ECONOMIC EFFECTS OF ELECTRONIC MARKETS

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ABSTRACT

This article aims to promote a better understanding of the economic effects of electronic markets. The central questions are: what are the main economic effects of electronic markets and what factors can explain these effects? A framework to evaluate electronic markets has been developed. Analytical aspects of the framework are: motives of participants, mode of cooperation, trust, entry barriers, electronic market structure, electronic market functionality, and economic effects of electronic markets on different stakeholders. Empirical evidence was found in four cases in two industries: the Dutch flower industry and the European transport industry. The results show that electronic markets can produce negative and positive effects. These effects can differ between the participating stakeholders. The results indicate that there is empirical evidence that convergent motives and high trust among the participants are essential for positive effects for all stakeholders. The other design aspects (mode of cooperation, entry barriers, structure and functionality of the electronic market) are, as a single aspect, not related to positive effects. The combination of design aspects will lead to positive effects for all stakeholders. Three successful combinations of design aspects are distinguished. The results of the analysis and the framework itself illustrate the various complex issues that arise in the design and implementation of electronic markets.

Keywords: economic effects, electronic markets, flower industry, transport industry

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1. Problem Specification.

Electronic markets (EM) are emerging in the international economy. With the help of electronic markets one can sell and buy products such as financial stocks, cotton, pigs, used cars, and flowers. Generally speaking, economies have two basic mechanisms for the coordination of the flow of materials or services through adjacent steps in the value-added chain: markets and hierarchies. Markets coordinate the flow through supply and demand forces and through transactions between independent individuals and firms. Market forces determine the design, price, quantity, and target delivery schedule for a given product that will serve as an input into another process [17]. Markets provide buyers and sellers with a venue for the exchange or the transfer of property rights from one party to another. Hierarchies coordinate the flow of materials through adjacent steps by controlling and directing it at a higher level in the managerial hierarchy. Transactions, under both markets and hierarchies, are affected with a variety of costs, uncertainties, and risks. In recent literature especially the element of trust, as a result of possible opportunistic behavior, has received considerable attention [5].

New Information Technologies (IT) have been used and will be used in the coordination of goods and services, resulting in electronic markets and electronic hierarchies. This article explores the economic effects of electronic markets. We define electronic markets as interorganizational information systems that allow the participating buyers and sellers to exchange information about prices and product offerings [2]. The firm operating the system, is referred to as the intermediary. In electronic markets, screen-based trading - with the help of data bases, Electronic Data Interchange (EDI), and Artificial Intelligence (AI) applications - supports: (i) establishing the price,
(ii) the dissemination of information on prices, quantities and qualities of products and services, and (iii) buyer and seller identities. IT will have an influence on trust. The closing of business deals through the (exclusive) use of databases and telecommunication as intermediary media, poses specific requirements on the perceived trustworthiness of the business partners.

Research on the effects of IT on exchange organizations and processes is relatively new. Early research applied transaction costs and agency theory to predict shifts from hierarchies to market form of organizations [8,17]. The central argument of this line of research was that IT would improve communication, search, monitoring and information sorting capabilities, thereby reducing transaction costs and enabling purchasers to take advantage of production economies available in markets. A critical drawback inherent in this analysis was the definition and treatment of markets

in abstract economic terms (i.e., markets coordinate economic activity through a price mechanism). In reality, different market structures exist, e.g. direct search, brokered, dealer and auction markets. Each of these structures organizes the trading process and related information processing activities in different ways. Thus the role and impact of IT can vary across types. The literature provides some examples. Konsynski et al. [14] provided a descriptive case study of an electronic market in used cars. Clemons and Weber [3] examined the effects of computerization on the London Stock Exchange. Hess and Kemerer [9] tested the Electronic Market Hypothesis (EMH) against the empirical results of five case studies in the home mortgage market. Ribbers et al. [21] concluded that EDI will increase transaction costs by transaction specific investments and predicted a shift towards hierarchies. Kambil and Van Heck [11] showed the role and impact of IT on the Dutch flower auction markets. Lee [16] identified two types of electronic markets - electronic brokerage and electronic auction.

