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AN EMPIRICAL EXPLORATION OF MULTI-ATTRIBUTE BIDDING: REDEFINING INTERMEDIARY ROLES IN ELECTRONIC MARKETS

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Abstract

The vast majority of electronic markets have been based purely on a single variable (price) as the factor that determines 'the winner'. Multi-attribute auctions are likely to be more appropriate for procurement scenarios where factors other than price need to be considered in determining the outcome. Nevertheless, there is a scarcity of empirical research on multi-attribute electronic auctions. In particular, there is little empirical evidence of how multi-attribute auctions fit with our theoretical conceptualisation of electronic markets. This paper uses the market design aspects of multi-attribute auctions to explore a multivariable electronic auction, using frameworks from electronic market process design and systematic sourcing. Evidence from the case study illustrates that multi-variable electronic auctions can be used to procure a wider range of operating and manufacturing input that has been considered possible with traditional, price only, auctions. The findings reveal how the use of an electronic auction intermediary creates a middle ground of interaction between spot and systematic sourcing, by automating for the buyer certain general parameters and trade context processes.

Keywords: Multi-variable auctions, Strategic Sourcing, Procurement, Case Research.

1 INTRODUCTION

Auctions are used as a price determination process within markets when sufficient competition exists, involving non-standardized products and/or products with unstable prices (Milgrom, 1989). Indeed it is the determination of the transaction price that characterizes different types of auctions (Wilson, 1992; Rothkopf and Harstadt, 1994). Most discussions of auction differentiate between open and closed, or English and Dutch, auctions (Ribbers et al., 2002; Wonseok, 2002). The vast majority of electronic markets have been based purely on a single variable (price) as the factor that determines 'the winner'. Bichler et al. (1999) discuss the concept of multi-attribute auctions and propose that such auctions are likely to be more appropriate for procurement scenarios where factors other than price need to be considered in determining the outcome. However, Bichler et al. (1999) conclude that much work needs to be conducted in the area of multivariable auctions to determine the degree to which classic auction theory can be applied to such auctions.

This paper utilises the electronic market process design work of Ribbers et al. (2002) and Kambil and van Heck (1998), as well as the work of Kaplan and Sawhney (2000) on systematic sourcing, to conduct an exploratory study of an electronic market utilising a multi-attribute auction mechanism. A comparison of our findings with existing electronic market theories illustrates that the use of an electronic auction intermediary creates a middle ground of interaction between spot and systematic sourcing, by automating for the buyer certain general parameters and trade context processes.

2 THEORETICAL FOUNDING

Wonseok (2002) notes that the growth in revenues associated with electronic auctions remains strong despite the slowdown in other electronic business activities, and attributes much of this success to the economic efficiency of the price discovery mechanisms of electronic auctions. The success of auctions has been studied in so far as they are seen as mechanisms within an electronic marketplace. Using the work of a number of researchers and an examination of the Dutch Flower Auction, Ribbers et al. (2002) classify electronic market success as a derivative of market design as shown in Figure 1.

