

## INTRODUCTION TO ELECTRONIC AUCTIONS

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### THE EMERGENCE OF AUCTIONS ON THE WEB

*“Auction markets provide centralized procedures for the exposure of purchase and sale orders to all market participants simultaneously.” (Lee 1996, 398)*

Auctions are formalized trading procedures in which the trading partners' interaction is governed by specific trading rules. In many cases an (electronic) auctioneer is functioning as an intermediary. Electronic auctions are a special case of automated negotiations (cf. Beam; Segev 1997). The auction patterns vary with the trade objects and trade rules. They cover extremes such as auctions for commodities like financial products, metals or agricultural products on the one side and auctions for unique items of fine art on the other.

Since the diffusion of the Web has gained momentum and the number of Web users is rising steeply, a proliferation of electronic markets, in particular electronic auctions, can be observed. AuctionNet [<http://www.auction.net>], NETIS auctionweb [<http://www.auctionweb.com/online/>], The Internet Auction List [<http://www.usaweb.com/auction.html>], Bid Find WWW Auction Search [<http://www.bidfind.com>], The Auction Hunter [<http://www.auction-hunter.com>] are examples for Web sites with listings of numerous, altogether hundreds of auctions.

### TYPES OF AUCTIONS AND MOTIVES OF PARTICIPANTS

What is the economic rationale behind auctions and what are the motives of the different actors to set-up (electronic) auctions? As the trade objects and contexts for auctions are very diverse, not a single answer can be given. Instead, we have tried

to cluster some of the main types and motives for auctions (for different mechanisms of price determination see Reck's paper in this volume):

#### AUCTIONS AS CO-ORDINATION MECHANISM

Auctions are increasingly used as an efficient co-ordination mechanism for establishing an equilibrium (price). Examples are an automated auction among software agents to control air conditioning at Xerox (Markoff 1996), power auctions (Singh et al. 1997) or in the future auctions for the allocation of telecommunication bandwidth. In these auctions there is little or no human intervention during the trading process.

#### AUCTIONS AS A SOCIAL MECHANISM TO DETERMINE A PRICE

For objects which are not traded on traditional markets, which may be unique or rare items or which are offered randomly or at long intervals, an auction creates a market place which attracts potential buyers, often experts. By offering numerous of these special items at one time and by attracting a good amount of attention, these auctions provide the requisite exposure of purchase and sale orders and hence liquidity of the market in which a price can be determined. Typical exam-

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ples for this pattern are auctions of piece of fine art or rare items as well as auctions of communication frequencies (cf. Lewyn 1994; Cramton 1995) or Web banner advertising space (E.COMMERCE TODAY 1 97.04.11 [<http://www.adbot.com>]).

#### AUCTIONS AS EFFICIENT ALLOCATION MECHANISMS

For consumer items that are difficult to market via the established distribution channels because they are

- ◆ products with a limited shelf life or last minute products like seats in a scheduled flight,
- ◆ overstocked products that shall be separated from the new product series,
- ◆ discontinued or reconditioned items.

In this case the auction is a separate distribution channel, targeted at a wide audience which might be prepared to accept the product restrictions in return for a significant discount. The auctioneer attempts to provide sufficient breadth and depth of the market, in order to continually attract interested buyers that have a high likelihood to find something and sellers that have a high likelihood of clearing these stocks if only they set the price low enough. A typical example of this type of auction is Onsale (cf. Economist 1997).

#### AUCTIONS AS A HIGHLY VISIBLE DISTRIBUTION MECHANISM

The fourth type of auction is similar to the third as items are auctioned off as a kind of special offer. In this case, however, the set-up of the auction is different: typically one supplier auctions off a limited contingent of items and uses the auction primarily as a mechanism to gain attention and to attract those customers that are bargain hunters or have a preference for the gambling dimension of the auction process.

The airline seat auctions by Cathay Pacific, American Airline and Lufthansa fall into this category. A special case are auctions in which the trading objects are donated and the auction return is dedicated for charitable purposes.

