
Electronic fish auctions

Strategies for securing and maintaining
comparative advantage in the seafood trade

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Electronic Auctions and the Fish Trade

Contents

Executive Summary

1. Purpose	1
2. Of telephones, databases and computers	5
3. Available technologies	9
3.1 The auction clock	10
3.2 Different bidding systems	10
3.3 Remote bidding on electronic auctions	13
3.4 Linking of markets	15
3.5 Market information	18
3.6 INFOMAR	20
3.7 Marketing using the World Wide Web	24
<i>The trading of fresh produce across long distances</i>	27
4.1 The changing economics of the fish trade	28
4.2 Breakdowns and impediments in the system	32
<i>How to proceed</i>	41
5.1 Effective business management	41
5.2 Imminent change	42
5.3 Preparing the way for the adoption of electronic auctioning	46
5.4 Choosing an appropriate system	51
5.5 Managing an electronic auction	53
5.6 Resistance to change	55
5.7 Concluding remarks	58

Electronic Auctions and the Fish Trade

Executive Summary

The use of electronic auctions is less to do with the technology, and rather more to do with the underlying social and economic structures found within the fish trade, and how exactly the industry itself chooses to respond to the build-up of competitive forces. Whether or not you, the reader, should be introducing electronic auctions will depend very much on the strategy you adopt to deal with these forces. Electronic auctions will not provide magic solutions to industry problems, but they may form a part of a programme designed to re-establish comparative advantage.

Nonetheless, electronic auction systems can facilitate an appropriate response to the changing nature of the international trade in seafood in ways that other systems cannot. Key elements of such change are that:

- ❑ in most fisheries there will be a marked shift away from fishing for volume to fishing for quality;
- ❑ knowing where, when and how a fish has been caught, handled and processed will form an increasingly important component of the 'quality' of that fish as it passes along the 'supply chain';
- ❑ exposed to increasing international competition, significant restructuring and streamlining of the supply chain will be achieved as companies remove the excessive costs and inefficiencies that have resulted from ad hoc responses to an extended distribution chain;
- ❑ in maintaining low operating costs, much emphasis will be placed on the generation and use of substantially increased flows of information within the industry, taking full advantage of all that modern communications and information technology have to offer;
- ❑ appropriate utilisation of modern communications and information technology systems will alleviate many of the scale and geographical penalties typically facing peripheral fisheries and fishery communities, allowing them to compete more effectively in mainstream and niche markets.

For every one of the above predicted changes or directions of change, any company involved in the fishing sector should have a considered view as to how it is likely to impact on its business. Almost every response will have some impact on how the first hand trade of fish is conducted in the future. Moreover, almost every response will have some impact on the extent to which it might be appropriate for any fishing interest to seek to promote and engage in the electronic auctioning of fish.

Some simple rules will govern which sort of development is most appropriate to your circumstances, notwithstanding the fact that you can upgrade most systems to any of the other systems.

Large volume ports: If you represent a big port, with a large volume of sales, and a large population of regular buyers, then you may seek to capture further efficiencies of scale through the use of an electronic auction system. This can be achieved through a stand-alone auction, and whilst the local buyers may not like it, opening such sales to remote bidders may further strengthen the competitive position of the market. It is also the case with such big markets that there are products or product groups that might be better sold using other systems. Bearing this in mind, due consideration should be given to the advantages and disadvantages of establishing strategic linkages to other bigger ports, or to a number of small ports.

Electronic Auctions and the Fish Trade

Specialist ports: If you represent a port that has developed a specialisation in one or more species or groups of fish, it may benefit you to seek to share or capture additional trade through linkage with ports with similar specialisation, or with ports that offer complementary specialisations.

Single species: Where particular market characteristics are associated with a single species or species group (e.g. nephrops, or small pelagics) there may be strategic advantage to pursuing opportunities for building one or more market networks, capturing economies of scale, encouraging greater market transparency, and seeking to reap the longer-term benefits of increased competition for product. Under such circumstances, the establishment of remote bidding facilities, whether on a hub network, linked markets, or stand-alone markets using common standards that allow for simple switching of remote buyers from one market to another, should be considered.

Peripheral ports: There are many ports that are located close to the resource, but considerable distances from market and processing concentrations. Maintaining attractive levels of competition on such markets is generally difficult, exacerbated by the tendency for both skippers and vessel agents to then consign product to more centrally located markets for first hand sale, or to sell such product by direct negotiation or by contract. Given increasing recognition of the value of resource access, and that wide competition in the sale of high quality raw material should offer better prices, there is something to be said for such peripheral ports seeking to establish some form of electronic trading. This could be done on a stand-alone basis, or through linkage with a more centrally located market that supports remote bidding, or through the establishment of a hub-network linking a number of peripheral and small ports together. Under each of these circumstances, the sorting, grading and specification of lots offered for sale could be managed and undertaken at the port of landing, with dispatch arranged once the product had been sold.

Small ports: As a general principle, there is almost no advantage to a small port in establishing its own electronic auction. Nevertheless, it is the case that considerable gains can be made by small ports clubbing together in a hub-network or in seeking to link into a larger ports electronic auction. However, care should be taken in examining these electronic options. Smaller ports tend to operate with smaller fleets, exploiting nearby resources, which tend to be under some element of local control. Some of the freshest and highest quality fish and shellfish can be harvested under such circumstances, and done so in a more sustainable manner than can be applied at the larger scale. Under such conditions there may be more to be gained by using established and more traditional sales methods to move such products into high value niche markets – the restaurant and hotel market, specialist retail outlets, and mail order / home delivery. In this case, use of the Internet and the World Wide Web may facilitate in overcoming some of the high costs associated with marketing small volumes of product.

In addition to increasing the transparency of first hand selling, most electronic auction systems can also be structured to offer various forms of system automation, from automated billing and credit management, to consolidation of information on sales volume and prices, and the management of fishing quotas. Further, it is possible to integrate such systems with a variety of forms of information provision (catch and landing trends, previous bidding records, performance on this and other markets), other sales systems (notably Internet mediated systems that allow for the advance sale of catches), and other forms of service provision (such as transport, insurance, packing, part-processing, inspection and quality control).

Introduction

It is not technology you need to worry about, but strategy

1. Purpose

This information paper describes the mechanics of electronic auctioning as it is, or can be, applied to the fishery sector. It also describes the conditions under which such technology is likely to prove an effective and profitable way of servicing particular customer bases.

The use of electronic auctions is not a matter of the technology being available, but whether the use of such technology offers any improvements in practice over traditional and alternative methods. It is to do with profitability, strategy, and comparative advantage.

In some cases electronic auctions offer clear advantage over traditional systems. In others such systems offer clear advantage in theory, but do not seem to in practice. In still other circumstances, no amount of electronic tinkering will create a trading environment that beats the established systems.

This paper seeks to give the reader a clear idea as to what electronic auctions are all about, to describe how others have found using these systems, and to describe how you should go about establishing whether or not such a system is suited to your particular circumstances.

Over the last fifteen years, many fishermen, traders and port operators in Western Europe have been experimenting with the use of this type of technology. At this point in time there are upwards of seventy electronic fish auctions, of various types, in operation in and across western Europe (see Table 1 overleaf). How these different fishing ports have set about introducing and upgrading these systems is instructive. More interesting still is why these ports have sought to introduce new systems. Throughout the report, information on these aspects is presented in the form of short illustrative examples.

For the future, however, a number of new perspectives on the international seafood industry are dramatically changing the way the fishery sector operates. These include:

- ❑ the changing nature of the seafood industry itself,
- ❑ the more clearly finite nature of available fish resources,
- ❑ the emergence of Internet related technologies.

Electronic Auctions and the Fish Trade

Table 1. The location of electronic fish auctions in Western Europe

location	supplier	type of system	status
Belgium			
Nieuwpoort	Schelfhout	remote	operational
Oostende	Schelfhout	remote	operational in 2000
Zeebrugge	PEFA.COM	remote network	operational
France			
Archachon		local	operational
Breste	Le Bris Pape	local	operations stopped
Cherbourg	Schelfhout	remote	operational
Concarneau	Schelfhout	rem. & loc. network	operational
Dunkerque	Schelfhout	local	operational
Erquy	Agro Marché Int. (AMI)	local	operational
Granville	Schelfhout	local	operational
La Cotiniere	Agro Marché Int. (AMI)	local	operational
La Rochelle	Schelfhout	remote	operational
La Turballe	Schelfhout	remote	operational
Le Croisic	Schelfhout	local	operational
Le Guilvinec	Schelfhout	local network	operational
Lesconil	Schelfhout	local	operational
Loctudy	Schelfhout	local network	operational
Lorient	Schelfhout	remote	operational in 2000
Port en Bessin	local supplier	remote	operational
Quiberon	Schelfhout	local	operational
Royan	Schelfhout	local	operational
Saint Quay Portrieux	Agro Marché Int. (AMI)	local	operational
Saint-Guérolé	Schelfhout	local network	operational
Sète	Schelfhout	remote	operational
Germany			
Bremerhaven	RSF	local	operational
Iceland			
Akranes	Íslandsmarkaður hf.	Inter-connected	operational
Djúpivogur	Íslandsmarkaður hf.	Inter-connected	operational
Eskifjörður	Íslandsmarkaður hf.	Inter-connected	operational
Grindavík	Íslandsmarkaður hf.	Inter-connected	operational
Ólafsvík	Íslandsmarkaður hf.	Inter-connected	operational
Patreksfjörður	Íslandsmarkaður hf.	Inter-connected	operational
Reykjavík	Íslandsmarkaður hf.	Inter-connected	operational
Þorlákshöfn	Íslandsmarkaður hf.	Inter-connected	operational
Vestmannaeyjar	Íslandsmarkaður hf.	Inter-connected	operational
Dalvík	RSF	Inter-connected	operational
Fáskrúðsfjörður	RSF	Inter-connected	operational
Hafnarfjörður	RSF	Inter-connected	operational
Hól mavík	RSF	Inter-connected	operational
Homafjörður	RSF	Inter-connected	operational
Njarðvík	RSF	Inter-connected	operational
Ólafsvík	RSF	Inter-connected	operational
Þorlákshöfn	RSF	Inter-connected	operational
Vopnafjörður	RSF	Inter-connected	operational

Electronic Auctions and the Fish Trade

Italy			
Ancona	Nieaf Systems	local	operational
Cagliari	Nieaf Systems	local	operational
P. Recnati	Nieaf Systems	local	operational
Pescara	Nieaf Systems	local	operational
Rimini	Nieaf Systems	local	operational
S. Benedetto	Nieaf Systems	local	operational
S. Stefano	Nieaf Systems	local	operational
Civitanova	Nieaf Systems	local	operational
The Netherlands			
Colijnsplaat	PEFA.COM	remote network	operational
Den Helder	Schelfhout	remote	operational
Den-Oever	Schelfhout	remote	operational in 2000
Enkhuizen	Nieaf Systems	local	operational
Harlingen	Schelfhout	remote	operational
Ijmuiden	Schelfhout	remote	operational
Lauwersoog	Nieaf Systems		operational
Scheveningen	PEFA.COM	remote network	operational
Stellendam	PEFA.COM	remote network	operational
Urk	Schelfhout	remote	operational
Volendam	Nieaf Systems	local	operational
Yerseke	Nieaf Systems	local	operational
Norway			
Alesund	Schelfhout	remote	operational
Bergen	Schelfhout	remote	operational
Egersund	Schelfhout	local	operational
Maloy	Schelfhout	remote	operational
Tromso	Schelfhout	remote	operational
Spain			
Bermeo	Schelfhout	remote	operational
Cadiz	Schelfhout	local	operational
La Coruña	Nieaf Systems	local	operational
United Kingdom			
Grimsby	Schelfhout	local	operational in 2000
Kinlochbervie	Schelfhout	remote	pilot installation
Kyle	Schelfhout	remote	pilot installation
Lochinver	PEFA.COM	remote network	operational in 2000
Lowestoft	PEFA.COM	remote network	operational
Milford Haven	PEFA.COM	remote network	operational
Plymouth	Schelfhout	remote	operational
Troon	PEFA.COM	remote network	operational

Even where port and industry operators have considerable experience of electronic auction systems, they too are having to reconsider what further modifications to their systems will allow them to benefit from these changed circumstances. In this way the knowledge gap between those used to electronic auctions, and those only now starting to think about whether or not such a system meets their local requirements, is not so big.

For example, the concept of being able to buy fish from a number of auction markets without being physically present at any of these markets has been around

Electronic Auctions and the Fish Trade

for some time. The technology to do this has also been around for some time. Such systems are common practice in Iceland and Norway, but it is only in the last year that such systems are beginning to emerge in practice elsewhere in Europe.

Few people had any idea of the scale of the impact that the Internet would have on the business community. Rapidly evolving Internet technology is both facilitating the development of electronic auction networks, and challenging these very systems by facilitating other ways of trading fish.

Future developments within the international seafood trade are now being dictated by two forces – cost reduction within the supply chain, and the growth in consumer demand for higher quality fish and fish products. These forces translate into the following calls for change within the fishery sector:

- ❑ Delivery of traceability, transparency, and product definition - aspects that both market and regulatory conditions increasingly call for - are now testing both traditional and electronic auction systems.
- ❑ The calls for greater openness, already achieved in most other fresh produce markets, are challenging the adaptive capacities of the deep-rooted social and economic structures of fishing communities.
- ❑ Competitive pressure on processors and traders to reduce costs is forcing many to shorten the supply chain and/or buy from lower cost fresh and frozen sources.
- ❑ The new opportunities that information technology and modern communications are opening both threaten traditional trading systems, and offer the tools for the productive modification of such systems.

These aspects are addressed in the text, drawing wherever possible on real life examples.

The use of electronic auctions is less to do with the technology, and rather more to do with the underlying social and economic structures found within the fish trade, and how exactly the industry itself chooses to respond to the build-up of competitive forces. Whether or not you, the reader, should be introducing electronic auctions will depend very much on the strategy you adopt to deal with these forces. Electronic auctions will not provide magic solutions to industry problems, but they may form a part of a programme designed to re-establish comparative advantage.

Technology can do almost anything you want. Ultimately, however, the success of the application of technology will depend on the human systems and practices that back them up, and the business strategies that incorporate their use.

Advances in IT and communications

A revolution in the making

2. Of telephones, databases and computers

As a general pointer, much can be achieved in the area of electronic marketing using readily available technology:

- Systems such as Minitel and Prestel¹, which provide for basic information exchange, on demand, between server and client, have been around for some twenty years. Traditionally most travel agents have used them, though most are now upgrading to PC (Personal Computer)², Intranet³ and Internet systems⁴. In the early 1980's, France opted to provide every telephone subscriber with electronic access to directory services, using Minitel. This familiarised most households in France with the use of screen and keyboard, and arguably broke down some of their natural resistance to new technology. A similar system was used to pioneer electronic banking in the UK, and until relatively recently to provide fish price information at French ports.
- More sophisticated systems based on fast modem links between PCs are in common use by many businesses, and can be easily adapted for a range of uses. For example, stock taking systems linked to check-out stations are in day to day use in supermarkets across Europe, where the bar code of your purchase is checked through the check-out scanner, and the sale information held for later down-loading to an in-store or remote site data-base which controls stock levels. This system has been developed further, to explore the buying patterns of a store's customers. Thus a recent addition to this system is the use of "loyalty cards", where discounts are offered to regular customers, with the by-product that information on the combination of goods purchased by

¹ Minitel and Prestel – these allow low resolution text and graphics to be displayed on television screens; typically restricted to forty or eighty characters per line; a similar system is used to provide Teletext services in support of terrestrial television services.

² PC – Personal Computer – developed in the early 1980s, and now ubiquitous throughout the world.

³ Intranet – an information exchange system that works on a computer network but is not accessible to the general public; it is typically used to allow ease of communication within large companies, where a commercial operation involves an extensive branch structure, or where time sensitive information needs to be accessed from a central database (as in flight and holiday bookings).

⁴ Internet – this is a public access system, where messages and information can be sent from one individual Internet address to another anywhere in the world, and information on limitless subjects can be downloaded from individual's and companies' Web-sites; routing of messages is achieved via a network of hundred's of thousands of Internet computer servers, with information transferred over the international telephone network; in general, aside from some set-up costs, access to this system is the cost of a local phone call.

Electronic Auctions and the Fish Trade

a particular type of customer can be analysed by reference to data provided by customers at the time they apply for their loyalty card.

