Application of E-Auction in University's Text Book Purchasement

by

Noor Aatifa Mohd Fadzli

Dissertation submitted in partial fulfillment of
the requirements for the
Bachelor of Technology (Hons)
(Information System)

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CERTIFICATION OF APPROVAL

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A project dissertation submitted to the
Information System Programme
Universiti Teknologi PETRONAS
In partial fulfillment of the requirements for the
BACHELOR OF TECHNOLOGY (Hons)
(INFORMATION SYSTEM)

Approved by,

_____
(Mr Mohd Noor Ibrahim)

UNIVERSITI TEKNOLOGI PETRONAS
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JAN 2006

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

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(NOOR AATIFA MOHD FADZLI

ABSTRACT

This paper focuses on the design and implementation of the online auction of university's text book and the way to promote trustworthy of using it. The paper considers three main problems such as no stop center to collect and resell the second hand text book among universities in Malaysia, inappropriate price of second hand text book and not enough information about second hand text book. The interesting problem is lack of trustworthy in using online auction among Malaysian. The research examines cryptography technology to establish a new auction model which verifies every step of the auctioneer. Analysis results demonstrate that the proposed model satisfies various requirements included fairness and privacy.

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INTRODUCTION

1. INTRODUCTION

1.1 Background of Study

The Oxford Dictionary defines an auction as a "public sale in which articles are sold to maker of highest bid." In this paper the term "auction" is used to describe both offering to sell and bidding to buy.

"Four basic types of auctions are used when a unique product or service is to be bought or sold: the English auction (also called the oral, open, or ascending-bid auction); the Dutch (or descending-bid) auction; the first-price sealed-bid auction; and the second-price sealed-bid (or Vickery) auction. The English auction is the auction form most commonly used for the selling of goods. In the English auction, the price is successively raised until only one bidder remains. The Dutch auction is the converse of the English auction. The auctioneer calls an initial high price and then lowers the price until one bidder accepts the current price. With the first-price sealed-bid auction, potential buyers submit sealed bids and the highest bidder is awarded the item for the price he bids. Finally, under the second-price sealed-bid auction, bidders submit sealed bids having been told that the highest bidder wins the item but pays a price equal not to

his own bid but to the second highest bid"(Vickrey, 1961, p.2). Dutch auction is chosen because it is suitable for the students.

Electronic auctions, therefore, have become promising examples of B-to-C electronic commerce. Yahoo!Auction (http://auctions.yahoo.com/) and eBay (http://www.ebay.com) are two successful examples.

e-Auction come-out with the idea of to build mechanisms that make it simple to buy or sell goods online. The auction offers a variety of benefits including reducing costs by simplifying or eliminating human involvement in processing and fulfilling orders. In today's context, e-Auctions present dynamic marketplace that operates 24 hours a day, seven days a week. The application is developed as many university students demand for second-hand text book. Unfortunately, it is not an easy job to buy the second hand book from previous student. The buyers have to walk around whole campus just for a book.

The main objective of the application is to satisfy the students' needs and demands. Basically, the text books are a main element in learning activities at university and students perceive them as a need. The electronic auction application is targeted for university students in Malaysia to buy and sell the second-hand text book. The application is separated into two types of user which are customer and administrator. System administrator comes from Student

Representative Council or MPP members for each university. Each user has different sites or pages. Customer has no privileges to view administration site due to maintain security of the application but the administrator can link to the customer sites from the administration site. Customers will display description of available books offered by the application.

After reviewing the book's detail in homepage, customers select whether to buy or sell the book. Customer who would like to sell second hand text book can skip the books' detail page as the page is mainly dedicated for buyers to choose the desired book to be bided. For the new customers, they need to get first authorization to enter the system. They must enter details and username in register form. The most important information required to be filled in is email address as the administrator will send the password to the customer via email. The buyers will be directed to bid page based on category and auction item chosen. The buyers place the bid value exceeds the reserve price for the selected book. The back-end system will calculate the highest bid during the close date. The successfully bidder will be notified as soon as possible through email. In the email, customers are requested for payment to be made within certain duration otherwise the buyer is considered as not interested to continue owning the book. The payment method used in the system is debit card as it offers many benefits to the target customers. Once the payment has been received, the system will deliver the book to the highest bidder by courier service. If the book comes from buyer's university, the book will be delivered manually to the buyer's room by the administrator due to promote cost efficiency.

Sellers has similar requirement as buyers do. If they are new to the system, they need to register and acquire the password from the system administrator. After being authorized user, they have privilege to sell the book. As the book appears virtually to the buyers, the sellers need to enter the item information and upload its picture. The information is useful for buyers to make choice. The book's information will be displayed in the homepage.

Administrators can perform process closings, change their password and send email to the customer as a notification of any event. Besides, they can add and delete category of auction items, add and delete auction items, view top three bids and send passwords to the new customers.

1.2 Problem Statement

1.2.1. Problem Identification

1.2.1.1 No Stop Center

There is no a stop center to collect and resell the second-hand of university's text book in Malaysia. But, the demand for second-hand text book is quite high. As students, they have to spend money wisely. A brand new text book costs almost RM70, if they have to buy 6 or 7 text books simultaneously, the accumulated price is up to RM420 or RM490. Students who survived to live in university using only small amount of loans with fairly high in interest will suffer.

Students have to walk from one room to another rooms or one block to another blocks to search for the second-hand text book. The students didn't know which room has a book to be sold. Thus, they have to take a risk, walking to stranger's room hoping somebody to sell the needed second-hand text book. The scenario above, describing how hard a university's student obtained a second-hand text book from their previous batch.

1.2.1.2 Inappropriate Price of Second Hand Text Book

The second-hand text book's price is controlled by the owner of the book (previous batch). Since no fixed price imposed by an authorized body, the irresponsible party will charge the book with inappropriate price. They gained advantage over the students who didn't know the actual price of brand new book. As a result, the students buy the second-hand text book which priced almost similar with the price of brand-new text book.

1.2.1.3 Lack of Internet Trustworthy

Auction sites are facing challenges arising from the intrinsic properties of the Internet. Since the net is a black box to bidders, they cannot verify the remote processes run by the auctioneer as they can in a traditional auction. Moreover, they worry about the leaking of personal information such as bid values by the auctioneer to the bidders' competitors who could unfairly take advantage.