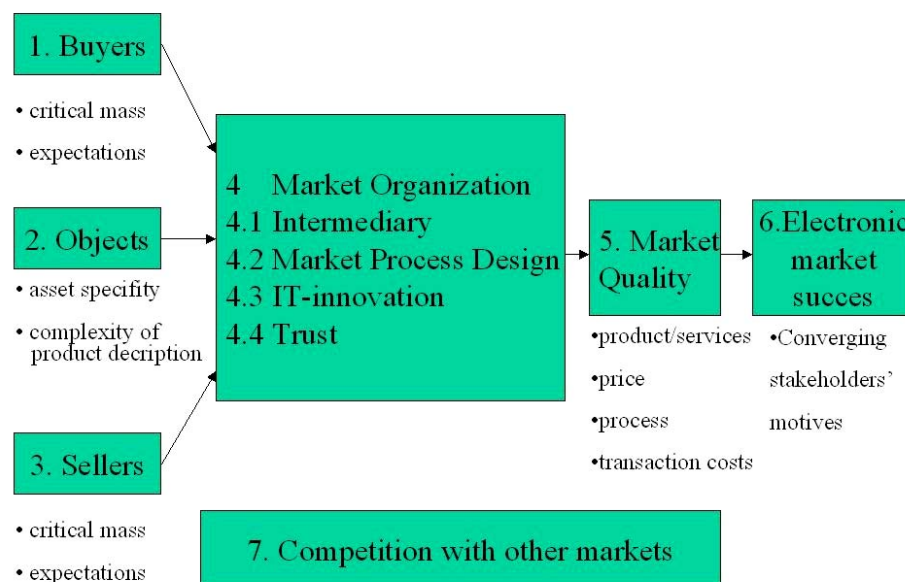


Figure 1. Electronic market framework (From Ribbers et al. 2002)

The first element, buyers, are characterised by their number, by the expectations with which they enter the market (such as the kind of products and services they expect e.g. standardized or customer specific), and their buying behaviour (e.g. their bidding strategies). Buyers affect success as buyer participation has to meet conditions of critical mass; the motives of the buyers will determine the required performance measures of that market.

The second element, objects (exchanged products) have certain characteristics. Asset specificity and complexity of product description are proposed as factors affecting the possibility of a product to be traded through an electronic market (Malone et al., 1987). Analogous to buyers, sellers can be characterised by their number, the expectations with which they enter the market, and their strategies. Critical mass and sellers' expectations affect the success of the market.

Market organization refers to the structure of key market processes, such as price discovery, information exchange, and logistics. Basically it refers to how and by whom different tasks are carried out and coordinated. The key issues in relation to market organization are intermediaries, market process design, IT-innovation, and trust.

According to Lee and Clark (1996), electronic markets are created by 'market making firms' or 'intermediaries'. Intermediaries are motivated by regular economic performance indicators - such as total revenue, profit, and number of transactions realized. The effectiveness of electronic markets depends on how critical processes are designed. The literature provides examples of descriptive/qualitative issues supporting an effective market process design. Kambil and Van Heck (1998) specified a generalisable model of exchange processes. As shown in Figure 2, the framework distinguishes five trade processes (search, valuation, logistics, payments and settlements, authentication) and five trade context processes (communication and computing, product representation, legitimisation, influence, and dispute resolution).

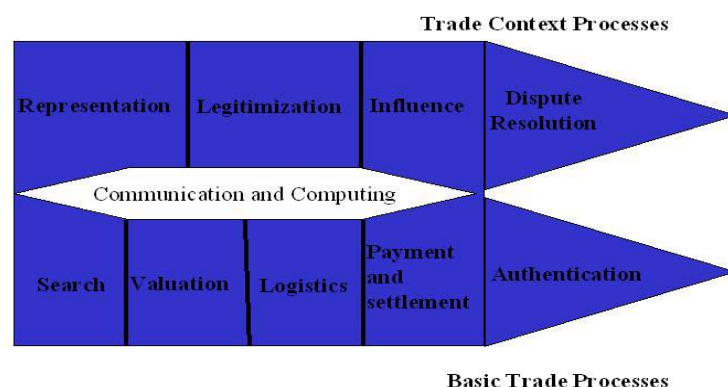


Figure 2. Market Process Design (From Kambil and Van Heck, 1998)

The issue of IT innovation posits that trading processes will be affected by increasing bandwidth and ICT convergence, facilitating electronic communication, electronic coordination, and electronic brokerage (Malone et al., 1987). In addition, the trust element posits that buyers and sellers may be confronted with opportunistic behaviours of their counterparts. Trust can be defined as the belief, or willingness to believe, that one party can rely on the fairness, goodness, strength, and the ability of the other party (e.g. the seller, the buyer) (Fukuyama, 1995). Trust applies to different transaction parts. Buyers expect delivery of the right products, of the right quality, and at the right time. Sellers expect payments as parties have agreed.

Market quality refers to effectiveness and efficiency of trading on that market. The literature provides some measures. For example Clemons and Weber (1990) characterize financial markets in terms of

liquidity, volatility, and transparency. Liquidity is an important attribute of a financial market's attractiveness. It measures the investor's ability to liquidate a position – that is, to convert a security into cash or cash back into a security, without delay, and without the transaction having an excessive effect on the price at which the security is bought and sold. Schwartz (1998) measures a market's attractiveness in terms of liquidity, accessibility, transaction costs, accurate price discovery, and adequate information about products, transactions, and quotes. Apparently, specific measures depend on the type of market.

