractually limiting redemption options has been identified, but remains unresolved.\(^{237}\) The predictive value of existing federal legislation for future resolution of interstate controversies concerning electronic money funds is unclear.

7.1.11 Seignorage

The government revenue from the manufacture of coins, calculated as the difference between the face value and the metal value of the coins, is called seignorage.\(^{238}\) The Federal Reserve has indicated a fear of seignorage losses resulting from the widespread use of electronic money.\(^{239}\) If Federal Reserve note usage is replaced by electronic cash, the Federal Reserve will need to respond by constraining the money supply in order to fight inflationary pressures and therefore the government will lose seignorage gains to the extent of the reduction in total volume of circulated notes.\(^{240}\) Due

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\(^{234}\) Id.

\(^{235}\) Id.

\(^{236}\) Id.

\(^{237}\) Richard L. Field, Survey-Electronic Cash Law, supra note 230, at 1021.

\(^{238}\) Id.

\(^{239}\) Gary W. Lorenz, Electronic Stored Value, supra note 233, at 1202.

\(^{237}\) Joshua B. Konvisser, Coins, Notes, and Bits, supra note 218, at 343.

\(^{240}\) Id.
to the uncertainties still related to the issue of electronic cash, the government is not taking any action right now. The question arises whether this attitude is prudent.241

7.1.12 Accessibility

The concept of electronic cash is definitely revolutionary and alluring and modern, quite at home in a world getting increasingly dependent on electronic technologies. However the question which arises is whether, while it is cost effective for a consumer who already owns, for example, a computer, how can such a technology be cost effective for a consumer who does not own one and cannot afford the same. The technology definitely seems to work well for the already affluent or at least well off customer but attention has to be directed to the needs of the not so well off customer too, to acquire acceptability.

7.1.13 Various General Risks Associated with Stored Value Cards (SVCs) and Electronic Cash

This is a description of general risks associated with SVCs.242 There is a possibility of a strategic risk, for example, if banks do not properly anticipate consumer and merchant behavior for small value transactions, this product may not be widely accepted. Failure to integrate the stored value card system into other bank operations would cause an otherwise successful business plan to fail.243 Then there is the possibility of reputation risk that arises from negative public opinion due to possible failures or adverse publicity. Another possibility is credit risk that arises from an obligor's failure to meet the terms of any contract with the bank or otherwise fail to perform as agreed. Credit risk is the most recognizable risk associated with banking and with electronic cash

241 Id.
243 Id.
there is a risk that the issuer may default on its obligations to redeem the electronic cash.\textsuperscript{244}

\textbf{7.1.14 International Concerns}

The Internet is a global phenomenon and therefore it makes electronic cash a global phenomenon. As a result quite a few concerns are international in nature. In cross border transactions there is concern over who has the final jurisdiction over electronic money.\textsuperscript{245} Problems may arise when crimes like smuggling give rise to legal disputes among nations. Quoting Treasury Secretary Robert Rubin, \textit{If the transaction takes place from London to New York on the Internet and there is a contract dispute, which court has jurisdiction?}\textsuperscript{246} Therefore there seems to be the need of some kind of single global jurisdiction. However one wonders if such an idea is feasible, though one cannot deny the need of it. Problems arise however with regard to choice of law, and uncertain enforcement of civil monetary judgments and injunctions in foreign countries.

The other international concern that needs attention is the feasibility of such a technology in developing economies. What would be the applicability of such a technology in economies that are agro-based or even quite poor. A country which is still coping with the concern of converting have-nots to haves is not going to be concerned with such a technology. However the concern of keeping up with the rest of the developed world so that it does not fall out of competition, might force such a country to incorporate such a technology. This would put undue pressure on its already, not so strong economy. Where in developed economies, electronic cash technology would just hitch a ride on the existing infrastructure, in developing economies the cost of infrastructure necessary to operate a cash-less retail system, particularly if it is

\textsuperscript{244} Id.

\textsuperscript{245} Electronic Banking: \textit{BIS Calls E-Money a Novel Payment Method but Says Unregulated Status Raises Risks}, 11/18/96 BBD d3 (Hereinafter, BIS Calls E-Money a Novel Payment Method).

nationwide, is likely to be beyond their means. Then again such developing economies might just refuse to incorporate such technology. This attitude will only make the electronic cash technology adversely popular or create transactional problems because while the developed economies would be using electronic cash, developing economies would not.