Auction type	Co-ordination mechanism	Price discovery	Allocation mechanism	Distribution mechanism
<b>Role</b>				
Buyer	short term acquisition of resources, e.g. for demand peaks, auction as a mechanisms to achieve an equilibrium	often experts/ professional collectors trying to acquire rare items at a reasonable price	bargain hunting, gambling motive	bargain hunting, gambling motive possible side motive: charity
Supplier	short term allocation of resources, load balance	exposing items for sale to a sufficient breadth of demand, hope for a high price	clearance of inventory	attention, PR, direct sales channel, possible side motive: charity
Auctioneer/ Intermediary	often electronic auction without auctioneer	achieve high breadth and depth of the auctions, high trading volume result in high returns, competitive advantage over other auctions	achieve high breadth and depth of the auctions, high trading volume result in high returns, competitive advantage over other auctions	limited role because of 1:n supplier – buyer relation, possible function as service provider for the supplier side

Table 1 Motives of the participants in different auction types

The motivation and possible gains for the respective players vary with the different auction types. Table 1 gives a summary of the main motives:

**A FRAMEWORK FOR AUCTIONS**

While we have started to explain the diversity of auctions and motives for the further diffusion of auction mechanisms, we would now like to focus the constituting elements of (electronic) auctions (Figure 1) and argue briefly how the Web is changing the conditions of auctions.

**AUCTIONEER**

The auctioneer provides the institutional setting of the auction, i.e. for the different transaction phases of the trading process: information exchange, price determination, the trade execution and settlement. While some of the traditional auctioneers are entering the field of electronic auctioning, we see a majority of new entrants. Some of them are affiliated with the suppliers of the trading goods, some emphasize their role as intermediaries who provide trading platforms for a variety of products and vendors.

**ACCESS RULES FOR BUYERS AND SUPPLIERS**

Among the main institutional design parameters are the access rules for buyers and suppliers. In particular electronic auctions depend on their reputation, e.g. whether the trading goods are available and of the promised quality or whether trades are executed without frictions. While there is a basic distinction between expert auctions and those for the general public, individual auctions vary in respect of control mechanisms, required advance payments or other credible commitments of the participants.

**TRADE OBJECTS**

The variety of potential objects traded on auctions can be distinguished into three broad categories (compare also Wrigley's paper in this issue):

- ◆ For commodities, auctions improve the market transparency and facilitate ad-hoc price determination.
- ◆ For perishable products in a broad sense, such as airline seats or overstocked products, auctions attract potential buyers and they are distinct channels that allow vendors to maintain a different price level in the traditional sales channels.

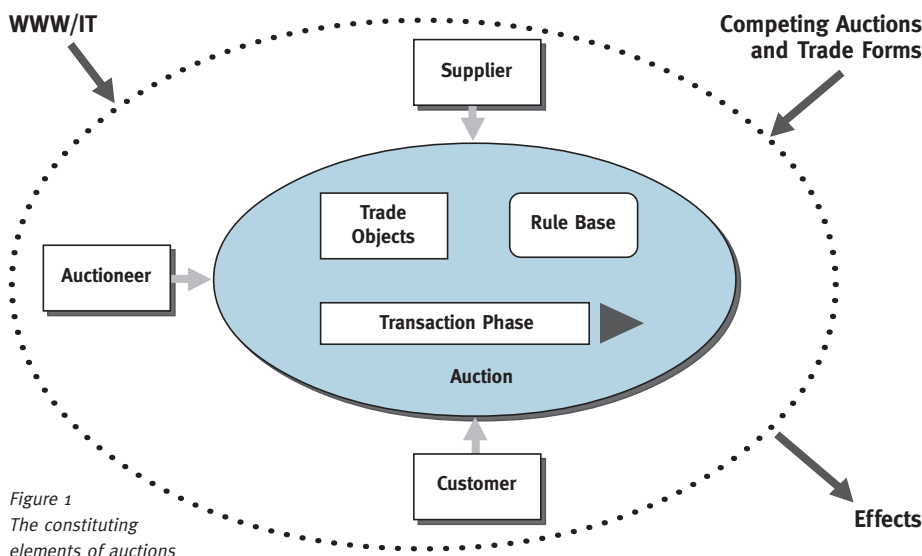


Figure 1 The constituting elements of auctions

- ◆ For products with a limited availability such as pieces of fine art, collectors items or communication frequencies, auctions are institutionalized procedures for price determination. By bringing together potential buyers and sellers they create a marketplace and make current levels of supply and demand more transparent.

TRADE OBJECT DESCRIPTIONS

Electronic markets initially have been developed for commodities and products with standardized product descriptions. The progress of technology allows to considerably extend this range into objects that require more complex product descriptions. In addition, samples can be provided or experts can be involved to evaluate products and probably communicate with potential buyers electronically.

TRADE RULES

Numerous rules have been developed that govern the trading process, in particular the exposure of bids and offers and the trade execution. Martin Reck (compare his paper in this volume) has specified a set of generic rules and has indicated how these may be used to design new types of auctions.

EXECUTION PROCESS

A wider set of rules governs the exchange and logistics of goods and payments. These rules are complementing the actual rules for price determination process (cf. Heck et al. 1997). The enforcement of these rules is meant to guarantee the correct execution of trades and is of utmost importance in an electronic environment.