While competition with other markets is an important element, the literature shows that most researchers view markets as single isolated markets (Rothkopf and Harstad, 1994). Recent work from Ribbers et al. (2002) and O' Reilly and Finnegan (2002) both propose that the success of electronic markets depends on two categories of factors: (I) the motives of (potential) participants, and (II) the level of effectiveness and efficiency of the market – expressed in terms of motives of participants.

Much of the theory on auctions address issues such as the decision to participate, real differences between auctions, and maximizing expected receipts (such auctions will be chosen by the auctioneer and seller). The answers to these questions are typically revenue-based. The participation of bidders in auctions is expected to depend on expected profits in relation to costs of participation (Rothkopf and Harstad, 1994). In general, a gap is observed between the theory and the practice of auctions. For theorists, Rothkopf and Harstad (1994) recommend paying attention to the particularities of how auctions are modelled. Milgrom (1989) argues that comparisons of auction institutions in terms of 'robustness, efficiency, transaction costs, and immunity to cheating, offer an important alternative to the revenue-based approaches for explaining the popularity of specific institutions'.

More advanced conceptualisations of market auctions have been considered by Kaplan and Sawhney (2000). Kaplan and Sawhney (2000) placed e-auctions and e-exchanges in the category of spot buying, as they were designed around the commodity purchasing parameter, as shown in Figure 3.

	Operating Inputs	Manufacturing Inputs
Systematic Buying (Non-commodities)	Horizontal Hubs (Procurement Hubs) Ariba W.W.Granger BizBuyer.com	Vertical Hubs (Catalog Hubs, Vortals) Chemdex SciQuest.com PlasticsNet.com
	E-Auctions (Yield Managers) Adauction.com CapacityWeb.com	E-Exchanges E-Steel PaperExchange.com
Spot Buying (Commodities)		

Figure 3. The B2B Matrix (From Kaplan and Sawhney 2000).

Kaplan and Sawhney (2000) define systematic buying, either horizontal or vertical, as using e-hubs, based upon type of input. These e-hubs create value through aggregation and matching. E-hubs are illustrated as an aggregation mechanism for both buyer and seller in systematic sourcing. E-auctions and e-exchanges that are set up for one buyer to many possible sellers, for systematic buying, the authors call reverse auctioneers. Kaplan and Sawhney (2000) state that these "biased e-hubs" (biased towards one side of the transaction) can exist as aggregators in systematic sourcing and matchers in spot sourcing.

The two models presented above are based on research that examined scenarios where price was the only attribute examined in determining the outcome of the auction. Emerging practices that focus on

more than one variable may challenge the applicability of much of the existing theory on electronic markets and auctions.

Multi-attribute auctions automate negotiation on multiple attributes of a deal (Bichler, 2000), and are useful in areas such as corporate procurement as such negotiations are dependent on more than just price (Bichler et al. 1999). Such auctions may hold the key to higher market efficiency through a more effective exchange of buyer's requirements and supplier's offerings (Bichler and Kalagnanam (2002). However, the process is complex as the description of all attributes and the determination of the overall utility offered by various combinations of attributes is a difficult and time-consuming task (Bichler et al., 1999). Despite this, multi-attribute auctions are likely to be very useful in expanding the range of products and services that are traded using electronic markets. However, little research on multi-attribute electronic auctions exists (Bichler and Kalagnanam, 2002), making it important for researchers to examine the applicability of existing e-auction theories in light of the developments in multi-attribute auctions (Bichler et al., 1999).