The Internet is a public medium so all bid transmissions are exposed to attack in the middle including various forms of eavesdropping and tampering. In addition to privacy infringement, an auctioneer might also infringe the fairness principle by failing to return goods or receipts which problem is a major issue for auction sites.

Despite many research focusing on electronic payment over the Internet, current payment instruments have not been met with buyers' confidence according to several survey reports. In the fraud research by CyberSource, 28% of the respondents reported experiencing frauds involving stolen credit cards. These concerns lead to distrust that prevents some Internet users from participating in Internet auctions.

1.2.2 Significant of the Project

1.2.2.1 Provide One Stop Center

The project recommended as a medium of a stop center to collect and resell the second-hand text book among universities in Malaysia

Figure 1 : Map of Universities in Malaysia

The map above indicated there are several universities existed in Malaysia. Almost every state has university. In addition to the map, there are many other public and private universities and also colleges in Malaysia.

Public universities:

- Universiti Utara Malaysia (UUM)
- Universiti Malaya (UM)
- Universiti Malaysia Sabah (UMS)
- Universiti Malaysia Sarawak (UNIMAS)
- Universiti Sains Malaysia (USM)
- Universiti Teknologi Malaysia (UTM) Skudai, Johor
- Universiti Kebangsaan Malaysia (UKM)
- Universiti Putra Malaysia (UPM) Serdang, Selangor
- Universiti Teknologi MARA (UiTM)
- Universiti Pendidikan Sultan Idris (UPSI)
- International Islamic University Malaysia (IIU)

Public university colleges:

- Kolej Universiti Teknikal Kebangsaan Malaysia (KUTKM)
- Kolej Universiti Kejuruteraan Utara Malaysia (KUKUM)
- Kolej Universiti Teknologi Tun Hussein Onn (KUiTTHO)
- Kolej Universiti Sains & Teknologi Malaysia (KUSTEM)
- Kolej Universiti Islam Malaysia (KUIM)
- Kolej Universiti Kejuruteraan & Teknologi Malaysia (KUKTEM @ UTEC)

Private universities:

- Curtin University of Technology Sarawak Campus
- International Medical University (IMU)
- Lim Kok Wing University College of Creative Technology (LICT)
- Monash University Malaysia Campus
- Malaysia University of Science and Technology (MUST)
- Multimedia University (MMU)
- Open University Malaysia (OUM)
- University of Nottingham Malaysia Campus (UNiM)
- Universiti Tunku Abdul Rahman (Utar)

- Universiti Tun Abdul Razak (UNITAR)
- Universiti Teknologi Petronas (UTP)
- Universiti Tenaga Nasional (UNITEN)

Private colleges:

- Australian International School, Malaysia
- HELP University College(Higher Education Learning Program)
- Kolej Tuanku Ja'afar
- Kolej Yayasan UEM
- LaSalle International Design School
- Malaysia France Institute
- Malaysian Institute of Art (MIA)
- Malaysian Institute of Management (MIM)
- Mahsa College
- Mantissa Institute
- Metropolitan College
- MSC International College (MSC)
- MTDC Multimedia Academy
- Nilai College
- Nirwana Institute
- Olympia College
- The One Academy
- Tunku Abdul Rahman College
- Penang Medical College
- Prime Group of Colleges
- PTPL College
- Reliance College
- RIMA College
- SAE Institute Malaysia
- Sentral Education Group
- University College Sedaya Internationl(UCSI)
- Sepang Institute
- Southern College(Kolej Selatan)

- Stamford College
- Sunway College
- Systematic Institute
- University of College Technology & Management Malaysia
- Taylors College
- Telekom Training College
- TPM Academy

E-auction focuses on collecting the second hand text books from all universities in Malaysia and become a stop center to resell it to the universities' students with relevant price. The main purpose is to assist the students who come from medium class group in buying the text book. As a fact, most of the text books used in Malaysia's universities are imported. Hence, the price is almost above RM40. Students in this group have to seek an alternative to spend less and save the money for future used.

Sometimes, the books are not fully utilized during lecture session but essential for self-reference or group discussion. Therefore the books are still in good condition and reusable for the next students. Moreover, most books practically used within one semester period which approximately 5 months. Some books still look like a brand new book.

1.2.2.2 Offer Low Price

The study applies the *Supply and Demand Theory.* The theory describes how prices vary as a result of a balance between product availability at each price (supply) and the desires of those with purchasing power at each price (demand). Supply is defined as the quantity that producers are willing to sell at a given price. In other hands, demand is defined as the quantity of a good that consumers are not only willing to buy but also have the capacity to buy at the given price. When supplier has gained the supply of the second-hand text book from many universities in Malaysia, the supply is said to be increased.

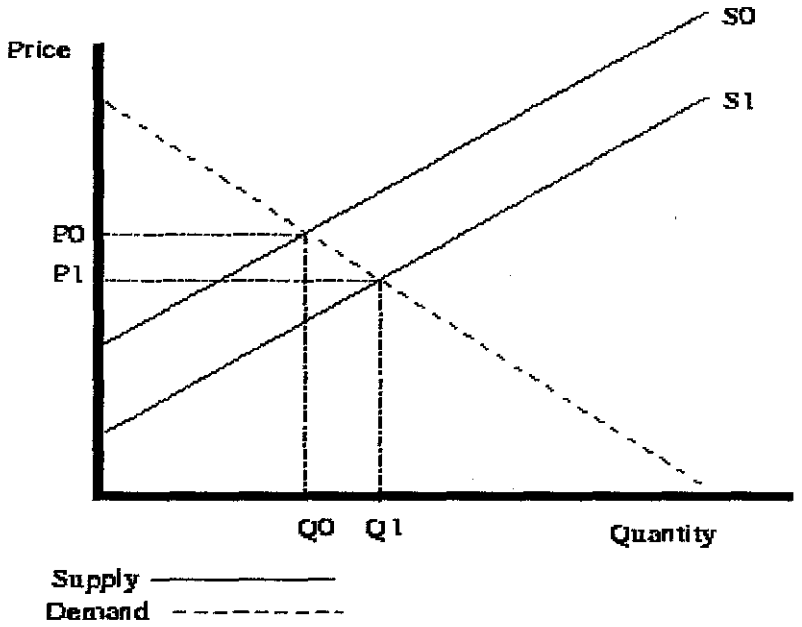

Figure 2: Supply and Demand Graph

Suppliers will be willing to supply more books at every price and this shifts the supply curve S0 to the right, to S1, an *increase in supply*. This causes the equilibrium price to decrease from P0 to P1. The equilibrium quantity increases from Q0 to Q1 as the quantity demanded increases at the new lower prices. In the case of a supply curve shift, the price and the quantity move in opposite directions.

