Electronic payment system

UNIT - 3 Electronic Payment System Contents • What is E-payment? • Types of E-payment Systems • Digital Token-based Electronic Payment Systems • Smart Cards & Electronic Payment Systems • Credit Card-based Electronic Payment Systems • Risk & Electronic Payment Systems • Designing Electronic Payment System What is E-payment ? • E-payment systems is the mechanism of transferringmoneyover the Internet andtechnologyused in this transfer is called as EFT. EFT defined as " any transfer of fund initiated through an e-terminal, telephonic instrument, or computer or magnetic tape to order, instruct or authorize a financial institution to debit or credit an account. It is mostly used for Business to business (B2B) commerce where companies doing business together tend to use electronic data interchange (EDI) system to send each other bills and notices of payment. E-Payment • Information online offline $

Products/services Advantages of E-Payment • • • Increase payment efficiency – Reduce transaction costs – Enable trade in goods and services of very low value Increase convenience of making payments – Payment can be made swiftly and remotely using various devices Can be used for – e-commerce / e-Trade – For other purposes like paying bills, taxes, etc MBA-II, EBF (FT-204C) Unit-3, Study material compiled by Prof. Vanita Joshi, SOM, SIMS, Indore 1

Categories of EFT Banking and financial payments * Large-scale or wholesale payment * Small scale or retail payment * Home banking Retailing payments * Credit cards * Debit cards On-line electronic commerce payments * Token-based payment system ~ Electronic cash ~ Electronic checks ~ Smart cards or debit cards * Credit card-based payment systems ~ Encrypted credit

cards ~ Third-party authorization numbers Main factors when selecting e-payment method • Availability (bank system, laws and regulations) • The consideration of size and type of business, type of a target group of consumers, types of products and services. The ability to provide security against fraudulent activity • Being cost effective for low value transaction fees • Being protective of the privacy of the users • Easy to use, and being convenient for purchasing on the web based e-business Token-based E-Payment Systems Electronic tokens are the new financial instruments which are in the form of electronic cash/money or checks.

Electronic tokens are same as cash that is backed by bank. They are of three types: 1. Cash or real-time (e-cash) 2. Debit or Prepaid (smart cards, e-purses) 3. Credit or Postpaid (credit/debit cards, e-checks) E-cash Electronic cash is a consumer-oriented electronic payment. Though it replaces the cash but still cash is quite dominant form of payment for three reasons: 1. Lack of trust in banking system 2.

Inefficient clearing and settlement of non-cash transaction 3. Negative real interest rates paid on bank deposit Advantages of cash over credit cards • It is negotiable • Cash is a legal tender • Cash is a bearer instrument • It need require bank account to operate • No risk on the part of acceptor that the medium of exchange may not be good MBA-II, EBF (FT-204C) Unit-3, Study material compiled by Prof. Vanita Joshi, SOM, SIMS, Indore 2

Properties of e-cash E-cash must have following four properties: Monetary values: Interoperability Retrievability Security E-cash in Action • E-cash based on cryptographic systems called “ digital signature” • • • This method involves pair of two numeric keys (very large number or integer) that work in

tandem (cycle): one for encoding and another for decoding. Message encoded with one numeric key can only be decoded with other numeric key and none other. The encoding key is kept private while the decoding key is made public. E-checks • E-checks are another form of electronic tokens. • • A new electronic version of paper check. E-check is an instruction to a financial institution to pay a given amount of money to the payee. It is a specially formatted email message sent over the Internet. It contains as the same information as on paper based check. Check service providers PayByCheck (http://www. paybycheck. com) CyberSource (http://cybersource. com) Transaction Payment Sequence in E-check system Payer Transfer e-check Payee Deposit e-check Forward e-check for payer authentication Bank Accounting Server MBA-II, EBF (FT-204C) Unit-3, Study material compiled by Prof.

Vanita Joshi, SOM, SIMS, Indore 3 Transaction Payment Sequence in E-check system • Buyer must register with third party account server using electronic check. • On receiving the check, the seller presents it to accounting server for verification and payment. • The accounting system verifies the digital signature on the check. • Properly signed and endorsed checks can be electronically exchanged between financial institutions through electronic clearing house. Advantages of E-Check • They work in the same way as traditional checks. • E-checks are suited for micro payments. Eliminate the need for expensive process reengineering and taking advantage of the banking industry. • Financial risk is assumed by accounting server. • E-checks create a float through third-party accounting server. They make money out of buyers and sellers transaction by providing deposit account.

Difference b/w EFT and E-check • In E-Cheque, electronic versions of the cheque are issued, received & processed. So, payee issues an E-Cheque for each payment. • In EFT transfer automatic withdrawals are made for monthly bills or other fixed payments; no cheques are issued.

Smart cards • A smart card is a plastic card with an embedded microchip containing information about you. • A smart card can store about 100 times the amount of information that a magnetic strip plastic card can store. • A smart card contains private user information, such as financial facts, private encryption keys, account information, credit card numbers, healthinsurance information, etc. • So far not successful in U. S. , but popular in Europe, Germany, Singapore and Japan to pay for public phone call, transportation.

