Lecture 10:
E-Commerce

CA Module E Paper 13
Information Technology Management, Audit and Control

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E-Commerce Models

- Business to Consumer (B2C)
- Business to Business (B2B)
- Business to Employee (B2E)
- Business to Government (B2G)
- Consumer to Government (C2G)
- Consumer to Consumer (C2C)
- Exchange to Exchange (X2X)
- Mobile Commerce (m-commerce)
Electronic Data Interchange (EDI)

- Electronic data interchange (EDI) is one of the first e-commerce applications in use between business partners for transmitting business transactions between organizations with dissimilar computer systems.

- It involves the exchange and transmittal of business documents, such as invoices, purchase orders and shipping notices, in a standard, machine-processable format.

- The transmission use standard formats, such as specific record types and field definitions. The process works by data from a business application translated into a standard format, transmitted over communication lines to a trading partner, and re-translated by the trading partner’s application.
EDI Benefits

The benefits associated with the adoption of EDI include:

- Less paper work
- Fewer errors during the exchange of information
- Improved information flow, database to database, and company to company
- No unnecessary re-keying of data
- Fewer delays in communication
- Improved invoicing and payment processes
Electronic Payment Options

- **Electronic Funds Transfer**
  - Wire Transfer
  - Automated Clearing House
    - *ACH Direct Deposit*
    - *ACH Direct Payment*
    - *ACH Electronic Checks*

- **Card Based Systems**
  - Credit Cards
  - Debit Cards
  - Stored Value Cards

- **Virtual Payment Systems**
  - Digital Cash
  - E-Wallets
**EFT - Wire Transfer**

- Bank wire transfer is often the most efficient method for transferring funds between bank accounts.

- A bank wire transfer is a message to the receiving bank requesting them to effect payment in accordance with the instructions given. The message also includes settlement instructions.

- The wire transfer itself is virtually instantaneous, requiring no longer for transmission than a telephone call.

- Generally, the overall transaction cost for wire transfer is expressed in dollars per transaction, whereas the transaction cost for checks and ACH payments is expressed in pennies per transaction.

- Wire transfer is cost effective for a small number of very large transactions but not for a large number of transactions.
EFT - Automated Clearing House (ACH)

- The ACH network was developed in the early 1970s in response to the rapid growth of check payments as an efficient, electronic alternative to checks.

- The network utilizes its nationwide telecommunications infrastructure to connect ACH operators, resulting in a system that provides rapid exchange of financial entries in a variety of formats.

- The network is administered through a series of agreements among financial institutions, customers, trading partners, and ACH operators.
ACH Options

- **ACH Direct Deposit**
  - Direct deposit is the electronic transfer of payments into the checking or savings account. A single payment can be divided among several different accounts and, in many cases, between different financial institutions.

- **ACH Direct Payment**
  - Direct payment is electronic transfer of an authorized payment from a consumer's checking or savings account into the account of the government or an organization. Direct payment is a safe, secure, accurate, and on-time method of payment. In fact, direct payment uses the same secure system as direct deposit.

- **ACH Electronic Checks**
  - An e-check is an electronic debit to a checking account that is initiated at the point-of-sale, on the Internet, over the telephone, or via a bill remittance sent through the mail. It is processed using the ACH network.
Card Based Systems

- Credit Cards
- Debit Cards
- Stored-value Cards
  - Closed System Stored Value Cards (CSSVCs)
    - Acceptable by a single merchant
  - Open System Stored Value Cards (OSSVCs)
    - Acceptable by multiple merchants
Virtual Payment Systems

■ Digital Cash
  - Digital cash is a tool that allows a person to purchase goods or services by transmitting a number (value) from one computer to another. The individual first sets up a digital account with a bank or other provider. Then, a limited sum is transferred from an existing bank account or credit card into the digital account. This may be in the form of anonymous or identified digital cash. When the person makes a purchase, the amount is transferred from his or her digital account to the account of the vendor.