1.2.2.3 Supply a Wide Range of Choices

The system supplies many choices of second-hand text books to the students due to the books come from several universities in Malaysia not only from one university. Even though, no integrated co-curriculum is practiced among universities in Malaysia, similar title of text books still commonly used in most universities. To decide which books to be used in the class, lecturers will look at book's title used by previous lecturers or lecturers from other universities. If the content of the books satisfy the most of the syllabuses of the course, they will simply use the text books. As a result, there will be a common text books used among universities in Malaysia. That is why the system is applicable for students from several universities around Malaysia.

1.2.2.3 Provide Appropriate Information

The system has an information page of second-hand text books. In the page, there are title, author(s), publisher, edition, and short description of second-hand text books. The information is essential for students to learn the product before they bid for the book.

1.2.2.4 Support Fairness of E-Auction

This study proposes the notion of verifiable fairness to avoid the weaknesses brought by the black-box of Internet. Fairness is defined as a state satisfying a collection of auction policies which a bidder gains no advantage over others. The following properties concerning fairness are required for Internet auction:

Property 1: Privacy before bidding. A bidder cannot know the bids of others before bidding.

Property 2: Deadline enforcement. The submission deadline is strictly regulated so that no one can bid when bid submission ends.

Property 3: Bid integrity. During transmission and processing of bids, no bid will be extracted or tampered.

Property 4: Privacy of losing bids. No one can learn the content of losing bids.

1.3 Objective

The goal of this system is to design e-Auction Application for selling and buying second hand text book among universities' students in Malaysia. Our system is specifically aimed to assist the target user in acquiring second hand text book in easier, faster, and efficiency way.

The system's objectives are to promote:

- ☐ Easy

  Before the e-Auction application of second-hand text book introduced, the students have to walk around the campus to find the second-hand text book. As we are aware, second hand text books offer cheaper price relative to new text book. Thus, the situation creates the high-demand of the second text book. If the students can get the same content of the text book but with lower price, why they should pay more? The system provides a platform to sell and buy the books using an auction option that requires students to put less effort in obtaining the book.

Now, the students have to be online to enter into system's site, click some buttons and finally wait for the back-end system to process the rest of transaction within certain periods of time. Later, the system will communicate to the customer via email service and deliver the products by courier service.

The system requires no special card for accepting payment from the customers. By common bank card and card reader machine, the customers can complete the transactions and possess the book for whole life.

☐ Fast

Online auction system attribute doesn't require people to be in physical auction center at specified time to conduct an auction. The students who would like to sell or buy the book can still sit in the rooms, face the computer's screen while doing some other jobs or assignments. The transaction takes less effort and less time-consuming.

☐ Availability

The e-auction offers the students to conduct auctions in anytime and anywhere has internet connection because the system is available for 24 hours per day, seven days per week. The traditional auction doesn't offer the benefit to the customers. The customers need to go to the auction center at specified time or otherwise they will miss the opportunity to bid for the goods.

☐ Efficiency

The system is conducting in distributed network environment. The system will check the location of the seller of selected book and the buyer. If the system detects that they are within same university, then it will use manual delivery to promote cost effectiveness and eliminate unnecessary courier delivery costs.

1.4 Scope of Study

The area of study focuses on auction transactions and payment methods.

1.4.1 Auction Transactions

Like most auction companies, e-Auction does not actually sell goods that it owns itself. It merely facilitates the process of listing and displaying books, bidding on items, and paying for them. It acts as a marketplace for individuals who use the site to auction off book.

The system has to ensure accurate calculation of successful bidder. An incompleteness system of e-Auction can cause inaccuracy and inefficiency of overall transaction. Besides, it has to maintain the overall security of transaction and atomicity. That is, if customer buys a book, the security and atomicity system will ensure that customer will receive the book if and only if the money is transferred to the account. That does explain how important wholeness and united automated system in maintaining the effective application.

1.4.2 Payment Methods

Like traditional commerce, electronic commerce also required payment to be made but the methods are different. The e-Auction offers to make payment by using debit card method and as most of the students have bank card (ATM card), therefore the system accepts bank card as a debit card. Debit cards authorize e-Auction system to debit customers' bank account electronically. To complete a debit card transaction, customer may have to use a personal identification number (PIN). The money for debit purchases is transferred almost immediately from customer bank account to the system's account. Customers can now shop even if there is no cash in wallet or purse.

As good as cash, e-Debit gives customers the convenience and safety of cashless payments and shopping. The usage of Personal Identification Number (PIN) allows for security and swift payment transactions. When customer shop and pay with bank card, customers are actually paying with their own cash. They can be sure there will be no bills to settle later. They can even manage expenses better as the payment is automatically debited directly from your savings or current account.

They will know how much they are spending each time and this will help to avoid over-spending. When customers enter their PIN at the point of payment, the system checks their account to see if they have sufficient funds. The minute they key in their PIN, their purchases are paid for and their account is debited.

CHAPTER 2
LITERATURE REVIEW

2. LITERATURE REVIEW

2.1 Debit Card Payment Method

According to a Bank Negara report, cheques accounted for 95.65% of the total non-cash payment value in Malaysia last year, while credit cards accounted for only 3.03%. The report also said the value of e-purse transactions, mainly for toll payment via the Touch n Go card, accounted for 0.06%.

The total transaction value of credit card, charge card and debit card to non-cash payment value accounted for 3.03%, 0.16% and a negligible percentage, respectively as at end of 2004. The report said the potential for paying by card, especially debit cards, was huge as it accounted for only 0.21% of the total volume last year.

Debit cards are also known as check cards. Debit cards look like credit cards or ATM (automated teller machine) cards, but operate like cash or a personal check. Debit cards are different from credit cards. While a credit card is a way to "pay later," a debit card is a way to "pay now." When using a debit card, money is quickly deducted from checking or savings account.

