EXPERIENCES WITH ELECTRONIC AUCTIONS IN THE DUTCH FLOWER INDUSTRY

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INTRODUCTION

Since the end of the nineteenth century flower products are marketed with the help of the Dutch auction mechanism. In those days flower growers formed a cooperative and developed their own local marketplace. In the last decades these local cooperatives merged into larger organizations, like, for example, Flower Auction Aalsmeer (VBA) and Flower Auction Holland (BVH); each with an annual turnover in 1996 of approx. 1 billion dollar. More recently, there has been an ongoing debate in the Dutch flower industry, about: (i) the decoupling of price discovery and logistical processes in the Dutch flower auctions; (ii) the increasing imports of foreign flower products at the Dutch flower auctions; and (iii) the use of new Information Technology (IT) in this industry. VBA and BVH were close to their limits in terms of complexity, capacity, and room to expand. One of the answers to these limits was the introduction of electronic auctioning. In this article we will present and investigate four electronic auction initiatives: (i) the Vidifleur Auction (VA); (ii) the Sample Based Auction (SBA); (iii) the Tele Flower Auction (TFA); (iv) the Buying at Distance Auction (BADA). This article aims

- to describe the development, implementation, and effects of four different electronic auction system initiatives in the Dutch flower industry;
- to explain through an in depth analysis a better understanding of the reasons for the failures of the VA and the SBA, and the successes of the TFA and the BADA.

ANALYZING EXCHANGE ORGANIZATIONS

Due to the convergence of IT and telecommunication, and the proliferation and availability of bandwidth, the impact of electronic markets is expected to grow rap-

idly. Their effectiveness, however, is dependent on their design. Existing research in this new area provides examples of relevant issues supporting an effective design. What is lacking, however, is a systematic classification of various complex issues that arise when designing and implementing electronic markets. Prior research on the effects on exchange organizations and processes typically applied transaction costs and agency theory to predict shifts from hierarchies toward market or other intermediate forms of organization (Malone et al, 1987; Hess and Kemerer, 1994). A central argument of these articles was that IT would improve communication searches, monitoring and information-sorting capabilities, to reduce transaction costs and allow purchasers to take advantage of production economics available in markets. A critical drawback of this analysis was the definition of markets in abstract economic terms (i.e., markets coordinate economic activity through a price mechanism) without consideration for differences in market organization. For example, some different market types include direct search markets,

brokered markets, dealer markets, and auction markets. Auction markets were critically analyzed from an economic point of view by Davis and Holt (1993), Hendricks and Porter (1988), and Rothkopf and Harstad (1994). More recently, the flower auction markets were investigated in more detail. Ajit Kambil and Eric van Heck (1996) specified a generalizable model of exchange processes and developed a process-stakeholder analysis framework to evaluate alternative market designs. In this framework, see figure 1, five trade processes (search, valuation, logistics, payments and settlements, authentication) and five trade context processes (communications and computing, product representation, legitimation, influence, and dispute resolution) are distinguished.

This framework is applied to analyze a number of IT initiatives in the Dutch flower markets. Van Heck et al. (1997) investigated the Tele Flower Auction and the competitive advantage of new entrants, as was suggested in Clemons et al. (1996). Van Heck and Ribbers (1997) compared the Tele Flower Auction with the Sample Based Auction initiative. In this article we combine the different results from these studies and we will present an overview of the past and current experiences of electronic auctions in the Dutch flower industry.
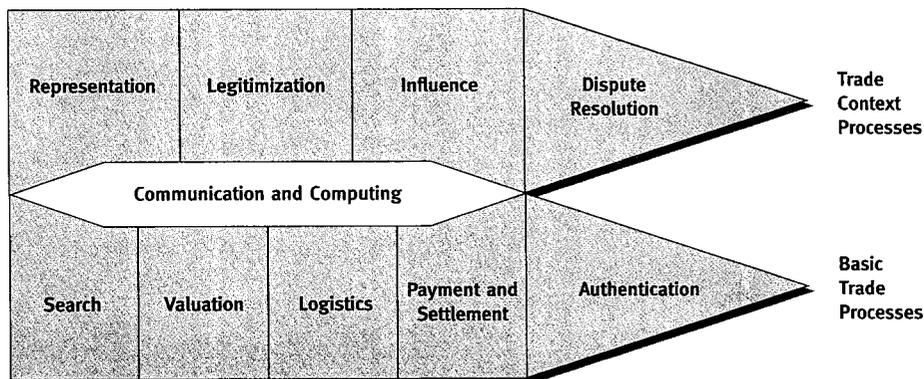