3 RESEARCH APPROACH

Our objective for this study was to explore the design of multi-attribute electronic auctions, to examine how the market design principles and operation of these auctions may differ from traditional auctions. In order to operationalise this research, an exploratory case study research design was devised. Yin (1989) suggests that case studies are appropriate when the object is to study contemporary events, and where it is not necessary to control behavioural events or variables. The case study approach is considered appropriate as it allows the researchers to probe case details in more depth than research methods such as surveys and experiments. Primary data was collected via semi-structured interviews and document analysis. Data was gathered over a three-month period from June 2003 to August 2003. Six people were interviewed on a number of occasions throughout this period, including the President, the CIO, the IS Manager, the Auction Manager and two Business Analysts. All interviews were transcribed. Data was analysed using matrices. Miles and Huberman (1994) define a matrix as "*essentially the crossing of two lists, set up as rows and columns*". The frameworks by Ribbers et al (2002) and Kambil and Van Heck (1998) were used to structure the within-case analysis.

4 CASE STUDY FINDINGS

Eutilia is a leading pan-European marketplace for the utility sector, offering source to pay services to buyers and suppliers. Headquartered in Leiden, the Netherlands, Eutilia is open to all companies on both the buy and supply sides. While being an independent marketplace, Eutilia has the financial backing of 11 of Europe's largest utility providers including Electrabel (Belgium), Electricite de France (France), Endesa (Spain), ENEL (Italy), Iberdrola (Spain), Nuon (Netherlands) and RWE (Germany). These 11 organisations account for the vast majority of the annual procurement spend in the European utilities market. Eutilia's services include supplier commercial assessment, e-tendering, e-auctions and transaction services. Eutilia was created as a result of the European commission's decision to liberalise the utilities market across Europe. Indeed Eutilia's creation had to be cleared by the European commission as it operates in an area governed by public procurement directives. Wim Rietveld, CEO of Eutilia during its formation stated that the advantage of using a marketplace is "not so much about price, it is more about having better prices and improved transparency." Increased competition and transparency were two principles which the European commission were anxious to encourage in the utilities sector.

Table 1 outlines the various elements of Ribbers et al. (2002) model of electronic market success and Kambil and van Heck (1998) framework of market process design in the context of the Eutilia case. The key points from the comparison to traditional single parameter (price) auctions can be seen in how certain general parameters and trade context processes are enhanced by use of intermediary over

traditional auction processes. For example, within the general parameters, suppliers are pre-qualified and the intermediary provides several additional value activities in market making and automation. The basic trade process of authentication is affected. Also, in the trade context process, product representation and communication are all impacted differently than in a single parameter auction. A fuller consideration of these parameters is represented in the following sections.

Variables	Indicators	Eutilia	Difference from traditional price auctions
General Parameters	Buyers	Predominately used by European Utility Organisations to procure manufacturing (e.g. cables, transformers) and operating products (e.g. protective clothing, vehicles)	Eutilia creates auctions for single buyers to meet multi-attribute requirements.
	Sellers	Preselected and prequalified international suppliers who are invited to participate if it is deemed that they meet buyer's requirements.	Pre-scanned across multiple attributes
	Products	Multi-faceted and varied. Include core (e.g. cables, transformers) and non-core (e.g. protective clothing, vehicles) products.	Less homogenous products as MVB provides meaningful assessment of full offer.
	Intermediary	Eutilia facilitates the communication, selection and negotiation processes for buyers. It does this through it's supplier optimisation services (SOS) incorporating supplier pre-qualification, supplier commercial assessment, e-tendering and e-auctions.	More planning required and more emphasis needs to be placed on auction design and structure due to multiple attributes. Buyer decides whether the object (contract) is suitable for auction.
	Competition with other markets	While having no direct competitor in the European utilities sector for core products, it competes with markets for non-core products. Biggest competitor to Eutilia's business is from the individual buyers traditional paper based e-tendering process	Competition reduced due to full service nature of procurement process offered.
Basic Trade Processes	Search	Buyers may utilise Eutilias database of prequalified and preselected suppliers to search for core and non-core products.	Search based on multiple criteria
	Valuation	Multi variable bidding (MVB) with price being just one characteristic. Other variables defined by buyers on a case by case basis. For example in the Scottish Power / United Utilities case who conducted an auction for vehicles, variables such as vehicles residual value, repair and maintenance costs were some of the variables utilized. Auction type: English Reversed (ER), Dynamic Sealed Reverse (DSR)	Valuation based on weighting of multiple criteria
	Logistics	Case specific on whether logistics are buyer or sellers responsibility – logistics may be one of the criteria utilised by buyers for multi variable bidding. Will be the buyers decision in relation to whether they want to include logistics as one of the criteria in multiple variable bidding.	Logistics may be included as an evaluation criteria under MVB
	Payments and Settlements	Final contract outside scope of Eutilia. Once an auction is completed, confirmation is sent to the buyers either directly to the buyer by the supplier or through Eutilia. Final contract and method of settlement is outside Eutilias scope. Direct communication between buyers and sellers on terms and method of payment	No differences observed
	Authentication	Eutilia prequalifies all suppliers who are invited and sign up for tenders. They collect information in relation to a supplier's financial position, environmental policies and legal issues. Eutilia evaluate supplier's technical ability and test all products.	Extensive pre-qualification of suppliers by intermediary to ensure the integrity of the auction process.
Trade Context Processes	Communication and computing	Auctions are live through Eutilias proprietary auction software and conducted over the Internet.	Ongoing as bid preparation is online. Sellers can determine ranking in advance of auction
	Product representation	As part of the qualification process, Eutilia checks the technical specifications and tests all products. Eutilia encourage buyers to move toward standardised products as there are efficiencies in the context of pricing. If buyers have specific needs e.g technical requirements, these will be incorporated in the tender	Buyers determine how object is represented across multiple attributes
	Legitimation	Bid validity based on output of multi-criteria analysis. Contracts exchanged between buyers and sellers after event.	No difference observed
	Influence	Eutilia owned by 11 leading European utilities. It may be deemed to be buyer biased as it only conducts forward auctions.	No difference observed
	Dispute Resolution	Contract between buyer and seller – Dispute resolution beyond the scope of Eutilia	No difference observed