Debit cards are accepted at many locations, including grocery stores, retail stores, gasoline stations, and restaurants. The card can be used anywhere merchants display the card's brand name or logo. They offer an alternative to carrying a checkbook or cash. Many banks are replacing their standard ATM cards with upgraded ATM cards with a debit feature.

2.1.1. Benefit of Debit Cards:

- Obtaining a debit card is often easier than obtaining a credit card.
- Using a debit card instead of writing checks saves customer from showing identification or giving out personal information at the time of the transaction.
- Using a debit card frees customer from carrying cash or a checkbook.
- Using a debit card means customer no longer have to stock up on traveler's checks or cash when travel.
- The debit card is a quick, "pay now" product, giving customer no grace period.

2.2 Benefits of Online Auctions to Sellers

For sellers, the benefits of auctions consist of selling merchandise quickly, easily, at low cost, and at sometimes premium prices. Even old, damaged, returned, and refurbished merchandise can be unloaded. Furthermore, new markets are established and a company's customer base can be enlarged. The widespread availability of outsourcing various online auction services has probably contributed to this growth in online auction selling. Everything from software applications to fulfillment services, to setting up front- and back-end operations can be bought from companies like Bidland.com, AuctionWatch.com, and SellXS.com for a small fee or percentage of sales (Reda, 2000; Warner, 2000). Another company, Andale, will set up a seller's auction listing, process credit card payments, and assist with inventory and accounting as well (Freedman, 2000). Even vendors such as Microsoft and IBM are adding auction modules to existing e-commerce software programs (Oberndorf, 1999).

Based on the available research, Internet auction sellers have cited the following reasons for using online auctions:

- To unload discontinued, returned, damaged, or overstocked goods (Collett, 2000; Reda, 2000).
- To test prices in order to see what the market will bear (Collett, 2000).
- To acquire new customers (Machlis, 1998) and keep new customer acquisition costs low (Warner, 2000).
- To sell quality, designer goods at a discount, appealing to the "price-only" shoppers (Warner, 2000).
- To generate excitement about an online site and to involve customers in an interactive sense (Oberndorf, 1999).
- To connect with buyers in real time (Reda, 2000).
- To complement traditional brick and mortar businesses and enhance retail store values (Colombo, 2000).
- To give seasonal products a broader year-round appeal (Lewis, 2000).

2.3 Benefits of Online Auctions to Buyers

For buyers, online auctions represent 24-hour availability seven days a week, instant gratification, and interactivity (Hoffman and Novak, 1996). This interactivity sometimes allows customers more control over price and product/service customization. Increased learning about a product category may also be a positive outcome (Hoffman and Novak, 1996; Van den Poel and Leunis, 1999). Consumer search costs can be reduced dramatically even while the number of available options increases, adding to both convenience and savings (Machlis, 1998). In addition, purchasers may pay lower prices, with industrial buyers saving 6-15 percent or more by opening up their purchasing processes to online auctions (Woolley, 1998). As a result of these benefits, the number of online auction purchasers is expected to increase to 6.5 million in 2002 (from 1.2 million in 1998). eBay alone has 38 million buyers and sellers who trade on its site (Hof, 2001).

2.4 The Size and Nature of Online Auction Sellers (eBay)

An increasing number of retailers, manufacturers, and liquidators are using eBay to unload returned and refurbished merchandise, not just to sell discounted goods. The corporate giants in the consumer electronic, computer, and automobile industries have been drawn to eBay because of the explosive growth in online auctions. For example, eBay currently lists more than 130,000 computer items, 6,000 cameras, and over 7,000 sweaters (Freedman, 2000).

Even so, some smaller auction sites have adopted niche-marketing strategies in order to survive. For example, the Boyds & Bears Auction Board (www.bearauction.com) sells more whimsical gifts, while Phoebus Auction in Virginia specializes in upscale classic collectibles and antiques (Millman, 1998, p. 77). In total, however, both the depth and breadth of product lines available via Internet auctions are still increasing. Clearly, large differences in the size and scope of online auction sellers exist.

The Internet was supposed to allow both small and large businesses to compete successfully online, yet only 30 percent of small companies even have some sort of Web sales capability, according to the US Small Business Administration (Freedman, 2000). Among sellers who do engage in online auctions, either directly or via third party auction houses, small companies have a presence, but variations in company size and strategies often exist.

For example, online auction sellers consist of both "microbusinesses" and large corporate sellers. Microbusinesses refer to a relatively new class of "tiny enterprises" or entrepreneurs who have successfully maneuvered the online marketplace (Freedman, 2000). Sometimes a single individual operating out of a home – with no inventory, overheads, or business acumen – can set up online selling opportunities simply by using third party auctions or setting up their own auctions using available services. Even small businesses with online sales capabilities could be threatened by the low cost and rapid response of microbusinesses if they do not adequately differentiate themselves (Freedman, 2000).

The corporate merchants have been drawn to eBay because of the explosive growth in the online marketplace (Wingfield, 2001). These large corporations (e.g. JCPenney, Circuit City, Disney, IBM, US Postal Service, Xerox) differ from microbusinesses not only in terms of company size, but also in terms of product offering. And even though eBay charges corporate sellers the same amount as small sellers to list items, eBay also gives some of its big sellers promotional perks that its smaller sellers do not receive. For example, Sun, Xerox, and IBM are all given top billing in eBay's computer area, and Disney has a special area on the eBay site to merchandise Disney products (Wingfield, 2001). Despite complaints from some smaller vendors, eBay continues to assert that it treats all sellers fairly and that average prices and profits are rising. Ultimately, both small and large auction sellers are exposing their products to millions of customers in order to achieve their business objectives.

It has been argued that, in online selling, size does not matter. Clearly, many of the aforementioned benefits related to online auctions could apply equally to small and large online sellers. The effects of firm size have been the focus of a great deal of research in strategy, organizational behavior, and entrepreneurship, however. And many significant differences between small and large companies have been discovered. The emergence of e-commerce, in particular online auction selling, may mitigate some of these effects. Furthermore, company size, if it does have an impact, may not be in the traditional ways (e.g. resource availability, customer responsiveness, strategy type, formalization, centralization, etc.).