Figure 1
Generalized model of exchange processes
(Kambil & Van Heck, 1996).

THE DUTCH FLOWER INDUSTRY

INDUSTRY BACKGROUND

The Netherlands is the world's leading producer and distributor of cut flowers. The Dutch dominated the world export market for cut flowers in 1996 with a 59 per cent share and for potted plants with a 48 per cent share. The world's two biggest flower auctions are in Aalsmeer (VBA) and Naaldwijk/Bleiswijk (BVH); every day on average 30 million flowers - originating not only from the Netherlands but also from countries such as Israel, Kenya and Zimbabwe - are traded in 100,000 transactions. The Dutch flower auctions play a vital role in Holland's leadership of this industry, by providing efficient centers for price discovery and transactions of flowers between buyers and sellers. These auctions traditionally use the 'Dutch auction' as the mechanism for price discovery. They are established as cooperatives by the Dutch growers.

THE DUTCH FLOWER AUCTION CONCEPT

The following auction rules characterize the Dutch flower auction concept, see also Van Heck et al. (1997). Dutch flower auctions use a clock for price discovery, as follows. The computerized auction clock in the room provides the buyers with information on producer, product, unit of currency, quality, and minimum purchase quantity. The flowers are transported through the auction room, and are shown to the buyers. The clock hand starts at a high price determined by the auctioneer, and drops until a buyer stops the clock by pushing a button. The auctioneer asks the buyer by intercom, how many units of the lot he or she will buy. The buyer provides the number of units. The clock is then reset, and the process begins for the left-over flowers, sometimes introducing a new minimum purchase quantity, until all units of the lot are sold. In the traditional way buyers must be present in the auction room. In practice, it turns out that the Dutch flower auction is an extremely efficient auction mechanism: it can handle a transaction every four seconds.

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FOUR ELECTRONIC AUCTION INITIATIVES

In this section we will discuss the characteristics of four electronic auction initiatives in the Dutch flower industry. Table 1 describes the main characteristics of the electronic auction initiatives and their processes.

THE VIDIFLEUR AUCTION

Vidifleur intended to use video auctioning to decouple price determination and logistics, and to allow buyers to trade from outside the auction hall. When the product arrived at the auction, a picture was taken, digitized and stored in auction computers. These computer transferred the picture for display to a screen in the auction hall, where buyers could bid for the product based on the image of the product. Buyers were also able to bid for and look at the potted plants on computer screens in their private auction offices. The computers in the private office provided a screen-based representation of the clock which was synchronized with the clock in the auction hall.

Buyer reaction to screen-based trading was negative and led to the termination of the experiment in late 1991. Buyers cited three main reasons for not adopting the new system. First, the clock-based trading system provided no new efficiencies for buyer. Second, the quality of the auction hall video display was perceived as poor, and trading from outside the auction hall created an informational disadvantage. In floor-based trading the buyers could observe each other, and the reactions of other major buyers to specific bids. Third, at the back of each auction hall is a coffee shop where buyers interact informally and share information about the market. Again, access to the social interaction and information was more difficult through screen-based trading.

