Online Auctions: Lessons Learned from Strategic E-Business Consulting

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ABSTRACT

Online auctions are among the most influential e-business applications. Their impact on trading in the B2B (business to business), as well as in the B2C (business to consumer) and C2C (consumer to consumer) areas is both remarkable and inevitable. Although there have been considerable efforts in setting up market places, online trading still lays in its early stages. Quite a few companies have started projects of their own, trying to improve their purchasing and sales channels. This article discusses the benefits of the most impressing concept of Internet marketplaces, namely, the conduction of online auctions. We discuss their benefits, the problems occurring, and possible solutions. In addition we sketch actions for suppliers to achieve a better strategic position in the upcoming Internet market places.

ONLINE AUCTIONS IN THE CONTEXT OF THE INTERNET MARKETPLACE

Electronic commerce will be the enabling technology for the next industrial revolution. Virtual, Internet-based markets allow entirely different forms of trading (Höller et. al., 1998). Local, therefore sometimes monopolistic markets become global and more competitive.

Expectations are that in the forthcoming decade the Internet will be a market enabler of unforeseen possibilities. Just in the last few years it became apparent that doing business over the Internet can simplify marketing and purchasing considerably (see e.g. Forrester Research, 1999). Figure 1 shows the worldwide trading volume in the Internet and it can be expected that the part based on online auctions will equally grow. Therefore, an increasing number of online marketplaces have come into existence. Online Marketplaces simplify the establishment of new alternative purchasing and selling partnerships. In the C2C and B2C areas this fact has been widely recognized, and numerous new B2B marketplaces have been coming up in the last two years.

Figure 1: Worldwide trading volume in the Internet (according to Forrester Research, 1999)

Billions of US $
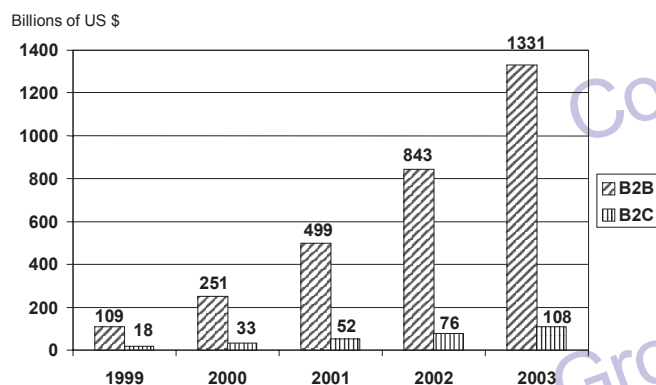
In most market places, sellers may advertise their offers and consumers and industrial purchasers can distribute their demands via the internet. Whereas these forms of establishing connections are important, it is the use of online auction systems that has an effective impact on the pricing structure. Auctioning is among the most efficient and fastest concepts available to achieve fair and competitive prices and identify the optimal business partner.

Figure 2: Electronic sourcing
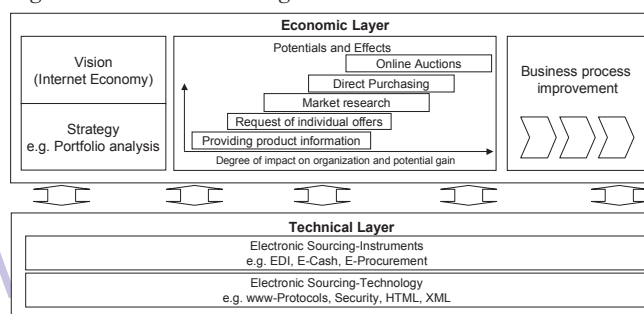
The chart in Figure 2 shows the core issues of electronic sourcing, which can be separated in an economic and a technical layer. The technical layer includes exchangeable documents based on the EDI standard, e.g. EDIFACT (ISO, 1993) or (UN/EDIFACT, 1993). or XML as a technical infrastructure (W3 Consortium, 2000), protocols for their safe transmission, electronic payment systems etc. The technical layer strongly supports and is driven by the economic layer. The economic layer focuses on the introduction of new strategies and techniques to let the vision of the Internet economy come true. This includes new interfaces to other companies as well as restructuring of the company internal business processes with the goal of overall improvement and cost reduction. The chart also shows that among the existing concepts, the potentials and effects together with the impact on the organization and, most importantly, the potential gain grows at its best when using Internet auctions. Whereas the other concepts mainly concentrate on improving the overall sales and purchasing process, the use of Internet auctions has an impact on the pricing structure of traded goods.