■ E-Wallets
  - An e-wallet is a secure, virtual container that holds a customer’s personal data and presents that data to a merchant at purchase time.
  - Prior to the e-wallet standard, customers had to fill out forms with shipping and credit card information each time they visited a site. This was time-consuming and led to high abandonment rates. E-wallets allow the constituent to register and enter information once into a form and have the e-wallet auto-populate forms.
E-Commerce Payment Processing & Security

- Online Payment Processing
  - The payment Processing Network
  - The payment Processing

- E-Commerce Security
  - Security Socket Layer Protocol (SSL)
  - Secure Electronic Transaction (SET)
Online Payment Processing - Network

- **Acquiring Bank**: An Acquiring Bank provides Internet Merchant Accounts. A merchant must open an Internet Merchant Account with an Acquiring Bank to enable online credit card authorization and payment processing. Examples of Acquiring Banks include Merchant e-Solutions and most major banks.

- **Authorization**: The process by which a customer's credit card is verified as active and that it has the credit available to make a transaction. An authorization also verifies that the billing information the customer has provided matches up with the information on record with their credit card company.

- **Credit Card Association**: A financial institution that provides credit card services that are branded and distributed by Customer Issuing Banks. Examples include Visa® and MasterCard®.
Online Payment Processing - Network

- **Customer:** The holder of the payment instrument—such as credit card, debit card, or electronic check.

- **Customer Issuing Bank:** A financial institution that provides a customer with a credit card or other payment instrument. During a purchase, the Customer Issuing Bank verifies that the payment information submitted to the merchant is valid and that the customer has the funds or credit limit to make the proposed purchase.

- **Internet Merchant Account:** A special account with an Acquiring Bank that allows the merchant to accept credit cards over the Internet. The merchant typically pays a processing fee for each transaction processed.

- **Merchant:** Someone who owns a company that sells products or services.
Online Payment Processing - Network

- **Payment Processing Service:** A service that provides connectivity among merchants, customers, and financial networks to process authorizations and payments. The service is usually operated by a third-party provider such as VeriSign.

- **Processor:** A large data center that processes credit card transactions and settles funds to merchants. The processor is connected to a merchant's site on behalf of an Acquiring Bank via a Payment Processing Service.

- **Settlement:** The process by which transactions with authorization codes are sent to the processor for payment to the merchant. Settlement is a sort of electronic bookkeeping procedure that causes all funds from captured transactions to be routed to the merchant's acquiring bank for deposit.
Online Payment Processing

1. Customer
2. Merchant
3. Gateway
4. Processors
5. Issuing Bank

8. Customer
7. Merchant
6. Gateway
5. Processors
4. Issuing Bank
Online Payment Processing - Settlement

Merchant requests Payment Gateway to settle a transaction

Acquiring Bank credits Merchant's bank account

Processor sends payment details to Merchant's Acquiring Bank

Processor sends settlement payment details to Issuing Bank of Customer's credit card

Issuing Bank includes Merchant's charge on Customer's credit card statement
Security Socket Layer Protocol (SSL) / Transport Layer Security (TLS)

- Secure Sockets Layer (SSL), is a cryptographic protocol.

- SSL protocol encodes the whole session among computers and provides the safe communication service on Internet. It is widely used eCommerce transactions.

- For online communications, SSL allows traffic between a Web server and its clients (like Web browser) to be strongly encrypted, using the public key technology.

- When compared with SET Protocol for online electronic transactions, the major disadvantage of SSL is that it cannot prevent personal information from being stolen. Furthermore, the merchant can examine or tamper this information.
Secure Electronic Transaction (SET)

- Secure Electronic Transaction (SET) protocol ensures that your entire credit card number is never traveling across the Internet, rather this information is transmitted in pieces - and that no human eye sees the entire card number.

- SET is a common secure electronic commerce payment protocol where five parties, namely, (1) customer, (2) seller, (3) payment gateway, (4) certificate authority and (5) issuer, are involved in the payment process. Although SET is secure for making online electronic transactions, it is not recommended for micro-payment because it is consider being time consuming, because of the several parties involved. Besides, all parties may have to authenticate themselves, for security reasons, introducing more penalties performance wise.
How to Sell Online?