THE SAMPLE BASED AUCTION

Flower Auction Aalsmeer began a sample-based auction for trading potted plants in 1994. In this concept, growers send a sample of the product to the auction house

Variables	Indicators	Vidifleur Auction (VA)	Sample Based Auction (SBA)	Tele Flower Auction (TFA)	Buying at Distance Auction (BADA)
General Parameters	Intermediary	Flower Auction Holland (BVH)	Flower Auction Aalsmeer (VBA)	East African Flowers (EAF)	Flower Auction Holland (BVH)
	Sellers	Dutch growers as member of cooperative	Dutch growers as member of cooperative	Non-dutch growers	Dutch growers as member of cooperative
	Buyers	Wholesalers	Wholesalers	Wholesalers	Wholesalers
	Products	Potted plants	Potted plants	Flowers	Flowers
	Start (End) Year	1991 (1991)	1994 (1994)	1995	1996
Basic Trade Processes	Search	Buyers can have a look in the storage rooms	Buyers can have a look in the storage rooms	Buyers can search supply data base	Buyers can search supply data base
	Valuation	Dutch auction clock	Dutch auction clock	Dutch auction clock	Dutch auction clock
	Logistics	Via auction room to buyer's place	Directly from grower's to buyer's place	Directly from storage room to buyer's place	Via auction room to buyer's place
	Payments and settlements	Within 24 hours; guaranteed by intermediary	Within 24 hours; guaranteed by intermediary	Within 24 hours; guaranteed by intermediary	Within 24 hours; guaranteed by intermediary
	Authentication	Quality grading on lot	Quality grading on sample	Quality grading on lot	Quality grading on lot
Trade Context Processes	Communication and computing	Computerized clock in room and on PC screen, video image on screen in room	Computerized clock, EDI with growers and buyers	Computerized clock on PC screen, 2 digital images on PC screen, EDI with growers and buyers	Computerized clock in room and on PC screen, 1 digital image on PC screen, EDI with growers and buyers
	Product representation	Real lot on site; video image on screen	Sample of lot	2 digital images on PC screen	Real lot on site; digital image on screen
	Legitimation	By intermediary	By intermediary	By intermediary	By intermediary
	Influence	Growers are owner of intermediary	Growers are owner of intermediary	Intermediary is importer of foreign flowers	Growers are owner of intermediary
	Dispute resolution	By intermediary	By intermediary	By intermediary	By intermediary
	Overall result	Failure	Failure	Success	Success

Table 1 Characteristics of four electronic auctions in the Dutch flower industry.

along with information on available inventory. During the auction the sample represents the entire inventory available to buyers who can bid for the product and specify product packaging and delivery requirements. Growers then package the product as specified and deliver it the next day to the buyer location in the auction complex or to other buyer warehouses. Buyers have to be physically present in an auction room. Growers, buyers, and the auction used electronic data interchange (EDI) to share all information required in this process. This trading model reduces the number of times a product is handled, reducing overall packaging costs and damage.

The different actors, the growers, the buyers, and the auction, expected a number of different benefits. First, by uncoupling logistics and price determination, the auction and growers expected the number of transactions per hour to increase. In reality the number of transactions per hour decreased as buyers had to specify terms of delivery. Second, while the auction expected 45% of the supply of potted plants to be transacted in the sample-based auction, only 10% of the product was transacted this way. Thus, SBA also did not effectively reduce storage requirements at the auction. After numerous attempts to increase the volume of sample-based auctions they were discontinued in late 1994. The system had a negative effect on the functioning of growers, the auction house and buyers. The sample-based auction system ended up in a complete failure.

THE TELE FLOWER AUCTION

An important effect of the import restrictions imposed by the Dutch flower auctions, was the creation of TFA by East African Flowers (EAF) (Van Heck et al, 1997). EAF is one of the biggest importers of cut flowers; they specialize in supply from East Africa (Kenya, Tanzania, and Uganda). For EAF, the effect of the import restrictions was that 30% of their imports could no longer be traded via the Dutch auction clocks during the traditional import season; in the summer season 100%

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of their imports could not be traded at all. EAF announced the creation of TFA in December 1994. On March 24, 1995 TFA was launched with 2 growers and 70 buyers. After some months, EAF decided that growers from other countries (for example, Spain, Colombia, France, India, and Israel) were allowed to use TFA. After one year, approximately 35 growers and 150 buyers were connected to TFA.