Existing studies have examined the relationship between company size and multiple uses of the Internet (e.g. e-mail, home pages, industry analysis, etc. (Haynes *et al.*, 1998)) or the perceived benefits of the Internet across firms of various sizes (information access and dissemination, increasing sales, customer support, etc. (Auger and Gallaugher, 1997)). In the specific case of online auctions, however, company size issues have been examined only in relation to Internet buyers rather than sellers. For example, in a survey conducted by the National Association of Purchasing Management and Forrester Research, large-volume buyers used online auctions to buy goods and services more than twice as much as small-volume buyers did (Faloon, 2001). Yet no research to date has examined size-related differences among firms engaged in Internet auction selling.

2.5 A Trustworthy Internet Auction Model with Verifiable Fairness

Several works employ the secret sharing concept to divide bids into n auction servers (Franklin and Reiter, 1995; 1996; Kikuchi *et al.,* 1999; Sako, 2000). Bidders in these solutions must completely accept the threshold assumption but cannot verify fairness with evidence. In Sako's work (2000), for example, privacy of losing bids is preserved because the decryption functions of these bids are shared among n servers. Protection of losing bids requires at least k correct servers under the threshold assumption, which bidders are unable to verify.

Nurmi proposed a different approach in that an auctioneer can only accept encrypted bids but has no right to compare bids; rather, bidders compare their bids and determine a winner among themselves (Nurmi, 1994). This approach might maintain privacy of losing bids, as no one including the auctioneer can learn the content of bids. Unfortunately, if a bidder cheats by claiming himself the winner, other bidders cannot verify this result. Therefore, Nurmi's approach does not ensure validity, which also leads to fairness infringement.

In Kudo's method, functions of an auctioneer are realized in three service providers. An auction service provider is responsible for determining the winning bid among encrypted bids. The decryption key is under the control of a key service provider, which is assumed never to leak the key until the time when the service provider certifies that the deadline has passed (Kudo, 1998). This premise hardly convinces remote bidders who distrust an auctioneer, even when its functions are dispersed into several parties.

In the verifiable auction model proposed by Naor *et al.* (1999), a seller sends an auctioning program to the auctioneer through a cut-and-choose procedure. This program accepts encrypted bid prices from bidders and generates the winner and the winning price. The encryption achieves privacy and verifiability because all can validate the result with the program that may be released after auctioning. However, if a seller conspires with the auctioneer, the content of bids will be disclosed.

CHAPTER 3
METHODOLOGY

3. METHODOLOGY

3.1 Procedure Identification

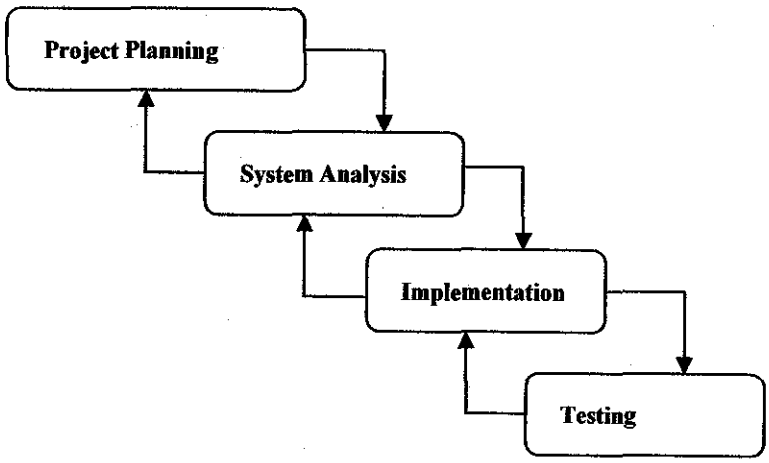

Figure 3 : Waterfall Model

In order to establish a high-level view of the intended project, the system required to build a Project Planning. After planning, refining project goals into defined functions and operation of the intended application and analyzes end-user information needs in System Analysis phase. System Design is meant for describing desired features and operations in detail, including screen layouts, and process diagrams. When finishing the design phase, the real code is written during Implementation phase. Finally, in the Testing phase, all the pieces are brought together into a special testing environment, then checking for errors, bugs and interoperability is done.

3.1.1 Project Planning

The first step in developing the e-Auction application is to interview the potential users and ask the features to be included in the application. This comprises the important input for defining the capabilities of the application.

There are two level of users of e-Auction applications: administrators and end users who sell or buy the book using their Web browsers. After interviewing administrators and end users, the next step is to define application requirements.

3.1.1.1 End User Requirements

End user features that facilitate the enjoyment of Internet auction might include the following:

- Users should be able to use the e-Auction application from any Web browser supporting HTML 3.2 (or later) and cookies.
- Customers who new to the site should be able to register by themselves. Users will be differentiated by unique user identifiers.
- Site visitors should be able to sell and buy books via the electronic store.
- Users should be able to view a complete list of second hand text book available through the site.
- Users should be able to view the current highest bid.
- Large numbers of users should be able to use the application simultaneously.
- The performance of the application should not degrade with an increase in the number of the books offered.

3.1.1.2 Administrator Requirements

Administrators who manage the site have specific requirements of their own:

- Administrators should be able to manage e-Auction applications using Web browsers.
- Administrators should be able to delete categories and auctions' item.
- Administrators should be able to view top 3 bidder.

3.1.1.3 Software and Hardware Requirements

The system is created using the ASP, Microsoft Access, Macromedia Dreamweaver MX 2004, Macromedia Flash MX and Adobe Photoshop. Harwares required are database server, Ethernet, printer, router, firewall, and debit card reader.