Due to the convergence of IT and telecommunication, and the proliferation and availability of bandwidth, the impact of electronic markets is expected to grow rapidly. 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 economic issues that arise when designing and implementing electronic markets. Such a classification must pay special attention to:

. routines and procedures to handle and possibly reduce uncertainties and risks caused by opportunistic behavior;
. different economic effects of electronic markets for different stakeholders, in different market settings;
. differences between the design of electronic markets and their underlying infrastructure.

This article provides a conceptual framework for analyzing the merits of electronic markets. The central questions are: what are the main economic effects of electronic markets and what factors can explain these effects? We use the framework to evaluate four electronic markets in the Dutch flower industry and the European transport industry.

The rest of this article is organized as follows. Section 2 discusses the conceptual framework. Section 3 provides basic data and economic effects of the four electronic markets. Section 4 provides a discussion on empirical evidence. Section 5 gives the conclusions.

2. Conceptual Framework.

The conceptual framework of this paper consists of seven analytical or design aspects: motives of stakeholders, mode of cooperation between participants, trust, entry barriers, electronic market structure, electronic market functionality, and economic effects.

Motives of Stakeholders

Stakeholders in organizations and markets behave in a bounded rational way. They are motivated by their goals and by satisficing behavior [18]. Stakeholders will often pursue different, and sometimes conflicting goals. Their decision to enter an electronic market will be based on the perceived contribution of the electronic market to their individual goals. We propose:

Proposition 1: If an electronic market can contribute to the driving goals of the stakeholders as perceived by stakeholders (convergent motives), then the electronic market will have positive effects for all stakeholders.

Mode of cooperation

Mechanisms to coordinate economic transactions are markets and hierarchies. They are, however, opposite extremes of a range of possibilities. Firms may decide to engage in various forms of (longer term) cooperation governed by contractual engagements. Swedish economists developed the network approach as an extension of the market-hierarchy dichotomy [10][20]. Network types of coordination reduce uncertainty. Consequently, distributed or network organizational forms emerge as the organization of the future [6]. We propose:

Proposition 2: Under conditions of high uncertainty, network forms of cooperation will emerge; electronic markets will then have positive effects for all stakeholders.

Trust

In markets, buyers and sellers may be confronted with opportunistic behaviors. Without sufficient trust between the business partners, adequate governance of the flow of materials and services will be severely hampered. This may especially apply to electronic markets where the only contact between buyers and sellers may be the contact through the databases and the telecommunication network. How does one know, whether the required quality can be delivered, whether the required amount can be delivered on time, and whether payment will be received as agreed? Then special emphasis is put on the perceived trustworthiness of the business partners. We propose:

Proposition 3: Trust in electronic markets will have positive effects for all stakeholders.

Entry Barriers

Special procedures and regulations, serving as entry barriers [1], provide safeguards against entrants who are not trustworthy. We propose:

Proposition 4: Adequate entry barriers to electronic markets will have positive effects for all stakeholders.

Electronic Markets Structure and Functionality

The Information Management approach discusses the structure and functionalities of IT architectures and infrastructures. A so-called reach/scope framework for IT infrastructures is defined [12][19]. In this paper, this framework is used in the electronic market context. It is proposed that effective electronic markets with a high reach (e.g., a relatively open structure allowing many participants) will have a low scope (simple functionality). Agreeing on a highly complex functionality with many participants is simply too difficult to accomplish. Electronic markets with a low reach (relatively closed structure, resulting in few participants) may have a high scope (complex functionality). The question is, which of the combinations of number of participants (reach) and functionality (scope) will provide positive effects. We propose:

Proposition 5: Electronic markets with a closed structure (few participants) and a complex functionality or a simple functionality (low reach/high scope; low reach/low scope) will have positive effects for all stakeholders.

Proposition 6: Electronic markets with an open structure (many participants) and a simple functionality (high reach/low scope) will have positive effects for all stakeholders.

Economic Effects of Electronic Markets

Successful electronic markets will stimulate potential participants to enter. Participants will enter the electronic market if it will support their economic objectives. To give a more detailed analysis of the effects of electronic markets, a closer look at objectives set by the stakeholders is required. We distinguish three types of stakeholders: buyers, sellers, and intermediaries.

