

### 3. E-Payment Systems

#### 3.1 Introduction

Various applications of e-commerce are continually affecting trends and prospects for business over the Internet, including e-banking, e-tailing and online publishing/online retailing. A more developed and mature e-banking environment plays an important role in e-commerce by encouraging a shift from traditional modes of payment (i.e., cash, checks or any form of paper-based legal tender) to electronic alternatives (such as e-payment systems).

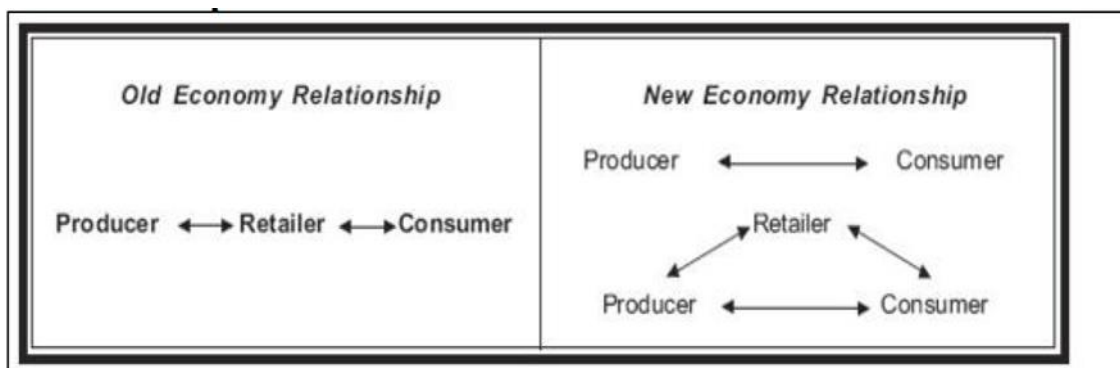


Figure (3.1) Old Economy Relationships vs. New Economy Relationships

#### 3.2 online payment schemes

##### 3.2.1 Traditional Payment Methods

**Cash-on-delivery.** Many online transactions only involve submitting purchase orders online. Payment is by cash upon the delivery of the physical goods.

**Bank payments.** After ordering goods online, payment is made by depositing cash into the bank account of the company from which the goods were ordered. Delivery is likewise done the conventional way.

### 3.2.2 Electronic Payment Methods

- **Innovations affecting consumers**, include credit and debit cards, automated teller machines (ATMs), stored value cards, and e-banking.
- **Innovations enabling online commerce** are e-cash, e-checks, smart cards, and encrypted credit cards. These payment methods are not too popular in developing countries. They are employed by a few large companies in specific secured channels on a transaction basis.
- **Innovations affecting companies** pertain to payment mechanisms that banks provide their clients, including inter-bank transfers through automated clearing houses allowing payment by direct deposit.

### 3.3 Types of Electronic Payment Systems

Electronic payment systems are common in banking, retail, health care, on-line markets, and even government—in fact, anywhere money needs to change hands. The organizations are motivated by the need to deliver products and services more cost effectively and to provide a higher quality of service to customers. The emerging electronic payment technology labeled electronic funds transfer (EFT). EFT is defined as —any transfer of funds initiated through an electronic terminal telephonic instrument, or computer or magnetic tape so as to order, instruct, or authorize a financial institution. EFT can be segmented into three broad categories:

#### 1- Banking and financial payments

- Large-scale or wholesale payments (e.g., bank-to-bank transfer).
- Small-scale or retail payments (e.g., automated teller machines).
- Home banking (e.g., bill payment).

#### 2- Retailing payments

- Credit Cards (e.g., VISA or MasterCard).
- Private label credit/debit cards.

- Charge Cards (e.g., American Express).

### **3- On-line electronic commerce payments**

#### **a-Token-based payment systems**

- Electronic cash (e.g., DigiCash).
- Electronic checks (e.g., NetCheque).
- Smart cards or debit cards (e.g., Mondex Electronic Currency Card).

#### **b- Credit card-based payments systems**

- Encrypted Credit Cards (e.g., World Wide Web form-based encryption).
- Third-party authorization numbers.

### **3.4 E-Cash**

Electronic cash is a general term that describes the attempts of several companies to create value storage and exchange system that operates online in much the same way that government-issued currency operates in the physical world. However, Concerns about electronic payment methods include:

- Privacy.
- Security.
- Independence.
- Portability.

There are many ways that exist for implementing an e-cash system, all must incorporate a few common features. Electronic Cash is based on cryptographic systems called "digital signatures". This method involves a pair of numeric keys: one for locking (encoding) and the other for unlocking (decoding). E-cash must have the following four properties.

- 1- Monetary value.
- 2- Interoperability.

3- Retrievability.

4- Security.

### **3.4.1 Electronic Cash Storage**

There are two methods of electronic cash storage including:

#### **1- On-line**

- Individual does not have possession personally of electronic cash.
- Trusted third party, e.g. e-banking, bank holds customers' cash accounts.

#### **2- Off-line**

- Customer holds cash on smart card or electronic wallet.
- Fraud and double spending require tamper-proof encryption.

The purchase of e-cash from an on-line currency server (or bank) involves two steps:

- 1- Establishment of an account.
- 2- Maintaining enough money in the account to bank the purchase.

Once the tokens are purchased, the e-cash software on the customer's PC stores digital money undersigned by a bank. The users can spend the digital money at any shop accepting e-cash, without having to open an account there or having to transmit credit card numbers. As soon as the customer wants to make a payment, the software collects the necessary amount from the stored tokens Convenience.