Many marketplaces focus on e-procurement elements trying to make the purchasing process more efficient. Contacts to professional purchasing departments of large and middle-sized European companies show that by far the largest gain in time and money arises from a proper identification of materials that qualify for Internet auctions, set of possible suppliers, and an appropriate auction format.

Auction Formats

The real world has already defined the primary auction formats that are possible and useful. Standard (also called English) auctions are used to offer one product to several potential buyers. Quite contrary, reverse auctions (also called purchasers auctions) allow one purchaser to auction a demand among several potential suppliers. In reverse auctions the bidders submit decreasing bids.

If a supplier has more than one item to sell (e.g. a fixed number of tulip bulbs), he may use the Dutch auction format. The price for one product constantly decreases over a period of time. Whenever a bidder submits a bid, he gets one item for the price valid at that time. The auction is finished when all items are sold.

The use of electronic resources allows not only to invite bidders throughout the world to participate in the auction simultaneously, but also allows to set up more complex and, dependent on the particular situation, more specific auction formats. Long term auctions may last up to four weeks, where the bidders repeatedly have a look at the current situation. However, it turns out that such kinds of auctions are mainly of interest during the closing phase. Short term auctions concentrate on these last few hours immediately. They may even be as short as 30 minutes, provided that the participants are explicitly invited beforehand.

Further auction formats like multi-round biddings have been defined. In a multi-round bidding, each bidder is forced to submit exactly one bid per round. Only after the round has ended, all bidders are informed about their competitors' bids and the next round begins. Multi-phase auctions are quite similar, where after each phase only a subset of the earlier bidders is admitted to proceed to the next phase.

Recently experience has been gained in conducting multi dimensional auctions. Here, not only the price is the left open and negotiated through the auction, but several other variables are determined as well. For example, the price may be combined from the supplier and the logistics entrepreneur (Prince, 1999).

In running Internet auctions, it became increasingly apparent that the auctioneer must be an independent instance. Only if such an independent auctioneer exists, both supplier and buyer have enough confidence in the fairness of the auction process. The experiences with other marketplaces have shown in an apparent way that an auction marketplace is not very successful when operated by the buyer or seller themselves.

Auctions can also be much more complicated. An auction can for example exist of multiple slots, that allow to slice the material/goods in order to auction it among several suppliers. This setting is important to prevent dependency from a single supplier – a critical issue when strategic goods are involved. These slots also may depend on each other, e.g. if two competing types of materials can replace each other and the price difference between both determines the purchased quantities. Another interesting question is at which time which information should be revealed to which participant. This should prevent illegal price agreements between bidders and at the same time ensure confidence in a fair auction. E.g. should competitors know each other? An interesting variant reveals identities of bidders at the beginning of a very short-term auction.

These examples show that today the power of Internet auctions has been by no means explored. Moreover, there is still a number of unforeseen variations to come.

Having conducted quite a number of online auctions, it became obvious that identifying auctionable goods and materials is not an easy task. Therefore, it is a common way to rely on assistance of a consultant to define the actual auction set-up, starting with the identification of the demands and possible suppliers. On the other hand, it also turned out that it is rather irrelevant to have large supplier lists at hand, because companies that buy material in industrial sizes usually know their probable suppliers beforehand. They keep watching the suppliers' situation and they want certifications that prove the suppliers' capability of delivering high quality material in time.