7.2 Virtues of Electronic Cash

As we saw earlier in this discussion, concerns regarding electronic cash and the disadvantages are quite overwhelming. However one cannot ignore the obvious advantages of the technology especially since that is what has made it so popular. To quote Comptroller of the Currency Eugene A. Ludwig, *The short term effects of e-money may be somewhat overblown, but the long-term implications of this phenomenon are under-appreciated.*

The identifiable advantages may not be so many but they are definitely sufficient to preclude outright criticism of the concept of electronic cash. Some of the advantages are faster access to benefits, greater convenience in terms of times and locations for obtaining benefits, improved security because funds may be accessed as needed, lower costs because recipients avoid check-cashing fees, and greater privacy and dignity. Some of these issues will now be discussed.

7.2.1 Lower Costs

One of the biggest advantages of the electronic money is that it reduces usage costs in comparison to coin and currency. These cost savings result from, reduced collection and deposit float associated with coin, currency, and checks, and faster funds availability, increased sales due to faster transactions at checkout counters and consumer tendencies to spend more with stored value cards, and increased self service transactions.

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247 BIS Calls E-Money a Novel Payment Method, supra note 245.
When transactions become quicker, easier and less cumbersome, consumers tend to spend more. The speed of electronic cash transactions and the lack of necessity of hiring people to handle cash transactions in stores also contribute to lower costs, and therefore efficiency not just for customers but also for users. Therefore the idea is increasingly alluring for merchants.

The Internet also provides access to the global market at lower costs. Further innovations and increased quality of technology will further reduce costs and further increase the advantages of using electronic money. An example of such cost reduction is the price of computers. While a particular PC cost $3000 two to three years ago, similar or better technology can be purchased today for less than $1000. This has been made possible due to innovation of better technology and this logic will very soon be applicable to electronic cash systems.

For electronic cash systems not using the computer or the online transaction system, for example the off-line cards, flexibility of usage increases, because access problems would not arise. This feature would further save time and money.

### 7.2.2 Reductions in Check and Credit Card Fraud

Credit and debit cards are prone to the possibility of fraud by being copied or overwritten. When we use smart cards they are more secure since they have a computer chip embedded in the card, and are endowed with cryptographic properties which make them tamper resistant. The cryptographic properties also prevent forgery and fraud. Electronic cash systems also discourage check fraud via theft and overdraft.

### 7.2.3 Paper Anonymity during Payment, and Payment Untraceability

The features of paper anonymity and payment untraceability provide privacy for users and consumers. This virtue is shared with the usage of conventional cash, which

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has the same features. In contrast these features are not available with the usage of credit and debit cards where the payment and transaction can be traced as well as the user. Therefore, for want of privacy, electronic cash systems would be preferable to credit and debit cards. Though the privacy feature is not impenetrable, as discussed earlier in this thesis, it is a step in the right direction, because the drawback is only temporary and short term. The way the world is advancing with innovative technology everyday, solutions are not very far ahead.

7.2.4 Government Efficiency

The National Performance cited the cost of Electronic Fund Transfers (EFTs) as only 6 cents per transfer, compared with 36 cents per check, and noted that each year the Treasury disburses approximately 100 million more checks than EFTs.\(^{249}\) This is just an example of benefits associated with incorporating new and fast electronic technologies in comparison to conventional manpower based technologies. One can only imagine how the efficiency of the system would increase due to decrease in transactional costs and reduction in number of required personnel, that is, reduction in administrative cost of the system. The domino effect would be reflected in increased work efficiency and increased benefits to the citizens. On a lighter note, who knows, maybe the whole thing may result in decreased taxes, a relief any tax paying individual would welcome.