In the exchange of goods and services, buyers and sellers are primarily interested in price, quality, amount, and timeliness of delivery. For each of these measures, minimum and/or maximum requirements exist, with both the buyer and the seller. Effects of electronic markets have to be related to these measures: prices may be adequate, but the quality or the delivery may be unreliable; there may be sufficient demand for the seller, but he/she is not sure that his/her bill will be paid on time (or anyway). Electronic markets will have positive effects when they enable buyers

and sellers to accomplish their objectives (assuming satisficing behavior) with regard to those measures. Intermediaries, who arrange the electronic market, are particularly interested in the economic performance of that market. Economic performance may be reflected by total revenue, profit realized by the intermediary, and number of transactions.

3. Four Case Studies.

Four cases were studied to show empirical evidence for the proposed framework. Cases were used for so-called analytical generalization (not to be confused with statistical generalization) [23]. The case study method was used because it enables 'reality' to be captured in considerably greater detail than other methods do, and it also allows the analysis of a considerably greater number of variables. Two cases were chosen in the Dutch Flower industry: the Aalsmeer Sample-Based Auction System and the Holland Supply Bank System. Two cases were chosen in the European Transport industry: the European Teleroute System and the Dutch/German Transport Management System. Table 1 summarizes the basic data about these four cases.

Table 1: Basic Data of Four Cases.

	Case 1 Aalsmeer Sample Based Auction System	**Case 2 Holland Supply Bank System**	**Case 3 European Teleroute System**	**Case 4 Dutch/Germ. Transport Man.System**
Year started (Year Ended)	1994 (1994)	1993	1986	1992
Product	Potted Plants	Potted Plants	Transport Capacity	Transport Capacity
Sellers	Growers	Growers	Transporters	Transporters
Intermediaries	Flower Auction Aalsmeer	Flower Auction Holland	Wolters Kluwer Publ.	Informore + Edeka Fruchtkontor
Buyers	Wholesalers	Wholesalers	Forwarders	Edeka Fruchtkontor + Supermarkets
Price Discovery	Dutch Auction Clock	Negotiable Posted-off Pricing	Negotiable Posted-off Pricing	Negotiable Posted-off Pricing

The cases were chosen because they represent different electronic markets, and detailed data are available. In each case, interviews with key officials were held. Relevant reports were analyzed, and archival data were obtained. Table 2 summarizes the economic effects of the electronic

markets for the different stakeholders in the four cases. It clearly shows that the four electronic markets investigated differ in their characteristics and their effects.

Case 1: The Aalsmeer Sample-Based Auction System

The first case deals with Dutch flower auctions. They are the world's leading price discovery and trading centers for cut flowers and potted plants. Holland is also the world's largest exporter and distributor of cut flowers and potted plants. The traditional Dutch flower auction is the place where supply meets demand in the industry. Dutch auctions use a clock for price discovery, as follows. The computerized auction clock in the room provides the buyers with information on the 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, and drops until a buyer stops the clock by pushing a button. The auctioneer asks the buyer by intercom; how many flowers of the lot he will buy. The buyer provides the amount. The clock is then reset, and the process begins for the next lot, until all units of the lot will be sold. Buyers have to be physically present in the auction room. In practice it turns out that the Dutch auction is an extremely efficient auction mechanism: it can handle one transaction every four seconds. The auction provides a central location for buyers to meet; it creates efficient quality control and logistics of product redistribution. Problems are related to the growth of the flower and potted plant trade. The growth causes capacity problems and creates negative economic externalities. The current auction facilities have limited space for expansion; traffic flows generated by the auctions, cause delays and traffic jams in the transportation network feeding the auctions. One solution, developed by the auctions, is to uncouple logistics from price discovery. One of the latest developments in that respect is the set up of a sample-based auction or so-called 'informatieveilen' for trading potted plants initiated by Flower Auction Aalsmeer auction [7][11][24]. In a sample-based auction, growers send a sample of the product to the auction house along with information on the quantity and quality of the product. Buyers bid for the product, and they specify requirements for product packaging and delivery. Growers package the product as specified by the buyer, and the next day they deliver it to the buyer location in the auction complex or to a buyer warehouse.