Figure 1. A selection of loyalty cards and a modem



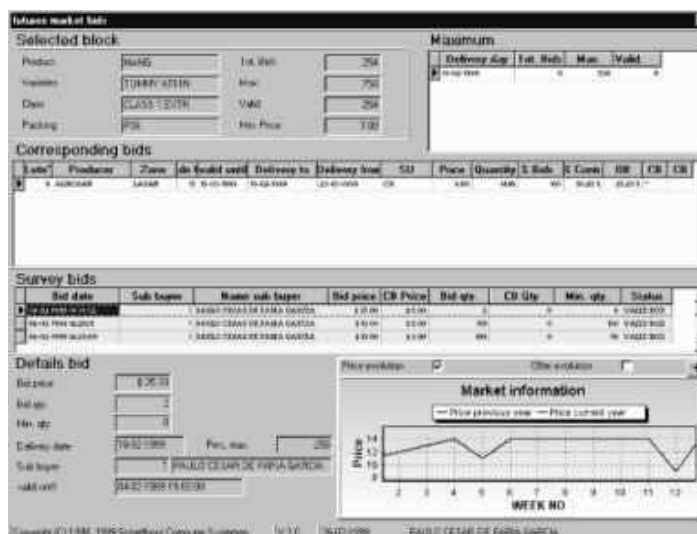
- With the massive increase in use of personal computers, the deployment of optical fibre cabling as the basis for modern fixed telecommunications links, and the evolution of text and graphic messaging systems from telex to facsimile to e-mail, the opportunities for development and use of more user-friendly and sophisticated information systems grow by the day. Electronic marketing systems are able to take advantage of such developments, using everything from stock control and data-mining, to the World Wide Web and e-commerce, from individual call telephone billing to relationship marketing.
- The advances in access to and use of the Internet, first developed by the US military, were popularised through the early enthusiastic support of the world of academics and dedicated recreational users. In as short a period as the last five years, however, the rate of uptake of this technology by businesses and by home users has shown exponential growth. This has been greatly assisted by the development of more user-friendly software packages, improvement in the facilities offered by the Internet's e-mail functions, much reduced costs, and major advances in all aspects associated with the World Wide Web. Under these conditions it is perfectly feasible, for example, for a group of oyster growers to present information on location, production facilities, handling and transport, complete with pictures, together with details of historic production, future harvesting schedules, product remaining available for sale, and an automatic enquiry or order form facility. Details can be updated as and when appropriate. Such systems are now in common usage in the seafood and fishing industries, lead by the US, Canada, Australia and New Zealand, but with European companies fast catching up.
- Ship to shore radio is now a basic technology in marine matters, as is the use of satellite communications. The use of digital communications systems is now greatly widening the range of communications applications available, at acceptable prices, to the public. Data files can be accurately, and confidentially, downloaded from on-board computers to shore based computers. It is now possible for skippers to offer fish for sale whilst still at sea

Electronic Auctions and the Fish Trade

by providing their shore agents with the relevant information, or by placing “lots” of fish for sale on an Internet mediated catalogue bidding system. The development of satellite mediated Vessel Monitoring Systems (VMS), besides adding to the control infrastructure of management and enforcement agencies, also opens up new opportunities for skippers and fleet managers to more closely control operating costs and revenues using increasingly low cost data transfer systems.

- Remote bidding systems are the very basis of trade on the world’s stock markets, with a wide range of systems that combine market tracking with real-time bidding. A revolution is underway in the world’s stock-markets, options and forward-trading markets and commodity trading markets, as more and more of them shift from open outcry systems to computerised and remote bidding systems. Whilst the traditionalists have mounted strong campaigns of resistance to such developments, the forces of competition, and particularly the reduced transaction and administration costs that such systems achieve, have now forced all major markets to follow suit. In sharp contrast to the world of high finance, however, similar forces are at work in the trading of antiques and fresh produce. The acceptance of anonymous telephone bids at fine art auctions is a long-standing tradition of the main auction houses. Remote bidding systems have been an established and accepted part of the world’s main cut-flower auctions for at least a decade.

Figure 2. Screenshot of an electronic auction system



The uses to which the amalgamation of modern communications and information technology can be put are only restricted by people’s imagination, the resources applied to developing a particular application, and crucially the acceptability of any system developed to the users or potential users of that system. Invariably, however, it is the last point that governs the extent and speed that such systems are applied within the fishery industry.

Electronic Auctions and the Fish Trade

The basics

Making sense of electronic auctions

3. Available technologies

At present, most trading in sea fish and fishery products in the European Union is undertaken based on negotiation by phone and fax.

Typically, fish is landed to a port from where it is dispatched direct to the premises of a merchant or processor. Alternately it is placed on the local or a distant "shout" auction - held on a daily basis in all major ports throughout the European Union - where fish merchants bid against each other for the purchase of a "lot" of boxed fish. Once purchased in this manner, the fish is then dispatched direct to the premises of a merchant or processor, or to another wholesale or "shout" auction, for onward sale. In all such cases, onward sale is arranged by phone and confirmed by fax. A similar structure exists for the sale of aquaculture products.

Figure 3. A traditional shout auction



Electronic Auctions and the Fish Trade

But there are a number of circumstances where other levels and types of technology have been employed to improve the efficiency with which this sort of system operates, or to provide fishermen and/or traders with comparative advantage over competing ports or sources of supply.

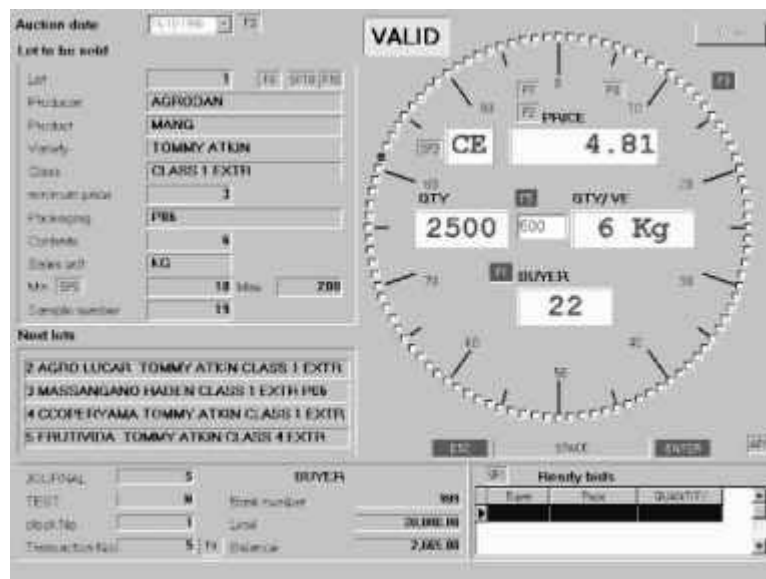
Below we look at the basic use of:

- the auction clock
- linking of markets
- remote bidding
- hub-networks
- advance notification systems
- sale by e-mail
- marketing using the World Wide Web

3.1 The auction clock

The auction clock has been in common use since the turn of the century. Usually involving a large dial clock, placed in prominent view on the market, the bid price is usually started high, and the clock hand is then set to fall by a fixed increment at a pre-set interval of time. The clock stops when a trader indicates his willingness to buy, and the lot is sold at the price indicated by the clock hand. Often referred to as the Dutch clock or Dutch auction, this type of bidding system can be found on many fruit, vegetable, cut flower and fish markets throughout Europe.

Figure 4. A typical auction clock



Contrary to generally held view this type of system can be adapted to accommodate a range of bidding techniques other than a simple “falling clock”. It can be set to deal with rising bids, and to deal with a range of hybrid systems allowing reverses in clock direction, and the settlement of identical bids.

3.2 Different bidding systems

There are essentially five methods of selling used with modern electronic auctions. Which one is installed will depend on the preferences of those using the auction.

Electronic Auctions and the Fish Trade

Sale by descending bids - This method, otherwise known as a Dutch auction, is the most popular on mainland Europe, and is also the fastest. The clock starts at a high price and simply descends until one of the buyers presses his button, thereby stopping the clock. It is virtually impossible, given the accuracy of the system, that two or more buyers will press their buttons at precisely the same time, but, if this is the case, most auctions prefer to sell the lot again.

Sale by descending bids (alternative method) - The clock starts at a high price and then falls, as with the Dutch auction. Once the first bid is received, the price is increased by a pre-determined value and then begins to fall again. If no bid is made before the level of the first bid is reached for a second time then the lot is sold at that price, to the original bidder. If a bid is made at a higher level than the original bid, however, the lot is assigned at the new, higher price.

Sale by ascending bid - The majority of shout auctions are operated on an ascending bid basis, whereby the price continues to rise until only one buyer is left bidding. Such a system can be operated with an electronic auction, as is the case at La Rochelle. In this instance, the auctioneer starts the auction at a high price and the clock then falls until a buyer presses his or her button and stops the clock. The price then remains at that level for a pre-determined period of time. When another buyer pushes the button during the running of the timer, the price is increased by an agreed increment and the timer starts running again. This process continues until no buyer bids during the timer period and the last bidder then gets the purchase.

Sales by ascending bid (alternative method) - The method described immediately above is unpopular as it slows down the auction process considerably. Therefore a faster ascending bid method has been devised. In this case, the price starts descending and the clock stops when a button is pushed. The buyers are then given a fixed time to raise the bid by pushing their buttons. If one or more buttons are pushed during this period, the clock ascends again. The bidders do not release their buttons until they are no longer prepared to pay the purchase price. Hence the price continues to rise until only one button is depressed. If no bid is made during the fixed time, the lot is assigned to the first bidder. When this method is used, buyers cannot raise their own bids.

Sales by ascending bid (second alternative method) - This last method is a mixture of the two previous ones. The procedure is the same as in the method described immediately above, until the point when there is only one buyer left. At this point the buyers are able to raise the bid by individual pushes, as in the first ascending bid method described above. This method allows a buyer, who decides at the last moment that he wishes to buy the lot, to still bid.

Example 1 - Moves to upgrade old electronic auction systems

The port St Guenolé in southern Brittany was one of the first western European fishing ports to introduce an electronic auction for the sale of its fish. This port specialises in the capture of Nephrops – the Norwegian lobster, Dublin Bay prawn or scampi Nephrops norvegicus. The high value of this species on domestic and export markets provided sufficient incentive to seek to extract the highest possible prices in the sale of such product. In addition, this move had the broad support of the market operator (the local Chamber of Commerce – a public body funded from business taxation, with

Electronic Auctions and the Fish Trade

responsibilities in the area of economic development) and the fleet owners and operators. The process from conception to installation and operation of the purpose built bidding auditorium took two years, and as a pioneer development the venture received generous financial support from the European Commission.

Figure 5. A mobi clock and a handheld bidding set



The port has not looked back since this time, remaining a vibrant, profitable and progressive port with a good feel as to how to maintain commercial success in a rapidly changing market place. One interesting hiccup in the early use of the electronic auction is, however, worth retelling. In early discussions over the design of the facility, the auction system developers said that since the bidders could view the fish prior to sale (product was laid out in a specially built temperature controlled display chamber) it would not be necessary to present the product before the bidders a second time in the bidding chamber. This the local merchants vehemently disagreed with, and provision was made for each lot to be displayed at the front of the bidding auditorium, using a roller bed to get lots in and out of the auditorium. As predicted by the auction designers, the merchants got so used to the system that after six months they indicated that it was no longer necessary to display the fish for a second time. The fear of not being able to “see” the fish remains a major barrier to the introduction of electronic auction systems, but wherever such a system has been introduced, this fear has soon been dispelled as buyers have got used to the new system.

In southern Brittany this early development occurred in the mid-eighties. St Guenolé forms one of seven fishing ports to be found in “Le Pays Bigouden” centred around the major port of Concarneau. Each of these ports falls under the management and operation of the local Chamber of Commerce for the whole area, which is located at the administrative centre of Cornouaille at Quimper. Some fifteen years later an electronic auction system has been installed at Concarneau, and design work is now underway to attempt to link all the ports together under a single system. The primary purpose of this is to gain the projected and substantial benefits of economies of scale deriving from:

Electronic Auctions and the Fish Trade

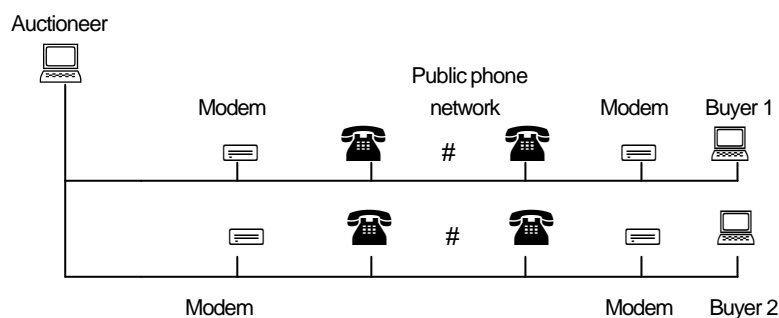
- larger volume of sales,
- standard systems for the handling and specification of product,
- automation of back-office activities (accounting, invoicing, marketing, and strategic management),
- tighter control of waste, and
- the higher prices being paid for product as a result of the greater competition deriving from the use of a remote bidding system.

Despite the long experience at St Guenolé, there has been no concerted move to a remote bidding or linked market system. Will the newly proposed system overcome the remaining commercial resistance to the further opening up of these markets to wider competition? The logic of the initiative looks strong, but it needs to be noted that the strength of local resistance has delayed development for the last fifteen years. There are also hidden benefits for the future. The structural shift that such a network of ports would bring about should put this area at the forefront of the French fishing industry, but also then allow it to reap additional benefits from linkage to more sophisticated data exchange and Internet trading systems.

3.3 Remote bidding on electronic auctions

A feature that is commonplace in flower auctions is the use of remote bidding on such clock auctions. The bidder, sitting in his or her office a hundred yards away or a hundred miles away, can bid "in real time" using a facsimile of the auction clock displayed on his or her computer screen. Under this sort of system, a mix of on-market and remote bidders competes for the purchase of product.

Figure 6. Basic structure of a remote bidding system



Such remote bidders may inspect the product offered for sale before the auction, returning to their home or office to participate in the auction. Alternately, they may depend on the description of the product listed on a pre-auction electronic catalogue, supported by their previous experience of buying in this way, and such additional knowledge and information as they may have about the suppliers of the product and market conditions in general.

These sorts of bidding systems are on fish markets in Holland, France, Spain, Italy, Norway and Iceland. These systems are most effective when used on large volume markets, where they achieve many system efficiencies. Much can be achieved in respect of quality control, bid speed, accurate weighing, classification of

Electronic Auctions and the Fish Trade

lots, automatic billing, automatic scanning of credit limits, automatic labeling for dispatch purposes, etc., etc..

For low volume markets, this sort of system only really makes sense where a large proportion of bidding is, or could be, undertaken on a remote basis.

Figure 7. Using a remote link



Example 2 - Improving the efficiencies of fish allocations to processing plants

For many years now the Norwegian pelagic industry (Norges Sildeslag) has been operating an electronic trading board for the advance sale of small pelagic fish. This is one of the earliest examples of the use of this type of forward selling system, and has contributed to the top position that Norway has been able to develop in international markets over just the last decade.

The origins of the system lie in the particular geography of the Norwegian pelagic industry. The Norwegian population is distributed in often highly dispersed coastal communities. Fisheries have played a crucial part in the evolution of the social and economic structures of these communities, and remains for many the most important component of their economy. Such communities typically support one or more large fish processing plants, complete with its own landing quays and discharge systems.

But the fishery has become less and less local. The migration of small pelagic species along the coast of Norway, and subsequently out into the Atlantic, is such that vessels need to follow the fish. And yet the processing plants need a regular flow of raw material to stay in business and maintain full efficiency. The forward selling system allows the two conflicting parameters to be matched up. Towards the end of any fishing voyage, vessels inform the system's headquarters in Bergen of what they have caught, where they have caught it, over what period they have caught it, and the size, quality and temperature of the fish. This fish is then offered for sale on the system to the various processors up and down the coast. The highest bidder secures the purchase, and the vessel is instructed to make for that plant's landing quay.

Using this sort of system, the time from fishing ground to processing plant is shortened, fish is discharged using state of the art hydraulic fish pumps, and plants can secure a regular supply of raw material. Sophisticated on-board temperature control ensures that fish is of the highest possible quality when pumped ashore, and the co-ordination, landing,

Electronic Auctions and the Fish Trade

discharge and processing is such that the best fish can be frozen or otherwise processed not just within 24 hours of discharge, but often within 12 hours of capture. The marketing muscle that the Norwegian industry has been able to develop based on this system has meant that its processors can pay higher prices than its competitors elsewhere in Western Europe. As a result, Scottish and Irish pelagic vessels commonly land to these same processing plants, and can avail themselves of access to the same forward trading system.

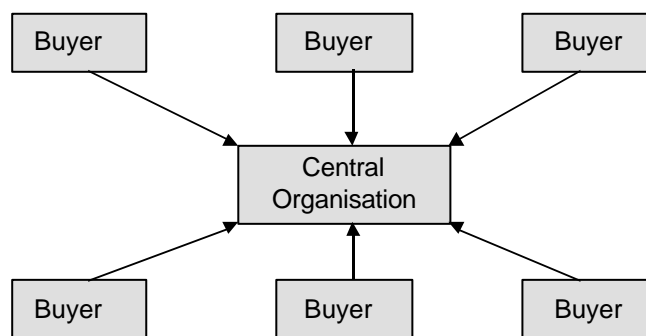
Processors in Shetland and Grampian in Scotland, and Killybegs in the Republic of Ireland, see the advantages of such a system, and are interested in seeking to extend the application of this electronic system to their plants as well. In the meantime, however, this system provides the Norwegians with a potent comparative advantage over their neighbours.

