quest-for-quote process, we need access to much more sophisticated parts databases. For example, in the commercial sector, no attempts have yet been made at standardizing the names and definitions of commodities (for US government buys this has been done with Federal Supply Classes). Without a standard nomenclature, any attempt at combining different vendors' linecards into a composite linecard is going to be idiosyncratic and of use only to transaction partners with access to that nomenclature.

Second, there will always be a need for human operators in an EDI-based procurement service. For a truly useful service of that kind, there should be help available for suggesting substitute parts where the original parts are out of stock or obsolete, and to help with part number identification in general. Though access to good parts databases can automate great parts of that problem solving, many tasks will still require human intelligence.

Third, without a seamless connection between in-house MIS systems and EDI software, most transaction partners are going to grow dissatisfied with EDI. Having to re-key information into a set of different software packages (standard or proprietary) for communication with several partners was NOT the idea behind EDI. It is, however, all too common.

Last, judging from the interest in and satisfaction with our brokerage service, we believe that there is a genuine need for such a service.

Future Directions

The lessons learned have led us to a current research and development agenda with two thrusts: automation environments for internal operations and software for electronic partnerships.

With respect to FAST's *internal operations*, we mentioned earlier that FAST focuses on the efficient integration of the manual and automated components in the operating environment. Some of the FAST researchers have developed a package for other ISI projects, called Scenarios/Agendas. It provides mechanisms for defining triggering events that require human intervention, for planning sequences of tasks to be performed by humans and/or the computer, for collecting and displaying tasks related to an activity, and for collecting and displaying activities in agendas of work to be done. FAST plans to implement Scenarios/Agendas in its operating environment in the near future.

With respect to *software for electronic partnerships*, FAST plans to create an "Environment Configuration Library" that will provide a library of data structures, specialized tools, and linking software to allow developers to rapidly compose an interface processor for a site entering into electronic partnerships with others. It will provide aids to help developers make selections from the library appropriate to their needs, and to help them combine the selections with their preexisting software for maximum overall interoperability of the system components at their site. As for FAST's business future, we hope to be able to increase its business volume during the next three years. An increased transaction intensity will test the system's robustness and efficiency and, we hope, demonstrate the feasibility of our electronic brokering concept.

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Electronic Agricultural Auctions in the United Kingdom

Electronic auctions are increasingly presenting an alternative to traditional auctions for agricultural, forestry and fishery products in the United Kingdom. This article describes the United Kingdom's leading electronic agricultural auction house, Electronic Auction Systems (Europe) Limited.

In a study of twelve small- and medium-sized enterprises in the Scottish economy, exemplary applications of telematics and, in particular, the business use derived from such services were examined [1]. One of the companies was Electronic Auction Systems (Europe) Limited (EASE). EASE was founded in April 1989 as a wholly owned subsidiary of the United Kingdom's largest co-operative auction group, Aberdeen & Northern Marts Limited, and, as its trading name suggests, the company seeks to introduce information technologies and telecommunications into the auction process.

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Electronic Auction Systems (Europe) Limited

EASE is based in Thainstone, a small town near Aberdeen in the northeast of Scotland. The main reason for the choice of this location was the proximity to its parent company. However, EASE could have been located virtually anywhere in the United Kingdom. There were two principal factors behind the creation of EASE. The parent company firstly wanted to gain experience in the application of new technologies, and secondly wanted to expand its trading area geographically. EASE employs a full-time general manager and a part-time marketing manager. In addition, the company has access to the clerical and computing staff of the parent company. It also has ten franchise partners who run the regional centres. During the first year of operation, EASE recorded a loss of over £ 200'000 which was largely due to the high capital costs incurred in installing the computer system that forms the backbone of the company's operations. While the company is still trading at a loss, this has been substantially reduced (less than £35'000 in the most recently published accounts).

EASE's Electronic Auction System

The company runs an electronic auction system, which is accessible anywhere in the United Kingdom and is used for the sale of livestock, particularly cattle, sheep and pigs, and grain. The company plans to handle a larger number of products in the future, including fish, timber and hides, and is considering expanding its activities into other European countries.

Electronic auctions are held several times a day Mondays to Fridays, and the process is as follows: Suppliers of agricultural products, in most cases the farmers themselves, contact their local EASE franchise holder. There are ten franchisees, located throughout Scotland and England. EASE chose the franchise system to defray the high capital costs of the computer installations over several partners. Information about the products for sale is fed into IBM compatible PCs or terminals at the local franchise office and sent to the company in Thainstone, using British Telecom's (BT) Global Network Service (GNS). At Thainstone it is stored on a Digital Equipment Corporation (DEC) VAX server. This information, including the actual geographical location of the sellers, is made available electronically to potential buyers several hours prior to the auction in the form of an electronic catalogue. In contrast to the sellers, who have access to the electronic auction system only through the regional franchises, the buyers have direct access to the system, using their own PCs and modem links. This is shown graphically in Figure 1. The electronic auctions themselves are very similar to the traditional

auctions. A lot appears on the computer screen at a certain starting price. This price is then decreased every five seconds by a predetermined amount, until the first offer to buy is registered, i.e. until the first buyer presses the appropriate key on his/her keyboard. The price of the product is increased if further offers to buy are registered. The product is declared as sold, when 15 seconds have elapsed since the last offer to buy.