FEATURES OF AN ONLINE AUCTION SYSTEM

In several seminars with major industrial purchasers it became soon apparent that complete

e-Procurement strategies are a time-consuming task to define and implement. On the one hand, aligning a whole purchasing department with electronic procurement is tiresome and brings an extra load of work. On the other hand, the desired effects of more efficient purchasing processes pay off only in the long run. However, it also became apparent that identifying the commodities with high purchase volume and buying them via auctions could significantly reduce the prices spent for these commodities, and, what is most important, leads to a high and immediate return on investment. From that point of view, an initial set of requirements for online auctions was defined: It was evolved and enhanced during the following period. In the following, the most important of these features have been described. Also other technical issues of interest, such as flexibility, ease of use, security, performance, robustness and compatibility to existing systems, both on the buyer's as well as the supplier's side have been discussed.

1. The software is capable for online auctions, both the normal English format and the reverse format, thus allowing to auction goods for buyers and demands for suppliers.

2. An intuitive graphical user interface is accessible through the web without any installation necessary. Being able to support access to online auctions without any installation proved a great success factor, since it is often rather difficult to install new software within company networks.

3. Auctions are running in real-time. This means that clients always have current information visible. This is especially important for short time (approx. 30 minutes) auctions, where the frequency of bids is relatively high.

4. An auction may consist of several slots, allowing the buyer to split the material desired among several suppliers. This allows to prevent a dependency on a single supplier only, as well as to split for different delivery points. We will later discuss a mechanism to automatically extend the auction time in order to ensure competitors to be able to react on incoming bids. However this extension time will get shorter as the auction proceeds. We had auctions where the bids arrived within seconds.

5. Different auctions may depend on each other. For example, depending on the results of simultaneous auctions, the buyer purchases percentages of competing materials. The auction system must reflect this dependency, e.g. by additional messages that describe which of the competing materials will be bought.

6. Persons may participate in an auction in different roles: the auctioneer, the bidders, the originator of the auction (buyer in reverse auctions, seller in the normal auctions), and guests shall be admitted. In particular, the role of guest is useful to show potential and not fully convinced participants how online auctions work, without revealing any information on auction details (neither currency, nor value, nor the buyer, nor the kind of traded goods).

7. Different roles get different information at hand. Only the auctioneer can co-relate the bids to their bidders during the auction. Bidders appear to each other anonymously, but know how many competitors there are. Furthermore, bidders see their ranking. External observers following the auction see percentage values instead of real currency.

8. Reverse auctions may have a historic and a target value. The historic value describes what the buyer paid for the auction goods so far, whereas the target value describes what he would like to pay this time. If the auction result hits the target value then the buyer is obliged to sign the contract. If the target prize is not hit the buyer is free to choose.

9. The auction times may vary. Very short auctions may have an auction time as short as 15 minutes. Typical auction times are 1-3 hours, consisting of a main part and an extension part.

10. The auction time is extended whenever a bid arrives shortly before the auction end. This allows all other bidders to react. The provided reaction time may vary, e.g. starting from 3 minutes as an initial extension down to a few seconds at the very end.

11. A login mechanism is imperative. Passwords are distributed through safe channels, among them PGP-encrypted emails.

12. A report on the auction result is provided for all participants. This report allows the participants to reflect the auction result. The winner has evidence of his success. The other bidders have evidence

that they have been over-bidden and perhaps should think about the pricing structure of their product.

Even though the field of E-commerce is highly innovative, to our current knowledge (August 2000), no existing online auction system provides all the functionality characterized above (Glänzer, Schäfers, 2000), (Grebe, Samwer, 2000), (Wahrenberg, 2000). Therefore, we created our own auction system, which is now online since March 2000. After two phases of intensive elaboration, a strongly increasing number of online auctions has been conducted. The rest of this paper discusses the lessons learned from these online auctions with this system for major industrial companies in Europe.

Figure 3: Screenshot of an Emprias Online Auction

The Emporias' auction engine systems can cope with the above described auction formats. It provides a standard and an extension phase, historical and target prices, multiple slots, visibility constraints for multiple participants (bidder, guests with different access rights), a ranking of bidders and other participants. Based on the Java technology used for implementation and therefore its emerging Internet-realtime features, it is capable of active monitoring of short time auctions as well as bidding agents.