Table 1. Case analysis - General parameters and market process design

4.1 The Intermediary

The role of the intermediary, as evidenced by the Eutilia case, is different from traditional conceptualisations of electronic markets. Eutilia has essentially established itself as a strategic sourcing partner for utility industry buyers. This is evident from the manner in which Eutilia customizes procurement auctions for each buyer, and engages in substantial pre-auction activities to ensure that the process meets the explicit requirements of each buyer.

Eutilia utilises a roadmap for auction preparation in order to ensure that the process fulfils EU regulations. To begin, Eutilia holds discussions with the buyer to decide whether an auction is a suitable mechanism for the product being procured. There is no definitive model to decide on this. Every contract is deemed to be unique, as the procurement environment for any given product is continuously changing. All that can be done is to consider the market at that point in time in order to establish if the environment is suitable for running an auction. A critical element is the importance of the contract to the market. For example, Eutilia describe a scenario where a supplier is invited to an auction but they believe that the contract is not important. Consequently, the supplier would rather loose the contract than reveal their best margin. Eutilia advises buyers, but it is the buyer who decides whether or not to go ahead with an auction for a specific contract. At this point, a commercial contract is agreed with the customer. This incorporates all terms and conditions for the auction.

The next stage is to define the auction structure. Eutilia believe that this structure is very important as it influences the auction result. It is possible for an auction event (contract) to consist of more than one auction line (product). Buyers will have to decide if they want one contract with one supplier for the entire event (one auction) or whether they wish to conduct a multiple auction event, thereby allowing for the possibility of numerous contracts. If a buyer wants a dynamic situation for each auction line then that needs to be reflected in the auction design.

Eutilia have noted that a key issue for design of an auction structure is the perceived level of interdependency between various auction lines. For example if you have three cables (products) in an event, cables a, b, c. How is the outcome affected if the events are run in parallel? Will suppliers that lose in auction A go deeper in their prices for auction B? If buyers believe that, Eutilia need to ensure that auction B does not end before auction A. If it is decided that there is inter-dependency between auction lines, individual auction running times can be linked. There are also practical limitations to this when deciding on auction structure. For example, if the buyer decides to run eight lines simultaneously, then suppliers have to concentrate on them all, especially if they are interested in all product lines. For practical reasons, they should not all finish at the same time. Therefore it is clear that dependencies between product lines will impact upon auction structure.