3.4 Linking of markets

An extension of the electronic clock system incorporating remote bidding is to link a number of markets together. There are two ways to achieve this. The one is by scheduling a number of markets to take place sequentially, so that buyers can "attend", at least electronically, each of the auctions in turn, buying through the use of a computer console. A buyer can operate such a console from home, in the office, or on one of the auction floors, as seems most appropriate.

Another way of organising this sort of linkage is to have a number of markets operating through the same central computer system. In this way, it is possible to hold one or more "virtual" auctions, where all the bidding is done with bidding consoles. In this sort of system, lots are sold in any order, irrespective of the port at which the landing is made, or the location of the product at that time. For example, a hub system linking five ports together in a common system could offer all whiting lots in one batch, followed by all skate lots, followed by all nephrops lots. Such a system can also be programmed to make automatic allowance for the cost of distribution from one market to another, for the delivery of the product to the location of the bidder, and even down to allowing bids to be placed in any number of currencies.

Figure 8. Diagram of a hub system showing linked markets



One of the biggest draw-backs (or conversely advantages) to such a system, is that lots have to be accurately described so that a remote buyer knows exactly what he is buying and does not suffer any disadvantage relative to someone buying on sight. Few market systems in the fish trade currently comply with such rigour.

Electronic Auctions and the Fish Trade

Nevertheless, when quality, accurate grading and consistency are rewarded in the market place - as is increasingly the case - it is easy to envisage the advantage that markets offering such controls will have over those not offering such controls.

Figure 9. EU grading chart for plaice

Score	Exterior		Eyes		Gills			Cut surface
	Skin	Slime	Shape	Color	Odor	Color	Slime	
E	Clear, shiny, metallic	Glass clear, varnish	Bulbous	Black, shiny	Fresh oily, metal soily, pepper, grass cuttings	Bright Red	Little or none, clear	Bright, white, smooth, firm
A	Clear, without shine	-	-	Black, dull	Oily, fruit aromatic	Paler edges	-	Glassy
B	Bleached, dull	Milky	Flat or swollen (bubble)	Opaque pupil	Stuffy, mousy lemon, malt, beer	Bleached	Opaque, yellowish	Opaque, dull, yellow
C	Dull, aquamarine or cyanic discoloured	Opaque	Flat, hollow in center	Milky cornea, gray pupil	Muddy, vinegar, rancid, faecal, butyric acid	Yellowish, brown	Yellow, brown	Opaque, yellow, brown

Electronic Auctions and the Fish Trade

Example 3 - Networking solutions

Iceland was probably the first country to adopt networked solutions to improving the efficiency of its first hand sales systems. Iceland sits towards the northern end of the mid-Atlantic ridge, surrounded by rich marine resources. The mainstay of the economy, both in its origins and in modern times, is the fishing industry. Fishing communities are to be found all along the island's coast, supporting a mixed fleet of small, medium and large fishing vessels. In modern times the industry as a whole has evolved a system of Individual Tradable Quotas for most major fisheries, a centre of activity around a small number of large processing plants, and a concentration of the larger vessels around a small number of larger ports.

The Icelandic population is small relative to its fish harvests, and its economy depends on the export of the large proportion of its seafood – both in raw and processed form – to markets in North America, western Europe and the Far East. The nature of the fish resource is such that its vessels can readily target the major commercial species, with the larger vessels able to harvest several hundred tons of prime whitefish in one ten- or twelve-day fishing trip. The combination of large single discharges of fish from the vessels, the relatively small number of large processing plants, and a sophisticated (though no less troublesome) ITQ system, has allowed for significant streamlining of the first hand selling system. For the large and much of the medium sized fleet, fish is landed in full and half-bins (approximately 600 and 300 litres in capacity). These bins are marked with the day the fish was caught – last day of the trip, second to last day of the trip, and so on. The bins are weighed in bulk, usually using a weighbridge (where the lorry carrying the bins is moved on to the weighbridge, saving time and effort in unnecessary manipulation of the bins and the fish). The bins are then offered for sale.

To further simplify the selling process, most of Iceland's fishing ports link in to one of two electronic selling systems. In the early period of the development of these linked electronic auctions one company used a fully computerised system and the other used a 'combination' system employing both audio and computer linkage. Today both companies use the 'combination' system. These systems are principally used for the sale of bulk fish. Fish and shellfish landed from the coastal fisheries is still predominantly sold by shout auction.

The 'combination' system is particularly interesting in the way that it combines computer technology with what might be termed more manual systems. The system is relatively crude (very much in line with the nature of bulk sale), is simple, is transparent and is low cost. The original CASS system is owned and operated by RSF, and is used to link fourteen port markets together. The similar BODI system has been developed by Islandsmarkadur, and links another eight auctions together.

The operator at each market inputs details of each lot into his computer, and this information is then transmitted to the central computer. Lots available for sale are detailed in a single computerised listing, which is printed out and made available to anyone wishing to purchase fish. Lots are treated equally; no matter at which port each lot is actually to be found. Each species of fish is sold sequentially – all cod lots together, all halibut lots together, etc.

Bidding for lots takes place at a sales room located adjacent to each market. Buyers congregate in an ante-room to this sales room, and tend to only enter the sales room when the species they are interested in is being sold. Each buyer has a hand-held paddle (a little like a table tennis bat) which displays his buyer number. The computer operator at each bidding room is linked to the auctioneer on a single computer network (using a telephone line connection) and by a normal voice telephone line. Using this system information can be transmitted both by computer and by voice.

Electronic Auctions and the Fish Trade

If a buyer is interested in bidding for a particular lot he/she raises his/her paddle. The auctioneer then proceeds with the auction as if for a normal shout auction, raising the price as the auction proceeds. Buyers at each market hear the auctioneer over the loudspeaker system, and drop their identity paddles as they withdraw from the bid. The last buyer with his paddle raised wins the bid. Each computer operator transmits the number of bidders remaining in the competition to the auctioneer. He/she indicates, using the computer keypad, that several paddles remain up, or only one paddle remains up, or no paddles are up. When only one paddle remains up within the whole system, the bidding round is closed, the auctioneer announces from which bidding room the successful bid has been made, and the computer operator at that bidding room announces to the auctioneer the identity number of the successful bidder. The auctioneer's assistant enters this information into the settlement register. Should any dispute arise, this is settled through verbal communication between the auctioneer and the respective bidding rooms.

This system represents a happy compromise between computer technology and traditional shout auction practice, and fits well with the operating practices of this particular industry. Such a system does not suit all situations by any means, but can nevertheless be applied to a wide range of circumstances. This system has since been developed to allow remote (outsider) bidding, and such systems have been installed by RSF in both the US and Germany.

3.5 Market information

Using such electronic systems, it starts to become increasingly easy to offer users access to historical data - on their own bidding record, on prices paid on that particular market on that particular day, or over the last week, or over the last year. It becomes possible to monitor overall market supplies, not just to one physical market, but to a group of markets, or to a region as a whole. It then also becomes possible to start providing advance notification of landings, details of how many boats are out, what amount of quota remains uncaught at any given time, how much fish has been caught, and when and where vessels are likely to land and discharge their catches.

Decision-making by a market trader, or a wholesaler or processor some distance from the market, or from the central purchasing unit of a major supermarket chain, becomes less a matter of guess work and more a matter of calculation. It becomes possible to envisage times when less fish remains unsold - unnecessarily destined for conversion to fishmeal - when fish prices remain more stable. It becomes possible to envisage times when skippers more closely catch for the market, rather than arrive back at port with a hold full of fish at the same time as every other vessel in the fleet is doing the same thing.

Is this a fantasy or is it remotely possible that the industry can so order itself? In practice, examples of all the systems referred to above are in operation in France, and some such systems are in operation in Holland, Norway and Iceland.

Consolidated landings information: To reduce the quantities of fish withdrawn from French port markets, a system was set up by the Producer Organisations (POs), in co-operation with major processor and supermarket buyers, whereby each auction is contacted early in the morning to ascertain the sorts of quantities of fish available. Buyers are then directed to where they are most likely to find the quantities of fish they require. The system is reported to work very successfully, to the advantage of both vessel owners and buyers. It is also inexpensive to operate.

Electronic Auctions and the Fish Trade

Rapid response to unusual catch levels: A further development of this same system is used to give forewarning of unusually large landings of any given species. Instead of assessing the volumes of product being currently sold on each market, auction and port managers are asked for information on how each location's fleet is getting on. Where there is indication that the fishing has been particularly good, and thus market prices are likely to be uncomfortably low, the POs work with the larger retail organisations to promote the sale of that species. Once again this avoids the need to withdraw fish from market because of over-supply. Under these circumstances, with 48 to 72 hours notice of high landings, the POs and multiple retailers arrange for special advertising of species promotions. Use is made of radio, local press, and point of sale advertising, with the result that up to twice the normal volume of sales can be achieved. The sales are made at a lower price than normal, but the increased sales volume ensures that fishermen, traders and retailers profit from the activity in a way that would not have been possible if the fish had been diverted to fishmeal production. (On the other hand leaving the fish in the sea, to be caught at another time, might have proved an even more profitable option, particularly in a fishery managed by quota.)

Advance notification of landings: To combat the increasing pressure on the French industry from competing sources of raw material - for example that originating in Scotland and Ireland - a number of port operators have sought to establish a system of giving selected buyers information on what and when their boats are likely to land. A Paris based supermarket buyer of nephrops, for example, will want to know that he/she has sufficient purchases to meet current consumer demand in his/her stores. Buying from suppliers in Scotland and Ireland means that he/she knows that product is on its way to Paris at least 48 hours before it is needed in the stores. Buying from a French port on the other hand, typically for overnight delivery to Paris, means that if insufficient product is landed, he/she is stuck with no product. Clearly better (and often cheaper) to buy in advance from Scotland and Ireland. To restore control to the French industry, some fleet / port operators have arranged to relay consolidated information on what vessels have caught and expect to land some two to four days in advance of landing. This has the advantage of allowing key purchasers to be assured that sufficient product to meet their needs will be available from local sources. This sort of arrangement is spreading to other regions, given both the ease of use of confidential ship to shore communication systems, and the obvious commercial advantage that such information offers fleet and port operators.

Figure 10. Market information web page

PEFA Network Auction :		Zeebrugse Visveiling			
Date :		10/03/2000			
Currency exch rate :		1 BEF = 0.024800 EUR			
Article	Quality	Supplies	Unit	Price	
				AVG	Max
PCOUT 000 0000-9999 GT IC NO XX	AA	2439	KG	0.742	0.893
PCOUT 000 0000-9999 GT IC NO XX	AE	816	KG	0.675	0.794
BRILL 010 2000-9999 GT IC NO XX	AA	111	KG	9.932	10.399
BRILL 010 2000-9999 GT IC NO XX	AE	157	KG	9.348	10.894
BRILL 020 1000-2000 GT IC NO XX	AA	279	KG	8.278	9.474
BRILL 020 1000-2000 GT IC NO XX	AE	393	KG	7.863	9.672
BRILL 020 1000-2000 GT IC NO XX	BA	18	KG	6.423	9.423
BRILL 020 1000-2000 GT IC NO XX	E	10	KG	9.722	9.722
BRILL 030 0500-1000 GT IC NO XX	AA	420	KG	6.393	8.184
BRILL 030 0500-1000 GT IC NO XX	AE	405	KG	7.034	8.209
BRILL 030 0500-1000 GT IC NO XX	E	6	KG	8.356	8.356
BRILL 040 0000-0500 GT IC NO XX	AA	56	KG	4.865	5.481
BRILL 040 0000-0500 GT IC NO XX	AE	42	KG	7.206	7.936
BRILL 040 0000-0500 GT IC NO XX	BA	5	KG	4.638	4.638
BLACK SEABREAM 000 0000-9999 RO IC NO XX	AA	2	KG	0.893	0.893
BASS 000 0500-9999 RO IC NO XX	AE	5	KG	11.284	11.284
BASS 030 1000-2000 RO IC NO XX	AE	39	KG	7.366	7.366
BASS 040 0500-1000 RO IC NO XX	AA	5	KG	3.819	3.819
BASS 040 0500-1000 RO IC NO XX	AE	34	KG	4.931	4.960
ATLANTIC CATFISH 040 1000-2000 GT IC NO X		40	KG	3.720	3.720
ATLANTIC CATFISH 050 0500-1000 GT IC NO X		40	KG	1.736	1.736
COCKLE 000 0000-9999 WH IC NO XX	AE	35	KG	0.373	0.273
COD 000 0000-9999 RE IC NO XX	AE	10	KG	1.959	1.959
COD 000 0300-9999 GT NI NO XX	AE	7	KG	4.642	4.642
COD 100 7000-9999 GT IC NO XX	A	25	KG	3.646	3.646
COD 100 7000-9999 GT IC NO XX	AA	78	KG	3.791	4.300
COD 100 7000-9999 GT IC NO XX	AE	40	KG	4.538	4.538
COD 200 4000-7000 GT IC NO XX	A	311	KG	3.554	3.621
COD 200 4000-7000 GT IC NO XX	AA	317	KG	3.616	4.414
COD 200 4000-7000 GT IC NO XX	AE	35	KG	4.687	4.687
COD 200 4000-7000 GT NI NO XX	AE	69	KG	4.363	4.661
COD 200 4000-7000 GT NI NO XX	E	169	KG	4.960	4.960
COD 030 3000-5000 HD IC NO XX		40	KG	3.968	3.968
COD 300 2000-4000 GT IC NO XX	A	280	KG	3.208	3.249
COD 300 2000-4000 GT IC NO XX	AA	331	KG	3.168	3.646
COD 300 2000-4000 GT IC NO XX	AE	37	KG	3.894	3.894
COD 300 2000-4000 GT NI NO XX	AE	93	KG	3.796	4.042
COD 300 2000-4000 GT NI NO XX	E	880	KG	4.096	4.404

Price and volume data: A system of market information has been available to a wide range of industry members in France for some years. Marketed under the trade name Datapeche, this system allowed participating markets and subscribers to access a wide range of price and volume information on the fish trade in France through a Minitel connection. This service is no longer available, but variants of this system are now being tested by other industry institutions in France and elsewhere, based on the use of PCs and increasingly incorporating some element of the Internet.

3.6 INFOMAR

A major advance on all these systems was achieved by a consortium of private companies in the development of a wider area system under the EU assisted project INFOMAR. This project pioneered the development of an information, forecasting and trading system for the European fresh fish industry. Its aim was to connect fishing vessels at sea with their potential customers, provide flexible linkage between shore markets, and facilitate trade along the full distribution chain. In doing so, it sought to:

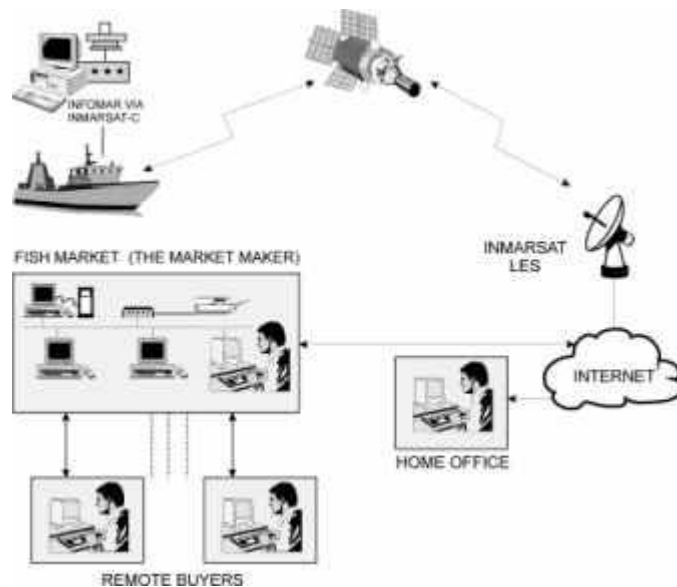
- ❑ stabilise fish prices and supply
- ❑ improve quality by reducing handling and delay
- ❑ increase value, streamline distribution and steady supply
- ❑ strengthen traditional fishing communities by making them competitive

This project was operational between 1997 and 1999, and culminated in the development of an integrated suite of prototype software products. These products are now being further developed and introduced into commercial systems by each

Electronic Auctions and the Fish Trade

of the consortium members. Similar systems have been developed independently by at least one company that did not form a part of the INFOMAR consortium or link with one of the consortium members.

Figure 11. Schematic of the Infomar project



The base system of INFOMAR comprises a confidential ship-to-shore data exchange system (FishLink), a fishery information service (FishCast), and an Internet mediated fish trading service (FishTrade). Using satellite, e-mail and computing technology these software products allow interested individuals or groups to set up systems that allow any authorised user, no matter where they might be (in western Europe), to call up relevant fishery information and to place product for sale on a sales board. The information carried by such a system could encompass anything from fish quotas to fish prices, and details of insurers to credit agencies. Such a system is not intended to replace telephone and fax mediated sales, shout auctions or electronic auctions, but rather to complement such systems. It offers skippers, port authorities, market managers and traders the opportunity to make advance trades through the system, effectively allowing fish to be sold before it has been landed. Fish that has not been sold before landing can then be offered for sale through normal sales channels - typically by auction and telephone.