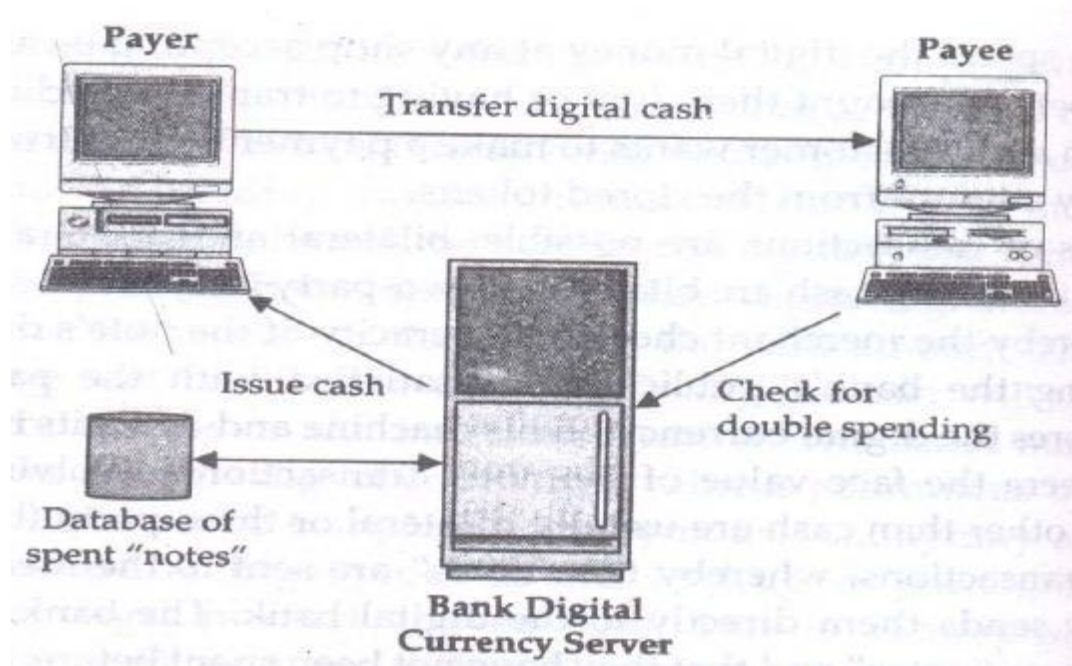


Figure (3.2) E-Cash System

### 3.5 Electronic Checks

It is another form of electronic tokens. Buyers must register with third-party account server before they are able to write electronic checks. The account server acts as a billing service.

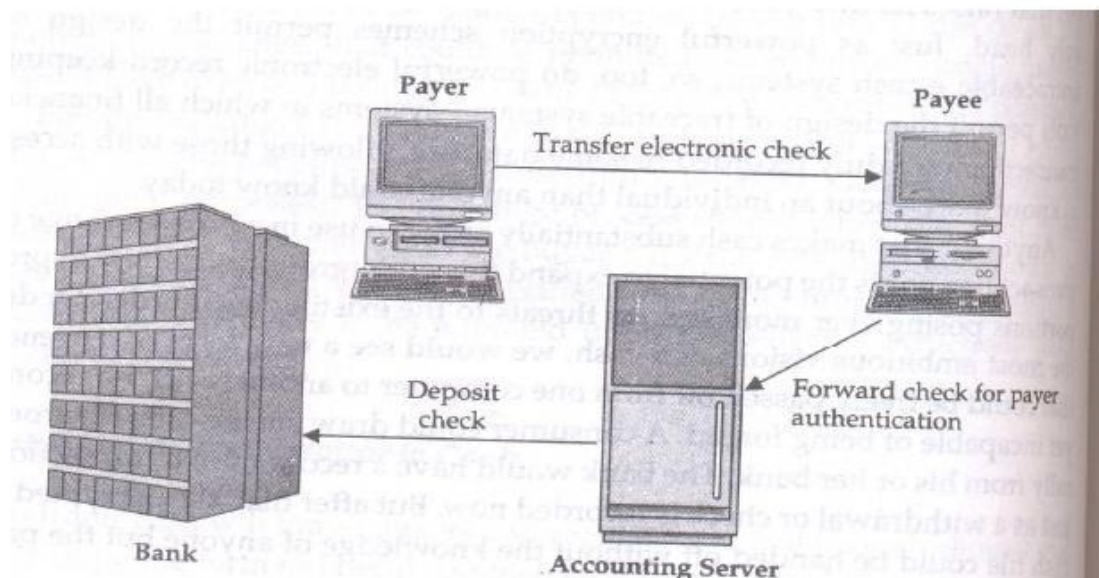


Figure (3.3) E-Checks System

### **3.6 Smart Cards & Electronic Payment Systems**

Smart cards have been in existence since the early 1980s and hold promise for secure transactions using existing infrastructure. Smart cards are credit and debit cards and other card products enhanced with microprocessors capable of holding more information than the traditional magnetic stripe. The smart card technology is widely used in countries such as France, Germany, Japan, and Singapore to pay for public phone calls, transportation, and shopper loyalty programs.

#### **Advantages**

- Payment cards provide fraud protection.
- They have worldwide acceptance.
- They are good for online transactions.

#### **Disadvantages**

Payment card service companies charge merchants per-transaction fees and monthly processing fees.