Eutilia also supports single or multi-currency bidding. Buyers may decide that it is advantageous to allow bidders to bid in their own currency. The opening price may be individual (per bidder) or general (per auction). The systems will also allow users to decide on whether to show or hide the opening price. It is usual to hide general opening price when current market levels are unknown. It is also possible to specify a minimum bid decrement. This will depend on the chosen auction type, English Reverse (ER) or Dynamic Sealed Reverse (DSR). It is also possible to show or hide the lead bid. It is usually good practice to hide the lead bid when individual prices differ hugely.

Eutilia works closely with buyers to determine an appropriate auction structure that takes into account the product and the prevailing market conditions. The auction structure outline the activities and responsibilities of both Eutilia and the customer (buyer) in organising the auction. A sample auction structure, showing activities over a twelve-week period, is outlined in figure one. Figure 4 illustrates Eutilia's heavy involvement in organizing the auction.

Roadmap auction preparation		week					week				
		month					month				
		1	2	3	4	5	8	9	10	11	12
	Who										
Have GT&Cs signed by originator	Customer										
Have commercial contract agreed and signed by originator	Customer										
Discuss/agree the auction structure and set-up with originator	Eut / Cust										
Send originator invitation pack to the originator	Eutilia										
Shortlist of suppliers available to Eutilia	Customer										
Send registration form to bidders (e-mail)	Eutilia										
Collect the bidders registration forms	Eutilia										
Registration of bidders	Eutilia										
Send user ID to bidders (by e-mail) and verify they receive it	Eutilia										
Give password to bidders (by phone)	Eutilia										
The "auction set up form(s)" available to Eutilia	Customer										
Prepare bidder invitation pack (customize)	Eutilia										
Send the invitation pack to bidders	Eutilia										
Test the originator software for viewing the dashboard	Eut / Cust										
Prepare the auction execution room and helpdesk	Eutilia										
Set up the bidder training events	Eutilia										
Internet connection check with registered bidders	Eutilia										
Training event bidder	Eutilia										
Training event bidder	Eutilia										
Training event bidder	Eutilia										
Training event bidder	Eutilia										
Evaluate trainings (and make adjustments if necessary)	Eutilia										
Set up the live auction	Eutilia										
Hold Live event	Eutilia										
Prepare and send report to originator	Eutilia										

Figure 4. Eutilia's auction structure

4.2 Authentication

A significant value-added provided by Eutilia is the authentication provided by pre-qualification. The pre-qualification process may be broken down into three distinct stages. Stage one is known as commercial pre-qualification where Eutilia collects supplier information in relation to the suppliers financial condition, supplier capabilities, environmental and safety policies, outstanding legal issues and references. Stage two involves examining the supplier's technical capability. This involves Eutilia assessing the technical ability of suppliers through supplier audits and visits. Stage three involves product qualification where Eutilia tests the product to ensure it meets specifications.

The objective of supplier commercial assessment (SCA) is to provide instant pre-qualification information on suppliers as an input to the utility sourcing process. The supplier scan service leverages the power of on-line and off-line searches for potential suppliers, supported by the market knowledge of Eutilia's sourcing experts. The service can be used to generate a long list of potential suppliers or taken a step further to apply specific search criteria. The benefits of supplier commercial assessment (SCA) include shared supplier data amongst utilities, consistent pre-qualification, and reduced sourcing cycle times. SCA also enables the identification of new suppliers by virtue of a shared centralized database of utility suppliers

Eutilia's supplier commercial assessment (SCA) is an important advance in making the assessment and selection of suppliers as easy and transparent as possible for utility industry buyers. All utilities using SCA are obliged to share their supplier data with other users. Eutilia believe that by using the

SCA service it can save up to 60 days on the overall procurement process compared to traditional calls for competition.

4.3 Product Representation

Eutilia's tendering process is fully transparent for both buyers and bidders. All questions must be answered in a standardised format and the buyer may choose to make certain questions mandatory. This enables cross tender analysis across multiple attributes. One of the key benefits of MVB is that buyers can factor in elements other than price. When two of the UK's largest utility companies, United Utilities and ScottishPower decided that they were seeking suppliers to provide them with a mix of cars, vans and trucks for their vehicle fleets, they issued a tender document with a value of 250 million euro over three years. As well as price, factors like the repair and maintenance costs, residual values and fuel efficiency were important for both organizations. In conjunction with Eutilia both companies decided to utilise multiple variable bidding (MVB) in which buyers factored in all of the variables they are seeking from the contract.

