Unit 6: E-Payment System

6.1

> ### E-payment
>
> The term ePayment refers to the completion of payment processes electronically. In other words, a person or an institution sends a sum of money electronically to a receiver. For example, a product that is bought in an online shop is paid for using ePayment.
>
> E-Payment solutions can be classified in various ways:
>
> 1. By amount
>   ePayment solutions can be classified by What is the the size of the amount to amount? be paid.
>   - Pico payment : cent to 1 Euro
>   - Micro payment : 1 Euro to 10 Euros
>   - Macro payment: more than 10 Euros, generally done by business houses
> 2. By time of payment
>   The time of the transaction is also used to classify payment solutions.
>   - Prepaid
>   - Pay now (Cash on delivery)
>   - Pay later (Invoices)
> 3. By technology
>   Payment solutions can be differentiated according to the technology employed. This is deposited into an account or stored in the form of virtual coins in software or hardware.
> 4. By degree of anonymity
>   Payment solutions differ in terms of the degree of anonymity. If a person pays for a product with cash in a non electronic payment process, then this is considered an anonymous transaction. When a credit card is used, the transaction is not anonymous because the seller knows the name of the buyer.

> ### Types of E-payment:
> 1. E-cash
> 2. Electronic wallet
> 3. Smart card
> 4. Credit card and Debit card
> 5. E-Banking and M-Banking

1. ### E-Cash
   > - It is Crypto currency or paperless cash
   > - Also known as cybercash, digicash and emoney
   > - Transaction can be made via internet or email
   > - Anonymous transaction is possible
   > - They generally involve 4 components;
   >   - Issuers : Financial or Non-Financial institution
   >   - Customers: who pays
   >   - Merchant or Traders: who accepts
   >   - Regulators: authorities or state tax agencies

Compiled by Sujan Malla
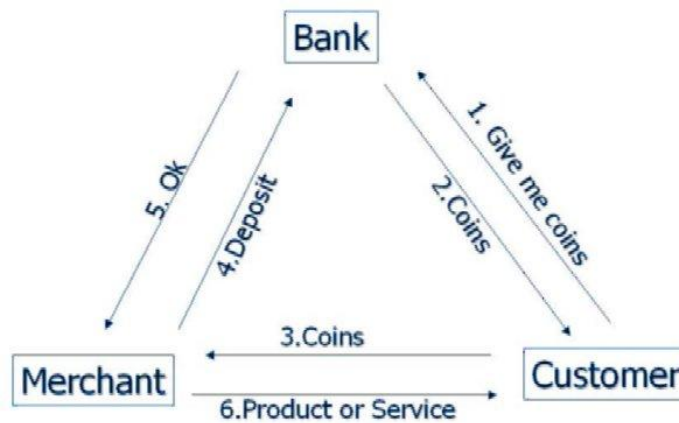
The ECash System

2. **Electronic Wallet**
   - Device or software allows to store money, personal information and other data for use in online transaction
   - Stores credit card, ecash, owner identification and address
   - Eliminates hassle to fill out order forms with same information every time they make purchase
     E.g. google e-wallet, paypal, e-sewa
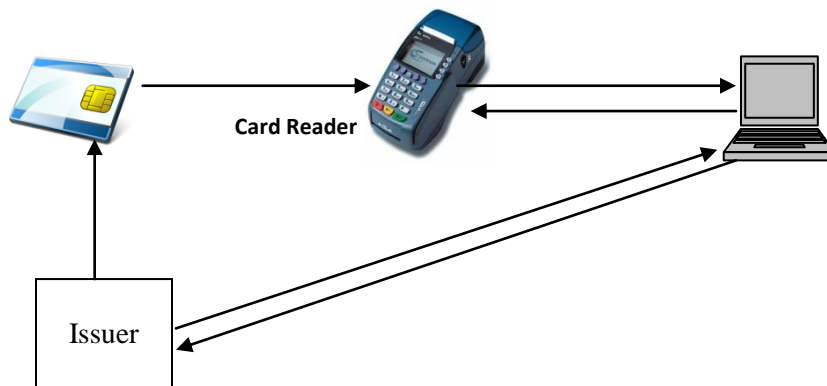   - Emerging technology used in e-wallet is NFC, secure payment with a single tap.
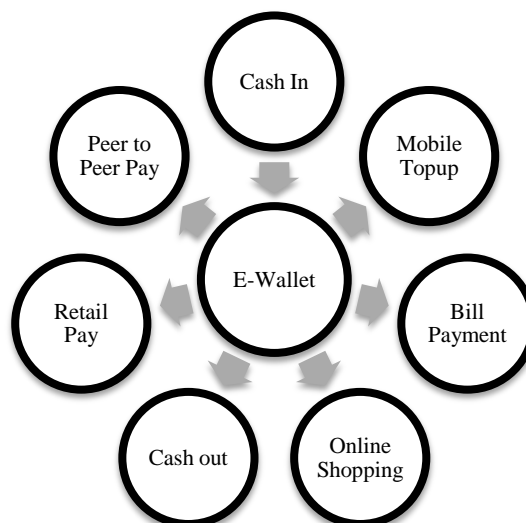
E-Wallet Usage