Table 2: Economic Effects of Electronic Markets in the Four Cases

Economic effects for each of the stakeholders	Case 1 Aalsmeer Sample Based Auction System	Case 2 Holland Supply Bank System	Case 3 European Teleroute System	Case 4 Dutch/Germ. Transport Man.System
. sellers	Growers did not favor this market because product prices decreased dramatically after the introduction. Some changes to the auction rules (price floor of 70% of the average price, increase of lot size) have stabilized the market. Growers received no extra compensation for modifying packaging and delivery practices to suit the buyer. Growers also perceived they got lower prices in a slower auction. Better prices were obtained for the representative lots themselves (which were auctioned in a second round). As a reaction, growers would split the same product into different sample lots, hoping this would lead to higher prices during the auction.	The Holland Supply Bank System has a positive effect on growers. If growers could meet the very specific requirements made by buyers, they could get higher prices.	Transporters have mixed feelings about Teleroute. On one hand they favor it, because it is cheap to get, and easy to use. It reduces search costs and it can help to reduce the number of empty truck trips and a more efficient use of the fleet of trucks. On the other hand it results in lower prices.	Transporters did favor the system, because they could plan return freights in advance with fewer waiting hours and an increasing truck load.
. intermediary	The number of transactions per hour decreased as buyers had to specify terms of delivery. 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, sample-based auctioning did not effectively reduce storage requirements at the auction.	Trade volume and product prices increased after the system was introduced. The auction house was satisfied with this new new brokerage system for their growers, because the auction house (owned by the growers) still is a concentration point of supply.	Wolters Kluwer perceive Tele-route as successful. In total there are 20,000 users all over Europe, there is a growth of 20 to 25% per year.	The system has a positive effect on Informore. They agreed to develop the system on an no cure no pay base. The success of the system makes it profitable. Informore can show it to other transporter - forwarder groups as a successful example.
. buyers	Buyers did not favor this system either because trade volume decreased as a result of lower prices and resulted in uncertain supply. The lack of strong functionality in dealing with tracking and tracing meant the system did not bring buyers and sellers competitive advantage.	Buyers did favor this system because they could order to specific requirements (quality, quantity, delivery time). Strong functionality in dealing with tracking and tracing is another advantage.	Also forwarders have mixed feelings about Teleroute. Most forwarders prefer network modes of cooperation. There is an unwillingness by forwarders to pass on loading to another forwarder and the fear of relinquishing more loading than someone has taken over [19:137].	Edeka (buying organization and supermarkets) mentions an increase of efficiency, reductions of transport costs and a higher service level.

The Sample-Base auction system started in January 1994 and ended in September 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.

Case 2: The Holland Supply Bank System

In recent years more cut flowers and potted plants have been distributed through the Mediation Office or 'bemiddelingsbureau' instead of via the traditional Dutch auction clock system. In the Mediation Office an auction employee acts as an agent for the growers, and negotiates between growers and buyers in a forward market. Prices, product specification, number of lots, and delivery specifications are specified in a contract, which is legitimized and monitored by the Mediation Office. Flower Auction Holland, situated in the villages of Naaldwijk and Bleiswijk, developed the Holland Supply Bank ('Holland Aanbod Bank'), which is a database with the supply of potted plants of the growers, including 2,000 electronic product pictures [4]. Buyers can enter the system electronically, search for relevant products, and use the information to buy and sell those products. Buyers can order products electronically too.

The Holland Supply Bank System was introduced in 1993, and since then it has been regularly updated. The System has a positive effect on the functioning of growers, the mediation office, and buyers. Trade volume and product prices increased after the system was introduced. A better tuning of supply and demand, especially for specific orders, created competitive advantages for growers and buyers.

Case 3: The European Teleroute System

One of the examples of an electronic market in the transport industry in Europe is Teleroute, introduced by the Dutch Wolters Kluwer Publishing company [15]. Teleroute is an international, electronic transaction system for freight and vehicle space all over Europe, to be used by forwarders and transporters, but not by shippers. Forwarders represent the shippers. They plan the transported goods. Freight forwarders and transporters are directly connected to the Central Teleroute computer based in Lille (France). The database gives a picture of freight and vehicle space availability across Europe. Teleroute was initially developed by the French company Lamy, a subsidiary of Wolters Kluwer, and was introduced in 1986 in France using Minitel as a basis. Next applications were introduced in Belgium and Luxemburg (1986), The Netherlands (1988), Germany (1989), Switzerland and Italy (1990), Spain and Portugal (1991), Great Britain (1992), and Denmark (1993).