- 1. Domain Name
- 2. Website
- 3. Web hosting
- 4. Broadband Access
- 5. Merchant Account
- 6. Gateway Payment Provider
- 7. Marketing
Bendy Garments (Pvt.) Ltd (BGL) is a medium sized manufacturer and exporter of cotton T-shirts. In the last quarter, the company’s performance was far below the expected level. Shipments were delayed and the company incurred a huge loss. When the staff was given a chance to clarify the situation, all of them posted the blame on supply chain and complained that the material required for production was not received on time. On the other hand, the suppliers were of the view that the orders were not placed on time. After carefully observing the situation the management has decided to adopt an e-business model to minimize such time lapses.
Exam Question - Winter 2007

Required:

You are required to explain the following:

(a) An appropriate e-business model which BGL may adopt along with brief explanation of the model and the key characteristics which distinguish it from traditional business transactions. (4 Marks)

(b) The benefits of the e-business model recommended by you which may help improve the profitability of BGL. (4 Marks)

(c) Barriers in implementing the suggested model. (List at least eight points) (4 Marks)
Examiner’s Comments:

“(a) In this question of 12 marks, a considerable number of students were not able to identify the right e-business model. Even those students who could correctly identify the Business to Business (B2B) model were either unable to explain the characteristics which distinguish it from a traditional business model or mentioned the characteristics of a general e-business model. The characteristics of a B2B model which distinguish it from a traditional transaction model are that it is based on very close alignment of systems and procedures of the business partners in an environment of paperless transactions, there is strict adherence to standards and high level of continuous co-ordination between the business partners.”
Exam Question - Winter 2007

Examiner’s Comments:

“(b) The standard of the replies were generally much below expectations. The benefits which accrue from a B2B model are significant reductions in costs and paperwork, more efficient inventory management, just-in-time manufacturing, elimination of rogue purchases, more rapid launching of products in the market and closer interfacing with the customers.

(c) The performance in this part of the question was extremely poor. The students were unaware of the barriers/limitations inherent in a B2B model. These barriers may be in the form of cultural barriers, lack of qualified personnel, absence of standards, employee indifference and week legal systems. It was observed that students explained general benefits and barriers of e-business models instead of explaining these with reference to B2B model under the given scenario.”
Adamabad is a large city of a developing country. The city government of Adamabad has passed a resolution in its last meeting to implement the G2C e-commerce model to facilitate its citizens. In this regard mayor of the city has invited leading e-commerce consultants of the country to give presentations on G2C e-commerce model.

**Required:**

Being one of the recipients of mayor’s invitation, you are required to prepare a presentation on G2C model which should include the following:

(a) Identify the benefits which Adamabad’s city government could achieve through G2C initiatives.  

(b) Brief explanation of potential challenges which may affect the realization of desired benefits to the city government and its citizens.

(4 Marks)  

(9 Marks)
Exam Question - Winter 2006

Examiner’s Comments:

“The second question regarding benefits and potential challenges to implementation of Government to Consumers (G2C) e-commerce model in a developing country, was relatively well attempted.

In part (a) the students were successful in identifying the benefits of implementing a G2C for a city such as more convenience to citizens, access to more information, lower costs, increased transparency, increased efficiency and ability to disseminate critical information on timely basis.

In part (b) most of the students only concentrated and mentioned issues like lack of infrastructure and end-user awareness. They overlooked the challenges of security, frequent updates and overall availability and integrity of data and system.”
Express Bank is a commercial bank operating throughout the country. The bank has a network of 150 retail branches, which offer various services to its clients. Operational performance of the bank has been reasonably satisfactory however potential for improvement exists. Recently, the President of the bank has been replaced and a seasoned banker with international experience has taken over. The new President is very much impressed by the technology infrastructure of the bank and believes that it can be leveraged to increase business as well as profitability. He also wants to develop alternative delivery channels of the bank to reduce reliance on branches. One way of achieving this objective has been identified as implementation of B2C strategy by offering Internet banking services to the clients. The President believes that this strategy would dramatically expand the customer base, increase bank’s reach and ultimately improve the bottom line.
(a) Briefly explain B2C strategy in the context of Internet banking. (2 Marks)

(b) Identify the main differences between conventional and Internet banking? (3 Marks)

(c) Identify four major risks that are associated with Internet banking? Specify at least one control to mitigate each type of risk. (8 Marks)
Examiner’s Comments:

“The question was about various aspects of Internet Banking.

Part (a) required examinees to explain ‘business to consumer' (B2C) strategy in the context of Internet banking. Most of the examinees concentrated on explaining B2C strategy alone, without reference to Internet banking.