7.2.5 Reduction in Risk of Theft and Vandalism in Retail Outlets

Increased usage of electronic cash especially at retail outlets, for example grocery stores and gas stations, would reduce the risk of theft and vandalism. This is because with less usage of conventional cash, there would not be any cash registers to rob. With most of the grocery stores and gas stations, operating 24 hours a day there have been cases of easy thefts, more so with gas stations, and particularly in hours of the night when

there are fewer people around. Such stores would feel safer in spite of their remote locations if there was no fear of being robbed. Such a feature would reduce the amount of money lost through criminal activities of theft and vandalism because electronic money would not be accessible especially in case of protection by cryptographic properties.

7.2.6 International Acceptability

Electronic money has international acceptability. It is increasingly evolving as an international currency, a feature it shares with credit cards, minus the disadvantages of credit card usage. It is a popular technology with most developed countries increasingly getting involved in promotion of such a technology. Due to its unique characteristics, it has reduced the problems related to currency conversions with conventional cash and therefore contributed to increasing financial unification of the world.

7.2.7 Good for the Business World

When electronic money hits it big, it will profoundly change and greatly expand electronic commerce. Software could be paid for on a per-use basis, a tenth of a cent at a time. Anybody could set up an online business and instantly rake in revenue. The convenience and efficiency of usage of electronic cash make it cost effective for businesses and therefore an interesting idea for business. The quick natures of the transactions facilitate instant decisions and the far reach of electronic cash via the Internet facilitates efficient globalization of business. Reduction of prospective problems related to currency exchange also make the concept less messy than conventional cash usage in the international sphere. The portability feature of electronic cash devices like the SVCs and smart cards, as compared to the bulky nature of conventional cash is another advantage for the business world.

251 Id.
7.2.8 More Value-Added Services

Electronic money technology, particularly smart card applications, could help sharpen merchants’ offers of value added services, strengthening customer relationships.\textsuperscript{253} For example, retailers could track customer activities (to an even greater extent than they currently do with credit cards) to discern buying patterns and offer buyer-specific discounts and loyalty programs.\textsuperscript{254} These targeted promotions also known as “micro-marketing” are generally viewed as more efficient than the mass-marketing techniques currently used.\textsuperscript{255}

7.2.9 Convenience to Consumers

Electronic cash systems offer a variety of payment options, and therefore increased choice to consumers. This enables flexibility, because the consumer can choose the method of payment most suited to their purpose. In addition, electronic cash payment systems enable payment of small amounts which is not possible with credit card usage. While electronic cash offers features of convenience of conventional cash usage namely features of anonymity and the like, it is more portable since the physical features of stored value and smart cards resemble credit and debit cards. Finally, electronic cash usage provides independence of usage to consumers.

7.3 Concluding Remarks

After a fair evaluation of electronic cash systems, one may be concerned with the overwhelming amount of problems associated with the concept. No doubt these problem exist, but it is necessary to note that the advantages are many. The concerns raised are more immediate and short-term in nature, because with emerging technologies one would find solutions and then what would come out of the exercise, but a concept so

\textsuperscript{252} Id.
\textsuperscript{253} Williams and Gillespie, An Introduction to Electronic Money, supra note 200, at 99.
\textsuperscript{254} Id.
\textsuperscript{255} Id.
revolutionary that it may be compared to the invention of the super sonic aircraft in the world of air travel. One cannot help but notice that electronic cash is an attempt to incorporate the best of both worlds, that is, conventional cash as well as credit and debit cards.

This discussion now leads us to possible solutions and suggestions to make the system better and reduce chances of failure of the system. One may then reflect on its position in the world.
CHAPTER 8

PROPOSED SOLUTIONS AND SUGGESTIONS TO HELP IN DEVELOPMENT OF ELECTRONIC CASH AND TO PREVENT THE SYSTEM FROM FAILURE

Till now, in this thesis, we have developed an understanding of the concept of electronic cash, its effects and implications. We may now reflect upon possible methods of development of the system and prevention of the system from possible failure. The proposed solutions will include some general recommendations, and some specific ones like those dealing with off-line electronic cash problems.

As we saw in the previous chapter, there are a lot of concerns regarding electronic cash technology especially those related to security of the system. The reasons attributing to the lack of security are various, ranging from lack of acceptability, being a private form of currency instead of being "legal tender," to issues related to breaking into the system by computer hackers and money laundering by criminals. Mostly, all of them have similar solutions and some of them will be dealt with in this discussion.

