TOPIC: OVERVIEW OF ELECTRONIC MONEY, ELECTRONIC PURSE AND DIGITAL CASH

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Electronic Money

Electronic money is the currency that exists in banking computer systems that may be used to facilitate electronic transactions. Although its value is backed by fiat currency and may be exchanged into a physical, tangible form, electronic money is primarily used for electronic transactions.

Classifications of Electronic Money

Electronic money can be classified into two broad categories:

1. Hard

Hard electronic money is when e-money is used for irreversible transactions, ones that are highly securitized, and are more or less procedural in nature. They may include transactions that are drawn through a bank.

2. Soft

Soft electronic money is when e-money is used for reversible or flexible transactions. There is an increased level of flexibility offered, and users are allowed to manage their transactions even after payment is processed, like canceling a transaction or modifying the payment price, etc.

The changes can be made post-transaction within a defined period. They may include transactions that are passed through payment mechanisms like PayPal, PayTM, Interac, credit cards, and so on.

Features of Electronic Money

Just like physical paper currency, electronic money also includes the following four features:

1. **Store of value**

Just like physical currency, electronic money is also a store of value, the only difference being, that with electronic money, the value is stored electronically unless and until withdrawn physically.

2. **Medium of exchange**

Electronic money is a medium of exchange, i.e., it is used to pay for the purchase of a good or when acquiring a service.

3. Unit of account

Just like paper currency, electronic money provides a common measure of the value of the goods and/or services being transacted.

4. Standard of deferred payment

Electronic money is used as a means of deferred payment, i.e., used for the tools of providing credit for repayment at a future date.

Advantages of Electronic Money

Electronic money offers several advantages for the global economy, including:

1. Increased flexibility and convenience

The use of electronic money brings increased flexibility and convenience to the table. Transactions can be entered into from anywhere in the world, at any given time, with one click of a button. It removes the hassle and tediousness involved with the physical delivery of payments.

2. Historical record

The usage of electronic money is becoming increasingly popular because it stores a digital historical record of each and every transaction made. It makes tracing back payments easier and also helps with making detailed expenditure reports, budgeting, and so on.

3. Prevents fraudulent activities

Since electronic money makes available a detailed historical record of each and every transaction made, it is very easy to keep track of transactions and trace them back through the economy. It increases security and helps prevent fraudulent activities and malpractices.

4. Instantaneous

The use of electronic money brings with it a kind of instantaneousness that has not been experienced before in the economy. Transactions can be completed in split seconds with the click of a button from virtually anywhere in the world. It eliminates problems of physical delivery of payments, including long queues, wait times, etc.

5. Increased security

The use of e-money also brings with it an increased sense of security. To prevent loss of personal information while transacting online, advanced security measures are implemented like authentication and tokenization. Stringent verification measures are also employed to ensure the full authenticity of the transaction.

Disadvantages of Electronic Money

Electronic money comes with the following disadvantages:

1. Necessity of certain infrastructure

To use electronic money, the availability of certain infrastructure is necessary. It includes a computer or a laptop, or a smartphone, and a stable internet connection.

2. Possible security breaches/hacks

The internet always comes with the inevitability of possible security breaches and hacks. A hack can leak sensitive personal information and can lead to fraud and money laundering.

3. Online scams

Online scamming is also possible. All it takes for a scammer is to pretend to be from a certain organization or a bank, and consumers are easily convinced to give away their bank/card details. Despite the increased security and presence of authentication measures to counter online scams, they are still something to be looked after.

Electronic purse

It is a mechanism that allows end users to pay electronically for goods and services. The functions of the electronic purse is to maintain a pool of value that is incrementally reduced as transaction performed [1]. Electronic purse is an electronic system e-commerce, based on smart card. Electronic purse must ensure the security of each transaction [2].

Advantages of Electronic Purse

The advantages of the electronic purse are summarized as below [3] [4]:

1. **Authentication of the purse by the issuer**

   Authentication of the purse by the issuing institution, which is not necessarily a banking institution, can be done either online or offline.Online authentication uses a secret key shared between the issuer of the purse and the smart card of the purse itself. This key allows the derivation of a common session key that will serve to compute the MAC to protect the integrity of the data exchanges and to encrypt the authentication data.Offline authentication uses RSA-based hierarchical certificates for mutual authentication and for the exchange of a temporary session key next between the chip card and the terminal

2. **Loading of value**

   Loading the purse with value depends on whether the purse is linked to a bank account. If the purse is linked to a bank account, the conversion of the monetary value to a

dematerialized from stocked in the purse in under direct control of the holder's bank. Authentication of the card, verification of the holder's identity on the basis of a PIN, and authorization of the transaction can be done at once. The exchanges involve the card, the load device, and the authorization server of the issuing bank. The purse is not linked to a bank account when the line of credit is from a totally separate account or if it entails a revolving credit. In these cases, the risk of error or fraud increases and the authentication is more complex. The communication protocol must verify the integrity of the value transfer from the client's bank (or from that of the purse issuer) to the acquirer bank in addition to the authenticity and the identity of the cardholder and of the card that the holder presents.

