Scenerio of Implementation of E-Money

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EXTENDED ABSTRACT

In recent years there has been considerable interest in the development of electronic money Schemes. Electronic money has the potential to take over from cash as the primary means of making small-value payments and could make such transactions easier and cheaper for both Consumers and merchants. Electronic money is a record of the funds or "value" available to a Consumer stored on an electronic device in his or her possession, either on a prepaid card or on a personal computer for use over a computer network such as the Internet. This paper argues that e-money, as a network good, could become an important form of currency in the future. Such a development would influence the effectiveness and implementation of monetary policy. If an increased use of e-money substantially limits demand for central bank reserves, it would require changes in the operational target of the central bank and a closer coordination of monetary and fiscal policies.

KEYWORDS
Electronic money, paper money, smart card, value of money, barter system.

1.INTRODUCTION TO E-MONEY

Electronic money refers to money which is exchanged only electronically. In another words it can be defined as money balance recorded electronically on a “stored-value” card. These cards, “smart cards,” have a microprocessor embedded which can be loaded with a monetary value.

In addition to that, “electronic purse” which is defined as a plastic card contains real purchasing power, for which the customer has paid in advance (card-based products).

Another form of electronic money products which employ specialised software on a personal computer, typically allowing the electronic value to be transferred via telecommunications networks, such as the Internet, has emerged since then (software-based products).

The main differences between card-based products and software-based products are certain aspects of the technical security features and the storage medium of the electronic money. However, there are also many similarities: in both cases the user has to pay in advance for the value stored as electronic money units, which can then be used for payment purposes.

2.NEED OF E-MONEY AND PITFALLS OF EXISTING PAPER MONEY SYSTEM

As it is an era of computerization and technologies, people are taking advantages of latest technologies. I believe that e-money should be implemented because there are several pitfalls in the existing paper money system which are:

- **Creation of Paper Money**: The process of creation of paper money is time consuming and moreover it is expensive as well.
- **Easy To Get Damage**: Another aspect that supports to the implementation of e-money is that paper money get destroyed easily and moreover some people knowingly/unknowingly try to make notes shabby by writing and they also make drawings on the notes. Hence many of notes get destroyed and to reprint new notes government has to pay.
- **Difficult to Maintain**: It’s difficult to maintain the paper money as it can easily torn by any person.
- **Hurdles in Circulation of Paper Money**: The existence of particular type of paper money is limited to area of the world. For Example: if we are citizen of India and the currency used is RUPEE and then further if we want to go abroad, suppose in USA, the currency used there is DOLLOR. It concludes that we have to change the currency according to the country (say rupee to dollar) and it is a very time consuming process to exchange one type of paper money with another.
- **Exchange Concept**: Last but not the least point where I would like to pay your attention, which I will explain with help of one Example: generally the prices of products are in the form of ₹ 99, 49 and 199 consecutively and paper money is usually divisible by 5 or 10 and the balanced money after purchasing the product say is ₹ 1 and due to the shortage of ₹ 1 or to gain profit from such purchase they don’t return the balanced amount of ₹ 1. Instead of ₹ 1 they use to give toffee or some other small things which is a kind of corruption. “It might be just ₹ 1 for a shopkeeper or for a purchaser but for poor people even of ₹ 1 means a lot!!!!!”
- **Duplicate/Black Money**: It refers to the money accumulated by way of illegal transactions without declaring it for the tax purposes. In the existing system if a person is working as a government employee, he/she have limits to purchase any asset but what people do is they use to make investment on the name of their relatives or near/dears who are not doing any job. But in our proposed system of smart cards it is essential to have smart card for each and every citizen.
of one nation whether he/she is working or not so it will be easy to detect the crime if any illegal incident happens.

3. SCOPE OF STUDY
Since my views are in the favour of implementation of e-money, the scope of implementation of e-money seems to be on large scale as the new technologies are emerging at a very fast rate and majority of these technologies are supporting the same in efficient way. Its scope is wider because it is different from other available forms of money present in the current scenario in terms of its unique features it is having. In comparison with paper money that requires physical security features where as the e-money uses the concept of cryptography to protect the confidentiality of data from the unauthorised access and also maintain integrity of data at the same time. It is a kind of payment in which there is no physical exchange of coin and notes. The amount of money which is stored as a value on the Smart Card can be increased or decreased that is being used for making transactions need not to be involved the bank account. In the case of electronic money, the available funds can only be mobilised with a specific payment instrument, which is the storage medium representing the purchasing power. In this context i will not consider credit and debit card to be electronic money.