LESSONS LEARNED

So far, we have conducted online auctions for a volume of almost 100 Millions US $. These auctions have been realized in different formats, settings and, of course, different market types. In the following, we concentrate on the results from reverse auctions, since most of the conducted auctions were reverse auctions. We have learned a lot about the differentiation between various markets, problems that can be encountered and the solutions to master these problems. Therefore, we concentrate on the most common problems encountered and sketch solutions for them.

Emotional Refusal of the Internet

Even though in the C2C and the B2B market, the number of online customers is increasing exponentially, the knowledge about the Internet in the area of B2B purchasing is still somewhat limited. In particular, many managers do not trust the internet's security and capabilities to conduct safe trading through the internet. This emotional barrier can only be reduced by demonstrating how an online auction works to such a manager. For that purpose, the guest role for online auctions has been implemented to be able to invite foreign guests to participate in an auction without getting knowledge of auction details (e.g. such as price). Furthermore, it helps if, at least for the first auctions, a consultant is assisting the setup process.

Political Resistance

As always when people collaborate, different interests may give rise to conflict. In particular, some people are interested in improving the purchasing process, whereas others would like to stay with the old approved paths, because they do not wish to revise their habits or opinions. Therefore, it is a political process within a company to come up to the conclusion that the purchasing process will at least partly use online auctions. This works best in companies with a centralized purchasing department. It may, therefore, be of interest to reorganize the purchasing structure along with introducing electronic sourcing strategies. However this should not be conducted in a "big bang" manner. Instead of an immediate start in small online auction projects and with specific auctionable goods seems to be the best strategy.

Occasionally, one particular obstacle that we encountered are IT-departments. On the one hand, very restrictive IT-departments are reluctant to allow web-access to their colleagues at all. Such departments would even not allow the installation of web browsers.

Another more severe reason is that IT-development departments tend to focus on overall solutions. IT-personnel usually favors strategic and expensive solutions. They would, for example, favor a complete restructuring of the procurement process, starting from a single pencil up to gigawatts of electrical power through the same e-Procurement system. This kind of solutions will be costly, will take a longer project for its implementation, and therefore have no immediate effect. For some parts of the eProcurement strategies, it is today still unclear whether they will be a benefit in the long run at all.

Online auctions instead have proven their immediate effect. It is possible to reduce the price paid for commodities as well as for strategic materials and goods within hours after only a few days of preparation. Most importantly, online auctions tackle the major part of the total cost of ownership, namely material costs. Standard e-Procurement techniques focus more on internal process costs, merely 7% of the total costs. The Figure 4 shows the separation of the TCO into material and internal process costs.

Figure 4: Separation of total costs into material and process costs

Internal process cost rate: $\frac{34,1 \text{ Mio}}{500 \text{ Mio}} = 6,9\%$

Source: Forrester Research
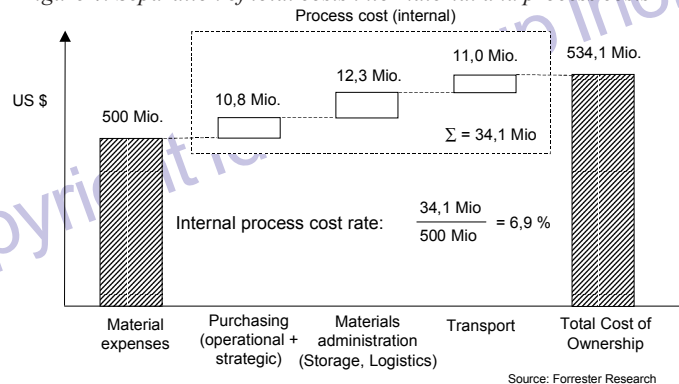
Identifying Auctionable Goods

Surprisingly, many purchasing departments do not have a detailed overview of materials and goods they buy. Of course, they have the numbers available, which tell what percentage of the budget is spent on each goods. However, to have a competitive advantage, starting with the purchasing process, means to know the structure of potential suppliers. How many competitors exist globally? What is the competitive market price? Does one or few companies have the monopoly on selling particular material? How easy is it for the company to switch to a competing material? Must all the material (or product) be from the same supplier? How reliable is the supplier? Is it useful to split strategic goods among several suppliers?