For example, an Icelandic vessel halfway through a fishing trip for cod can place a number of lots for sale on the system, well in advance of landing to a port. If someone should wish to bid for these lots in advance of landing, they can place a bid on the system, within a pre-defined time (a few hours, a day). The skipper can then check on ruling market prices, price forecasts, and market trends. He can also check on the credit rating of the bidder. Once a bid is accepted by the skipper, the system can then be used to make arrangements for the fish to be discharged to port, for the fish to be independently inspected and quality registered, for transport and insurance cover, and for financial settlement.

Figure 12. Screenshot from FishCast



With such large vessels and the considerable amount of fish they can carry at any one time, there may be circumstances where it is more appropriate to make delivery direct to a buyer than to land at the vessel's home port. By making the sale whilst still at sea, it becomes a relatively easy matter to decide whether to land direct to the purchaser's nearest port, to transship the catch to a transporter vessel, or to land the catch to home port for containerisation and then onward delivery by sea. A variant of this system has been in operation in Norway for some years.

Depending on how exactly such a system is put together, it should be possible to facilitate, for example, the purchase of a range of fresh seafood from vessels landing into the west of Scotland, by a fish buyer in Milan, for consolidation in Inverness prior to transport by refrigerated lorry to Milan. All the financial arrangements, together with guarantees of product quality and product delivery, would be mediated through electronic linkage, and guaranteed through the system operator.

Indeed, it might also make sense if such a system also incorporated a hub network of electronic auctions. This would allow both large and small ports to achieve cost savings through the use of shared systems and services, with sales mediated through a combination of catalogue sales, traditional shout auction, real time virtual auction, contract sales, and sales by direct negotiation.

Figure 13. Screenshot from FishTrade

Date	Produit	Quantite	Prix	Statut	Moyen de paiement	Moyen de transport	Moyen de livraison	Statut
10/10/02	Anguille	2000	0%	90%	0.27	0.21	3	
10/10/02	Anguille	2000	0%	75%	0.21	0.21	1	
10/10/02	Anguille	2000	0%	125%	0.18	0.12	2	
10/10/02	Anguille	2000	0%	50%	0.11	0.11	1	
10/10/02	Anguille	2000	0%	50%	0.17	0.17	1	
10/10/02	Anguille	2000	0%	0%	0	0	0	
10/10/02	Anguille	2000	0%	100%	0.25	0.13	2	
10/10/02	Anguille	1000	0%	0%	0	0	0	
10/10/02	Crab	2000	0%	100%	0.12	0.12	1	
10/10/02	Crab	2000	0%	100%	0.12	0.12	1	
10/10/02	Crab	2000	0%	1%	0.11	0.11	1	

Figure 14. Screenshot from FishCatch

The screenshot shows a window titled 'Infomars FishCatch - catch reports'. At the top, there are 'User values' for 'F0', 'F1', and 'F2'. Below this is a table with columns: Species, Mixed, Size1, Size2, Size3, Size4, Size5, Total, Units, Condition, and Preservation. The table contains five rows of data for different fish species. At the bottom, there are instructions: 'Press F1 to exit, F2 to send, F3 for homepage, F4 for setup, F12 for help' and a 'Clear' button.

Species	Mixed	Size1	Size2	Size3	Size4	Size5	Total	Units	Condition	Preservation
cod	1	333	5	5	48	5	1395	kg	whole	coolat
sole	3	56	777	6	5	6	853	kg	whole	coolat
plaice	33	4	4	6	77	8	132	kg	whole	coolat
haddock	7	78	0	7	3	0	82	kg	whole	coolat
trout	5670	0	0	0	0	0	5670	kg	whole	coolat

Example 4 - The INFOMAR project

In 1996 a bold initiative aimed at creating an electronic, Europe-wide market in fresh seafood was launched, with the support of the European Commission, by a consortium of European communications, auction development and software companies. The project came to an end in 1999 with the successful development of a prototype suite of integrated fish trading and data exchange products. These prototypes are now being incorporated into commercial products by each of the consortium members, for deployment in a European and wider context.

As originally conceived by the founding Icelandic and Norwegian members of the group, the idea was to develop a set of tools by which skippers could sell the fish that they had caught well in advance of landing to market. What fish remained unsold at that time could be placed on the local auction market. The drive for such a system was that the Icelandic and Norwegian whitefish industries caught far more fish than their home markets could ever expect to consume, and they were therefore totally dependent on selling catches and derivative part and fully processed product to export markets. Western Europe remained its most important market and the possibility of forward selling catches to other European traders and processors offered attractive economies of scale.

The project looked to develop three software applications:

FishCAST – a means by which market information could be collated, interpreted and disseminated over a closed network of computers – an Intranet.

FishLINK – a system by which skippers could confidently and confidentially transmit details of what they had caught from ship to shore.

FishTRADE – a system by which either the skipper or a shore agent could sell lots of fish through a closed network of computers – an Intranet time limited trading board.

The original idea built on the concept deployed in the Norwegian electronic marketing system for small pelagics. But in trying to develop a product suit that applied not just to Iceland and Norway, but which could be utilised by skippers from fleets in other western European countries, it became clear that some serious modification of the original concept was necessary. In particular it required that the product remained applicable to a wide range of vessel types – both large and small – and that it could deal with a wider range of species more typical of the coastal and offshore fisheries of Western Europe.

Subsequent modification of the consortium team brought on-board an experienced electronic auction hardware and software development company which had wide

Electronic Auctions and the Fish Trade

commercial experience of installing and operating electronic trading systems within western Europe. Further modification of the concept saw a shift in emphasis from the development of a trading system that sought to compete with land-based auctions, to one that complemented the services provided by the port auctions. Indeed the INFOMAR suite of prototype products provided the basis for significant modification, upgrading and extension of the services provided by the electronic auctions themselves.

During the course of project execution, the Internet and the World Wide Web blossomed forth. What had been a rather esoteric networking and communications tool at the outset of the project became an increasingly accessible and popular extension of not just academic communication, but business to business communication. In parallel with this, software tools and routines that were of a specialist development nature in the early part of the project could be purchased off-the-shelf by the end of the project. So much had changed over the course of just four years.

But the outcome of this highly successful project has been that the concepts and prototype communications and database structures and software developed within the project have now moved into the mainstream of developments in electronic trading. Not just in the fishing industry, but in the more traditional territories of cut flowers, fruit and vegetables, livestock and in the many new and emerging areas of e-commerce. The break-up of the INFOMAR consortium at the end of the project has meant that the code, ideas, and crucially the development experience, have been distributed amongst a number of development companies. These companies are now binding this technology into new commercial products, and these products are being actively tested in various parts of Europe and further afield. It is unlikely that future electronic auction installations will not also contain elements that derive from or parallel those developed as part of the INFOMAR prototype product suite.

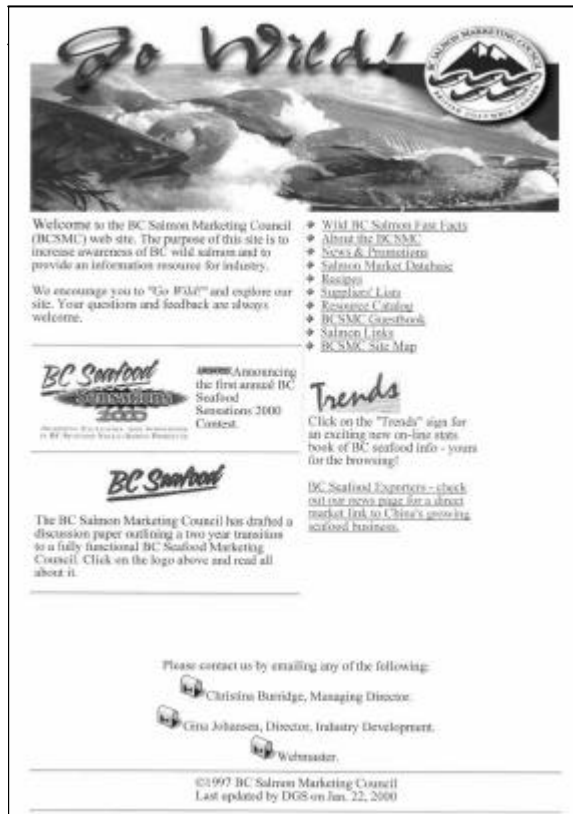
The INFOMAR consortium members were:

- **VEGA Group plc** (United Kingdom) – consortium leader
- **Marstar ehf** (Iceland) – first year only
- **Schelfhout Computer Systemen nv** (Belgium)
- **Havinfo AS** (Norway)
- **Navigs sarl** (France)

3.7 Marketing using the World Wide Web

An alternate means of promoting a product, a company or a port, is through the World Wide Web. Use of this medium has now extended well beyond academic and hobby circles of its formative years, and it is now accepted as a cost-effective means of promoting services to a wide range of customers. It is particularly useful when you can direct known customers to your particular web site.

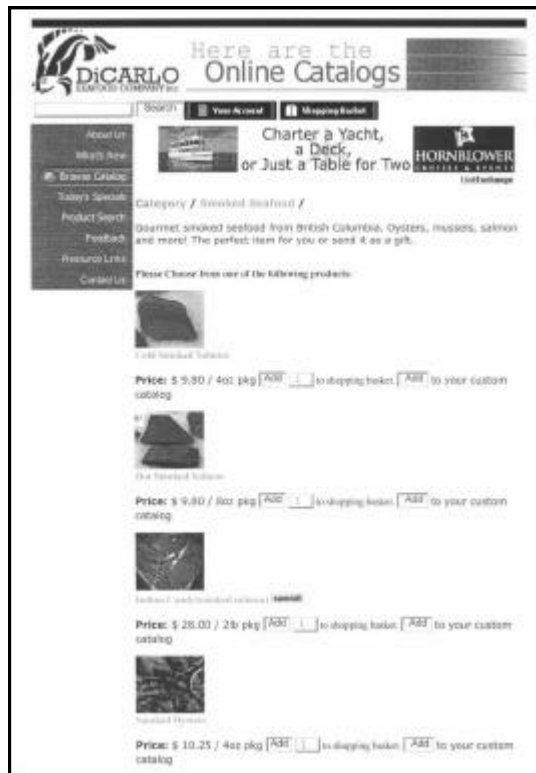
Figure 15. Screenshot of an aquaculture group site – BC Salmon Marketing Council



This system works on the Internet; you can post text, pictures and colour graphics of the company, facility, product, and prices. For example, it would be quite feasible for a grouping of shellfish farmers in Spain to come together under a joint marketing format. This grouping could design a short brochure describing why the grouping has been formed, who its members are, where they are based, and how the group operates. This could be followed by details of each farm, production records, independent evaluation of the quality of product, details of harvesting and grading facilities, and a projected harvesting schedule.

With only a little modification, this type of format can be transferred to a Web site - a locus on an Internet Service Provider's computer - where anyone with access to the Internet can access the site. Such access will allow a potential buyer to explore what the group has to offer; and all for the price of a local phone call. By going to the group's "home page", a user can identify what other information he or she would like to see, and turn to the relevant page, on the basis of an index system shown on that "home page". If a prospective purchaser were interested in the product of one particular farm, then he or she could simply complete an electronic enquiry form on the Web site, which will then be automatically e-mailed to that farm for action. Again, this system can be very effective, providing a low cost addition to a company's marketing efforts.

Figure 16. Screenshot of fish product site – DiCarlo Seafood Company



New frontiers

Why even think about electronic auctions?

The trading of fresh produce across long distances

Any visit to a greengrocer or open market will show fruit and vegetables originating from all over the world. Indeed the movement of fruit and vegetables from one part of Europe to another has been going on for several centuries. But today, you can expect to find fruit and vegetables in these shops and on these markets from every corner of the world, shipped in by ocean reefer, chill container, lorry or air. Gone is the traditional seasonal pattern of supply. Even national fruits and vegetables such as apples, oranges, potatoes, cauliflower, carrots and lettuces can come from local sources in season, but from sources many thousands of miles out of season.

The same goes for cut flowers. What used to be limited to what could be grown in open beds and under glass in the nearest nursery, is now an international business. The vast majority of scheduled and cargo long haul flights carry cut flowers for distribution and sale in markets far distant from their point of production.

To support the internationalisation of this trade, new production, packaging, transport, distribution and wholesaler businesses have sprung up across the globe. New or enlarged central wholesale markets have been constructed, and new service industries have evolved to deal with this new scale of business.

European farmers and market gardeners have had to alter their practices dramatically in order to stay in business. Indeed it is fair to say that many have had to find other businesses altogether. But this is business, and it has always been so. It is inevitable that human systems will change to meet new circumstances. You see it in the changes underway in the stock markets and commodity exchanges. You see it in the impact that Internet trading is having on the music industry and on the sale of books.

These changes are taking place at an ever-accelerating pace:

- The globalisation of trade in fresh produce has its origins centuries ago, based on the exploits of the fast trading sailing ships.

Electronic Auctions and the Fish Trade

- ❑ The development of the steam engine and the internal combustion engine added further impetus to the expansion of this trade, as did the development of commercial air travel.
- ❑ But the modern expansion of this trade derives from the 1940s, when the costs of air, sea and land travel have fallen sufficiently relative to typical wage levels to bring the purchase of these “exotic” products within the scope of many more people.
- ❑ It is only in the early to mid 1980s, however, that people have come to expect to be able to buy lady’s fingers from Kenya, bell peppers from Central America, kumquats from Thailand.
- ❑ It is only in the 1990s that we expect to be able to go down to our fishmonger or supermarket and buy fresh tuna from the Indian Ocean, fresh hake from Argentina, fresh cod from Iceland, fresh tiger prawns from Malaysia – and expect to be able to do so almost every day of the year.

As with the evolution of the fruit and vegetable industry to the point where no one thinks twice about buying bananas, grapefruit and potatoes from far distant parts, the costs of distribution of fresh fish are coming down all the time. This is bringing formerly “exotic” fish species within the budget of an ever increasing proportion of society.

4.1 The changing economics of the fish trade

So why all this talk about the importation of exotics? Well, the main thing is that these long-distance movements of fish are both possible and profitable. Fresh tuna flown in from Oman, fresh hake flown in from Namibia, and fresh cod flown in from Iceland generally sells for a higher price than the local product available from the Bay of Biscay, the Grand Sol or Rockall. But it is increasingly the case that the long-distance source provides a fresher and more dependable quality of product, delivered from net to table in a shorter period of time than the locally produced equivalent. It not only commands a higher price, but also the idea of having to bear the costs of fish sent half way around the world, only to be rejected as sub-standard on arrival, is a great incentive to ensuring that quality considerations are uppermost in any exporter’s mind.

But this is not all. The western European market is dependent on non-European sources for over 60 per cent of its seafood requirements. The sheer volume of seafood trade is such that it is increasingly possible to source like-for-like product from outside the European Union at prices equal to or below those available from local sources. It is not just that the imported product is often of better quality, but that where it is of the same quality, it can be sourced at prices below equivalent local product.

This is a re-run of all the past trade revolutions – in fresh fruit, cut flowers, stock markets, cars, meat. Local producers have been unable or unwilling to compete with the scale, efficiency and lower cost of producers from distant parts. Eventually, however, they have adopted smarter systems themselves, or have identified parts of the market where their production methods can demonstrate advantage, or have simply moved into other areas of business. Industries based around each of the product groups mentioned above are alive and well in Europe and exist in dynamic

Electronic Auctions and the Fish Trade

equilibrium alongside competitors from all over the world. To achieve this new equilibrium, however, they have had to change.

The same change cycle is now underway in the fisheries sector, and is permanently altering the traditional face of fishing across Europe. The fact that so much fish is transported around the world is testament to the extent to which this sector has evolved. But this is, truly, the "exotic" part of the trade. Over the last two or three decades, the build up of equivalent intra-European trade has been even more striking. The fishery economies of Ireland, the UK, Iceland, Norway, Sweden and Denmark are now dependent on the mass movements of fresh seafood produce from the fisheries of the North East Atlantic to the key European consumer markets of south east England, France, Spain, northern Italy and southern Germany.

Such movements focus on live shellfish, prime quality whitefish and large pelagics. The increasing scale of this business, and the strong competitive forces between the different production regions of Europe has created great opportunities for fishermen and traders alike. At one and the same time, however, it has challenged the capacity of existing production and trade structures to provide the level of service expected by European wholesalers, processors, distributors and retailers. To do so at a profit has posed a considerable challenge, as witnessed by the many mergers and acquisitions taking place within the European wholesale, distribution and processing sectors, and the remorseless thinning out and restructuring of Europe's fishing fleets.

These changes have seen the demise of many small-boat fleets across Europe, and have seen the migration of employment from traditional fishing villages to the larger fishing ports. These changes have also weakened the ties between fishing port and processor to the point where proximity to a fishing port may no longer be a governing consideration, and where the combination of labour costs, productivity and market access may be more telling.