In total, there are 20,000 users all over Europe; there is a growth of 20 to 25% per year. There are

approximately 20,000 national and international freight offers per day, and about 12,500 accesses per hour [15]. The advantages of the system for the forwarder are that it saves time and money; the advantages for the transporter are a reduction in the number of empty truck trips and a more efficient use of the fleet of trucks. Some statistics, to support these advantages, are: Europe has about 1,000,000 trucking units, driving 100,000 km per year, 38% is driving around empty, average cost 1 ECU/km [15]. Most forwarders prefer cooperations based on long term agreements. In addition, due to increasing competition, forwarders do not wish to pass on loading to another forwarder [15]. Another disadvantage is the suspicion that Teleroute will increase competition and increase the transparency of the market, which reduces margins. Higher utilization of trucks will not compensate those reduced margins. Teleroute supports the driving goals of transporters and forwarders, by offering immediate and possible transport. Lower prices (a disadvantage) overcompensates fewer empty truck trips.

Case 4: The Dutch/German Transport Management System

Edeka Fruchtkontor Benelux GmbH is a buying organization for a similarly named German retailer. Edeka exports on demand from the Dutch vegetable and fruit auctions to 50 distribution centers in Germany, and then to 10,000 supermarkets. Buying at the auction is done by commissioners. In 1992 Edeka redesigned the fruit and vegetable chain by decoupling logistics and information streams and by using Electronic Data Interchange (EDI). They invited Informore, a Dutch logistics and IT value-added service supplier, to develop and maintain the Transport Management System (TMS) [13].

TMS has a positive effect on the functioning of Edeka, its commissioners, repackers and transporters, and Informore. Edeka mentions increased efficiency, reduced transport costs, and higher service level. Transporters were also happy because they could plan return freights in advance, with fewer waiting hours and an increasing truck load. Informore has succeeded in re-engineering the Edeka fruit and vegetable value chain and in decoupling the logistics from the information streams.

4. Empirical Evidence

Given these four case studies in electronic markets, what can be said about the crucial elements in the design of these electronic markets? Appendix 1 summarizes the four case studies. The case study results are presented in table 3.

This table shows that the Aalsmeer Sample-Based Auction System (case 1) has a negative effect on the functioning of sellers, auction and buyers (lower prices for growers, less trade, and therefore uncertain supply for buyers). The Auction System got into a death spiral, and it was finished in 1994. It seems to be that divergent motives of stakeholders and a profound lack of trust between growers and buyers caused these negative effects. Also a lack of functionality of the electronic market might cause negative effects. In case 2, one sees that the Holland Supply Bank has medium functionality with an open structure in a market mode of cooperation, which results in positive effects for all stakeholders. The Holland Supply Bank System has a positive effect on the functioning of sellers, mediation office, and buyers. Convergent motives of stakeholders, a market mode of cooperation, and a high level of trust between growers and buyers, combined with an open electronic market structure, resulted in those positive effects. The European Teleroute System (case 3) was moderately positively received by transporters and forwarders. The Teleroute case shows that even medium functionality of electronic markets architectures can create positive effects (lower prices for forwarders and efficient use of the fleet by transporters). Although in this case negative effects are reported (lower prices for forwarders are negative for transporters), important conditions seems to be low entry barriers and an open structure. The Dutch/German Transport Management System (case 4) has very positive effects on the functioning of transporters, Informore, and Edeka Fruchtkontor. This system shows that a closed and high functional architecture in a network cooperation mode with high entry barriers can result in very positive effects for all stakeholders (lower cost and higher service for Edeka, efficient use of fleet for transporters).

Proposition 1: Convergent motives will have positive effects

Proposition 1 is supported by all cases. Case 1 indicates the reverse, e.g., divergent motives will lead to negative effects for all stakeholders. In case 3 mixed effects were reported, but specific negative effects are compensated by positive effects (lower prices versus efficient use of fleet for transporters, and lower prices versus uncertainty for forwarders).

Table 3: Summary of the Four Case Results.