Purchasers often have no quantitative comparison available that would allow an easy identification of most promising auctionable goods.

Therefore, it is often useful to analyze the material structure before identifying online auctions. The technique of portfolio analysis proved useful.

How to Set Up an Auction

Sometimes it is very simple to set up an auction. In a reverse auction, the buyer usually knows quite well what he wants to buy. Therefore, a number of potential suppliers have to be identified and invited to participate in the auction. Apart from the current supplier, a number of potential suppliers is usually well-known already. Additionally and if desired, a web-search can help to identify new suppliers. The online auction contract is settled. After that, the auction is conducted and then the purchasing contract is closed.

When auctioning strategic goods however, the situation is often more complicated. For example, if the buyer does not want to depend on one supplier only, he can split the material into several slots with the side condition that each supplier will get a contract for only one slot. Splitting material in slots is also of interest, when the points of delivery are partitioned among time or space (e.g. in different countries).

To increase the competition, it is also possible to run two auctions on competing goods simultaneously and define the contract in such a way that only the most competing goods will be bought in the end. For example, if one material is of better quality , but also more expensive, then the ratio of which goods to buy to which extent can depend on their price difference.

To decrease further the barrier for the buyer to conduct an online auction, the concept of target price can be used. The buyer is allowed to define a target price, which must be hit so that the buyer is obliged to sign the purchasing contract. If the target price is not hit, the buyer is free to sign. The definition of a good target price is not an easy task. In some occasions and some markets, the definition of a competing target price had very good results. In other markets, the target price was completely missed. The problem was that setting the target price too competitive prevented the suppliers to start bidding seriously at all. The most impressive results have been achieved by talking to the potential suppliers before the auction was conducted and finding out how they react to a more or less ambitious target price.

In most auctions, the bidders did not know each other, but there are markets where bidders can guess easily who are other competitors. To decrease the risk of making special arrangements among bidders, it is useful to identify at least one or two additional bidders in the emerging global market. In addition, bidders can see during the auction how many competitors are online. Another strategy is to reveal the anonymity of the bidders with the start of the auction. To prevent arrangements between bidders, the auction is then conducted in 10-15 Minutes only. This helps e.g. in markets in which the competitors know and dislike each other.

A last problem encountered is the onlooker problem. It happened that some suppliers were not interested in committing bids, but only wanted to get an overview of the market prices of their competitors. In the market where this problem can occur, multiphase auctions are particularly useful. The idea behind being to run the auction in a first phase as a normal auction. A given first target price must be hit, so that the participant be admitted to the second phase. In that phase the target price is usually lower, but not visible for onlookers that are not allowed to cast bids any

longer. Two or three phases are usually enough.

To summarize: to our experience different markets need customized variants of auctions. Some kinds of auctions are pretty straightforward, in other situations markets are less competitive and therefore need additional techniques to ensure the finding of a fair price in an online auction.

SUPPLIER REACTIONS

The Emporias' auction engine was able to reduce the costs for certain materials up to 46%. This is a great gain for the purchasers, but also a loss of profits for suppliers. Therefore, suppliers have started to realign their purchasing structure. Market places that mainly focus on establishing contact between buyers and suppliers are not as critical. Online auctions are the critical part of the new E-Business economy. They drastically increase competition in the global market place. The supplier problems can be pinned down to the following tree questions:
- How can I prevent to participate in an online auction?
- What is the best strategy when forced to participate in an online auction?
- How do I deal with the consequences arising from online auctions?