Governing the new economics of the European seafood industry are three key factors:

- ❑ there is strong and growing demand for really fresh, top quality seafood produce throughout Europe, with a recognition that such food is healthy, natural, and (generally) additive and pollution free;
- ❑ there is mounting consumer concern for sustainability, which is starting to translate into a preference for the purchase and consumption of produce from sustainable systems (systems which European producers, and smaller scale operators, are often better able to support and maintain);
- ❑ the development of modern telecommunications and information handling systems substantially raises the standards of what may now be recognised as "best practice", but is also able to offer small scale and peripheral operators the same sorts of services, and consequent advantages, as have formerly only been available to large scale and centrally located operators, and at prices that do not penalise small scale or more isolated operators.

For those with the foresight and skills to capture these three forces in support of their businesses, the future looks particularly interesting.

Electronic Auctions and the Fish Trade

Care must be taken to avoid getting sucked in by the technology, however. When it comes to the fish trade, as with so many other primary industries, current practises are the result of the gradual modification of traditional practise. There is great resistance to change, and though practise is being changed all the time, the role of such resistance is important, and should not be pushed aside - it is to provide long-term protection to such communities. It is to ensure that the rate of any change is in line with the rate of change within the many support systems that go to make up the industry as a whole. Efforts to short-circuit these more traditional change systems will be counter-productive unless given the support of the key decision-makers and opinion setters of the particular industry segment concerned.

Example 5 - The pace of adoption of electronic auctioning

As a general principle people resist change. The larger the grouping, the greater the resistance. And yet we are surrounded by change, and actively and willingly participate in change all the time. What is at work here is a dynamic tension between the forces of "change" and "no change".

It is right and proper that people should question the need for particular changes, testing the basis for such change. This is certainly not a foolproof system – we adopt some changes that seem to serve little purpose, and yet reject others that we logically agree would be beneficial. But on balance it serves the interests of individuals and communities, with the most common outcome maintaining the status quo – no change.

*This is particularly so when looking at the potential for introduction of electronic auction systems to the complex commercial and social inter-linkages that make up fishing communities and the fish trade. Who comes up with the idea, and how it is presented to the fish trade, may prove critical to its adoption or rejection, but there are absolutely no hard and fast rules in this. Two aspects that **are** likely to weigh heavily on the outcome, however, are the views of key opinion formers within the industry and community, and the extent to which the various power structures feel threatened by the proposals.*

Three examples show how unpredictable things can be:

Saint Quay Portrieux, France: *In the mid-eighties the live edible and spider crab industry in northern Brittany was coming under increasing market pressure from suppliers from the Channel Islands, South West England and Scotland. As a way of strengthening their market and trade position, consideration was given to the installation of an electronic auction at the port of Saint Quay Portrieux. This initiative had the cautious backing of industry leaders who then set about seeking to achieve industry consensus in what was recognised as a diffuse sector. Once this was achieved, specific issues relating to standards, financing, industry practice, and operating structures were addressed, and solutions found. This whole process involved extensive industry consultation throughout, but after a development and consultation process lasting approximately two years the project was shelved. Despite the best efforts of the project committee and the consultants, there was ultimately insufficient support and consensus for the introduction of an electronic trading system.*



Highland Council Harbours, Scotland In the early to mid-nineties, the Highland Council, with responsibility for the management of a number of fishing ports in the highlands of Scotland, gave serious consideration to the development of the ports under its charge. The particular focus of its deliberations was on attracting increased fish landings from Scottish and foreign vessels fishing to the west and north west of the British Isles. This initiative coincided with generally increased levels of fishing activity in this area, and particularly the emergence of a major fishery for "deep water" fish species caught along the edge of the continental shelf and on the mid-Atlantic ridge. Substantial upgrading of the ports of Lochinver and Kinlochbervie ensued, attracting increased landings from vessels operated from Peterhead and Fraserburgh, as well as visitors from France, Spain and the Faeroe Islands. A large proportion of such fish was consigned to the home markets of these boats – in northeast Scotland, and in France and Spain. In an effort to enhance the economic benefits of such landings to the economy of the highlands, the Highland Council Harbour Board sought to pilot test an electronic auction system based around a hub system, linking a number of its ports together, and allowing remote bidding. Whilst the equipment was ordered, delivered and installed at Lochinver harbour, widespread resistance from Scottish fish merchants has meant that the system has never been activated. Whilst a number of electronic auctions have now been established elsewhere in Britain, this pioneer effort has still come to nothing. The private electronic operating company PEFA.COM has recently applied for and been given a licence to sell fish at Lochinver, but the commencement of its operations is still held up by resistance from the trade.



Sutton Harbour

Plymouth Harbour, England: In the late eighties, the long-standing and out-dated council-owned Barbican fish market adjacent to Plymouth Harbour ceased operations as part of a major redevelopment of the Plymouth waterfront. A private development company had purchased an extensive plot of largely derelict waterfront property immediately opposite the Barbican, and had substantially remodelled the area. Its long-term development plans included a new marina, fish docks, a new fish market, and premises for a range of support services, from hotels and restaurants, to marine engineering and fish processing. A key development on the site was a new National Aquarium to replace that formerly housed at the Marine Biological Association's headquarters on Plymouth Hoe. The fish market that was constructed by this company remains the most modern in the UK and the development as a whole has attracted substantial increases in both the value and volume of landings to the port. Whilst management of the premises rests with the development company, Sutton Harbour Marine, all aspects of the auction operation are handled by the Plymouth Trawler Owners' Association, which has the sole fish selling license for the market. Following year on year growth of the market well above that originally planned, active consideration was given to its further enhancement through the addition of an electronic auction and the future addition of remote bidding facilities. The time from the

Electronic Auctions and the Fish Trade

specification of such a system in consultation with electronic auction installation companies to its commissioning and daily use has been just over a year. Following some understandable trepidation on the part of auction operators, skippers and buyers, and a short period of intense training, the electronic auction was successfully opened in late 1999. The transition to electronic auctioning has been achieved without incident, and the success of the venture is such that consideration has now turned to the scheduling of the introduction of the remote bidding element of the system.

4.2 Breakdowns and impediments in the system

But there are real structural problems in the way that various parts of the European fishery sector go about their business.

Using unsustainable practices to support over-capitalised fleets

The one that gets into the papers most is that there are "too many boats chasing too few fish". This situation is far from unique to Western Europe, but is one where the more explicitly national basis of the Common Fisheries Policy contrasts strongly with the main thrust of the European Union, which is an economic union. The political peculiarities of the Common Fisheries Policy distort competition.

There are many parts of the European fleet that cannot operate at acceptable standards of profitability and earnings without contravening ruling regulations. Variable compliance and enforcement across the European Union provides an indirect subsidy to Europe's fishing fleets. This situation is unsustainable, and will not last for much longer. At its worst, equilibrium will be achieved through concentration of ownership around a smaller number of reasonably large, technically over-specified and over-capitalised vessels. At its best, a more balanced fishery management regime will promote the development of mixed fleets with tenure of access to specific regional resources, and designed to provide acceptable returns to labour and capital under locally competitive conditions.

Only in the last decade have European fishermen (and policy makers) had to face up to the practical reality that it is no longer feasible to overcome local over-exploitation of stocks by building bigger boats and going further out to sea to access relatively less exploited stocks. What everyone has known in theory has now taken practical effect - there are finite limits to the capacity of the marine environment to support fish stocks. It is now essential to look to the practical achievement of more sustainable exploitation practices.

What European vessel owners and skippers are only now coming to grips with is the fact that the traditional focus on the volume of fish caught is no longer an adequate and sustainable fishing strategy. Future long-term profits will crucially depend on marrying resource access, the control of fishing costs, and the achievement of maximum unit value for catches. What used to be achieved by "feel" will now be done by calculation. Monitoring the operating and financial dimensions of fishing will become increasingly important, as will the direction of fishing activity according to more informed perceptions of specific market conditions. In this, real-time and near real-time data will play a crucial role. The business of running a fishing vessel will move still closer to the more traditionally accessible picture, for most of us, of a manager running a manufacturing plant.

Electronic Auctions and the Fish Trade

The hunger for information under these newly emerging business conditions will have dramatic effect on how the sector restructures over the coming decade. A key aspect of such restructuring will be the rapid expansion of data exchange, data consolidation and data reporting systems. Almost all of such systems will be based around IT and the use of modern communication infrastructure. Increasingly exposed to the full force of competition, inefficient operators will be forced out of business. Stripped of unacceptable subsidy and protection, only the smartest and leanest businesses will survive. In the middle of this will be electronic data exchange systems and electronic trading systems.

Getting fish to market

Similar structural impediments can be identified in the post-harvest sub-sectors. Key to these is geography and cost control. Fish is typically harvested and landed in areas that are distant from the main consuming centres. Whilst getting fish to the consumer used to involve a fairly short distribution chain, this is no longer typically the case.

Most wholesalers, wholesale distributors and processors operate at such a scale that issues of consistency and continuity of supply can rank as more important qualities than simply price. Changing a process-run at short notice, dealing with customer complaints about poor or variably quality, or finding additional filleters at the drop of a hat, unnecessarily ties up resources and incurs management and operational costs. The need to resort to such actions can also impact negatively on the image and reputation of the company and its products.

Finding suppliers that can be depended upon not to put companies in such costly situations is worth money to such companies. Typically the larger companies have opted to use fresh and frozen supplies from industrial-scale fishing operations - where scale factors work in everyone's favour. Thus a large and generally homogenous resource is exploited using large extraction machinery, standardised bulk handling procedures, and an efficient quality assurance and distribution system. Examples of such systems are the Icelandic cod fishery, the South American hake fishery, the South Atlantic squid fishery, the north east Atlantic mackerel fishery, the eastern Pacific tuna purse seine fishery, the Alaskan pollack and New Zealand hoki fisheries, and the Ecuador farmed shrimp industry.

But such supply chains conform more closely to the idea of commodity trading. Indeed, there is a futures market for frozen shrimp operated by the Minneapolis Grain Exchange, and the trade in frozen whitefish block is very much to do with the moving around of containers full of standard specification product. Further, most such product goes into the production of frozen and highly processed seafood products.

For the more time limited and smaller volume dimensions of the seafood market, primarily involving fresh produce, buyers seek to achieve the same supply characteristics of consistency of quality and continuity of supply. But in an area of the world where fishing is notably weather dependent, and the characteristics of the coastal marine ecosystems support particularly diverse fish populations, nature conspires against the achievement of such standards.

Electronic Auctions and the Fish Trade

What happens in practice is that consolidators (a description of the activities of typical fish traders, wholesalers and processors) source supplies from a range of locations on a daily basis. Where any one consolidator is unable to meet a client's requirements from his/her own purchases, he/she will trade with other consolidators to fulfil the order if at all possible. Such consolidation forces first take effect on-board the fishing boat, when fish is sorted and boxed, ideally according to particular haul, but often involving the mixing of fish from different hauls. Further consolidation takes place at the port market, when any one trader's purchases are normally made up of the catch from a number of different boats. The trade consolidators then get to work to bring fish from different ports together to make up clients' requirements.

Despite its complexity, this process of consolidation is an orderly and effective system for meeting traditional supply requirements. It involves a lot of informal sub-systems and inter-dependencies, but does achieve, on a daily basis, a resolution of the supply and demand parameters of the trade. Or at least it has done up to now.

For short supply-chain distribution, this sort of system has been particularly effective. But as the supply chain has lengthened, so its effectiveness as an efficient system of distribution has decreased. Such systems typically depend on local knowledge, which is used as a highly effective trade barrier. In addition, as the supply chain has lengthened, the tendency has been to support the *status quo*, retain the local trade structures, and to bolt on additional new elements. This development has added substantial costs to the supply chain.

As long as everyone uses such a system, everyone is subject to the same sort of costs. But of course this is not the case. Where costs can be reduced, at some point in time someone will seek to take advantage of this opportunity. There are various examples in the UK and Ireland where French, Belgian, Spanish and Dutch traders and processors have identified that they can meet their particular supply requirements more effectively by setting up their own operations. Such companies have established advance supply offices, dedicated companies and/or primary processing operations closer to the sources of supply. They have also recruited locally, buying in to local knowledge and expertise, and where appropriate taking advantage of lower labour and social costs. Through this vertical integration process such companies have been able to cut supply costs, improve supply consistency and continuity, and meet the specific specification and quality assurance requirements of the company.

But it has not just stopped there. In time, local traders and processors have sought to capture the same sorts of savings, building on their local knowledge and proximity to supplies of prime fish, and recruiting multi-lingual staff, nationals from the countries where product is eventually sold, and paying more specific attention to specific customer requirements. In other situations - in the UK, France, Belgium - traders and processors have established their bases some distance from the fishing ports. In making such decisions, these companies have balanced proximity to raw material supply with the advantages of a more central location. Such locations are typically serviced by an efficient transport network, come with access to a large skilled and semi-skilled labour pool, and provide an environment more suited to the requirements of a more mobile professional class of senior managers and their families.

Electronic Auctions and the Fish Trade

What these changes have done is to short-circuit the more traditional evolution of the supply chain, using bolt-on units to extend the length of the supply chain. In doing so they put such traditional supply chain structures at a cost disadvantage, forcing them to accept lower profits, or make changes. Faced with these conditions, such traditional businesses have three main options - achieve costs savings through efficiency gains, re-align production to serve market segments that can accommodate such higher cost systems, or invest in alternate activity. Doing nothing is not a viable option, and retrenching behind subsidies and protective trade barriers will only provide temporary relief.

Making quality pay

Running through all the elements of the harvest and post-harvest systems is the relationship between costs of production, quality and price. Each element in the supply chain needs to ensure that over the medium-term, if not also in the short-term, business operations remain viable and profitable. As already referred to in earlier sections, many elements of the European fleet are maintaining viability only by harvesting quantities of fish above those that they are legally entitled to fish, and beyond those levels considered sustainable. It is also becoming a practical reality that it is no longer possible to move onto relatively un-exploited or under-exploited resources. The only room for manoeuvre is to make more out of less – to reduce costs (reduction of unproductive activity, reduction of waste) and increase unit revenues (through improved quality, improved product definition, through use of more effective sales channels, and through more effective marketing).

Example 6 - Adding value through narrow product specification

In the mid to late nineties, the port of Ijmuiden, Holland, experimented with ways in which it could better meet certain customers' requirements through the closer regulation of the sale of one and two day old fish. Using such a system it would be possible to offer guarantees as to when the fish was caught and how it had been handled within a relatively narrow margin of error. Restaurateurs and boardroom caterers, specialist fish mongers and some supermarkets would be prepared to pay higher prices for such closely specified fish. Such specification would allow such buyers to pass on such costs to the customer, and/or to substantially reduce costs and waste (being able to guarantee a supermarket shelf life of five rather than three days is worth a price premium).

Much of the fish landed at Ijmuiden is sorted on landing, laid out for inspection prior to sale, and then sold through the port's electronic auction system. Sales take place off-market in an adjoining bidding room. The auction can theoretically handle remote bids for product, but this facility is rarely if ever used. The port and its market are known for the quality of its fish and the efficiency of its operations. Its location allows its traders easy access to the international maritime catering opportunities associated with the commercial ports of Rotterdam, Antwerp, etc., as well prime consumer markets in Holland, Belgium, northern France, Germany and Switzerland, where product can be delivered within twenty-four hours of purchase.

One of the key impediments to remote bidding is the difficulty in describing product in a way that adequately reflects the characteristics of that product. A remote bidder who is unable to see the product he/she is bidding for must be able to have full confidence in the description of that product. This must not be just a matter of "luck of the draw". Such a bidder must be able to buy with confidence, and the buying system must be able to cope with settlement of any disputes that arise between seller, auctioneer and buyer over matters of product description.

Electronic Auctions and the Fish Trade

The idea behind Ijmuiden port's "Silver Sealed" quality brand of fish is very simple. The catch resulting from the last trawl of a fishing trip is undoubtedly the freshest of the trip, and usually commands a premium at first hand sale. If you can guarantee that the fish sold under the seal was definitely caught within twenty-four or forty-eight hours of landing, and has been handled according to a standard set of principles, then both the extent and the rate of deterioration of the fish should be a known quantity. Under ruling market conditions, this is substantially more than can be said about most fish landed to fishing ports around Europe. Branding and selling a product that is superior to, and different from, other products generally available, offers the potential basis for a profitable business.

Figure 17. Silver Sealed fish from Ijmuiden



Given the spread of landings to Ijmuiden the volumes of fish that might conform to this specification are relatively modest. To boost the volume available for sale, outline arrangements were made to link the markets of Egersund in Norway, Ijmuiden in Holland and Oostende in Belgium for the purpose of the electronic auctioning of "Silver Sealed" fish. In the event, it was not possible to secure the necessary commercial agreements for such a deal (pointing up that this forms a difficult and often insurmountable aspect of the electronic linkage of markets). Nevertheless, Ijmuiden is continuing with the promotion and sale of "Silver Sealed" product, and continues to seek strategic alliances with other port markets in the further expansion of this market opportunity.