THE IMPACT OF THE WEB

While most of the motives for auctions are independent of the underlying technology, we have scrutinized how the Web influences the constituting elements of auctions. The Web as a "global hyper-media computer-mediated environment" (Hoffmann, Novak 1995) represents the result of IT achievements in different ar-

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Heck, E. van; Damme, E. van; Kleijnen, J. and Ribbers, P. "New Entrants and the Role of Information Technology - Case Study: the Tele Flower Auction in the Netherlands, in: Nunamaker, Jay F.; Sprague Ralph H. (eds.): *Proceedings of the 30th HICSS, Vol. III: Information Systems - Organizational Systems and Technology*. Los Alamitos, CA: IEEE Computer Society Press, 1997.

reas: advanced client-server architectures, low-cost, widely diffused hyper-media clients, low-cost communication-infrastructure, platform independent software, etc. These features have an impact on the diffusion of auctions

- ◆ The communication infrastructure with millions of potential trading partners facilitates the global visibility of offerings. Even highly specialized items for selective customer groups can thus be marketed efficiently.
- ◆ Standardized mechanisms for hyper-media representation of trade objects have increased the manageable and economically feasible complexity of electronic product descriptions.
- ◆ The development and diffusion of standardized search mechanisms and event-driven notification of bidders as well as
- ◆ mechanisms for secure payments encourage customers to opt for Web auctions with electronic trade execution.

COMPETING AUCTIONS

As the number of auctions, especially on the Web, is mushrooming, the amount of competition among auctions for comparable trade objects is rising. While this is beneficial in terms of general attention, it might limit the liquidity of less popular auctions. Further research is needed in order to determine what the critical suc-

Parameter	Impact of the Web
Auctioneer	Lower entry barriers, opportunity for direct sales
Access rules	Customizable, theoretically millions of potential customers can be reached
Trading objects	Focused product segments can be auctioned off, the technology extends the complexity of the product description
Trading rules	The trading rules reflect the lack of a guaranteed service
Settlement	For digital products the entire trading cycle can be handled on the Web for physical products the trading process and the physical logistics of the trade objects can be separated, leading to a reduction of costs.

Table 2 Summary of impact areas

cess factors for individual auctions are. Likely candidates for success factors are as diverse as the reputation of an auction, trading rules, the level of commissions and fees or the expected liquidity of the market.

#### EFFECTS

The different motives we have described are clearly pointing towards intended effects from the various players. However, it is not only difficult to identify causal relationships between e.g. trading rules and effects, but there are also numerous potential side effects. A major concern of the suppliers is that it will be difficult to isolate auctions from other sales and distribution channels because customers will adapt their buying behavior. As a result, an increasing price pressure not only on the auctioned products but also as a side effect on those products that have not been singled out for auctions is feared. Given the dynamics of the underlying product markets and the individual market places where the respective products are traded, it is difficult to assess in general what the effects of auctions will be. For now, we are suggesting a number of hypothesis, indicating advantageous settings for Web auctions.

H 1: If product branding and customer attention is a concern, especially in markets with a strong position of trade intermediaries, auctions provide the opportunity to raise or re-emphasize customer attention.

H 2: Auctions provide allocation efficiency for specific product segments that can be isolated to a certain degree such as last-minute offerings, returns, over-stocks etc. At the same time traditional distribution channels and trade forms are maintained.

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#### <sup>1</sup>"E.COMMERCE TODAY

*The Newsweekly of Internet-Based Electronic Commerce and Business Strategy" is an electronic information service published by V-Networks, Inc.*

H 3: Companies deploy electronic market mechanisms in combination with other coordination mechanisms.

H 4: The Web enables suppliers and auctioneers to approach a global audience with very specific interests and needs, thus generating the requisite liquidity even for specialized market segments.

#### CONCLUSIONS

Web auctions and electronic markets in general have recently emerged at a high rate. Technological progress and the proliferation of global hyper-media communication infrastructures have enabled numerous players to expand the use of the advantages of auction mechanisms in a computer-mediated environment:

- ◆ The Web has provided low-cost access to a global market space and at the same time highly focused customer groups.
- ◆ The wide availability of standardized software clients for the access to auctions, in most cases just Web browsers, has extended the group of potential participants.
- ◆ Cost-efficient communication infrastructures and low-cost market-engines have enabled auctioneers to set up auctions quickly and with limited investments.
- ◆ Expert examination and hyper-media representation of trade objects facilitate the separation of trade process and physical logistics of the trade items, thus lowering the transaction costs even further.
- ◆ Recent technological progress enables players not only to extend traditional market mechanisms into the electronic realm but also to use auctions in new application areas where previously no market mechanisms have been employed.