

An Application of E-Commerce in Auction Process

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Abstract: Fast growing e-commerce (electronic commerce) segment at first influenced big companies business that led to B2B (Business to business) e-commerce structure. This paper presents an application of standard e-commerce model in e-auction (electronic auction) process. In addition, based on the several auctions experiences, the recommendations for the real-time auction organization are emphasized. The procurement departments started using electronic forms that helped evaluating business into electronic ways of negotiations for buying/selling goods over the Internet. Benefits have been visible by reducing the negotiation resources, i.e. timing reduction in on-line auction where a time frame of very few hours might be defined when the bidders are able to put their bids. In addition, a reduced process complexity results in the cost saving process.

Key-Words: Electronic commerce, Business to business, on-line auction, e-commerce, e-auction, B2B, seller, buyer

1 Introduction

Using Internet as the place of various activities, incl. business transactions, traditional business processes were upgraded to their electronic equivalents. E-commerce is a part of e-business (electronic business), covering various applications i.e. supply chain management (SCM), enterprise resource planning applications (ERP) or business intelligence (BI). The following resources are needed to establish a simplified e-commerce network [1]: a seller, a buyer, an interface and a business transaction. There are several well known e-commerce models [2], based on the participants roles [3] and business transactions [4]: Business to Business (B2B), Consumer to Business (C2B), Business to Consumer (B2C) and Consumer to Consumer (C2C). The procurement procedure is a long term process that usually consists of several negotiations steps [5]. It requests the issuing of tender or even RFQ (request for quotation) needed for the bigger bid amounts or for the specific seller's tasks. After a traditionally paper form tender is issued, it is followed by the negotiations where non-satisfying offers are eliminated in order to the most acceptable ones. In such conditions, auction became integrate part of the strategy for most of the companies during selling / buying of goods activities. E-auction [6], as the part

of the e-commerce had been accepted at first by large enterprises, and little by little, by all electronic participants worldwide. Important financial savings are achieved by increased number of bidders and simultaneous transactions than in the traditional way of negotiation. On-line auctions, i.e. e-auction, are parts of dynamic market development, enabling buyers and vendors to setup real-time market pricing conditions of the products or services. Organisations implementing web auctions can use gathered information in pricing determination policy and improve the consumer interactions. The market values of the goods are changing in real time environment according to the current supplies and demands. E-auctions are interfaces leading to dynamic price determinations. By implementation of web auctions in business strategy, enterprises enhance relationships and interactions with users and improve efficiency of decision making process.

2 Auction Types

Auctions can be organized any time when the needs for selling or buying goods (products or services) appear [6]. Different auction types had been developed as follows:

- Forward auction, selling model:

This is an auction where both, a buyer and a seller, have to respect final price at the end of the auction if the highest bid is equal or higher than the starting price set by seller. The seller has the possibility to sell one or more pieces of the same item. Buyers place their bids for the price and quantities. An item will be announced as sold and removed from the list if the total item quantity is sold before the end of the auction.

- English auction, Standard high bid:

English auction is an auction used for single quantity items or single items only. Seller set starting price or opening bid, and the final price at the end of auction is respected. In addition minimal increment is defined and higher bid wins. An item is sold to the highest bidder if the proposed price is reached and the auction is closed.

- Dutch auction:

In this auction type the identical items, or multiple quantity items, are offered at the same time. Different bidders can win, and any bidder can buy desired quantity of the same item. The winning bidder buys items at the lowest winning price. There is an option to setup the proposed (planned) price that will make seller safe not to sell items below that value. Winning price has to be equal or higher to the planned price. Highest bidder takes total quantity he was bidding for, at the lowest winning price. Next bidder, with a bid just below the highest one, takes the bidding quantity or the remaining quantity if desired quantity is below available quantity. The same procedure follows further until the remaining quantity or winning bidders are reached. When single bidder is willing to buy total quantity, he could wait until someone place winning bid (that exceeds proposed price) and afterwards has to propose a higher bid for the full quantity.