It is very clear that the marketing of fish that has been produced using a standard "code of practice" in its harvesting and handling is playing an increasingly critical role within the seafood industry, and that more and more fish will be sold with specific quality guarantees. It is also very likely that electronic auction networks will be increasingly used to sell specific types and qualities of seafood – day boat landings, one-day-old fish, live shellfish, etc. In such networks, it is not necessary to commit to market linkage for the sale of all product passing through the market, nor is it necessary to sell all fish through the same network. By the same token, the local consumer market may be capable of handling as much high quality fish as might be landed to a particular port. In such a case it might prove more profitable to keep its sale a local affair, and sell by traditional shout auction, with all buyers physically present on the market (a situation that persists in many parts of France for the sale of product from the coastal fisheries).

As is all too obvious, skippers would like to see more competition for their product, whilst local buyers would like to see less. Where the *status quo* is maintained, a "reasonable" level of competition for product is established through a combination of auction sales, sale by contract and sale by direct negotiation. In some ports all

Electronic Auctions and the Fish Trade

landings must be placed on the local "shout" or electronic auction. In others, the skipper and his shore agent are allowed greater discretion. Invariably, sales have to be completed through a local company acting on behalf of the skipper and vessel owner, and where an auction sale is made buyers or their representatives have to be physically present on the market.

As mentioned before, such systems are well suited to short supply chain conditions, but become less efficient the longer the supply chain involved. With longer supply chains such systems tend to limit rather than maximise competition, and are used to protect rather than expose local interest. In close-knit communities this can be all to the good, but once exposed to the full force of competition, such systems are rapidly undermined.

This is not to say that traders have it all their own way. Such systems may provide a comfortable trading mechanism for local buyers and processors, but it also provides a level of service and price disclosure that the vessel owners, skippers and fishermen are happy with. Generally speaking the last thing a skipper or fishermen wants to do at the end of a hard five or ten day fishing trip is to spend extra time sorting and grading his catch. Nor does the skipper want to look over the shoulder of his shore representative to ensure that he squeezes the very best deal out of the range of available buyers. What most skippers and fishermen want is a "reasonable" price for their catch. They are happy to make use of the established system, even though it may not be the most efficient or the most likely to get them the highest price for their catch.

But this is no longer enough. Many vessel owners, skippers, their agents, and even traders consign fish to auction markets other than that at the port of landing. This they do on the basis that the scale and level of competition on that market tends to yield higher prices, or that for a particular species or mix of species other markets are stronger. For smaller ports, what might have been originally prompted by concern at the small number of buyers competing for product on the local auction market may then become a permanent fixture as that market loses viability, thus leading inexorably to further centralisation of industry infrastructure.

There is also evidence that the owners of both large and small fishing vessels are entering into formal and informal supply contracts, prompted by the wish of the contracting parties for increased stability, reduced price volatility and, in some instances, the securing of vessel financing. In still other instances, skippers sell using Internet-based "trading boards", and others focus on Tele-sales. In part such alternate systems have become more common as a means of dealing with the distribution of "over-quota" fish, in part as a means of off-setting the increasingly high costs of vessel financing, and only in part to secure higher prices. Nevertheless, at the heart of these activities is the relentless pursuit of cash flow and profits.

This fact is becoming clearer in some of the more recent innovations in vessel operation. With the introduction of satellite-mediated vessel monitoring systems (VMS) for all fishing vessels of 24 m and over, and a general tightening up in monitoring, control and surveillance (MCS) systems, the risks attaching to illegal fishing activity are steadily rising. Over-fishing is becoming a less rewarding business, and vessel owners have to examine new ways of reducing costs and

Electronic Auctions and the Fish Trade

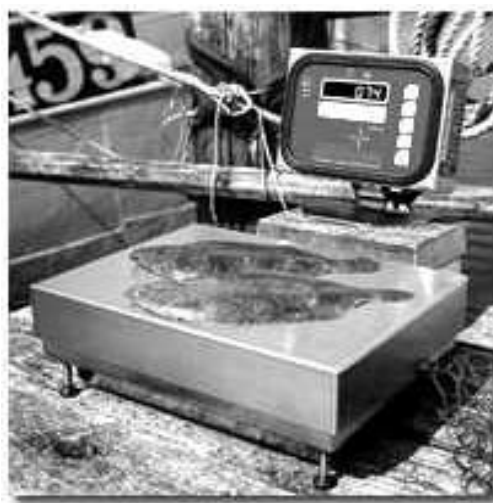
increasing revenues. One relatively simple and low-cost way of achieving this is to provide advance information to prospective buyers of what fish has already been caught. Where only a few vessels provide such information, its public dissemination is likely to be counter-productive. But such information can be and is provided to selected clients on a confidential basis. If used more widely, such a system would become the norm rather than the exception, and arguably stimulate distribution that is more efficient and less volatile pricing of fish, to the benefit of both harvesters and upstream businesses.

Another is the renewed focus of skippers and support agencies on the sorting and grading of fish on-board the vessel, prior to landing, and on-market prior to first hand sale. Traditionally what normally happens is that fish is roughly graded and then boxed on-board the vessel. These boxes are then size and grade marked when placed on the auction, but only re-graded at a wholesaler's or processor's premises, after the box of fish has been purchased. For the higher value fish species, it is an increasingly common practice to more finely sort and grade on-market prior to first hand sale. Such a system is widely used for flat fish, for example.

For the larger boats exploiting more homogenous fish stocks, skippers have developed new bulk handling systems, normally based around half and full size "bins" – PVC containers with a capacity of 300 to 600 litres (most plastic fish boxes have a capacity of between 40 and 70 kgs). The holds of some larger vessels operating on fishing grounds to the Far West of Europe – have been specifically adapted to allow for the easy handling of such bulk storage systems.

But at another level altogether, catches are being more finely graded and weighed at sea. Under what are currently mainly still trials, fish are sorted to boxes which are then marked with bar-codes identifying the species, size and quality of the fish, the specific trawl haul that the fish was caught in, and the time the fish was caught. In its most sophisticated form, the position of the boat at the time the fish was caught is also automatically recorded on the bar code through linkage to a Global Positioning System (GPS).

Figure 18. Scales for weighing fish at sea



Electronic Auctions and the Fish Trade

The major advantage that such effort brings is that buyers will pay a higher price to the fishermen for fish they know more about. Under traditional systems, a buyer has to estimate the size and quality of fish in any box placed on a market based on direct visual inspection before sale. He or she is helped in this by knowing the boat the fish was caught by, and by the size and grade marked on the box. Unfortunately, however, despite the theoretical existence of standard size and quality grades across the European Union, in many cases the same fish could be marked up differently on different days, according to the "state of the market" on that particular day.

In another departure from common practice, skippers are starting to develop and use sophisticated vessel management systems. The evolution of the electronic wheelhouse has been rapid. Most commercial vessels are now fitted with radar, various sonar devices, and an electronic chart; in addition, where appropriate a wide range of additional electronic aids to gear handling and catch monitoring. To this is now being added vessel management software which allows the skipper to optimise the way he manages the boat and sets the gear, both in terms of maximising catch, but also in directly controlling costs.

Example 7 - Traceability enters the vocabulary of the seafood trade

There is more to the "quality" of seafood than just the characteristics of the flesh of the fish; where it comes from, how it has been caught and how it has been looked after from time of capture to time of consumption, is becoming almost as important. Whilst there is no doubt that large purchasing groups, such as the many multiple retail groups operating in Europe, negotiate very keen prices with their suppliers, they cannot afford to buy on price alone.

Knowing exactly when a fish was caught, and how it has been looked after during its distribution from ship to processor and sales outlet can have a great influence on how much profit a buyer can make out of that fish. Buying a mixed batch of fish from a trader, containing fish that might look of very similar quality, but which may contain fish that has been caught at different times, and subjected to different temperature control during the course of distribution from vessel to processor, is a bit of a lottery.

It is highly probable that such a batch of fish contains fish of a quality that greatly exceeds the specification required by a processor's customers (to the advantage of the supermarket), but may also have bought fish that unexpectedly falls below that minimum specification (at a cost to the processor). As a result the processor needs to separate out the different qualities of fish, and process them separately. It is usual that cutting and trimming an older and lower quality fish results in greater wastage than its fresher counterpart. It is also the case that if the quality control procedures exercised by the supermarkets show up unacceptable proportions of fish that fall below the required specification, the processor risks to lose the business of that supermarket chain.

This is not a matter to be shrugged off. A contract with a major supermarket chain is often responsible for between 10 per cent and fifty per cent of a processor's business. A processor will do much to stay on the right side of such an important customer. Separating different qualities of fish is not so easy. Visual inspection will allow you to do a lot. But where one batch of fish has been iced immediately once the fish has been discharged into the hold after capture, and another has lain around in deck pounds for several hours before it has been sorted, iced and boxed, it may not be enough. Back in the processor's premises, fish from one batch will be on a faster deterioration curve to the other. Thus what might meet supermarket specification on dispatch from the processor

Electronic Auctions and the Fish Trade

may not meet specification when it arrives at the central warehouses of the supermarket chain. Worse still, the difference will be more extreme when the fish reaches the individual stores and is put on display for sale to the consumer.

The long-term impact of not knowing where a fish has come from and how it has arrived at its destination can be considerable. A supermarket example demonstrates this point. Most modern supermarkets are now required to indicate a "sell-by" date, the date up to when a consumer purchasing that product can have confidence that the product remains suitable for human consumption, and reflects the qualities for which he or she bought the product. If taken home and cooked, or taken home and stored in a cool place or refrigerator for cooking within a day or two of purchase, the product will remain of an appropriate quality. For fresh wet fish, the shelf life of such a product is commonly set at between three and five days. Once fish has reached its sell-by date, it is normally disposed of as unsuitable for human consumption. Some of the costs associated with the purchase, processing, packaging and distribution of that product might be recouped if sold on for animal feed or similar, but its failure to be sold to a consumer before it has reached its sell-by date constitutes a loss to the business. By being much more specific about when and where the fish was caught, and how it was handled during distribution, gives the supermarket packers a much better idea as to its rate of deterioration. They can then mark-up the shelf life of that product with greater confidence, and reduce potential loss.

What has this to do with electronic auctions? To sell on an electronic auction and particularly one where remote buyers make regular purchases, requires a much higher standard of sorting, grading, weighing and general specification than is normal on shout markets, or indeed on directly negotiated sales. Because the system is computerised, and built around a number of inter-linked databases, it becomes a relatively simple matter to extend the range of data used in the specification of the product. It becomes a commercial reality that skippers can have their catches sorted, graded and weighed at sea, with boxes bar-coded accordingly, and including details of when the fish was caught, where it was caught, and the number of the haul it was caught in. All this information can be relayed to the computer system in advance of landing, or immediately after landing. Key elements of this data set can be transmitted to any buyer, and where there is any dispute over quality, etc., the particular history of that box of fish can be examined in considerable detail as part of the problem resolution procedure. This would be much more difficult to achieve using the more common manual systems in general use today.

Systems being developed in the area of advance notification of catches and Internet trading from the wheelhouse also allow skippers and fleet managers to better predict income streams. Still other systems under development assist skippers, vessel owners and fleet managers to look more strategically at historical and planned fishing activity from the perspective costs and revenues. Such programmes can assist in options analysis, determining such things as returns to capital and labour, the impacts of different levels of quota entitlement and ownership. They can also help in examining the financial and operational consequences of different crewing and marketing strategies, and of the impact of new investments in such areas as improved quality assurance systems, and both higher and lower specifications of vessel equipment.

Similar sorts of management systems are already in operation in the larger processing plants. But the falling costs of such systems, and increasing regulatory pressure on smaller businesses to comply with more stringent food hygiene standards, waste controls, and environmental controls is encouraging their spread to still smaller plants.

The practicalities

Using electronic auctions to establish comparative advantage

How to proceed

5.1 Effective business management

There is no doubt that the structure and operation of fishing and the seafood trade are changing as never before. The demand for the products of the sea has never been greater.

But at the same time, widespread concern about the ability of the marine environment to sustain current exploitation patterns and extraction methods is now resulting in local and international actions to curb over-exploitation of fish stocks.

In an environment where the impact of change on the commercial dynamics of the sector is so strong, no one has a monopoly on the right commercial model or on guaranteed future profitability. In the context of the use of electronic auctions within the fishing sector, even those with considerable experience in the use of such technology do not necessarily have any major advantage over those coming to such technology afresh.

What will separate the winners from the losers in this increasingly competitive sector will be the extent to which businesses identify and respond to opportunities and threats. Crucially much will revolve around the extent to which groupings of businesses can come together for the benefit of all group members. An example of this is the distinction between ports. In one port the many businesses that contribute to its operation pull together to promote the image and commercial interest of the port. In another the various parties are unable to overcome individual differences and frictions as each seeks to get one up on its neighbour, rather than the port as a whole achieve comparative advantage over its competitors, whether they are ten miles away or a hundred miles away. Where issues of synergy and structural adjustment are at least as important as short-term profitability, there is only so much that an individual business can do to secure medium and long-term profitability, on its own. Knowing when to work collectively and when to work alone will be a crucial skill in coming years.

Thus, if the businesses that contribute to the operations of a fishing port are poorly managed, have poor comprehension of the market-place in which they operate,

Electronic Auctions and the Fish Trade

and are unable to identify opportunities and threats, let alone to respond to such, the adoption of no amount of technology will improve matters. Indeed, in the absence of relevant improvements in management and structure, any expenditure on advanced technology is likely to weaken rather than strengthen the competitive position of businesses. For companies such as these, the benefits that electronic auctions and other technologies have to offer will be lost.

For the more informed businesses, the first task is to 'know the future'.

5.2 Imminent change

We can make a number of sensible predictions about the future development of the fishery sector – not just in Western Europe, but on a more global basis. Thus:

- ❑ there will be market pressure to increase the commercial harvest from the world's seas and oceans;
- ❑ there will be market pressure to increase the commercial harvest from the seas through wider and improved use of husbandry and farming techniques such as mariculture, sea ranching and stock enhancement;
- ❑ there will be commercial and regulatory pressure to reduce waste in the way that fish is harvested;
- ❑ there will be commercial and regulatory pressure to reduce waste in the way that fish is processed and distributed;
- ❑ there will be greater involvement of practising fishermen and boat owners in the design and application of fisheries management regimes;
- ❑ the rights to exploit fishery resources will be more specifically allocated to individuals, to individual vessels, to individual fleets and to fishing communities, on the basis of historical right, the commercial trade in such rights, the regular payment of access fees, and such other local controls as may be deemed appropriate;
- ❑ the value of access rights will increase substantially as the above factors bring about a shift in emphasis away from the 'race to fish' towards a more planned mode of exploitation; such planned exploitation patterns will lead to an overall reduction in the capitalisation of fleets and a steady reduction in operating costs (reduced costs), coupled with strong prices for high specification raw material, and increased yields from husbanded fisheries (increased revenues);
- ❑ in most fisheries there will be a marked shift away from fishing for volume to fishing for quality;
- ❑ there will be a much greater price penalty levied on poorer quality fish (relative to top quality fish) brought about by a combination of consumer preference, the control of upstream costs, and stiff international competition;

Electronic Auctions and the Fish Trade

- ❑ knowing where, when and how a fish has been caught, handled and processed will form an increasingly important component of the 'quality' of that fish as it passes along the 'supply chain';
- ❑ exposed to increasing international competition, significant restructuring and streamlining of the supply chain will be achieved as companies remove the excessive costs and inefficiencies that have resulted from *ad hoc* responses to an extended distribution chain;
- ❑ in maintaining low operating costs, much emphasis will be placed on the generation and use of substantially increased flows of information within the industry, taking full advantage of all that modern communications and information technology have to offer;
- ❑ the power within the industry will shift from upstream traders, processors, and marketers to those that have secure access to the resource – the primary producers;
- ❑ at one and the same time, traders, processors and marketers will have much improved access to the information that will allow them to source product from almost anywhere in the world, opening up primary producers to more overt competition from distant fisheries;
- ❑ responsible and sustainable practices in respect of resource husbanding, management and exploitation will be increasingly recognised and supported in the market place;
- ❑ there will be greater and more balanced recognition in the market place of the positive features of each scale and type of fishery – industrial, small-scale; inshore, offshore; mobile, static;
- ❑ appropriate utilisation of modern communications and information technology systems will alleviate many of the scale and geographical penalties typically facing peripheral fisheries and fishery communities, allowing them to compete more effectively in mainstream and niche markets.

For every one of the above predicted changes or directions of change, any company involved in the fishing sector - whether a producer, service company, processor or distributor - should have a considered view as to how it is likely to impact on the business, and should have reached a decision as to what measures are to be taken to secure advantage from the situation.

Almost every response will have some impact on how the first hand trade of fish is conducted in the future. And almost every response will have some impact on the extent to which it might be appropriate for any fishing interest to seek to promote and engage in the electronic auctioning of fish. It will also dictate what changes need to be put in place first in respect of industry practice.

Example 8 - Distinguishing electronic auction software suppliers from operators – the case of the United Kingdom industry and PEFA.COM.

As we enter the new millennium, the UK fishing sector remains somewhat confused as to who is making the decisions about the introduction of electronic auctioning within the industry. It is understandable that various parts of the industry might feel alienated and threatened by the arrival of new technologies, but the general view that the introduction of this technology is in the hands of “outsiders”, over whom the industry has little to no control, is worrying. It is particular so since it is largely untrue.