Analytical Aspect	**Case 1 Aalsmeer Sample Based Auction System**	**Case 2 Holland Supply Bank System**	**Case 3 European Teleroute System**	**Case 4 Dutch/Germ. Transport Man.System**
Motives of Stakeholders	divergent	convergent	convergent	convergent
Mode of Cooperation	market	market	market	network
Trust	low	high	low	high
Entry Barriers	medium	medium	low	high
EM structure	closed	open	open	closed
EM functionality	medium	medium	low	high
Economic Effects				
. Sellers	-lower prices -uncertain demand	+lower risks +higher prices	-lower prices +efficient use of fleet	-lower prices +efficient use of fleet
. Intermediary	-less transactions -lower prices	+concentration of supply +more transactions	+more users +more transactions	+no cure/ no pay +more transactions
. Buyers	+lower prices -uncertain supply -late delivery -uncertain quality	+specified requirements and better quality -higher prices	+lower prices -uncertainty about transporter	+lower prices +higher service

Proposition 1	Motives	*yes	yes	yes	yes
2	Network mode	no	no	no	yes
3	Trust	*yes	yes	yes	yes
4	Entry barriers	no	yes	yes	yes
5	Closed EM	no	no	no	yes
6	Open and Simple EM	no	no	yes	no

Note: Negative effects: -, Positive effects: +, Reverse proposition with negative effects: *.

Proposition 2: Network forms of cooperation will have positive effects

Proposition 2 is supported by case 4. In that case, a network mode of cooperation could be distinguished, which corresponds with positive effects of the electronic market for all stakeholders. In cases 1, 2, and 3 one has to deal with market modes of cooperation.

Proposition 3: Trust will have positive effects

Proposition 3 is supported by all cases. Case 1 indicates the reverse, e.g., low trust will lead to negative effects for all stakeholders. The trustworthiness of the sample, as a representation of the lot, was questioned by the buyers. In case 3 low levels of trust lead to mixed effects for all stakeholders (uncertainty by the forwarder about the reputation of the transporter).

Proposition 4: Adequate entry barriers will have positive effects

Proposition 4 is supported by cases 2, 3 and 4. In case 1 medium barriers are related to negative effects.

Proposition 5: Closed structure will have positive effects

Proposition 5 is supported by case 4. In case 1 the closed system architecture with medium functionality was not successful. In cases 2 and 3 one has to deal with open architectures.

Proposition 6: Open structure with simple functionality will have positive effects

Proposition 6 is supported by case 3. In cases 1 and 4 closed architectures were reported. In case 2 an open architecture was related, not to low but medium functionality; it resulted in positive effects.

5. Conclusions.

The analysis of four cases in the flower and transport industries, using the proposed framework, supports the following conclusions.

Electronic markets can produce negative and positive effects. These effects can differ between the participating stakeholders. In case 1 negative effects were reported for all stakeholders, e.g., lower prices, fewer transactions, and uncertain supply. In cases 2 and 4 positive effects were reported for

all stakeholders, e.g., lower risks, efficient use of fleet, more transactions, and better product quality and service. In case 3 mixed effects for transporters and forwarders were reported, but overall the effects were perceived positively.

It is argued from a theoretical point of view that the motives of stakeholders, the mode of cooperation, trust, entry barriers, the structure of the electronic market and the functionality of the electronic market play a significant role in explaining the main economic effects. Propositions were formulated and four case studies were performed to search for analytical generalization.

The results indicate that there is empirical evidence that convergent motives and high trust among the participants are essential for positive effects for all stakeholders. The other design aspects (mode of cooperation, entry barriers, structure and functionality of the electronic market) are, as a single aspect, not related to positive effects.

Indeed, we conclude that the combination of design aspects will lead to positive effects for all stakeholders. We distinguish three successful combinations of design aspects. The first type of electronic market is characterized as a market mode of cooperation, combined with medium entry barriers, an open structure, and medium functionality. The second type of electronic market is characterized as a market mode of cooperation, combined with low entry barriers, an open structure, and low functionality. The third type of electronic market is characterized as a network mode of cooperation, combined with high entry barriers, a closed structure, and high functionality.

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Appendix 1: Description of Cases.