There is a great deal of possible actions suppliers have at hand. Ranging from strategic, long lasting contracts with their purchasers down to dramatic cost reductions by using online auctions in their own purchasing process. Depending on the goods, on the market peculiarities, the geographic and contractual situation of the supplier, a number of additional actions can be taken to deal with that new situation. Aggressive suppliers do not fear participating in online market places, but try to use them as a chance to establish contact with new purchasers. As always: the early bird catches the worm.
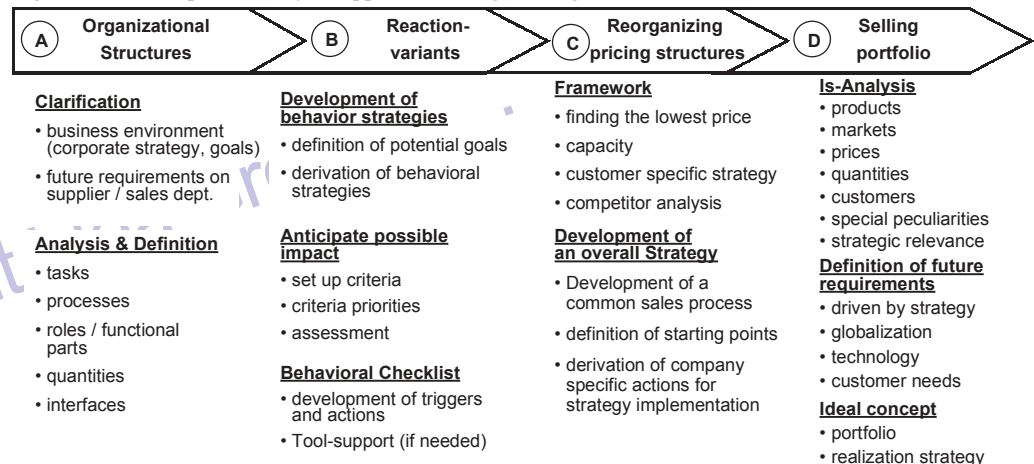
To optimize suppliers' strategies in various markets, it is useful to conduct workshops with the goal to realign organizational structures, define reaction variants for each type of material, redefine pricing strategies and finally lead to an improved composition of the companies sales portfolio. See Figure 5 for a structuring of such a workshop.

Although it is possible to define general strategies for suppliers that have to react in online auctions, the results and therefore the behavior of competing suppliers greatly depends on the auction format. Therefore, auction formats have to be taken in consideration when defining the auction individual bidding strategy. Although there is a number of actions possible, e.g. to prevent an online auction or to break up a buying syndicate, today it seems to be one of the most promising strategies for a supplier to reduce material costs himself in online auctions.

SUMMARY

In this article, we have introduced different auction formats and their impacts to conduct competitive online auctions. Online auctions

Figure 5: Workshop structure for suppliers' strategic realignment

A Organizational Structures	**B** Reaction-variants	**C** Reorganizing pricing structures	**D** Selling portfolio
Clarification	**Development of behavior strategies**	**Framework**	**Is-Analysis**
• business environment (corporate strategy, goals)	• definition of potential goals	• finding the lowest price	• products
• future requirements on supplier / sales dept.	• derivation of behavioral strategies	• capacity	• markets
		• customer specific strategy	• prices
		• competitor analysis	• quantities
Analysis & Definition	**Anticipate possible impact**		• customers
• tasks	• set up criteria	**Development of an overall Strategy**	• special peculiarities
• processes	• criteria priorities	• Development of a common sales process	• strategic relevance
• roles / functional parts	• assessment	• definition of starting points	**Definition of future requirements**
• quantities		• derivation of company specific actions for strategy implementation	• driven by strategy
• interfaces	**Behavioral Checklist**		• globalization
	• development of triggers and actions		• technology
	• Tool-support (if needed)		• customer needs
			Ideal concept
			• portfolio
			• realization strategy

are among the Internet techniques that will become inevitable in the B2B purchasing area. They are rather easy to implement and have a high and immediate gain of results in return.

Forecasts say that the B2B E-Business will explode in the next few years. However the techniques which the new economy offers have to face the traditional fears and problems that the old economy and the people in that economy are still holding. Online auctions are one of the electronic sourcing techniques that will find their terra firma in the E-sourcing portfolio. However, the way to arrive there is not as easy and simple as the people had in mind in the early days of E-commerce.

ACKNOWLEDGEMENTS

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