Firstly, distinction has to be drawn between those companies that design, install and service electronic auction and trading equipment and facilities and those that operate electronic auctions. There are several EU based companies that develop and install such equipment. The main companies at the moment, in what is a dynamic and rapidly evolving market place, are **Schelfhout Computer Systems**, **Pan European Fish Auctions (PEFA.COM)**, **Agro Marché International (AMI)**, **Nieaff Systems**, **RSF Iceland**, and **BODI Iceland**. Other companies based in Germany, Spain and Italy also produce electronic auction equipment. With the exception of PEFA.COM, none of the companies own or run electronic auctions or appear to have any intention to do so.

The establishment of its own electronic auction software and equipment division in 1997 formed part of PEFA's ground-breaking business development strategy based on the long-term development of the Zeebrugge fish auction, Belgium, and the land and property around it. These are owned by the same private company that owns PEFA.COM. The deployment of this business model, and the early acceptance of its remote bidding systems by its users, has meant that what was originally set up to promote the interests of Zeebrugge has since escalated into a full-scale hub-network. Today, Zeebrugge has taken something of a back-seat as its traders bid for product alongside other buyers, as product is traded across Europe, from production area to market, using the PEFA.COM system.

It is perhaps easier to comprehend the evolution of this strategy by separating its commercial elements into two – PEFA Software, that part of the company that develops and sells electronic auction software and systems, and Pan European Fish Auctions (PEFA.COM), that part of the business that manages and operates electronic fish auctions. The strategy employed by the latter element was to seek to substantially increase the flow of raw material to Zeebrugge by placing the Zeebrugge fish auction at the centre of a network of linked electronic markets. An increased flow of product through Zeebrugge would encourage the expansion of existing processing and distribution operations at the site, and encourage others to set up there. This would be good for the landlord, and good for the local economy.

What was particularly innovative in this strategy was that the development of the PEFA.COM network was based explicitly on the use of remote bidding technology, a technology that had been around for some time, but for which take-up had been minimal. Though there are over seventy electronic fish auctions in operation across Western Europe today, in all but Iceland and Norway electronic auction operators have struggled to incorporate this technology into their operations. By placing it at the very heart of its operations, whilst also accommodating exclusively local sales, PEFA.COM has irrevocably bound remote bidding into its standard mode of operation.

To overcome initial resistance to the use of remote bidding systems it initially targeted the UK, where no electronic fish auctions were formerly in place. In the case of Milford Haven it set up the Milford Haven Fish Auction Company. This has the exclusive right to auction fish at Milford Haven, and has built new auction premises on land leased from the port operators, in much the same way as it owns and operates Zeebrugge Fish Auction. Unlike most continental fish auctions, where the owner of the auction premises also

Electronic Auctions and the Fish Trade

operates the auction, Milford Haven is the only example in the UK where this is so. In every other instance the functions are quite distinct, with one or more fish selling companies being licensed to auction fish using the port market premises. So in the cases of Troon, Lowestoft and Lochinver, PEFA.COM has secured, from the owner of the auction premises, licenses to sell fish just the same as any other fish seller. In these instances, however, the fish selling company chooses to sell by electronic auction, incorporating the use of remote bidding facilities. In the same vein, the company has also been successful in establishing linkage to electronic fish auctions in the Netherlands, France and Spain.

Figure 19. The logos of PEFA.COM and its fish selling companies at Troon, Milford Haven and Lowestoft



What PEFA.COM originally sought to achieve at Zeebrugge through this business strategy was exactly the same as any other infrastructure owner might seek, say at Fraserburgh or Boulogne or La Coruña – increased throughput and increased locally based processing, leading to improved profitability. This strategy has worked to a degree, bringing increased employment opportunities, and improved local economic activity to Zeebrugge. Now the PEFA.COM hub system is as much about facilitating trade between producer and buyer, wherever each may be located, as about channelling fish through Zeebrugge.

There is no doubt that PEFA has permanently changed the fish-selling landscape in the UK, but it has done nothing that could not have been done by an adventurous UK local council or port manager, vessel agency or fishermen's association, processor or trader. Any one of these, or grouping of these players, could develop an appropriate business strategy, buy and modify the technology from one of the electronic software and equipment suppliers, and implement that strategy. Accordingly there is absolutely no justification for the perception that the development of electronic fish auctioning in the UK is in the hands of "outsiders". It is only so for the time being because the UK industry has waited for others to make the moves rather than orchestrating the moves itself.

So saying, the UK industry is not far behind. Plymouth Trawler Agency, the sole fish selling company on the privately owned Plymouth Fish Market, installed an electronic auction system in late 1999. In due course it will incorporate remote bidding facilities, and to this end has established a linkage with Oostende Fish Auction as part of its strategy to improve the marketing of, amongst others, the flat fish landed to the market. Schelfhout Computer Systems have supplied the system that has been installed here.

Grimsby Fish Market is also in the process of installing an electronic auction facility to operate alongside its traditional shout auction. This too will allow for remote bidding, and it too has established a linkage with another electronic auction – in this case Urk Fish Auction – as a means of improving the marketing of its flat fish landings. This is clearly a two way linkage, with the requirements of Grimsby and Urk processors complementing each other to a large degree, such that product is expected to flow in both directions. This system is to be installed by Schelfhout Computer Systems.

Electronic Auctions and the Fish Trade

In Shetland, a cross-industry grouping has registered the Shetland Fish Auction Company as the vehicle it will use to develop, install and operate electronic auction facilities. This follows the sort of format used by most continental operators, where a single company is responsible for auction operation. Plymouth achieves much the same outcome, but on the basis that the Plymouth Trawler Agency has an existing monopoly in selling fish on the market.

Other UK and Irish fishing ports are exploring their options in this regard, but it has to be said that no-one has yet come up with a development strategy that is quite as all encompassing, ambitious and innovative as the one that continues to be played out by PEFA.COM.

5.3 Preparing the way for the adoption of electronic auctioning

From a port perspective, three key questions need to be answered preparatory to consideration of what sales system is most likely to serve the medium to long-term interests of that port and its constituent businesses.

- ❑ Do the port and its constituent businesses know their respective positions in the market place – who their key existing and potential customers are, and who their competitors are?
- ❑ Does the port as a whole have a strategy for maintaining and increasing the quality of the fish that it handles – both organoleptic quality and the way that the fish is sorted, graded and described?
- ❑ Does the port have a strategy for reducing costs and existing inefficiencies within the supply chain?

If the response to any of the above is negative, then any decision-making body at the port level needs to recognise that it is poorly equipped to give informed attention to the matter of electronic auctioning. Installation of an electronic auction will not resolve problems. It will certainly enhance the advantages that have already been built up through the evolution and/or introduction of good trade practice. But introducing an electronic auction without first addressing the issues of good trade practice is likely to add to rather than reduce the costs of marketing.

As a general indicator, the following check-list should be applied in consolidating information on where a port stands in its evolution, and what steps are planned to take advantage of market opportunities and what steps are planned to protect it against real or potential threats.

- ❑ prepare a detailed port development strategy with both a regional and national perspective
- ❑ look further up the supply chain for guidance on customer requirements
- ❑ encourage user participation in decision-making – promote an active port users' committee and such other working groups as strategy development and technical considerations dictate
- ❑ maintain flexibility in facilities and facilities' management, including selling systems, to take advantage of market opportunities
- ❑ identify the opportunities for establishing strategic alliances with other ports
- ❑ as a matter of priority explore the possibilities for financing the development costs of any strategy or strategy component
- ❑ explore the options available for the sorting, grading and weighing of fish

Electronic Auctions and the Fish Trade

- prior to first hand sale
- develop rigorous codes of practice for market operation, emphasising and aiming for quality improvements
- strictly implement these codes of practice
- install or improve existing market information and quality systems
- encourage a co-ordinated response to dealing with restructuring within the post-harvest sector
- encourage a co-ordinated response to training and re-skilling to exploit new business opportunities in industry support services

A wide range of first hand sales methods are employed within the fishery sector including:

- sale by fixed price – by price list or by previously negotiated contract
- internal transfer of product within a vertically integrated catching, processing and trading company
- sale by direct negotiation - face-to-face, by phone, fax and/or email
- sale by shout auction (a range of bidding variants in common use)
- sale by electronic auction (stand-alone, linked, or hub)
- sale by Internet (catalogue sale, or competitive bidding).

In most ports, a number of such sales methods are employed side by side. Thus, for example, in the same port the following sales systems may be in operation:

- small pelagic species such as herring and mackerel may be sold by modified contract (prices negotiated around a seasonally agreed striking price),
- some white fish may be sold in advance of landing by the vessels' sales agents using direct negotiation by phone and fax,
- some landings of white fish may be consigned to other ports for sale on their auction markets where factors of scale, competition and specialisation may be expected to yield higher prices than on the local market,
- some landings of white fish made by boats not originating from that port may be consigned for sale at the home ports of those boats,
- white fish caught by the small boat and/or day trip fleet may be sold by shout auction at the port auction,
- white fish from the industrial fleet may be sold by linked electronic auction (allowing remote buyers to bid on the market without being physically present on the market),
- crabs and lobsters may be sold by direct negotiation,

Electronic Auctions and the Fish Trade

- ❑ Norwegian lobster / nephrops may be sold against price list, and
- ❑ bottom grown and rope grown mussels are sold by competitive bidding on the Internet.

The idea that all landings have to be, or should be, sold using a single selling method is overly simplistic. There are examples where fishery administrators require that all fish be sold by auction, as much for the purposes of monitoring all landings as for achieving the best prices for fish landed, but these are rare, and unnecessarily constrain the competitive position of ports. More commonly, even where auction sale is considered the rule, fish are sold using a variety of methods, and landings to smaller ports are necessarily sold using more direct negotiation routes.

For the future, however, retaining a flexible approach to selling systems is likely to prove most productive, though at any one time one should expect that one or two types of sales system will dominate. Should one of these systems be an electronic auction system? For those ports operating smoothly, efficiently and effectively, the answer is probably yes. But communications and information technologies are advancing so fast that in some products or product groups, other forms of Internet sale may dominate.

But do not despair. No matter what sales system is actually used, there remains the problem of how to physically handle the fish. Whilst the trends towards the increased use of electronic selling methods, and much of it without sight of the product, means that selling systems are increasingly divorced from the physical handling of product, this separation does require significant improvements and rigour in the way that product is handled and specified. Upgrading handling systems can be undertaken in ways that are compatible with a wide range of selling systems.

In Figure 20 we have constructed a simple matrix of the association between trading method and service provision. This matrix provides some interesting insights into port infrastructure provision, and some of the risks associated with the different trading methods.

For real time auction trading, whether operating a shout auction, an electronic auction, or a virtual auction based around a hub system, there is need for a local market service company. It is also generally appropriate that there should be a physical locus for the display of fish, and a locus for the sorting and grading of fish. It is appropriate that the services of a local inspection service should be used to validate the specification of product (a task currently typically allocated to the Producer Organisations).

In addition, the use of an agreed code of practice is recommended, there is need to use a local sales agent, and the bonding of buyers provides a necessary guarantee of solvency. In the UK full settlement of the transactions is normally achieved within 5 days, mediated by the selling agent, providing considerable financial benefit and security to the producer; in fact a level of security that cannot generally be achieved using any other sales route. Other systems are in place in other European countries.

Electronic Auctions and the Fish Trade

The matrix indicates that provision of the same basic infrastructures will support a wide range of real time auction systems. An investment intended to support one type of sales system can also be used to support other types of sales system in the future.

Moving down the columns to sales by formal contract, sales at arms length, and sale by negotiation, a number of physical and service infrastructures may be desirable though not essential in supporting such trades. Investment in sorting and grading facilities could well be seen to enhance the trading prospects of a port. Further, the use of sales agents is indicated in most forms of trade.

This form of analysis indicates that not all aspects of the trade should be seen in terms of black and white, provision or no provision. There is room for considerable flexibility, and the overall image and presentation of a port's trading capacity can be relatively easily enhanced by providing key physical and institutional facilities that support flexibility whilst not compromising revenue streams. This may be achieved in the form of flexible market premises, whether they are used as a market facility for sorting and grading, or for auction sales. In either case it remains reasonable to charge for the service.

5.4 Choosing an appropriate system

In examining what type of electronic auction might suit your particular circumstances, a number of options are available. These include:

- ❑ simple upgrading of existing shout auction practices using a stationery or mobile bidding clock and bidding buttons (with fixed or radio link to the clock mechanism), with the auction taking place adjacent to each lot of fish, and with all bidders present on the market;
- ❑ modification of the above system, removing the bidding process to a separate bidding area, where bidding is undertaken on the basis of a catalogue of lots (including basic standard descriptions of the product offered for sale) and prior inspection of the lots in a display area (information can be displayed on a single common clock, or on individual computer screens where additional information can be called up);
- ❑ further development of this system to allow remote bidders to compete for lots, where remote bids are made on the basis of detailed lot specification, rather than direct inspection of the lot, and where various procedures are in place to ensure that the lot description accurately reflects the quality of the product delivered to the buyer;

Matrix showing the dependence of different sales channels on types of market infrastructure

	<i>local market service company</i>	<i>local auction hall</i>	<i>local grading & sorting area</i>	<i>local inspect. service</i>	<i>code of practice</i>	<i>use of local sales agent</i>	<i>buyer financial bond</i>	<i>normal payment period</i>
Real time auction sales								
<input type="checkbox"/> sale through electronic hub auction system	<i>maybe</i>	<i>maybe</i>	<i>maybe</i>	<i>maybe</i>	yes	<i>maybe</i>	<i>maybe</i>	<i>5 days</i>
<input type="checkbox"/> placing on the shout auction	<i>maybe</i>	yes	yes	<i>maybe</i>	yes	<i>maybe</i>	yes	<i>5 days</i>
<input type="checkbox"/> sale by electronic auction (single site only)	<i>maybe</i>	yes	yes	<i>maybe</i>	yes	<i>maybe</i>	<i>maybe</i>	<i>5 days</i>
<input type="checkbox"/> sale by electronic auction (with remote bidding)	<i>maybe</i>	yes	yes	<i>maybe</i>	yes	<i>maybe</i>	<i>maybe</i>	<i>5 days</i>
<input type="checkbox"/> sale by real time electronic internet auction	<i>no</i>	<i>maybe</i>	<i>maybe</i>	<i>maybe</i>	yes	<i>maybe</i>	<i>maybe</i>	<i>5 days</i>
Sale by formal contract								
<input type="checkbox"/> contract sale	<i>no</i>	<i>no</i>	<i>maybe</i>	<i>maybe</i>	yes	<i>maybe</i>	<i>no</i>	<i>10+ days</i>
<input type="checkbox"/> futures trading	<i>no</i>	<i>no</i>	<i>maybe</i>	<i>maybe</i>	yes	<i>maybe</i>	<i>no</i>	<i>10+ days</i>
<input type="checkbox"/> internet sales	<i>no</i>	<i>no</i>	<i>maybe</i>	<i>maybe</i>	yes	<i>no</i>	<i>no</i>	<i>10+ days</i>
<input type="checkbox"/> sale by internet auction (trading board)	<i>no</i>	<i>no</i>	<i>maybe</i>	<i>maybe</i>	yes	<i>no</i>	<i>no</i>	<i>10+ days</i>
Arms length sale								
<input type="checkbox"/> overlanding to foreign market	<i>no</i>	<i>no</i>	<i>maybe</i>	<i>maybe</i>	<i>no</i>	yes	yes	<i>10+ days</i>
<input type="checkbox"/> consignment to a more distant auction	<i>no</i>	<i>no</i>	<i>maybe</i>	<i>maybe</i>	<i>no</i>	<i>maybe</i>	yes	<i>5 days</i>
Sale by negotiation								
<input type="checkbox"/> advance sale by telephone	<i>no</i>	<i>no</i>	<i>maybe</i>	<i>maybe</i>	<i>no</i>	<i>maybe</i>	<i>no</i>	<i>10+ days</i>
<input type="checkbox"/> sale by direct negotiation	<i>no</i>	<i>no</i>	<i>maybe</i>	<i>no</i>	<i>no</i>	<i>maybe</i>	<i>no</i>	<i>10+ days</i>
<input type="checkbox"/> sale to trader or processor through commission agents	<i>no</i>	<i>no</i>	<i>maybe</i>	<i>no</i>	<i>no</i>	<i>maybe</i>	<i>maybe</i>	<i>10+ days</i>
<input type="checkbox"/> telephone sales	<i>no</i>	<i>no</i>	<i>maybe</i>	<i>no</i>	<i>no</i>	<i>maybe</i>	<i>no</i>	<i>10+ days</i>

Electronic Auctions and the Fish Trade

- extension of this system to allow bidding on a number of markets (each market is administered separately, but is linked to other markets through a common network, or port markets join together in a more explicitly hub-system, where product is sold more or less as if it were on a single market).

In each of the above systems it is possible to link the bidding process to various forms of automation, from automated billing and credit management, to consolidation of information on sales volume and prices, and the management of fishing quotas. Further, it is possible to integrate such systems with a variety of forms of information provision (catch and landing trends, previous bidding records, performance on this and other markets), other sales systems (notably Internet mediated systems that allow for the advance sale of catches), and other forms of service provision (such as transport, insurance, packing, part-processing, inspection and quality control).