Part (b) required examinees to elaborate main differences between conventional and Internet banking. Unfortunately some examinees restricted themselves to relief from physically visiting the branch and did not bother to explain other differences like paperless environment, logical security controls versus physical security controls, 24 X 7 banking etc.”
Examiner’s Comments:

“Part (c) was the most poorly attempted part. It required identification of major risks associated with Internet banking along with relevant controls. These risks include hacker attack, customer authentication, risk of repudiation and risk due to reliance on third party service providers. However, a number of examinees only mentioned hacking & denial of services as risks with antivirus and backup recovery plan as controls. Only few discussed about authentication of customer and none of them were able to mention about refusal of transaction. Most of the examinees tried to describe the general IT risks which can be associated with any IT environment and are not specific to Internet banking. This approach was not correct and was marked accordingly.”
Exam Question - Winter 2004

Pak Greetings Ltd. is a medium-sized company that produces and sells greeting cards and various gift items. It is planning to market its products on the Internet. You have been retained as a consultant to advise them on suitability of electronic payment system.

(a) Briefly describe the following systems, their target markets, advantages and disadvantages to Pak Greetings Ltd.:

(i) Payment through electronic cheques
(ii) Payment through credit cards

(b) Recommend which of the above should be adopted by Pak Greetings Ltd. keeping in view its nature of business

(5 Marks)

(1 Marks)
Exam Question - Winter 2004

Examiner’s Comments:

“This was a very practical question covering modern day and upcoming areas. It required students to have elementary knowledge of e-commerce related payment mechanisms. While most students correctly defined credit cards and identified them as an example of the B2C model, very few correctly defined electronic cheques and the associated mechanism, target market, etc. Similarly many students incorrectly recommended electronic cheques as the mode of payment to be selected by Pak Greetings Limited. Those who correctly identified credit cards as the mode of payment did not give any reason for their recommendations, lost marks on that account.”
The advances made in information and communications technologies over the last few years have made it possible to interact with the citizens in a faster and economical way. Citizens are also becoming more aware and knowledgeable of their environment and their demand for information and expectation of services from government has increased manifold. The advent of the Internet has made awareness of government information and government services accessible and available to citizens across borders.

The key forces of change including globalization, the rise of knowledge economies and new technology are transforming the relationship between government, business and society. Public attitudes and expectations of government are changing quickly. Governments around the world are responding to the information age society and Pakistan is no exception. Government of Pakistan has initiated a number of e-Government Projects. This is guided by a vision, which describes objectives of e-Government.

Briefly explain the objectives of e-Government and how it can improve service deliveries to citizens. (8 Marks)
Exam Question - Winter 2004

Examiner’s Comments:

“This question clearly required students to demonstrate how aware they were of the developments taking place with regard to e-government which also includes an important aspect of the B2G/C2G model of E-commerce. Students failed to adequate define/identify the two main objectives of E-government, i.e. improve service delivery to citizens and improve the internal efficiency of government operations, and the several related minor objectives. The second requirement of the question on how service delivery could be improved was very poorly attempted. Few students identified improvement measures such as automating routine functions; reducing time and effort on search, retrieval and dissemination of information within the government; creating synergies between government functions by deploying IT enabled applications/systems; and providing IT training to enhance skills of government employees.”
Good Employers Limited (GEL) is a marketing and distribution company with offices of varying sizes located all around the country. GEL is planning to improve its staff turnover, which is already lowest in the industry. They are also aiming at improving employee morale and loyalty. Human Resource (HR) Manager has been given the task of redefining company – employee relationship. Management, however, is not interested in giving any raise or extra benefits as they consider pay packages to be on the higher side in comparison with the market.

Identify how and where an e-business model can help GEL in achieving the redefined target and also identify technological and human barriers to introducing such technologies in the company.

(10 Marks)
Examiner’s Comments:

“Most of the candidates did not even mention that Business to Employee (B2E) model would be helpful in this case. A number of candidates were struggling around B2C model and Sales Force Automation. Even the candidates, who managed to mention the name of B2E model, were unable to define it properly and to answer as to how it can help GEL in this issue. Human barriers were generally well defined but the technological barriers were not properly defined by most of the candidates. This question was answered by a majority of candidates in very general terms. In this respect, a few of the candidates appeared to be psychiatrists instead of accountants.”
Lecture Supplements

- *Electronic Payments Primer*
  National Electronic Commerce Coordinating Council

- *E-Commerce, Electronic Payments*
  A. Koponen

- *COBIT Security*