8.1 Solutions via Granting "Legal Tender” Status to Electronic Cash

By having federal sponsorship there will be a single regulatory framework to govern electronic cash transactions. This would help eliminate possible risks like ones related to bad and risky investments related to electronic cash.\(^{256}\) If obligations were insured then investments turned sour would possibly not impair the issuer’s ability to redeem stored-value balances at par and impose losses on consumers and other holders.\(^{257}\)


\(^{257}\) Id at 332-333.
Other advantages would include an increase of public trust in the technology. If electronic cash were equivalent to conventional cash, then people would not be so apprehensive about using electronic cash. However, it would be important to note that even though this is a solution, it can be done only after the more immediate problems, like those related to security, are dealt with.

8.2 Private Sector Measures to Address Risks

Issuers and other providers of electronic money products whose capital is at risk in electronic money schemes have strong incentives to protect themselves against financial as well as operational risk. The need to retain market reputation and attract new capital will provide significant motivation for issuers to develop effective financial risk management practices, including incentives to maintain sufficient liquid assets on hand to meet demands for redemption of electronic money. Such practices could include investing the proceeds from issuance in high-quality, short-term, liquid securities, although issuers may also have conflicting pressures to increase asset returns by investing in higher risk assets.

8.3 Regulations and Consumer Protection

The legal environment for electronic money should include a minimum level of targeted regulation. Action should be focused principally on protection of the existing payment system, the safety and soundness of issuers, and basic consumer protection. No preemptive legal regulation should be implemented before a clear threat is discernible. General consumer protection measures should be applied to electronic

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259 Id.
260 Id.
262 Id.
cash, instead of banking laws that were designed to govern the bank-depositor relationship.\textsuperscript{263}

As far as SVCs are concerned, the federal government should enact laws to provide a legal framework for SVC transactions that guarantees consumers a minimum standard of protection.\textsuperscript{264} Because of the complexity and variety of SVC systems, laws concerning basic issues are necessary in order for consumers to have crucial information and to safeguard the money they pay for SVCs.\textsuperscript{265}

As far as consumer information is concerned, the Smart Card Forum on May 07, 1997, released a set of reasonable practices to address consumer concerns over privacy implications of smart cards and stored-value instruments.\textsuperscript{266} The forum identifies seven components of \textit{responsible consumer information practices}, which are as follows.\textsuperscript{267}

1) Identify, recognize, and respect the privacy expectations of consumers and make applicable privacy guidelines available to them;

2) Establish procedures to ensure that consumer data-information directly related to the use of the card, is as accurate and up to date and complete as possible. Promptly honor requests from consumers for information the company has about them as a result of the consumers’ use of their cards, and provide a procedure for them to correct inaccurate personally identifiable information;

3) Limit the use, collection, and retention of information about consumers to what is necessary to administer their accounts, provide service, and offer new products;

4) If personally identifiable information is provided to affiliated third parties for marketing or similar purposes, inform the consumer of that purpose and provide an opportunity to decline. Also require third parties to adhere to privacy standards;

\textsuperscript{263} Id.


\textsuperscript{265} Id.

\textsuperscript{266} Electronic Commerce: \textit{Smart Card Trade Group Issues Guidelines to Protect Consumer Privacy Online}, 5/8/97 BBD d8, May 08 (1997).

\textsuperscript{267} Id.
5) Provide a means for consumers to remove their names from the company's telemarketing, online, mailing, and other solicitation lists;

6) Maintain appropriate security standards and procedures regarding access to personally identifiable consumer information; and,

7) Implement policies and procedures to limit employee access to personally identifiable consumer information to a need to know basis. Educate employees about privacy standards and employees' responsibilities to protect consumer privacy and monitor employee compliance, and take appropriate disciplinary actions with employees failing to meet those standards.

Uniformity in legislation is also vital otherwise these rules and regulations would vary from state to state giving rise to more and more ambiguity. Therefore consumer protection should be given prime importance if electronic cash technology is to survive.