“Credit and Debit card will be treated as electronic payment method but not electronic money”.

Token money in the existing system is physical money in the terms of paper money and coins whereas the notational money is in the ledger of the banks. However, electronic money should be electronic transfer of token money or currency. This is an important distinction between the credit card and the electronic money. Electronic money includes all non-cash and non-paper payments instruments such as plastic cards and direct transfer and all money transfers via electronic channels such as ATM, the telephone, the fax and the internet.

E-money is a prepaid bearer instrument excluding all kind of electronic payment instruments such as credit and debit card.

Reason for implementation
Here are some of the main reasons why I should implement Electronic money and these reasons are as follows:

- **Secure**
- **User friendly**
- **Portable**
- **Divisible**
- **Reliable**

**SECURE**: Implementation of E-Money using smart card is more secure as compared to existing paper money system because it provides more protection against criminal abuse using cryptography and various other security measures.

- **USER FRIENDLY**: The smart card is more user friendly as compared to existing paper money system as it is easy to operate and doesn’t require much training.
- **PORTABLE**: Smart card is a portable as it is of a small size, moreover, it is easy to handle as all the information is stored on the single card hence no need to maintain and operate the multiple cards having the different information of a single person.
- **DIVISIBLE**: These cards deduct the exact price of the product hence no “change money” concept as cited above.
- **RELIABLE**: As all the information of a single person is on his/her unique smart card, there will be no conflict in information and it also maintains the integrity of data, hence it is a reliable system.

4. E-MONEY METHODOLOGY:

Owing to the various advantages cited in future, I propose a new model which caters to the public need and legal bindings. In this project I am going to implement E-Money using “SMART CARD SYSTEM” in which smart card will contain micro-processor chip, appropriate operating system and embedded programs to increase or decrease the value of money and a small storage device to store the value of money, would be build on smart card. Moreover each smart card will store information about all necessary information of a single person like Permanent Account Number (PAN), User identification Number (UID no.), Bank Account Numbers and Home Address, Digital Signatures and Photograph and basic details.

The model, in its development goes through the SDLC model, to check whether it's feasible or not to pursue. I, briefly summarize my project that will follow the phases of SDLC project. I had also explained this process in the diagrammatically way where a customer is making his smart card recharge and he is also purchasing some items with the help of E-money. On different locations he is spending money. And end of his purchasing, it is also showing the balance left and with that again he can make his smart card recharge at any point of time. Moreover all the transactions are on the spot being recorded on the person’s smart card as well as in the bank also.

5. E-MONEY IMPLEMENTATION:

According to my views to implement E-Money, it should follow the SDLC that consist of the following phases and these are as follows:

5.1 PHASE I:

**Requirement Analysis:**
In this phase, I analyse the existing system in order to identify its disadvantages so that new system (SMART CARD
SCENARIO OF IMPLEMENTATION OF E-MONEY

SYSTEM) can be proposed and developed to overcome the limitations of existing system.

The existing system of cash money and coins has many limitations which lead to the Corruption, duplication of money and is difficult to maintain. So the proposed system is the E-Money System which will try to overcome the limitations of existing paper money system.

5.2 PHASE II:
Feasibility Study:
It is a way which determines that whether the implementation for proposed system is achievable or not. In this phase of development, I will study whether the proposed system i.e. Smart Card System is feasible in terms of various feasibilities factors that are explained as follows:

- Technical Feasibility
- Economic feasibility
- Operational feasibility

Technical Feasibility: It evaluates whether a proposed solution can be implemented with help of available hardware, software, and other technical resources. Like in our Smart Card system the hardware and software I need are microprocessor chip, operating system, storage devices etc.

Economic Feasibility: It determines whether the benefits of a proposed solution outweigh the costs. Like in existing system paper money system, creation of each note and coins is very expensive but in the creation of proposed Smart card system will be less expensive as compared to old system because it would be made only once and if in case it will get lost, the cost of development of new card will not be so expensive as in case if we lost a large number of banknotes or they get destroyed.

Operational feasibility: In this we evaluate whether customers can operate the proposed system easily or not. In the existing system there are cash cards, cash books, debit cards, credit cards and they are very difficult to handle because in existing cash system it’s very difficult to remember multiple account numbers or cash card numbers. But in case of proposed Smart card system everything will be mentioned on smart card itself along with the photograph and also digital signatures will appear on it.