3.1.2 System Analysis and Design

3.1.2.1 System Architecture

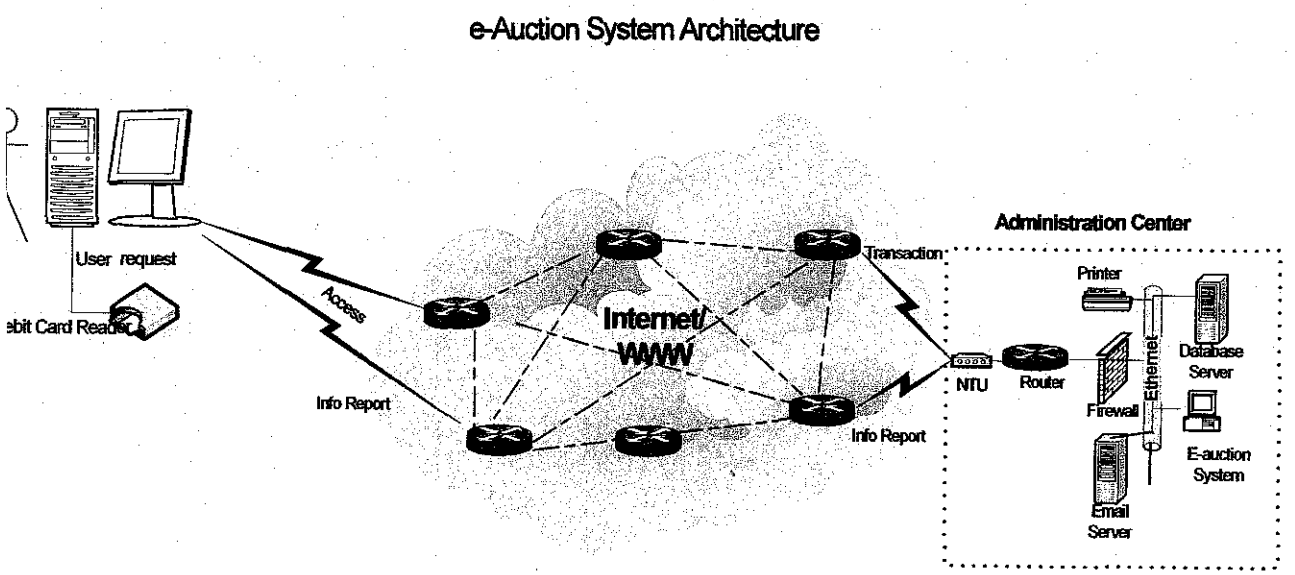

Figure 4: System Architecture

3.1.2.2 Flow Chart Diagram

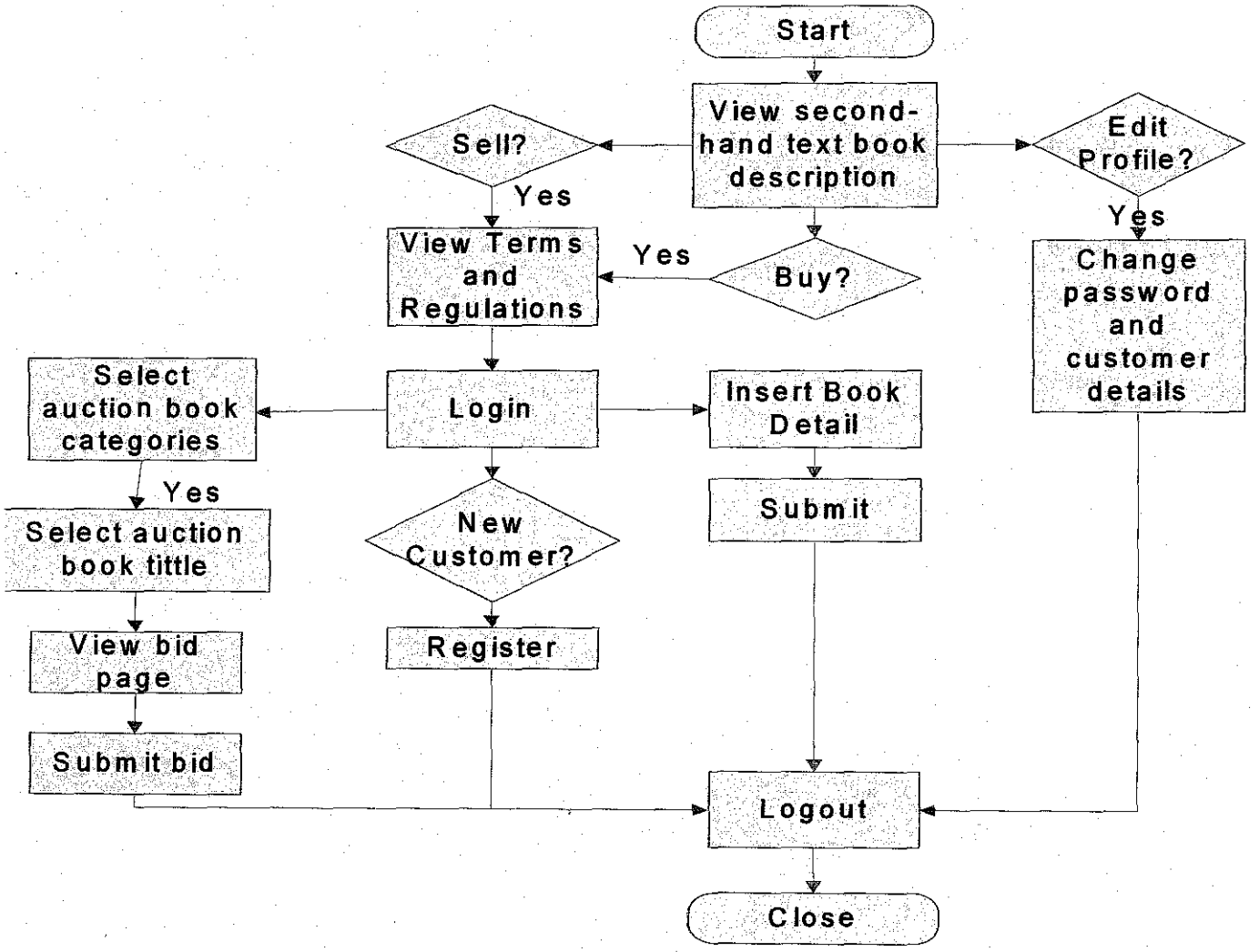

Figure 5 : Flow Chart Diagram