3. **Smart Card**
   - Plastic card

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- ➢ Prepaid, amount or value stored on chip
- ➢ Used for low value payment in 1990
- ➢ Payment requires smart card reader

Smart Card Payment System

4. **Credit card and Debit Card**
- ➢ In credit-debit systems, customers are registered with their normal bank accounts to a payment server. After the registration has taken place they can authorize charges against those accounts
- ➢ Credit cards are most widely used, with high transaction fee and uses Pay later modality
- ➢ Debit card are Prepaid system
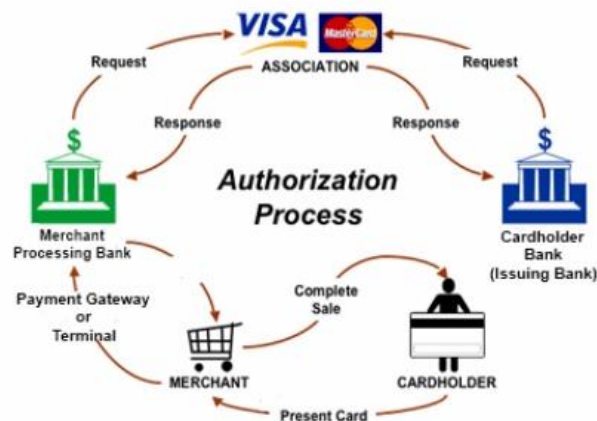
5. **E-banking and M-banking**

E-banking
- ➢ Conducts transaction electronically mainly via internet
- ➢ The transaction is via bank website

M-Banking
- ➢ Mobile banking refers to internet based facility provided by banks that enables the customer to execute bank transaction via cellular devices.
- ➢ Via SMS, mobile banking application or website
- ➢ Limited function
- ➢ Devices used mobile set or tablet.

> ## Digital Payment Requirement:
> For any digital payment to succeed following requirement should be satisfied

S. No.	Requirement	Need for Criteria
1	Acceptability	Payment should be widely accepted
2	Anonymity	Identify of customer should be protected
3	Convertibility	Digital money should be converted to any type of fund
4	Efficiency	Cost per transaction should be near zero
5	Integration	Interface should be created to support existing system
6	Scalability	Infrastructure should not breakdown while adding new customer or merchant
7	Security	Should allow transaction over open network
8	Reliability	Should avoid single point of failure
9	Usability	Payment should be easy as in real world

> ## Online Payment categories:
> Online payment categories can be broadly divided into three categories:
> 1. Micropayment
>   > - Transaction values are less than 5 Euros or dollars
>   > - Transaction cost are nearly equal to zero
> 2. Consumer payment
>   > - Transaction between 5 to 500 Euros or Dollars
>   > - Payment executed by credit card transaction
> 3. Business payment
>   > - Transaction value more than 500 Euros or Dollars
>   > - Debit card or invoices are appropriate solution in this type system