8.4 Evidentiary Issues and Dispute Resolution

A unique solution provided for the problem of some considerations regarding computer evidence, is the creation of on-line forms of dispute resolution.\(^\text{268}\) This system is potentially efficient and inexpensive, and solves the difficult problem of the inconvenient forum for electronic commerce transactions.\(^\text{269}\) The process involves different options like having a "virtual magistrate" to mediate on-line.\(^\text{270}\) This method is targeted primarily at the issues related to copyrights, domain names, on-line service providers, harassment, and the like.\(^\text{271}\)

8.5 Solutions to the Problem of Security

The most immediate problem regarding electronic cash is the problem of security, as has been identified earlier in the thesis. The reliance of electronic cash technology on


\(^{269}\) Id.

\(^{270}\) Id.

\(^{271}\) Id.
electronics, computers and the Internet make it susceptible to computer hackers, criminals and money launderers. It has to be ensured that crooks or hackers cannot tamper with the transactions while they are in transit, or with data stored on a merchant’s server. There have been various endeavors regarding invention of such a security technology and a technology developed at Stanford University in 1976 provides tools for accomplishing these tasks.\textsuperscript{272} It is called public-key encryption and it is used in software primarily since the late 1980s; it uses sets of numerical formulas to scramble information so that it is intelligible to authorized people.\textsuperscript{273} All encryption systems rely on keys – algorithms for transforming a message into an unintelligible form and back. The choice for securing the integrity of Internet messages is RSA encryption and involves the usage of two keys: public and private.\textsuperscript{274} By using these keys the sender can 1) guarantee to the recipient that she is the sender, 2) guarantee that only the intended recipient can read the message, or 3) both.\textsuperscript{275}

The method also involves the usage of digital signatures. The technology of encryption will have to be accepted legally and should be admissible as evidence in fraud and forgery cases to lend strength to the concept, and to make good use for it. A digital signature is legally binding once it has been entered in an authorized registry.\textsuperscript{276}

### 8.6 Ways to Maintain System Integrity

In a world of fully electronic payments system where non-banks can issue electronic money, care should be taken not to erode public confidence in the integrity of the payments system. One of the key sources of systemic risk in the payments system is the interconnection among the banks that make it up. This can be done by preventing

\textsuperscript{271} Id.
\textsuperscript{273} Id.
\textsuperscript{274} Konvisser, Coins, Notes, and Bits, supra note 256, at 338.
\textsuperscript{275} Id.
\textsuperscript{276} Id. at 340.
large interbank credit exposures in the payments system by using measures such as collateral requirements, debit caps, and pricing of intraday credit.\textsuperscript{277}

\section*{8.7 Recommendations for Off-Line Electronic Cash Systems}

Technologies and protocols are being invented and experimented upon to increase the efficiency of the off-line electronic cash systems. These are developed to provide specifically how to include (and access when necessary) the identifying information meant to catch multiple spenders and involve concepts like the cut-and-choose method and zero-knowledge proofs.\textsuperscript{278} In the cut and choose method the electronic coin is accompanied with $2K$ large numbers to prevent multiple spending. The system is not very efficient but it is a probable solution. The term zero-knowledge proof refers to any protocol in public-key cryptography that proves knowledge of some quantity without revealing it or making it any easier to find.\textsuperscript{279} Authentication and signature techniques like those similar to on-line electronic cash can also be used for off-line cash to achieve security. The features of transferability and divisibility may also be added to off-line electronic cash to make it more convenient to use.

\section*{8.8 Possible Approach to Addressing International Concerns}

The recent tendency in addressing cross-border concerns has been toward the establishment of international cooperative channels to provide a basis for assessing the severity of such concerns and addressing specific problems.\textsuperscript{280} In the area of consumer policies, there has not been extensive international cooperation, and since the concept of electronic cash crosses international borders, discussions on policies regarding


\textsuperscript{279} Id at 1144.

\textsuperscript{280} E-Money Technologies, Banking Pol'y Rep., supra note 258, at 14.
jurisdictional issues, security concerns and broader consumer policies are appropriate.\textsuperscript{281} Furthermore it may also be appropriate for banking supervisors to share information on electronic money schemes with international ownership and operation to understand fully any cross-border liability issues that may affect institutions in particular countries.\textsuperscript{282}

8.9 Concluding Remarks

Since electronic cash technology is still a fledgling concept as far as the possibilities of its expansion and development are concerned, all the related problems are not identifiable. As a result it is difficult to provide a comprehensive list of solutions to the problems. However as scientific technology keeps expanding, the concept of electronic cash will become clearer and therefore it will be easier to propose solutions.