- Reverse auction, e-Procurement:

In this type of auction the lowest bid wins the auction. The reverse auction usually takes few hours only. In these couple of hours, a pretty intensive auction is held. The bids are not increasing, but decreasing by the certain amount, if there is a defined bid increment (decrement). In this case, the buyer is an auction organizer and he announces list of products or services he is interested in or he intend to buy. Buyer (merchant) sets the proposed (planned) price as the highest price he is willing to pay. Sellers place bids that are lower proposed price and the lowest bid wins. The planned (reserve) price is not mandatory, but it ensures merchant that he will not

pay more than he is willing to pay. The item is sold if the proposed (reserve) pricing is met and the auction is closed, or if the bid amount reaches 0 value.

- Standard reverse auction:

This is a reverse auction type which enables seller to publish request for quotation, and allows bidders to bid in hope that they will be the lowest bidders. Time for request for quotation is set by seller.

- Sealed high bid auction:

This auction model allows seller's sealed bid, meaning that bid is not seen to other bidders. There is also no starting price or published buying price. Bids can be of any amount, and they remain secret. Receipts are issued to bidders as the confirmation they placed a bid but there is no feedback if someone overbid them or if they are the highest bidder. Proposed (reserve) price is not mandatory, but if it is defined only the information will be sent to bidders but not the value. Item is sold if proposed price is met and if auction is closed.

- Sealed Dutch auction:

In this model, same as in the standard Dutch model, the highest bidder gets items, at the lowest winning price. However, every offer is confidential. Auction organisation is same as in sealed high bid model, and the way of final items delivery is identical to Dutch model.

- Trading floor auction:

In this auction type, the item is sold when asking price is reached. Seller can always decrease the asking price that might be encouraging to the bidders. Proposed (planned) price and a bid increment are defined. Asking price is the price at which seller will sell the goods. Item is sold if asking price is met, either by increasing bids, or decreasing asking price.

3 Reverse Auction Model

Reverse auction is a model used in the supply services [5]. As described in previous chapter, the lowest bid wins. Benefits and cost savings in e-business are mainly achieved in the procurement process. Therefore reverse auction should be the most interesting auction model. The other benefits of e-business, e.g. in sales departments, are achieved by the optimization of the business processes, while in the procurement process itself the significant cost savings might be reached. The procurement process starts with the issuing of the request for quotation for different goods or services. It is possible to target

RFQ to certain providers, or to publish it in public. Most companies are usually targeting specific providers. RFQ consists of the description of needed goods or services and conditions to be fulfilled by providers to become a candidate. It is possible to publish predicted pricing list presenting the prices buyer is willing to pay for the selected services or goods. Usually, RFQ financial information is not published. Further to RFQ issuing, the negotiations with providers begin and finally the contract is signed with selected vendor (provider). To avoid never ending negotiations, e-auction model is used. In this case the negotiations are replaced with much faster and dynamic business method - an e-auction.

3.1 Reverse Auction Benefits

There are several benefits of the reverse auction, as follows.

- **Reduced purchasing costs:**
Increased process efficiency leads to decreased operational costs by eliminating unregulated and unauthorized purchases. In addition, it helps restructuring the business by consolidation of multiple catalogues from multiple vendors into one catalogue with multiple vendors.
- **Strengthened relations to the suppliers:**
Reverse auction enables supplier to easily participate in procurement process. Transparency of the whole process is increased by sharing information and transactions in single environment.
- **Better pricing conditions:**
Consolidated multi vendor catalogue makes the pricing comparison easier. The process consolidation and visibility enable the maximization of volume discounts.
- **Streamlined authorization flow**
Reverse auction will set business processes in order to achieve the right level of procurement control. It will improve budget control and cost management and will ensure the efficient order processing.