> ## Digital token based E-payment System
> Digital token based e-payment system which is based on electronic tokens rather than e-cheque or e-cash. Electronic tokens are generated by the bank or financial institution. Electronic tokens are equivalent to the cash which are to be made by bank.
> - Categories of electronic tokens
>   1. Cash or real time:
>   In this mode electronic tokens transaction takes place via the exchange of e-cash.
>   2. Debit or Prepaid:
>   User pays the value in advance. Generally transaction takes place via smartcard or electronic wallet.
>   3. Credit or postpaid:
>   In such transaction the server authenticates the customer and verifies their identity through bank, and then the transaction takes place.
> - Benefit to buyer
>   - Convenience of global acceptance
>   - Enhanced security and reduced reliability
>   - Consumer protection through an established system of dispute resolution
>   - Convenient and immediate access to fund
>   - Accessibility to immediate credit
> - Benefit to seller
>   - Speed and security of the transaction processing chain from verification and authorization
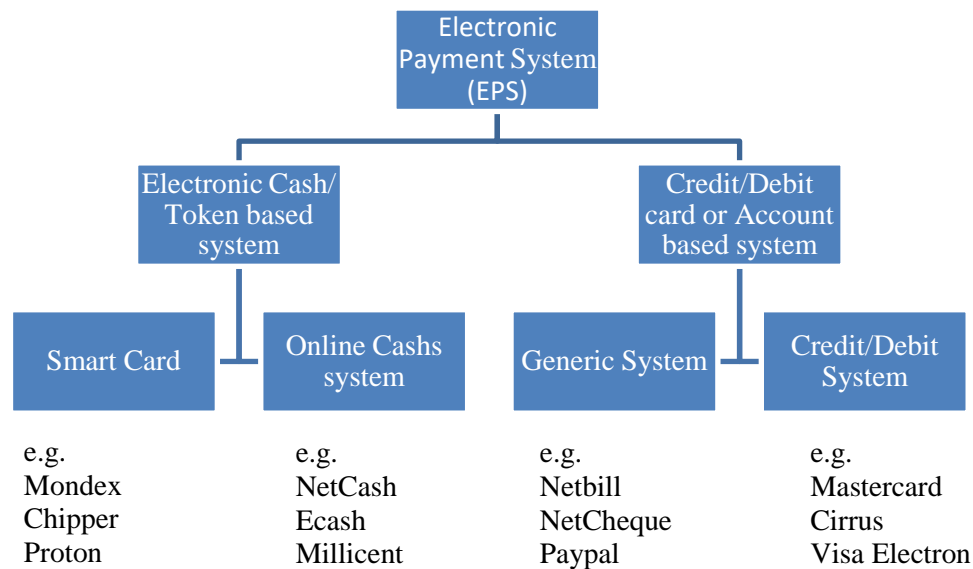>   - Freedom from costly paper based processing

- Better management of cash flow
- Incremental purchase power on the part of the consumer
- Cost and risk saving by eliminating the need to run an in house cresit facility.

6.2

> **Classification of New payment system**

The explosive development of electronic commerce in recent years makes the issue of paying over open networks very important. Electronic payment systems are required to bring the necessary infrastructure to facilitate payment over the Internet. They are becoming an essential part of, and are greatly necessary for, further development of electronic commerce and electronic business.

The solution to the payment system that satisfies needs of users and merchants, and demonstrate a potential for acceptance on a mass market scale is classified as:

```
                        Electronic
                      Payment System
                          (EPS)
                    ┌─────────┴─────────┐
            Electronic Cash/        Credit/Debit
            Token based          card or Account
              system               based system
          ┌───────┴───────┐     ┌───────┴───────┐
    Smart Card      Online Cashs   Generic System   Credit/Debit
                      system                          System
```

e.g.	e.g.	e.g.	e.g.
Mondex	NetCash	Netbill	Mastercard
Chipper	Ecash	NetCheque	Cirrus
Proton	Millicent	Paypal	Visa Electron