3. **Point-of-sale transactions**

The protocol for point-of-sale payments defines procedure for offline reciprocal authentication of the purse and the point-of-sale terminal. This protocol conforms to the EMV specifications and cover single transactions as well as a series of periodic transactions (such as the payment for service bills). The terminal can authenticate the card with the public certificates of the card issuer and of the issuing bank.

Examples of Electronic purse

1. **Apple Pay**

Apple Pay is a mobile payment and digital wallet service by Apple Inc. that lets users make payments using an iPhone, Apple Watch, iPad or Mac. It is available in countries such as the US, UK, and Canada. Apple Pay works with credit and debit cards from major banks and card providers, and is designed to work with the existing contactless payment infrastructure.

2. **Samsung Pay**

Samsung Pay is a mobile payment and digital wallet service by Samsung Electronics that lets users make payments using a compatible Samsung device such as a Samsung Galaxy smartphone or tablet. It is available in countries such as the US, UK, and South Korea. Samsung Pay works with credit and debit cards from major banks and card providers, and is designed to work with the existing contactless payment infrastructure.

3. **Google Pay**

Google Pay is a mobile payment and digital wallet service by Google that lets users make payments using an Android device. It is available in countries such as the US, UK, and India. Google Pay works with credit and debit cards from major banks and card providers, and is designed to work with the existing contactless payment infrastructure.

4. **PayPal**

PayPal is an online payment system that lets users make payments, transfer money, and accept payments without sharing their financial information. It is available in countries such as the US, UK, and Australia. PayPal works with major banks and card providers, and is designed to work with the existing online payment infrastructure.

Limitations of Electronic purse

An electronic purse has some limitations, such as:

1. **Limited availability**

The use of electronic purses is still limited, as it is not accepted by all merchants and retailers. Therefore, users may find themselves without a payment method if electronic purses are not accepted.

2. **Security concerns**

Electronic purses are susceptible to security issues, as the data stored in them is vulnerable to cyber-attacks. Therefore, users must take extra precautions to ensure the security of their electronic purses.

3. **Cost**

The cost of using electronic purses may be higher than using traditional payment methods, as users must pay transaction fees and other related costs.

4. **Lack of anonymity**

Electronic purses can be tracked, and the transactions are not anonymous. Therefore, users must be aware of their privacy when using this kind of payment method.

Other approaches related to Electronic purse

Introducing other approaches related to Electronic purse

1. **Mobile Payment**

   Mobile payment is an alternative to the traditional form of payment, usually cash or card payment, which uses a mobile device as a payment method. Mobile payment can be used to purchase goods or services from any location, either online or in-store.

2. **Contactless Payment**

   This is a form of payment that does not require physical contact between the customer and the merchant. It uses radio-frequency identification (RFID) or near field communication (NFC) technology, which allows customers to make payments by simply tapping their payment card or device, such as a smartphone, on a contactless payment terminal.

3. **NFC Payment**

   NFC, or Near Field Communication, is a form of contactless payment technology. It enables two devices, such as a smartphone and a payment terminal, to exchange data over a short distance. This allows customers to make payments by simply tapping their NFC-enabled device on a payment terminal.

Digital Cash

Digital cash can be defined as any electronic system which allows for storage, transfer, and spending of electronic cash.

Digital cash is a valuable tool for facilitating online transactions and has played a significant role in the growth of e-commerce. As more and more individuals and businesses become comfortable with making and receiving digital payments, it is likely that digital cash will continue to evolve and become an increasingly important part of the global economic system.

Advantages of Digital Cash

There are several advantages to using digital cash. Some of them have been mentioned below.

1. **Lower Cost**

   Firstly, the cost of using digital cash is extremely low. Normal bank transactions require huge amounts of infrastructure. There are bank branches, tellers, clerks, electronic systems, all of which combine to make transactions possible. This infrastructure can only be used for banking transactions. On the other hand, digital cash does not warrant any special

infrastructure. It can use basic services such as the internet to make the same transactions possible. Hence, the need for dedicated infrastructure is removed. This brings down the cost of transactions.

2. **Long Distance Transactions**

   With physical cash, sending money to the other side of the world can be very expensive. This is also the case with electronic cash since intermediaries like SWIFT get involved and hence have to be paid a fee. However, digital cash can be sent around the world without too much of a hassle. The cost to send money to the next door neighbour and to a person on the other side of the world is the same in a digital cash system.

Disadvantages of Digital Cash

The digital cash system also presents some formidable problems. Earlier, double spending was the biggest problem. However, over time, it has been solved by using marked electronic tokens. The problems which still exist are as follows:

1. **Not Traceable**

   The digital cash uses the internet, which makes traceability difficult. Hence, the system provides anonymity. This can be a good thing but also a bad thing. For instance, criminals could use the digital cash system to launder their money to different countries. The lack of traceability is a major problem for governments and legal authorities. It does not have any significant impact on the user community.

2. **Forgery**

   Digital cash systems pose some unique risks. Since cash is digital, it is likely that hackers might break into the system. They may generate more coins even though they have not paid anything to earn that cash. When excessive coins are generated, the value of the other coins in the system is reduced. Hence, this risk affects both the users as well as the banks equally.