3. A *national market* has been created in contrast to the previous regional markets, leading to a wider choice for buyers and moreover to more stable (national) prices and the elimination of regional variation.

4. Since the identity of the buyers is concealed in EASE's auctions, *price offers* tend to be *'fairer'*, since personal relations and conflicts are less influential.

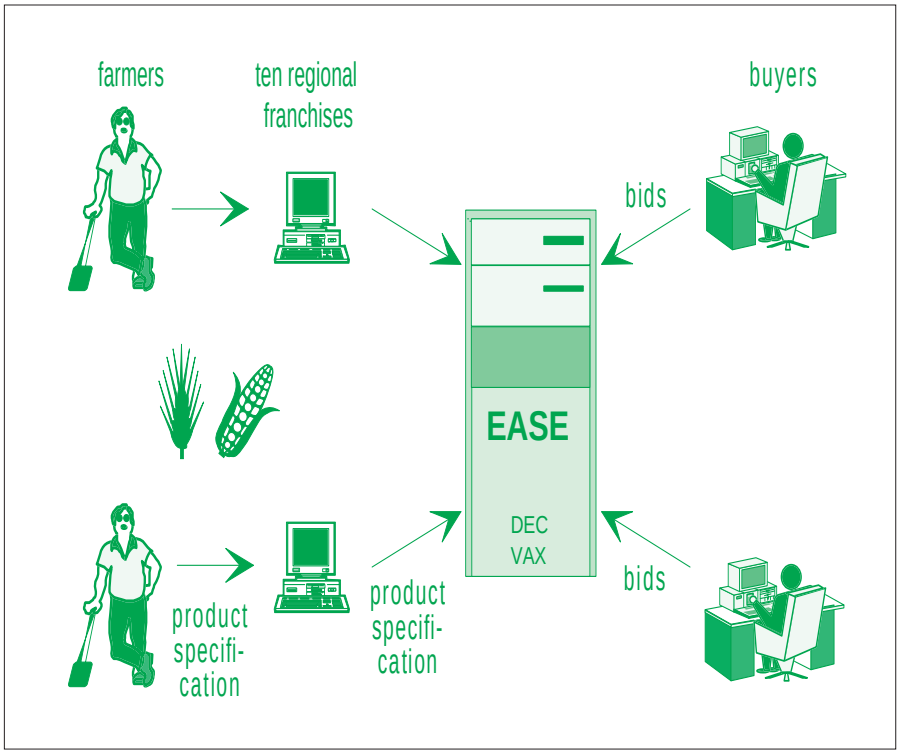

Figure 1: Function of EASE's electronic agricultural auction

Advantages of EASE's Electronic Auctions

The main advantages of electronic auctions when compared to traditional auctions, as perceived by the users of EASE's system, are that costs are reduced, the operation of the auction is more transparent and prices are less likely to be influenced by specific and local circumstances. These points are elaborated below:

1. *Transportation costs* are directly related to stock sold. There is no need to transport the products to the traditional auction places any more. Thus the products are only moved when sold, and because the buyers are able to schedule the routes of their vans and lorries more effectively with the information from the electronic catalogue, costs are minimised.

2. The *fees for participating* in EASE's auctions are less than those associated with traditional auctions, and travel and accommodation expenses are also saved.

Furthermore, the bidders tend to stay for the period of an electronic auction, whereas the *attendance* of buyers at traditional auction places tended to be erratic.

A further advantage is the ability of EASE to *offer additional, previously unavailable services*. Data on past and current auctions is stored in an electronic format, allowing EASE to perform analysis of trends in supply and demand comparatively easily. Such information is not only more up-to- date than was previously available from traditional auctions, but it can also be supplied relatively cheaply.

Disadvantages of EASE's Electronic Auctions

EASE's auctions have two main disadvantages. The first is that all information needs to be keyed into the system in the form of numbers and text. It is difficult, however, to describe some products this way. EASE intends partly to eliminate this disadvantage by transmitting visual information, for example video pictures, using ISDN (Integrated Services Digital Network) lines, once such services become economical. The second major disadvantage is that a large number of farmers and traders consider the social contact at traditional auctions highly important. EASE, however, sees its role as a provider of additional or complementary services. The company aims to replace traditional auctions by electronic auctions, or to introduce them in new areas, where social contact has little or no importance or where the advantages of an electronic auction outweigh those of the more traditional system. Traditional auctions can still be held parallel to the electronic auctions, if this is desired.

Future Perspectives

EASE's electronic auctions have been shown to be highly successful in some agricultural markets, encouraging the company to plan to increase the scope of its activities. Other competitors have, however, started developing and introducing similar systems in the United Kingdom. It is apparent that new trading methods and patterns are beginning to appear, offering the potential to change agricultural trading immensely. ■

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