In this example, a total of 26 different auctions were held, making up three auction events covering cars, vans and trucks. This approach suited the buyer's needs along with the time and cost savings enabled by participating. Participants did not need to travel to a physical auction and because suppliers were pre-qualified, their involvement in any further auctions would be even more streamlined. There is an immense amount of value added for the customer through this pre-qualification process and the fact that all products are thoroughly tested for their product quality and technical specifications.

In total, the buyers received 167 bids and during the process the importance of Eutilia's multi variable bidding approach emerged strongly. Manufacturers were invited to sharpen up their initial bids and this had benefits for buyers. In many cases, it was not the supplier offering the lowest price that won the auction but the one that could provide the lowest life cost. In addition, Eutilia believe that those suppliers that invest in customer service are often revealed as offering better value than competitors who quote a lower headline price.

An important element in Eutilia's auction system is the Dashboard. This enables buyers to see the bids during the live auction, and to list these using such criteria as bid time, ranking and whether the bid is on the total quantity or part of the quantity. Reports are available in Excel with the best bids and all bids listed in chronological order. An extension time mechanism is also available to enable bidders to react to a previous bid where it is deemed advantageous. The number of extension times may be limited. All of these decisions will be made by the buyers in conjunction with Eutilia.

Up to recently bidders were not able to see the number of bids which had been entered in relation to an auction. In many auctions bidders saw the auction times being extended and they did not see anything happening unless they made a bid themselves, especially if the leading bid was hidden and they didn't have a rank in the top three for instance. They saw the time being extended and nothing else happening. The system was changed to improve transparency. Bidders can now see bids coming in. They can therefore see how others bidders are reacting and this may stimulate them into making a revised bid.

Eutilia are also leading the drive towards standardised products in the utilities sector. The advantage for the buyers is that they have a broader base of suppliers from which to purchase their products and it makes the task of procuring certain goods less uncertain. By not only pre-qualifying suppliers but products as well, buyers can be assured that all goods meet the specified technical standards and have been fully tested.

A comprehensive set of IT tools and services are offered to suppliers to present their products and services to buyers. The application enables the creation, maintenance and distribution of customised catalogues. The system forces suppliers to answer questions in a specific format. Suppliers cannot release their offers until mandatory questions are answered. During the auction, Eutilia's helpdesk

supports up to 10 languages to facilitate a broad range of suppliers. Once the auction is closed, a report can be generated with the suppliers ranked under specific criteria.

4.4 Communications and Computing

The complexity of the buyer's requirements and product offering necessitates that Eutilla have a formal process for representing both in advance of and during a live auction. This is necessary as suppliers need to be able to customise their offering in light of competing bids, and the buyer has to be able to evaluate offerings across a number of criteria.

Eutilla uses a formal series of processes to distribute information during the auction set-up and the auction event. Incorporated in this process is:

- Publication of the tender document
- Invitation of pre-selected, commercially assessed suppliers
- Helpdesk support during the auction to deal with queries.

Eutilla's proprietary eSource system provides all necessary information to buyers and suppliers to ensure that the auction is as transparent as possible. This system utilises the up-to-date encryption technology, and is protected by a series of firewalls. The system enables buyers to develop electronically and centrally stored tender documents. It also enables the buyer to communicate simultaneously with all bidding suppliers and support the efficient evaluation of responses. The application is available in three languages; English, German and French. This helps to extend the market reach by ensuring that suppliers from various countries can take part in auctions with language not being a barrier.

The first stage in the process is to set-up the tender. Eutilla examines all the documentation which a buyer traditionally distributes to suppliers through 'snail mail'. The tender is designed with weightings attached to specific criteria. Several answer formats are possible, and the buyer decides on the format and which questions should be mandatory.

Once a list of suppliers is finalised, suppliers are contacted and invited to tender. This process is undertaken by Eutilla by distributing registration forms by email. Interested suppliers (bidders) return these registration forms. User IDs are then sent to these suppliers by email, with passwords distributed via phone.