Analytical Aspect	Case 1 Aalsmeer Sample Based Auction System	Case 2 Holland Supply Bank System	Case 3 European Teleroute System	Case 4 Dutch/Germ. Transport Man.System
Motives of stakeholders	The different stakeholders expected a number of different benefits. By uncoupling logistics and price discovery, the growers and the auction expected the number of transactions per hour to increase. Growers would like to obtain a better price for their products. Buyers would like to specify requirements (package material) for their customers prepared by the growers.	Growers provide supply information to obtain the best price and reduce risks compared with the traditional Dutch auction clock. The auction house develops and maintains the system because they would like to concentrate supply for their growers. Buyers would like to get up-to-date reliable and complete information to speed up their purchasing processes and make them more efficient. Buyers can obtain more specific products with this system, compared with the traditional Dutch auction clock system.	Transporters want to reduce empty truck trips and promote a more efficient use of the fleet. Forwarders want to save time and money by finding quickly a transporter. The intermediary would like to have many sellers and buyers at their system. For transporters efficient use of fleet compensates the effect of lower prices. For forwarders lower prices compensates the uncertainty about the transporter's reputation.	Edeka would like to improve the efficiency of the internal organization and the communication with external relationships (commissioners, repackers, transporters) by using EDI. They would like to increase there service level: orders processed before 16:00 on day A, goods delivered in Germany before the supermarket opens the next day. Informore was involved on a no cure no pay base. Transporters want to promote a more efficient use of fleet, more certainty in ordered transport capacity and faster transport.
Mode of cooperation	The relationship between growers and buyers can be characterized as a market mode. Growers cannot negotiate during the price discovery process.	The relationship between growers and buyers can be characterized as a market mode. Growers and buyers can negotiate during the price discovery process.	The relationship between transporters and forwarders can be characterized as a market mode. Transporters and forwarders can negotiate (by telephone) during the price discovery process.	The relationship between the transporters and Edeka can be characterized as network mode. They have a long term contract but can negotiate during the price discovery process for specific transports.
Trust	The level of trust between growers and buyers is low. Buyers have the idea that the samples did not represent the quality of the lots. Growers have the idea not being compensated for fulfilling special request by buyers.	The level of trust between growers and buyers is high. Buyers and growers can negotiate on price, quality, quantity, and delivery time and these are specified in contracts.	The level of trust between transporters and forwarders is low. Forwarders are never sure about the capabilities of the transporter and transporter are not sure about for example the trustworthiness of the forwarder.	The level of trust between transporters and Edeka is is high, because there are global contracts between them. For each transport they can negotiate about specific requirements.

Appendix 1: Description of Cases. (to be continued)

Analytical Aspect	Case 1 Aalsmeer Sample Based Auction System	Case 2 Holland Supply Bank System	Case 3 European Teleroute System	Case 4 Dutch/Germ. Transport Man.System

Entry Barriers	Entry barriers are medium. Growers have to be members of the auction organization and have to deliver their products via the Dutch auction clock, the mediation office or the sample-based auction. Buyers must be registered if they are to become trading partners.	Entry barriers are medium. Growers have to be members of the auction organization and have to deliver their products via the Dutch auction clock or the mediation office. Buyers must be registered if they are to become trading partners.	Entry barriers are low. In Europe every transporter and forwarder can use the system and it is offered at a very low price: hardware Dfl 300, subscription Dfl 915 per year. There is a marginal quality check before transporters are allowed to enter.	Entry barriers are high. Edeka selects its transporters. Other user-groups can use TMS but they use it independently from Edeka and can be supported by Informore.
EM structure	The architecture has a closed character and is only suitable for the direct participants therefore it can be characterized as low reach.	The architecture has an open character and can be approached by all growers and buyers of auction FAH. Buyers can read the supply data by using a supply book, a supply diskette or an electronic link with the supply bank.	The architecture has an open character and can in principle be approached by all forwarders and transporters in Europe.	The architecture has a closed character an can only be used by Edeka and commissioners, repackers, and transporters.
EM functionality	The scope of the architecture is medium. No specific functionality was created in the system for tracking and tracing the products. The focus of the system was on efficient price discovery and requirements specifications.	The functionality is medium. Growers, auction, and buyers are happy with the current architecture which provides actual reliable, and complete supply information. Coupling with the auctions tracking and tracing system provides competitive advantage. There is no strong electronic integration with the logistical and financial systems of the buyers.	The functionality is low. Mostly, the system is used to determine freight and vehicle space availability. It offers additional services like exchange rates, cost price calculations, and country regulations. Teleroute does not offer functionality for bargaining and contracting or services dealing with tracking and tracing.	The functionality is high. The offered services deal with structuring the transporters' logistic process, processing the operational information (checking and confirming booking and instruction), translating bookings into transportation orders and tracking and tracing the transported goods. TMS generates management information for performance measurement and cost reduction.