Some fairly simple rules will govern which sort of development is most appropriate to your circumstances, notwithstanding the fact that you can upgrade most systems to any of the other systems.

Large volume ports: If you represent a big port, with a large volume of sales, and a large population of regular buyers, then you may seek to capture further efficiencies of scale through the use of an electronic auction system. This can be achieved through a stand-alone auction, and whilst the local buyers may not like it, opening such sales to remote bidders may further strengthen the competitive position of the market. It is also the case with such big markets that there are products or product groups that might be better sold using other systems. Bearing this in mind, due consideration should be given to the advantages and disadvantages of establishing strategic linkages to other bigger ports, or to a number of small ports.

Specialist ports: If you represent a port that has developed a specialisation in one or more species or groups of fish, it may benefit you to seek to share or capture additional trade through linkage with ports with similar specialisation, or with ports that offer complementary specialisations. One example of this is the trade across the North Sea in flat fish species (plaice, sole, etc.). The different market characteristics between the UK and Belgium / Holland are such that small fish tends to find its way to the Continental markets, and large fish to the UK market, with boats from each fleet landing to whatever port they perceive to offer advantage at any given time. Under these conditions, there are efficiency gains to be made by building strategic linkage between different groups of ports – on the one hand reducing competition between linked ports, and on the other hand strengthening competition between strategic groups.

Single species: Where particular market characteristics are associated with a single species or species group (eg nephrops, or small pelagics) there may be strategic advantage to pursuing opportunities for building one or more market networks, capturing economies of scale, encouraging greater market transparency,

Electronic Auctions and the Fish Trade

and seeking to reap the longer-term benefits of increased competition for product. Under such circumstances, the establishment of remote bidding facilities, whether on a hub network, linked markets, or stand-alone markets using common standards that allow for simple switching of remote buyers from one market to another, should be considered.

Peripheral ports: There are many ports that are located close to the resource, but considerable distances from market and processing concentrations. Maintaining attractive levels of competition on such markets is generally difficult, exacerbated by the tendency for both skippers and vessel agents to then consign product to more centrally located markets for first hand sale, or to sell such product by direct negotiation or by contract. Given increasing recognition of the value of resource access, and that wide competition in the sale of high quality raw material should offer better prices, there is something to be said for such peripheral ports seeking to establish some form of electronic trading. On the one hand such a port could seek to establish its own electronic auction, with remote bidding facilities. On the other it could seek to link with a more centrally located market that supports remote bidding. A half-way system could be to form a hub-network linking a number of peripheral and small ports together, allowing remote buyers to bid for product, no matter where they might be located. Under each of these circumstances, the sorting, grading and specification of lots offered for sale could be managed and undertaken at the port of landing, with dispatch arranged once the product had been sold.

Small ports: As a general principle, there is almost no advantage to a small port in establishing its own electronic auction. Nevertheless, it is the case that considerable gains can be made by small ports clubbing together in a hub-network, or in one or more small ports seeking to link into an electronic auction of a larger port. But care should be taken in examining these electronic options. Smaller ports tend to operate with smaller fleets, exploiting nearby resources, which tend to be under some element of local control. Some of the freshest and highest quality fish and shellfish can be harvested under such circumstances, and done so in a more sustainable manner than can be applied at the larger scale. Under such conditions there may be more to be gained by using established and more traditional sales methods to move such products into high value niche markets – the restaurant and hotel market, specialist retail outlets, and mail order / home delivery. Once again, there may be benefit from strategic linkage with other ports (not necessarily neighbouring ports) as a means of overcoming disadvantages associated with seasonal factors, variable weather, and scale. Using the Internet and web-based sales systems may facilitate such linkage, and overcome some of the high costs associated with marketing small volumes of product.

Example 9 - Key elements in developing any strategy

- *Gain broad consensus from port users that a strategy should be developed and establish mechanisms by which inputs from all port users can be accommodated and differences resolved.*
- *Identify which markets and market segments the port is best able to service and where it has, or might expect to develop, comparative advantage over other nearby ports and over other suppliers to those markets*

Electronic Auctions and the Fish Trade

- *Decide how to deal with the matters of quality, product specification and traceability.*
- *Determine how best to meet customer needs and thus what part the port auction is likely to play in future operations of the port.*
- *Assess whether or not there is need for expansion or contraction of port market facilities.*
- *Identify the requirements for merchant and processor facilities within the port area, including facilities for grading and sorting fish.*
- *Assess if physical constraints or competing port development opportunities are likely to impinge on identified opportunities for port market facilities (flexible or dedicated facilities) and determine how to deal with these constraints.*
- *Identify what impact the call for tighter specification of product will have on sales systems employed.*
- *Identify whether or not remodelling of physical port infrastructure is required.*
- *Identify, where remodelling is indicated, whether or not it is economically justifiable and where the necessary financing can be raised.*
- *Determine if, after all this examination, the strategy is likely to ensure comparative advantage in a regional context, or if the competing strategies of nearby ports are likely to pose a real risk to such a strategy.*

5.5 Managing an electronic auction

As with managing traditional should auctions, there are many management and ownership structures employed. There are, however, two dominant formats. The first is that a public body (port authority, local council, or chamber of commerce) owns, operates and manages the whole operation. The second is that a public body (or port operator) owns and maintains the facilities whilst one or more private companies (an auction company or individual sales companies) manage the selling of fish. But the nature of fishing port facilities management is changing.

Much of this change is associated with trying to balance the books. In general, fishing ports (and to a large extent their cargo equivalents) have a water, quayside and warehouse complement that is somewhat larger than current business requires. This is often of a configuration that met requirements at the time of construction or modification, but which is now becoming redundant. Maintaining revenue streams from current activity that adequately cover the costs of maintaining such over-sized infrastructure is difficult. It is even difficult in the case of specific elements of infrastructure where, even on a narrower cost centre basis, the poor capacity utilisation of the facility undermines cost recovery efforts.

A further complication has been the tradition of lumping cost recovery into a small number of overall levies and charges. Typically, landing dues have covered the use of port market and auction facilities. Whereas in the past it was general practice when landing to a port to also place that fish on the auction market, this is

Electronic Auctions and the Fish Trade

no longer automatically the case. It no longer seems sensible to levy a single charge against landing.

At the same time, where ports have opted for some form of electronic auction, they have tended to substantially improve the grading, sorting and weighing facilities available at the port, and to greatly extend the covered areas available for these tasks. Under such circumstances it is more appropriate to charge for the individual services provided.

For publicly and privately owned ports, overall port management has become more a matter of property management. Much port property has been sold or leased off for residential and retail development, others for office, food processing and industrial uses. Where fishing use has declined, quay space has often been re-allocated to merchant shipping, bulk cargo discharge, and bulk storage facilities. What remains has often been retained under the direct management of the port owner, but increasingly this too is being contracted out to other more specialist companies. Different companies now look after facilities as look after management of the ice plant, the fuel depot, and after the fish sorting and grading area, and the fish auction.

Focusing on the fish auction, in most cases this is run by a single company that manages the auction infrastructure, deals with the computing and invoicing side of the business, and provides the auctioneers. The same company can undertake the sorting and grading of fish, but it can just as easily be contracted out to one or more separate companies.

As with overall ownership, operation and management of the port, there are three key ways of owning and managing an electronic auction. The more traditional way is that the facilities manager also takes over management of the electronic auction. Given the evolution of remote bidding, and the establishment of auction networks and strategic alliances, it is becoming more appropriate to put auction ownership and operation in private hands. One such way is to license such operation to a single operating company, where the exact ownership of the company is immaterial to the issuing of the licence. The other way is to issue the license to a company formed specifically for the task, co-owned by representatives of most parts of the fishing industry.

This last structure may prove more beneficial, particularly in the early stages of operation, on the basis that in a situation where the industry may be somewhat reticent in adopting such a new sales system, but is reassured by the cross-industry ownership of the operating company. Where such cross-industry ownership is established, it is crucial that an operational distinction is drawn between the role of the Board in establishing operational guidelines, and the role of independent management in taking day to day decisions.

Example 10 - Check-list of factors affecting the success or failure of the introduction of electronic auctions

Some common characteristics associated with the adoption of electronic auction systems:

Electronic Auctions and the Fish Trade

- *the important role of “agents of change” - someone has to set the ball rolling, and has to have the conviction to follow ideas through;*
- *the industry is naturally resistant to innovation - but primarily because it alters the balance of interests in the industry;*
- *removing such resistance may require developers to include “comfort factors” - factors that may be contrary to the logic underlying such innovative systems and, albeit temporarily, undermine the advantages offered by a new system;*
- *the technology is not a limiting factor - defining the most appropriate system for a particular set of circumstances may be;*
- *co-operation in such ventures is difficult to achieve, but essential to the success of such innovations;*
- *the industry participates in such developments primarily on the basis that it will gain comparative advantage over others - neighbours and/or more distant targets;*
- *participation in systems that share the advantages with too many people, even, or more particularly, local people, may meet with strong opposition;*
- *power, and the control of information, appear to be at the root of people’s interest in, and fear of, such marketing technologies.*

5.6 Resistance to change

Slow beginnings: In the mid-1980s ports in Brittany, France started experimenting with the application of electronic auction techniques to the fishery sector. In any one such initiative, the biggest hurdle was to convince fishermen and buyers of the benefits of such systems. In some instances, despite in-depth consultation, detailed planning, system demonstrations and the like, the initiative came to nothing - dropped, even some two years into such a programme. In others, where such projects eventually reached fruition, the changed practices dictated by the requirements of the technology have become quickly accepted, and these markets have subsequently moved to upgrade such systems at intervals of something in the order of every five to eight years.

Recognition of benefits: Where an electronic auction system has been installed, it has been recognised by the majority of fishermen and merchants trading at that auction as a step forward. It has also been considered to enhance the commercial status of that port, its fleet, its traders and its processors, and to provide them with commercial advantage over their competitors.

If this is in fact the case, why has not every fishing port embraced such technology? Surely such unconditional support for such systems speaks for itself.

Close structure of fishery communities: The fishing industry is particularly complex and is strongly, albeit informally, structured. The hunting and personal danger dimensions of fishing have tended to set fishermen and their families apart from the rest of society, and have encouraged the development of tight and self-reliant communities. This has been further accentuated where such communities

Electronic Auctions and the Fish Trade

have a peripheral location in relation to the main population and economic centres of a region - an all too common characteristic of the fishing industry.

Such communities have their own ways of doing things, are deeply suspicious of outside influences, and are strongly resistant to changes that are likely to alter the balance of power within such communities. In addition, they do not share information easily, and they are so structured as to offer preferential advantage to members of the community. These structures are inherently protectionist. It is not just a matter of convincing fishermen and buyers of the benefits of such systems, but in convincing them that their trading model is no longer tenable - if indeed this is the case.

Resistance to "widening the circle": The strength of these traditional structures and practices should not be under-estimated. Even in those ports where such technology has been embraced, the industry has blocked moves to allow remote bidding on such markets - where it is possible to bid for product offered on an auction market without being physically present on that market. It seems to be one thing improving the efficiency of operation of a market, affecting those that have been directly involved in trade on that market. It is quite another matter to allow traders from "outside the circle" to bid for product from an office many miles distant from the market. Even here there is continuing pressure from the local industry to maintain some form of trade protection in favour of local operators.

Financial benefits difficult to prove: In the second place, however, it is not so easy to prove to others that electronic auctions have benefited fishery businesses. Whilst there is logic to the efficiency gains that the use of such technology can offer, and those that use such systems are more than happy to sing its praises, it remains very difficult to quantitatively prove that such systems offer commercial benefits. Fish trading takes place within a highly competitive and dynamic market place, and no trader, whether dealing in fish, vegetables, cars, or furniture, wishes to disclose the details of his or her trading strategies. Thus it is all very well to examine the head-line trading results of different vessels and trading companies, but it is quite another to establish what contribution electronic auctions have made to those results. It is difficult to determine what the trading results would have been like on the old system, and what part of the results are attributable to the electronic auction, and what to changing trading strategies.

Fear of job losses: A third area of difficulty is the commonly held belief that the introduction of new technology will automatically lead to job losses. It has in so many other industries, so why would it not also happen in the fisheries sector? Once again, however, the evidence is imprecise. In general, the introduction of electronic auctions has led to the redefinition of some jobs, the loss of others, and the establishment of yet other, new, jobs. On balance there has tended to be some small reduction in the active workforce associated with the auction market. However, it is difficult to establish how this would compare to a situation with an electronic market. Was the decision to install an electronic auction based to some extent on the realisation that the former market practices were increasingly un-competitive, a situation that would have led to job losses?

Demonstrating improvements in prices achieved at market: The argument that would convince most fishermen of the benefits of electronic auctions would be the

Electronic Auctions and the Fish Trade

fact that their introduction leads to the payment of higher prices for their fish. Whilst there is anecdotal evidence that this can be the case, the underlying arguments for the achievement of higher prices at electronic auction are weak. What is more generally accepted is that in a falling market electronic auctions tend to slow the rate of fall and the extent of fall of prices relative to shout auctions. Also, that if electronic auctions lead to more buyers bidding for fish, the price paid for that fish is more likely to be a fair reflection of the "market" price for that fish, under the market conditions obtaining at that particular time.

In addition, however, it is the general view that the use of a more transparent first hand trading system tends to result in a greater spread of price between high and low quality product than is achieved through other sales mechanisms. Coupled with improved on-board handling, and better sorting, grading, weighing and product description, a more transparent first hand sales mechanism is likely to reward the effort put into the production of such high quality product.

The underlying arguments against the achievement of higher prices at electronic auction are as follows:

- ❑ There is no fundamental difference between the bidding systems used in a shout auction and in an electronic auction restricted to the same family of buyers. There is no logical basis for the payment of more for the same fish in one system compared to the other.
- ❑ A basis for the payment of higher prices could be provided if fish under one system were described or presented in a different way to that under the other system. Thus if the practices underlying an electronic auction included a higher and more consistent form of grading, the trading risk that a buyer would be taking with such fish would be less relative to a less well graded product. A buyer could logically afford to pay more for that fish. But this is not comparing like with like. The same grading system could be introduced onto a traditional shout auction, and provide the same result.
- ❑ Where price advantage could be achieved would be if the introduction of an electronic auction led to more buyers bidding for fish. As mentioned above, this would tend to lead to the prices being paid for fish being more representative of the "market" price at that time. If this provided this particular market with a significant commercial advantage over its competitors, under normal conditions of supply and demand, and the absence of barriers to change, others would move to neutralise such commercial advantage. They would seek to sell their fish on that market, or establish a similar type of market at their own port. Thus, whilst it may be possible to establish such a price advantage in the short term, it would go against the rules of economics to do so over the longer-term. Luckily, however, no two ports are the same, and there are many barriers to the neutralisation of such price advantages. That is why the prices paid at different ports are usually so different. In addition, however, on many markets, weighing and grading practices are so different that it can be next to impossible to effectively and consistently compare prices between markets.

Electronic Auctions and the Fish Trade

- In the longer term, however, it would be illogical to expect that prices paid on your electronic market would be any different to those paid on another electronic market – for the same product. Where the integration of electronic auctions and the flow of market information had evolved to such a level where this statement became a reality, it is likely that the retention of a “close” auction (a shout auction where remote bidding was not supported) would be seen as disadvantageous under most circumstances. This would be particularly so where the market for the fish sold on that market was clearly international.

5.7 Concluding remarks

In conclusion, we can recap on a number of key pointers identified in the text.

- In an environment where the impact of change on the commercial dynamics of the sector is so strong, no one has a monopoly on the right commercial model or on guaranteed future profitability. There are no right and wrong ways for the adoption and development of electronic auctions.
- In the words of Charles Darwin *‘It is neither the strongest species that survive, nor the most intelligent, but the ones most responsive to change’*. There are very few situations where the exclusive adoption of electronic auctioning is a wise commercial decision. Binding electronic auctioning into an overall development strategy can form a highly effective business tool, but it would be wise to do so as part of an array of first hand sales mechanisms. Port managers should be prepared to alter selling strategies as a response to changing market conditions should this appear to offer comparative advantage over your competitors.
- In the context of the use of electronic auctions within the fishing sector, even those with considerable experience in the use of such technology do not necessarily have any major advantage over those coming to such technology afresh. The evolution of the Internet, and its use in real-time auctioning, as well as in trading boards and catalogue sales, has all but neutralised the system advantages that early adopters of electronic auctions in the fishing industry had gained. This is particularly exemplified where few existing electronic auctions have taken advantage of remote bidding opportunities, despite the long existence of the technology to allow for remote bidding.

Details of main electronic auction suppliers

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Web site	www.schelfhout.com
CEO	Luc Schelfhout

Pan European Fish Auctions (PEFA.COM)

Address	Ierse Zeestraat 201, B-8380 Zeebrugge, Belgium
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Tel	+32 50 54 76 48
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Web site	www.PEFA.COM
CEO	Marie Jeanne Becaus-Pieters

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Electronic Auctions and the Fish Trade

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