In the TFA, buyers can bid via their personal computer (PC) screens. Each PC is connected to a fully computerized auction clock. Logistics and price discovery are uncoupled. Flowers are no longer visible for buyers, and buyers are no longer physical in an auction room. The PC provides the buyer with information on the next flower lots. On his PC the buyer can earmark interesting lots, so at the time those lots will be auctioned, the PC will warn the buyer. The PC provides information on the producer, product, unit of currency, quality, and minimum purchase quantity. For each lot two images are presented on the PC screen. The underlying auction concept remains the same: Dutch flower auction. On the PC screen the buyer sees the Dutch auction clock. The clock hand starts at a high price, and drops until a buyer stops the clock by pushing the space bar at the key board of the PC. The auctioneer asks the buyer, via an open telephone connection, how many flowers of the lot he or she will buy. The buyer provides the amount. The clock is then reset, and the process begins for the next units, until the remainder of the lot is sold.

Growers send the flowers to EAF, and EAF stores these flowers in Amstelveen. Logistics and price discovery are uncoupled within the auction hall. The distribution of the flowers from the Amstelveen area to the buyer's addresses (nearby the traditional auctions of Aalsmeer, Naaldwijk, and Rijnsburg) is done by transporters of EAF. Transport costs are paid by EAF.

Compared with SBA, buyers can trade at a distance. TFA provides better and more frequently updated supply information.

The speed of the TFA system is amazing. Not only the auctioning process, but also the after-sales process is very fast; sometimes within half an hour products are delivered at the buyer's address. It soon became clear that one of the main propositions of TFA was that the quality of the flowers determines the buyers' trust in the TFA concept. TFA's motto is: 'Buyers have to trust the quality blindfold' because buyers cannot physically see the product anymore. Still, buyers who are nearby TFA, can inspect the imported flowers; 30% of the buyers do so regularly. Reliable product information and stable quality control are essential. Quality control is done by TFA's quality inspectors at the grower's place, at the distribution point in Nairobi (Africa), and at TFA in Amstelveen. Buyers also trust the IT innovations. One of the reasons seems to be that the Dutch auction clock is still the price discovery mechanism; buyers are used to that mechanism. Buyers were enthusiastic about the quality and the delivery time of the auctioned products, and about the service level of TFA. The prices were on average not higher or lower than in the traditional Dutch flower auctions. TFA expects a turnover of 50 million dollars for the growing season 1995/1996. Compared with the seven Dutch flower auction, TFA ranks fourth.

THE BUYING AT DISTANCE AUCTION

Flower Auction Holland started in June 1996 with the concept of 'buying at distance' elaborating on their previous experiences with the Vidifleur project. The concept is that buyers can connect with a modem their PC with several auction clocks in the auction rooms. On their PC screen they can click on an icon and open up a window for every clock available. The 'buying at distance' project started with six clocks and 16 buyers. In 1997 already 60 buyers are on the waiting list. Buyers can search in the supply data base for certain products or growers. Buyers like the better communication through this system between the purchase people and the sales people within the buyers' firm. Also lower travel costs were re-

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ported. On the other hand the auction house mentions that the amount of buyers (physically or electronically connected) in one market place will be stable or increase, and that will increase the auction prices.

SOME LESSONS LEARNED

The following lessons are learned from the experiences with electronic auctions in the Dutch flower industry.

LESSON 1

The application of information technologies to trading can enable increased efficiencies and separation of informational and physical trading processes. This in turn will permit more varied forms of trading customized to different user requirements (Kambil and Van Heck, 1996).

The four cases illustrate the use of IT to separate the informational and physical trading processes. In all cases the valuation and logistical processes are increasingly decoupled from another in time and space. TFA uncouples logistics and price discovery in the auction hall. Therefore, the internal logistics of the auction hall is much simpler, compared with the traditional auction system. This fact explains why TFA has a much better logistical performance and service level, in the opinion of the buyers. EAF paid much attention to the after-sales program (providing transport to the buyers).

LESSON 2

Conformance of the actual and the perceived quality of the product, logistical performance, and IT performance result in high trust contributes to a successful electronic auction system (Van Heck et al, 1997).