Bidder training events are then organized. This consists of Eutilla personnel being online with a supplier for half an hour in order to educate them on how to use the application. If there are 20-25 suppliers, this process may take anything up to two days. Eutilla tried to automate this approach by providing an online demo, but abandoned this approach as they found that personal contact is necessary to build trust. While Eutilla believe that this process is necessary, it is expensive.

Eutilla then tests the software to ensure that the buyers can view the dashboard. The auction execution room is then prepared and the helpdesk is set up. During the publication period, the buyer can monitor the event. For example, the buyer can check if specific suppliers have accepted the invitation, logged in to the event, or have worked on the tender. Eutilla is continuously communicating with the suppliers during this period in order to establish if they have any questions about the system or the tender.

5 FINDINGS AND CONCLUSION

Evidence from our study illustrates that multi-variable electronic auctions can be used to procure a wider range of operating and manufacturing input that has been considered possible with traditional, price only, auctions. This is because such products can be effectively evaluated across a range of criteria in real-time if there is sufficient support from the intermediary for the process. In particular, the role of the intermediary changes to include greater responsibilities for authentication, product representation and communications/computing.

This perhaps reflects the development of auctions over the last few years from mechanisms which only support a single negotiation element (price), to multi-variable auctions where the decision is based on multiple attributes. Multi-attribute auctions necessitate much more interaction between the intermediary, buyers and sellers, akin to the traditional face-to-face negotiation of deals from the past. They specifically require much more interaction between the buyer and intermediary with regard to planning, designing and structuring the auction. The relationship between the intermediary and suppliers is also much more complex as both suppliers and the products need to be pre-qualified and audited.

Consequently, the intermediary develops a greater understanding of the value chain activities of buyers and sellers. It appears from our analysis that this understanding can lead to long-term partnerships between the intermediaries and various buyers and sellers. Such partnerships are likely to facilitate the type of co-operation that has traditionally been associated with systematic sourcing arrangements between buyers and sellers. This represents a move towards strategic sourcing where many operating and manufacturing inputs can be sourced using electronic auctions rather than horizontal or vertical hubs (see Figure 5).

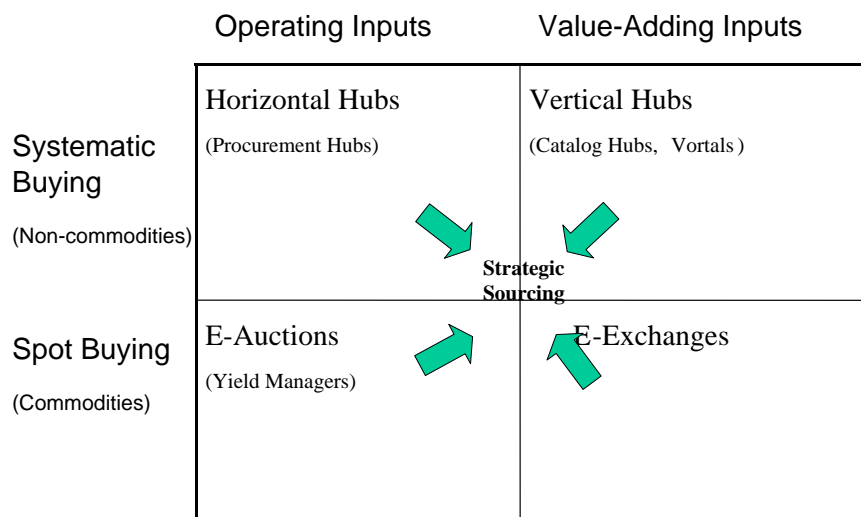


Figure 5. Moving towards strategic sourcing

In conclusion, we propose a note of caution. Buyers utilizing a ‘full-service’ electronic auction intermediary are likely to enjoy many of the benefits of both spot and systematic sourcing. However, the process activities by the intermediary may not aid the evolution of long-term, buyer seller partnerships. With the reliance on an intermediary for activities such as search, communication and product representation, we would argue that power and control of the buyer-seller relationship rests with the intermediary. Further research is required.

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