4 E-auction

4.1 Workflow of the E-auction

E-auction application interface has to be user friendly for both buyers and auction managers (persons in charge for managing the auctions). Reverse auction

generally begins when buyer issue RFQ. The URL with auction details (application, products or services) is sent to vendors. Each of the vendors gets its own unique username and password, valid only for this specific auction. Username represents data that will be seen as the only vendor specific information during the auction process. Further to the auction opening, vendors are bidding the offers for the goods or services. Every bid is visible to other bidders and listed as the username's bid, but the identity of the bidder remains secret. Auction leader can see all information. Vendors can modify their bids as they can see other bids, and can adjust the bid according to the best bid on the list. At the end of the auction, certain period of time is left as the overlap period, when the last bid can be over bided and after that the overlap period starts again. If there is no new bid during the overlap period, the last bid wins. Buyer, i.e. auction leader, is not obliged to accept final offer, but that one he considered to be the most acceptable. That is a discrete buyer's right to choose most acceptable vendor. The e-auction process, as shown in Fig. 1, consists of several phases, from RFQ issuing to the accepting of the most acceptable offer: creation of the auction, verification process (release), ready to go (after verification), rejected, postponed, active (after ready, before auction starts), active extended, closed (finished), evaluation, cancelled, vendor chosen, archived.

4.2 Functionality of the E-auction

There are various functionality demands that have to be fulfilled. The application has easy of use and security requests. Three different roles have to be created in auction process: an auction leader (person who starts auction, auction administrator), a bidder and a system (application). Their tasks are as follows. Auction leader (administrator):

- Bidder's usernames and passwords creation
- Auction creation (name, description of goods and services, etc.)
- Auction type definition (if there are different types available)
- Auction time definition
- Overtime period definition
- Auction value definition
- Bidders information input and administration
- Blocking bidders and removing bidders from auction

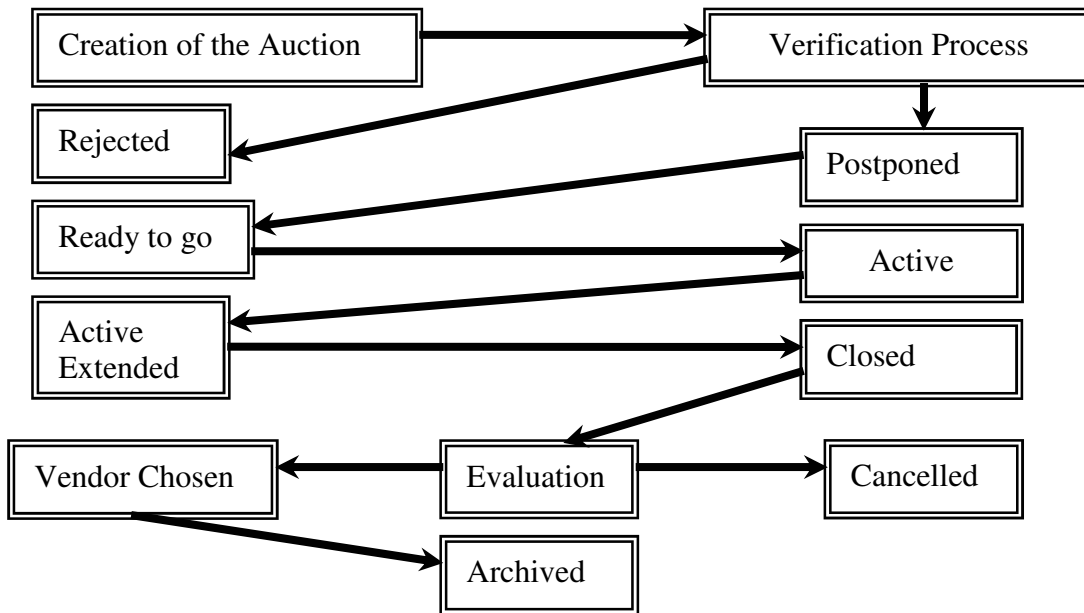


Fig. 1: The e-auction life cycle

- Auction graphical display
- Automatic save of every change, i.e. every bid
- Auction replay
- Bidders auction statistic display
- Time display