In the SBA the buyers chose to discount the prices bid for non-sample lots by nearly ten percent because they could no longer authenticate quality by visual inspection. Logistical performance was questioned by growers, and buyers. No problems were reported about the IT performance as such.

In the TFA case, sellers and buyers find that TFA keeps their promises concerning quality of products, delivery time of products, and reliability of IT performance. Buyers trust the TFA products. Usually, they get better products than expected from the data and images provided on the PC screen, due to a centralized quality control program. Buyers also trust TFA, because the underlying auction concept is the same: Dutch flower auction. Buyers trust the IT innovation: if a buyer is the first buyer to push the space bar at the key board of the PC, he or she is certain that the computer network transfers this signal fast and reliable, independent from the distance between the buyer's computer and the auction computer.

LESSON 3
Market organizations are the meeting point for multiple stakeholders: buyers, sellers, and intermediaries with conflicting incentives. Given existing or competing market alternatives, no new IT -based initiative is likely to succeed if any key stakeholder is worse off after the IT enabled innovation (Kambil and Van Heck, 1996).

In the two cases of failure, the application of the process-stakeholder framework clearly identified either the grower or the buyer was worse off from the innovation. For example, the SBA failed to meet expectations for many reasons. First, the incentives and benefits to buyers and growers (in particular) did not change substantially to encourage their participation in this market. Specifically, growers received no extra compensation for modifying packaging and delivery practices to suit the customer. Second, the growers perceived they got lower prices in a slower auction. To overcome this disadvantage growers would break the same product into different sample lots so that it would be priced multiple times during

the auction hoping it would lead to higher prices. Third, the auction rules initially did not provide incentives to buyers by supporting transactions on large lots. Instead, the auction maintained rules to favor transactions in small lots. Thus, an insufficient number of buyers and sellers initially adopted this new form of trading. In the Vidifleur auction, the buyers did not perceive a new benefit from the system. The video quality was poor, authentication of quality less convenient, and trading online did not provide all the information available in the auction hall.

LESSON 4
New entrants, facing established dominant players, can quickly build competitive advantage with an innovative auction system concept (Van Heck et al, 1997).

The TFA case demonstrates the way a new entrant may use IT in an innovative way, in order to enter a market and compete with dominant players in that market. The efforts to reduce foreign access to the traditional Dutch auctions, led buyer organizations and foreign growers to announce the creation of competing auctions. Indeed, EAF's development and introduction of TFA is one of the initiatives in response to these import restrictions by the traditional Dutch flower auctions. It was the first time in Dutch history that an importer organization performs this function. Traditionally, the Dutch flower auctions are

established as cooperatives by the Dutch growers. Another interesting point was the high speed of entrance. The import restrictions were valid in October 1994; at that time EAF developed the first ideas about TFA. TFA started in March 1995. So EAF developed and implemented TFA in a few months. This case shows that new entrants can quickly build a competitive advantage. It illustrates the conclusion derived by Clemons et al (1996) concerning the strengths of new entrants in a competitive market. Besides the strengths of TFA, the weaknesses of the traditional Dutch auctions partly explain the success of TFA. The cooperative structure of the Dutch auctions (every single grower has one vote), the complexity of the after-sale logistics (due to the coupling of the logistics with the price discovery process), their inability to implement IT innovations quickly further decreased the market share of TFA's competitors.

CONCLUSIONS
We presented current research on the Dutch flower auctions. The process-stakeholder framework, proposed by Kambil and Van Heck (1996), is useful to: (i) evaluate or explain the successes or failures of IT-based initiatives in markets; (ii) design new electronic market systems. In the near future we expect that more varied forms of trading will emerge. Electronic auction markets, with a Dutch auction concept, will be one of these forms. However, one of the important weaknesses of the Dutch auction concept is that it is a supply oriented trading mechanism. In the last couple of years the flower industry (and not only this industry) became more demand oriented. Therefore, trading via brokerage systems becomes more popular. On the other hand, as the Internet evolves to a powerful and reliable infrastructure for electronic commerce, electronic Dutch auctions will become a popular trading mechanism in some industries.