5.3 PHASE III:
Designing:
In this proposed system, overview of design of overall working of smart card and smart card encoder system is as under:

5.4 PHASE IV:
Coding:

In this phase of system development model; smart card, smart cards Encoder system and its functions would be coded using a specific programming language.

In this, transactions to be conducted through e-money should be considered as the computerised transaction system. In computerised transactions must process the properties that are referred as ACID properties and these are defined as follows:

1. Atomicity
2. Consistency
3. Isolation
4. Durability

- ATOMICITY: In this, either a transaction occurs completely or it doesn’t occur at all. For example: consider what happens when a person transfers funds from a saving account to a checking account both the checking account is credited and the saving account debited or neither account balance changes. The atomicity property requires that transaction is executed to completion.

- CONSISTANCY: The phrase “no violation of integrity constraint” describes the property of consistency.

- A transaction is said to be possess consistency property if database before the start of transaction and the computation of transaction is in consistency state.

- ISOLATION: A transaction is said to possess isolation property if several transactions that executed concurrently results the same as if they were executed serially in the same order.

- DURABILITY: The changes applied to store data by a committed transaction must persist; these changes must not be lost because of any failure.

5.5 PHASE V:
TESTING:
Various types of testing techniques will be used to verify and validate whether the programs coded in the smart card operating system works properly and accurately or not. It tests the various part of the system as a Unit, Module and the complete system. Proper testing tools will be selected for error detection and correction.

In the existing system scenario the duplicate money or black money is not easy to verify and validate.

5.6 PHASE VI:
IMPLEMENTATION:
After developing and testing the proposed e-money system it will be given to the users to operate it. It will be easy to understand by the user by providing the proper training to them.

5.7 PHASE VII:
MAINTENANCE:
It is enhancing the system to cope with newly discovered problems or new requirements that can take far more time than as in initial development of system. It may be necessary to add code that doesn’t fit the original design to correct an unseen problem or it may be that customer is requesting more functionality and code can be added to accommodate their request.
In existing system it is not easy to detect whether the black money or corrupted money or fake id’s are exist or not. But the e-money which is implemented using smart card cannot be duplicated moreover if any fake id exist it would be illegal and can be detected easily.

6. EXAMPLE OF E-MONEY IMPLEMENTATION IN INDIA
(yet to be implemented within coming years)

The upcoming e-money methodology is based on the concept “AADHAAR” which is being launched by Mr. Nandan Nilekni co-chairman of Infosys technologies limited. The word AADHAR means “SUPPORT” and its logo is a yellow sun with a fingerprint embedded in its centre as it is shown:

AADHAAR

AADHAR is a UID Project which means Unique National IDs. The UID will link a person's Passport Number, Driving License, and PAN card, Bank Accounts, Address, Voter ID etc and all this information will be checked through a database. So, if someone has a different address on PAN and driving license, is liable to get caught. Those who will opt out of this program will have much inconvenience in doing business, operating bank accounts and other offices which will require a UID. Government issued IDs are fragmented by purpose and region in India, which results in wide spread bribery, denial of public services and loss of income, especially afflicting poor citizens. As the unique identity database comes into existence, the various identity databases (voter ID, passports, ration cards, licenses, fishing permits, border area ID cards) that already exist in India are planned to be linked to it. The Authority is liaising with various national, state and local government entities to begin this process.

CONCLUSION:
Times are changing fast; the credit can solely be attributed to the revolutionizing information technology. It is therefore, important form and incorporates new measures which provide reliability to the money by taking care of the security and integrity of the participating entities. The proposed model has the properties of security, reliability, portability and divisibility and moreover it is a user friendly one. E-MONEY is the very next step in the money evolution ladder in which BARTER SYSTEM is the foundation and second step was the paper money, the present transaction system being revolutionized with the emergence of debit/credit cards. However, E-Money will be the most innovative and revolutionary transaction system of all.

FUTURE SCOPE:
The major future work of the suggested “e-money system” requires the extension and implementation of the payment process protocol. The protocol to be developed should address the hardware issues of a secure system in detail taking into account the following aspects:

- Security of transactions
- Linkage of various Account/s of the Company/Person on a single unique smart card.

REFERENCES
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PHASES OF SYSTEM DEVELOPMENT LIFE CYCLE

A Money Evolution ladder representation

Customer with Smart Card before Purchasing/Selling

Smart Card Encoder System

Accessing database and invoking the appropriate function (to update the value of money on smart card).

Customer with Smart Card after Purchasing/Selling
Symbol Specification:

1. Verifying Process
2. For Purchasing
3. Acknowledgement

E-Money Methodology Process