Mondex Smart Card • Holds and dispenses electronic cash (Smart-card based, stored-value card) • Developed by MasterCard International • Requires specific card reader, called Mondex terminal, for merchant or customer to use card over Internet • Supports micropayments and works both online and off-line at stores or over the telephone • Secret chip-to-chip transfer protocol • Loaded through ATM – ATM does not know transfer protocol; connects with secure device at bank MBA-II, EBF (FT-204C) Unit-3, Study material compiled by Prof. Vanita Joshi, SOM, SIMS, Indore Mondex Smart Card Processing Mondex Smart Card • Disadvantages – Card carries real cash in electronic form, creating the possibility of theft – No deferred (overdue) payment as with credit cards - cash is dispensed immediately Types of Smart cards Smart cards are basically of two types: 1. Relationship-based Smart Cards 2. Electronic Purses and Debit Cards Relationship-based Smart Cards It is the enhancement of existing card services that offer

customers far better options like: 1. Access to multiple accounts (debit, credit, e-cash) on one card. 2.

Offer various functions (cash access, bill payment, balance inquiry, fund transfer) 3. Multiple access options at multiple location using multiple access device (ATM, PC, PDA or screenphone etc) Electronic Purses and Debit Cards Electronic Purses or E- wallet are the smart cards embedded with programmable microchip that store sum of money instead of cash. Once a purse is loaded with money it require card reader vending machine which verifies its authenticity . Then after amount is deducted from balance. It shows the remaining balance on the card hence eliminate the small bill in busy stores.

E-wallets when depleted can be recharged with money . MBA-II, EBF (FT-204C) Unit-3, Study material compiled by Prof. Vanita Joshi, SOM, SIMS, Indore 5 Credit cards-based e-payment system Credit Cards • A credit card is a small plastic card issued to users dealing in e-commerce. Most credit cards are the same shape and size, as specified by the ISO 7810 standard. • A credit card is different to a debit card in that it does not remove money from the user's account after every transaction. In the case of credit cards, the issuer lends money to the consumer (or the user) to be paid to the merchant.

Credit cards-based e-payment system Customers who purchase any goods send their credit card details to the service provider involved and the credit card organization will handle this payment. Online credit card payment has following categories: 1. Payment using plain credit card details 2. Payments using encrypted credit card details 3. Payment using third-party verification Entities involved in Credit card Transaction Consumer (Buyer or Card holder)

Merchant (Seller) Card Issuer (Consumers' Bank) Acquirer or Principal (Merchant's Bank) Card Association (Visa, Master Card etc) Third party processor How an Online Credit Transaction Works

Encryption and Credit cards Encryption process starts when credit card information is entered into a browser and sent securely over network between buyer to seller. Encryption process includes following steps: 1. Customer presents his credit card information securely to merchant. 2. Merchant validates the authenticity of card holder 3. Merchant relays this information to its bank or on-line card processor. MBA-II, EBF (FT-204C) Unit-3, Study material compiled by Prof. Vanita Joshi, SOM, SIMS, Indore 6 4. The bank relays the information to customer's bank for authorization approval 5.

The customer's bank returns the credit card , charge authentication and authorization to the merchant Processing Payment with Encrypted Third-party authorization and Credit cards In third party processing, consumer register with third party on the internet to verify emicrotransaction. The companies providing third party payment service on internet are: (First Virtual) • http://www. fv. com • http://www. openmarket. com • http://www. 2checkout. com/ • http://www. paypal. com/ Payment can be made by credit card via clearing house.

Online Third-Party Processor (OTPPs) has following steps for buying information online. 1. Consumer registers for an OTPP a/c that is backed by credit card. 2. To purchase customer request merchant by her OTPP account no. 3. Merchant then contact the OTPP payment server with customer's account no. 4. OTPP payment server verifies the customer's account no. for vender (merchant) & checks for sufficient funds. 5. OTPP server send a

message to buyer that can be responded back by buyer as ; yes/agree; No/disagree; fraud. 6.

If OTPP gets ‘ Yes’ from customer, merchant is informed & then customer is allowed to download material. MBA-II, EBF (FT-204C) Unit-3, Study material compiled by Prof. Vanita Joshi, SOM, SIMS, Indore 7 Online Payment Processing using a Third-party Processor Risk in using Credit cards • Customer uses a stolen card or account number to fraudulently purchase goods or service online. • Many people who will be on the Internet have not even had their first Web experience. • Hackers find the ways into an e-commerce merchant’s payment processing system and then issue credits to hacker card account numbers. Many users are also likely to be younger and have less access to credit and debit cards • Many purchases they make will be micropayments. • Credit cards cannot be used for large sums of B2B transactions • Customer falsely claims that he or she did not receive a shipment Limitations of Online Credit Card Payment Systems • Security – neither merchant nor consumer can be fully authenticated. • Cost – for merchants, around 3. 5% of purchase price plus transaction fee of 2030 cents per transaction. • People living in rural areas don’t have same access to computers and Internet that others do. Social equity – many people do not have access to credit cards (young and old age), disabled, individuals who are not computer savvy and individuals who cannot afford cards (poor credit risk). Designing Electronic Payment Systems Following criteria should be satisfied while designing any new E-payment System: 1. Privacy 6. Pricing 2. Security 7. Standards 3. Intuitive Interface 4. Database Integration 5. Brokers

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