Bidder:

- System login with username and password
- Bidding
- Bidding receipt
- Proxy bidding (automatic bidding with bid decrement or increment set)
- Auction graphical display
- Auction information (start, end, bid price, etc.)
- Time display

System:

- Easy of use
- Thin client (no installation required)
- Ability to work on various systems
- Short response time
- Reliability and security
- Scalability and upgrade
- Automatic auction start and overtime
- Automatic auction end and archiving

- Automatic end of auction warning messages

The number of roles can be expanded by adding the fourth one, i.e. splitting auction leader's responsibility to the auction administrator who will be taking the auction's technical issues (administration) and to the auction leader who will be managing the auction process.

4.3 Implementation and Technical Conditions

The implementation of e-auction application should be driven by functionalities described in the previous chapter. E-auction application should be based on the three-tier architecture, as shown in Fig. 2. The tiers: Data Tier, Business Logic Tier and Presentation Tier, should be acting as the single part. This architecture enables different presentation to each of the auction roles. This creates the possibility to separate the presentations according to auction access technologies (i.e. LAN-Local Area Network access, remote computer, mobile devices, etc.). Furthermore the functionality is independent of the access technology and improves the auction flow. Implementing the three-tier architecture, the complete process fits into distributed system design rules.

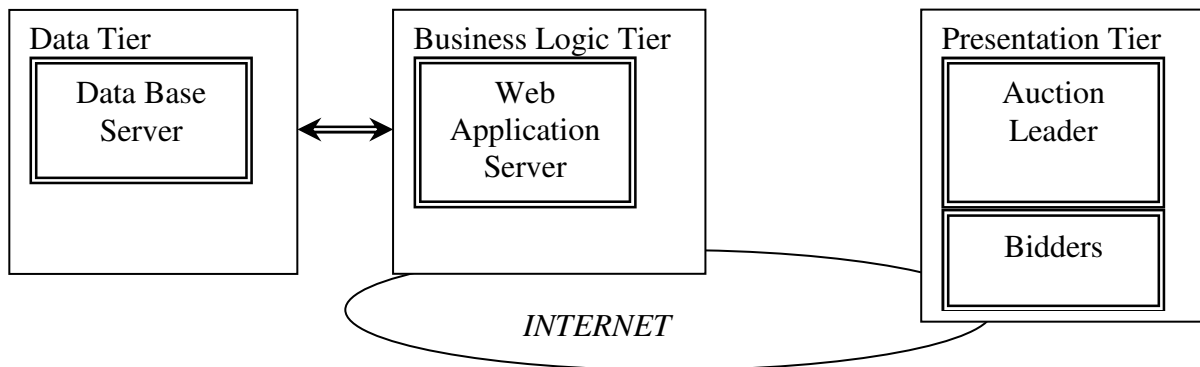


Fig. 2: The e-auction system architecture

4.4 Recommendations

The following issues have to be considered in e-auction process:

- to have dedicated phone line for bidders, if problems occur, in order to solve problem immediately
- to define auction period that depends on number of bidders, tender complexity, amount, etc.
- to setup a minimal bid increment in order to avoid very small bid increments that leads to never ending auction
- to setup the overtime auction rules to allow the auction to be extended in the specific bid requests
- to setup the reasonable starting price
- to decide whether to outsource the software application or not
- to decide should it be the open auction or just for the selected vendors

5 Conclusion

Based on the results from several conducted e-auctions the recommendations for the real-time auction organization follow:

- to choose the right product or service
- to train the participants involved in e-auction process

- to setup all elements needed for the successful e-auction evaluation
- to fulfil the e-auction run time criteria:
 - sufficient financial frame
 - number of vendors (at least four to be involved at the auction start)
 - accurate specifications
 - market availability of product

In addition, not to forget to issue the precisely written tender documentation to avoid any misunderstandings.

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