Now that we have completed the endeavor of studying the concept of electronic cash, we may reflect on its current position in the world, in the subsequent chapter.

\textsuperscript{281} Id.
\textsuperscript{282} Id at 15.
CHAPTER 9
ELECTRONIC CASH AROUND THE WORLD

Electronic cash in the form of smart cards and the like have been around the corner for a very long time and is increasingly getting popular around the world, especially in the developed half. While it is quite popular, the identifiable vices are many and therefore the path of the future is not certain.

The electronic transfer of funds is not a new phenomenon in the United States, or, most of the developed world. Large scale and wholesale payment transactions in the United States and other nations have been conducted electronically for quite some time. What is new in this is the addition of electronic cash technology in financial transactions conducted by consumers and smaller, non-financial organizations

While the electronic cash concept is already popular in Europe, it usage is still not as wide in the United States. In Asia, the concept is still in the stage of introduction. The following discussion is an attempt to get familiar with the position of electronic cash in the world.

9.1 Europe and United States

With relation to electronic banking or cyberbanking, in Europe there is quite wide acceptance. Consumers in Belgium, Finland, and France openly embrace cyberbanking. On the other hand, Americans have showed reluctance to move away from the tried and true paper-based checking accounts and traditional credit cards. According to attorney Thomas P. Vartanian, a partner in the law firm of Fried, Frank, Harris, Shriver & Jacobson, Washington, D. C., the reason is cultural, and while

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Americans like the feel of cash in their wallet, Europeans and Asians are not so wedded to paper based currencies. Whether or not this logic is true, the fact remains that Europe is quite ahead of the United States on the use of electronic money. However, for the electronic cash concept to really gain momentum in Europe, it would take about seven to ten years. In the meantime, new pilot programs regarding electronic cash have come up in Europe. One such system is Mondex, currently being tested in the town of Swindon, England. It was developed by Nat West, Midland and British Telecommunication, and is based on the storage of electronic cash on smart cards. Other European endeavors in the field electronic cash include Digicash, developed by a Dutch company. Hungary is not far behind and electronic banking is booming in the country. The new trend in Hungary is on-line or telephone banking. One of the most sophisticated options is MultiCash, a software program that allows customers to do their financial management through their PCs. The software, developed in Germany, allows customers to make bill payments, even in another currency. It also allows the users to keep track of cash flows, balance transactions and liquidity positions. In sum, Europe has really taken to this technology like a fish takes to water, as opposed to the United States. The reason for this could be very apparent and obvious. In Europe the telecommunications industry is still mostly nationalized and, therefore, telecommunications costs are much higher than they are in the United States. Since each credit card purchase needs to be verified by a call to the central clearing house, this can become costly in Europe. So electronic cash cards are cheaper in Europe since the verification step and its associated costs are avoided. This is not a problem in the United

284 Id.
285 Id.
287 Id.
288 Visit site at www.ibm.com/OtherVoices/Milligan/February119814926.phtml (site visited on May 12, 1998).
289 Id.
290 Id.
292 Id.
States since those phone calls are incredibly inexpensive and the credit card infrastructure is well established. A decisive factor in Europe might come from the quest for a monetary union, where electronic money could conceivably gain ground during the period between the proposed start of a single currency transition (1999) and the date when notes and coins denominated in Euros are likely to become available (2002). In the transition period, e-money denominated in national currencies and Euros could be used interchangeably, the Bank for International Settlements observed.

At this time in the United States, stored-value cards in closed systems are fully operational. Open-card systems (single and multiple users) are still primarily in the planning and test stages. On the other hand off-line unaccountable cards like the university copy card and the prepaid cards used in the transit systems have been in the United States for a very long time. However electronic cash technology is continuing to grow in the United States with different pilot programs like VisaCash in Atlanta Olympics in 1996, CyberCash and ECash. The Mondex system has also been introduced in the United States. Therefore, electronic cash technology is proceeding at a faster pace than before in the United States.