3.1.2.3 UML: Use Cases

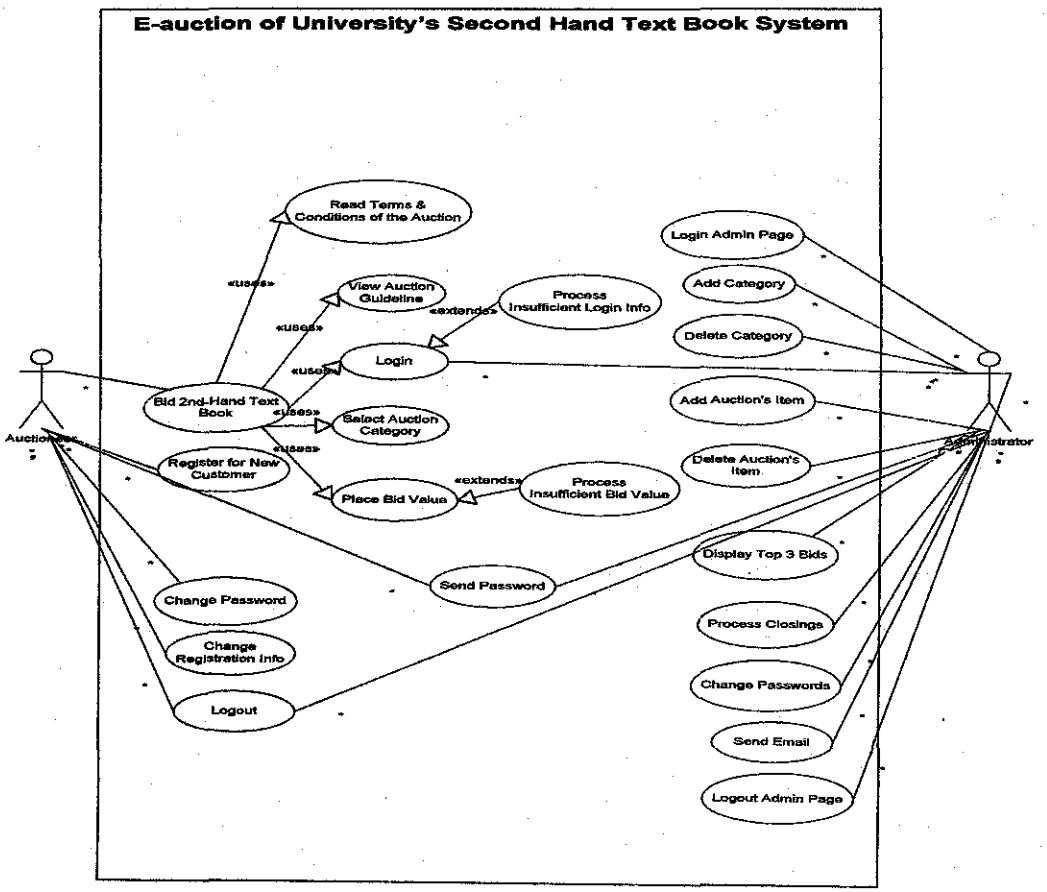

Figure 6: Use Case

3.1.2.4 UML:Class Diagram

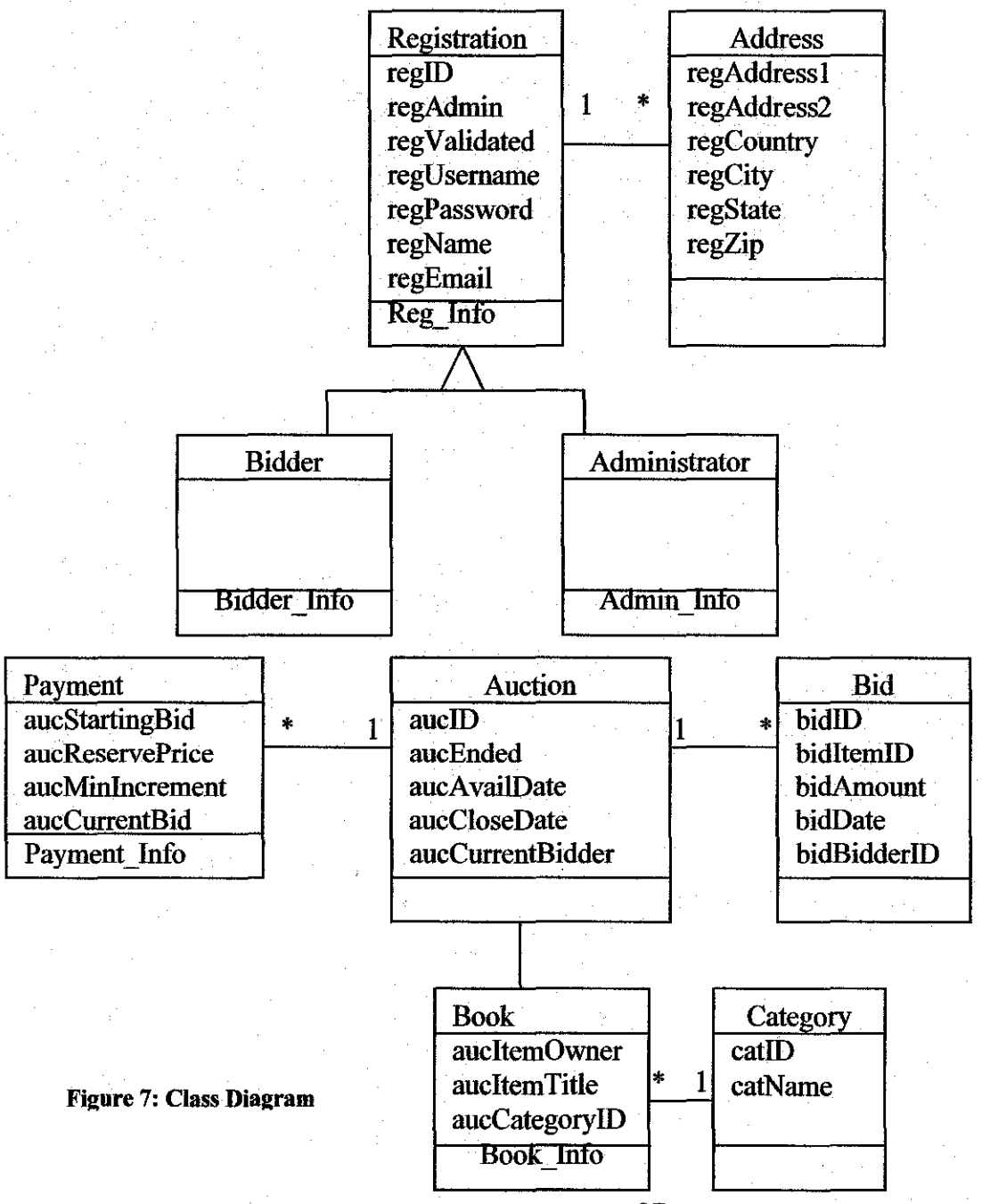

Figure 7: Class Diagram

The interfaces of the system's prototype are attached in Appendices page.