Groups and Example of New payment System

Technology	Substitution	Circulation with the Banking system	Circulation outside the Banking System
Smart Card	Cash	Visa International e.g. Visa Cash, Smart Cash	Mondex International e.g. Mondex, Digicash
	Cash	Cybercash, cyber coin	
	Cheque	Check free payment service FSTC: echeque	
Internet	Credit card	Cybercash : credit card service First virtual holding Internet payment system	
	EFT	Intuit:Quicken Microsoft: money	

Terms used in above Table:

Visa International

> Visa largest credit card company
> Capable of large value payment
> User identification and authentication not needed

➢ Operation cost high as bank money is used.

Mondex International
➢ Developed in 1993 December in Britain
➢ Uses smart card
➢ Mondex loading is from bank or Mondex telephone

Check free payment service
➢ Free and secure way to pay bills
➢ Allows to make payment, view payment history, manage profile etc

Electronic Cheque
➢ FSTC: Financial Service Technology Consortium was established in 1993 with 60 different organization in united states
➢ E-cheque was first issued in September 1995, it used digital signature

First virtual holding
➢ First online payment was done in 1994 by this organization
➢ Verification was done via email

EFT:

Electronic Funds Transfer (EFT) is credit transfers between banks where funds flow directly to the payer's bank to the payee's bank. They are same-day, almost instantaneous payments. EFT is one of the earliest examples of payment systems that use online transactions, although these transactions are carried out on private networks. In other words, an **electronic funds transfer (EFT)** is a transaction that takes place over a computerized network, either among accounts at the same bank or to different accounts at separate financial institutions.

EFTs includes direct-debit transactions, wire transfers, direct deposits, ATM withdrawals and online bill pay services. Transactions are processed through the Automated Clearing House (ACH) network.

6.3

\#   **Risk factor in E-payment System:**

One of the essential challenges of e-commerce is risk management operation of payment system. Although frauds, financial misdemeanors and tax avoidance are not just in e-commerce but e-commerce presents new way to commit crimes.

There are three major risks in e-payment system:
1. Data protection
2. Data reliability
3. Taxation

1. **Data Protection:**
   ➢ Refers to protection of data related to users
   ➢ Technologies used for data protection are firewall, password access, secure electronic transaction (SET), encryption technologies etc.
   ➢ The essential challenge in e-commerce are risk management
   ➢ The operation of payment system incurs three major risks
      i.   Risk from mistakes and disputes:
         ➢ Consumer protection
         ➢ Requires some ability to keep automatic records
         ➢ Dispute resolution solely rely on records

- However, consumer might feel that all this record keeping is an invasion of privacy resulting in slower adoption of EPS.
  - ii. Managing Information Privacy:
    - Requires security framework
    - EPS must ensure and maintain privacy
    - Every time consumer makes a transaction it goes to database, all these transaction can be interlinked to breach consumer privacy
  - iii. Managing Credit risks
    - Moderate credit and reduce float in market
    - Developing of clearing and settlement system

2. **Data Reliability:**
   - Reliability requires authentication of the user
   - Address the issues related to authentication and authrorization

3. **Taxation:**
   - They are enforced by government entity, whether local regional or national in order to finance government activities.
   - Issues concerning E-Business are:
     - What would be taxed?
     - Who would be taxed?
     - Who would collect tax from internet?
     - Who would regulate the taxation system?
     - How would tax affect the profitability of e-commerce?

Types of taxes
1. Direct tax:
   Imposed directly on the tax payer and paid directly to the government.
   e.g. income tax, corporate tax, gift tax.
2. Indirect Tax:
   Paid by intermediary
   e.g. custom duty, service tax, sales tax, VAT etc.

Fundamental principle of taxation
1. Neutrality: Same tax treatment regardless the delivery
2. Simplicity: Tax rule should be simple and clear
3. Fairness and Effectiveness: Right amount of tax at right time
4. Flexibility: Flexible to keep up to the pace of technology
5. Enforceability: Reasonable and technological tax collection free of unnecessary burden.