9.2 Asia (Emphasis on India and Japan)

Almost all countries in Asia are developing countries like India barring a few like Japan. These countries are still primarily depend on traditional forms of money transactions which concern paper, not because they do not want to adopt new technologies but because they do not have appropriate existing infrastructure and financial status to adopt electronic cash technology immediately. Even if they do, the use

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293 Id.
295 Id.
297 Id.
will remain restricted to a smaller part of the population, who are capable through literacy and financial status to become involved. Besides these countries and their economies are still trying to cope with the concept of electronic banking and it will be a while before electronic cash gets popular.

In India, banks have played a crucial role in the development of the country and the commercial banks are the most important financial institutions in providing credit to industry and trade and in collecting savings.298 The 14 leading banks of the country have been nationalized.299 These banks do not have existing infrastructure to cope up with electronic cash but have already started engaging in electronic transfer of funds. India is trying to spruce up the payment system by introducing an electronic clearing system and the idea that one could completely eliminate cash and checks as forms of exchanging value is mind boggling.300 As for the future of electronic cash in India and other countries in Asia a joint venture company with Hong Kong will manage franchises in 13 Asian countries including India, China and Sri Lanka.301 The cost of introducing this system will be borne jointly by MasterCard, the banks will sell this product sooner than later. Meanwhile around 30,000 Mondex cards are under a pilot test in Hong Kong.

In Japan the usage of electronic cash is already quite popular, and it is making efforts to further the usage of this technology on its own.302 Japan is one of the few countries in Asia which have already adapted quickly to the usage of electronic cash.

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299 Id. at 8.
301 Id.
CHAPTER 10

CONCLUSION

The study in this thesis has enabled us to understand the concept of electronic cash in detail. We are now familiar not only with the working and implications of the electronic cash system but also with its position around the world. The whole study has definitely established one thing, that the concept is quite a fascinating alternative to cash and credit card technology but probably not a replacement. This is because of the plethora of questions still related to its usage, most importantly with relation to security. With financial transactions it is quite important to address the question of security because that determines how much trust users and consumers will have in the system and therefore how popular it will be.

Today, electronic money and electronic payments systems for retail transactions are on the top-ten list of issues for those with significant interests in financial interests. The decline in cost and increases in capacity of computers, as well as advances in communications technology, have altered not only the way information is communicated but also the cost of processing and storing information.\(^3\) This is what led to the emergence of the electronic cash system.

While some people have recommended a highly regulated approach towards electronic cash, obviously concerned with the security issues, others have recommended sparse regulation as of now so that we may impose regulations only after we know which way the concept is going. Either of the approaches seem to be good but perhaps what is required is more or less a middle path. Maybe it is good to not regulate so much as to stifle the growth and development of the electronic cash concept that is still in its nascent

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stages. On the other hand, if there were an absence of regulations the implications would be disastrous since the electronic technology used by electronic cash is so susceptible to criminal activity. Payments on the Internet could be traced by computer hackers and criminals and the electronic cash technology can be used for money laundering and smuggling. The concern would be to determine the amount of regulation that is required to make sure that while the technology gets space to develop it still remains a secure and trustworthy form of payment. The need and application of the present laws in the United States is presently unclear and international laws regarding this technology need more work.

There is still a long way to go to be able to predict the future of electronic cash. But it seems quite sure that, though the electronic cash technology may be getting more and more popular, it will never completely replace the usage of conventional cash, except maybe in the far off future. Conversely, the concept of money may not exist anymore. Since it is quite premature and therefore illogical to make predictions for so far beyond, it is best to say that as of now conventional cash usage is going to be around for a very long time.

Looking closer into the future, perhaps electronic cash in the form of cards is going to be a more popular usage since it is more accessible to the masses as compared to electronic cash based on the PCs and the Internet. This is because the usage of electronic cash on the computer is contingent upon everyone owning a computer. With advancement in technology and a resultant reduction in computer prices, electronic cash on computers may be a popular usage not too long from now. Finally, a correct attitude towards electronic cash technology would be to have an open mind, to let the technology develop but not to let it get out of hand, to give the concept a fair chance. Maybe this could be achieved by continuing to use the electronic cash technology for small payments and not indulging in bigger financial transactions till the system gets more secure, so as to prevent big losses.
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