3.1.3 Implementation and Testing

3.1.3.1 Sending email

```
<!-- #include file="QALib.asp" -->

<!-- #include file="QAAdmConfig.asp" -->

<%




sCommand = RequestValue("CMD")

sErr = ""

If IsLoggedOn Then

        DoPageHeader

        TableHead GLS_AdmSmlTitle

        Response.Write "<TABLE BORDER=""0"" CELLPADDING=""3""
CELLSPACING=""0"" WIDTH=""100%"">"




        Select Case UCASE(sCommand)

            Case "EMAILFORM" :
```

```
                    EmailForm
                Case "SENDEMAIL"
                  If Len(Trim(RequestValue("TO"))) = 0 Then
                    sErr = sErr & GLS_AdmSmlErrTo
                  End If
                  If Len(Trim(RequestValue("SUBJECT"))) = 0 Then
                    sErr = sErr & GLS_AdmSmlErrSubject
                  End If
                  If Len(Trim(RequestValue("BODY"))) = 0 Then
                    sErr = sErr & GLS_AdmSmlErrBody
                  End If
                  If Len(Trim(sErr)) = 0 Then
                      SendEmail
                    Else
                      EmailForm
                    End If
                Case Else :
                    EmailForm
End Select

Response.Write "</TABLE>"
```

```
                TableFoot

                DoPageFooter

        Else

                Response.Redirect "QAAdmin.asp"

        End If


        Sub EmailForm

                Response.Write "<FORM METHOD=""POST"" NAME=""EMAILFORM"" ACTION=""QAAdmSendEmail.asp"">"

                Response.Write "<TR><TD COLSPAN=""2"">" & gsAuctionTextOpen & GLS_AdmSmlFormTitle & gsAuctionTextClose & "</TD></TR>"

                If Len(Trim(sErr)) > 0 Then

                  Response.Write "<TR><TD COLSPAN=""2"">" & gsErrorTextOpen & sErr & gsErrorTextClose & "</TD></TR>"

                End If

                Response.Write "<TR><TD>" & gsLabelOpen & GLS_AdmSmlToPrompt & gsLabelClose & "</TD>"

                Response.Write "<TD><INPUT TYPE=""TEXT"" NAME=""TO"" VALUE=""" & RequestValue("TO") & """>"

                Response.Write "</TD></TR>"



                Response.Write "<TR><TD>" & gsLabelOpen & GLS_AdmSmlSubjectPrompt & gsLabelClose & "</TD>"

                Response.Write "<TD><INPUT TYPE=""TEXT"" NAME=""SUBJECT"" VALUE=""" & Server.HTMLEncode(RequestValue("SUBJECT")) & """>"

                Response.Write "<INPUT TYPE=""HIDDEN"" NAME=""cmd"" VALUE=""sendemail"">"
```

```
                Response.Write "</TD></TR>"


                Response.Write "<TR><TD VALIGN=""TOP"">" & gsLabelOpen & GLS_AdmSmlBodyPrompt & gsLabelClose & "</TD><TD>"

                Response.Write "<TEXTAREA NAME=""BODY"" ROWS=""15"" COLS=""55"">" & Server.HTMLEncode(RequestValue("BODY")) & "</TEXTAREA><BR>"

                Response.Write "<INPUT TYPE=""SUBMIT"" VALUE=""" & GLS_AdmBtnSend & """>"

                Response.Write("</TD></TR></FORM>")

        sCrLf = Chr(13) & Chr(10)

        Response.Write(sCrLf & "<SCRIPT LANGUAGE=""JavaScript"">" & sCrLf & "<!--" & sCrLf & "document.EMAILFORM.TO.focus();" & sCrLf & "// -->" & sCrLf & "</SCRIPT>" & sCrLf)

    End Sub


    Sub SendEmail

        Response.Write "<TR><TD COLSPAN=""2"">" & gsLabelOpen & GLS_AdmSmlSentTitle & gsLabelClose & "</TD></TR>"

        sTo = RequestValue("TO")

        sSubject = RequestValue("SUBJECT")


        SendEmailMessage sTo, gsAdminEmail, sSubject, sBody


        Response.Write "<TR><TD>" & gsLabelOpen & GLS_AdmSmlToPrompt & gsLabelClose & "</TD>"

        Response.Write "<TD>" & gsAuctionTextOpen & sTo & gsAuctionTextClose & "</TD></TR>"
```

```
                Response.Write "<TR><TD>" & gsLabelOpen & GLS_AdmSmlSubjectPrompt &
gsLabelClose & "</TD>"

                Response.Write "<TD><SMALL>" & gsAuctionTextOpen & sSubject & gsAuctionTextClose
& "</SMALL></TD></TR>"

                Response.Write "<TR><TD VALIGN=""TOP"">" & gsLabelOpen &
GLS_AdmSmlBodyPrompt & gsLabelClose & "</TD>"

                Response.Write "<TD><SMALL><PRE>" & sBody & "</PRE></SMALL></TD></TR>"

        End Sub

        %>
```

CHAPTER 4
CONCLUSION AND RECOMMENDATION

4. CONCLUSION AND RECOMMENDATION

As a conclusion, the application has offered selling the book with lower cost. It is due to satisfying Demand and Supply Theory. Thus, the application is hoped to help the students who have not enough money to buy new text books every new semester which cost almost RM 500 each semester. The online auction provides many benefits to the bidder but unfortunately, it is not so popular among Malaysian. Malaysian is lack of trustworthy of the online commerce as well as online auction.

For future enhancement, I would like to recommend owning remote server to locate database, email, and application. By owning the remote server, the application can communicate with outside world and can be used by people outside UTP.

The system is still lacking of uploading images and displaying images from database. In order to enable the system for uploading image (binary data) to database, I would suggest using Persits.Upload.1 component & Persits.Jpeg component. As the tools is powerful and easier to use.

As recommendation for payment method, I would like to join Maybank2u.com Merchant Programme. It is a strategic alliance that gives the opportunity to collect payments from customers via online.

Finally, as for the prototype, I have used Microsoft Office Access as database tool. For upgrading, I will convert to the old version into Microsoft SQL server database that has powerful queries and support a large data

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