European Commission



DIGITALISATION AT FIRST SALE STAGE



EUMOFA

European Market Observatory for Fisheries and Aquaculture Products

Maritimes Affairs and Fisheries

JUNE 2025
UPDATED VERSION - MARCH 2026
WWW.EUMOFA.EU

Manuscript completed in June 2025, updated in March 2026.

The European Commission is not liable for any consequence stemming from the reuse of this publication.

Luxembourg: Publications Office of the European Union, 2025



© European Union, 2025

The reuse policy of European Commission documents is implemented based on Commission Decision 2011/833/EU of 12 December 2011 on the reuse of Commission documents (OJ L 330, 14.12.2011, p. 39).

Except otherwise noted, the reuse of this document is authorised under a Creative Commons Attribution 4.0 International (CC-BY 4.0) licence (https://creativecommons.org/licenses/by/4.0/). This means that reuse is allowed provided appropriate credit is given and any changes are indicated.

For any use or reproduction of elements that are not owned by the European Union, permission may need to be sought directly from the respective rightholders. The European Union does not own the copyright in relation to the following element:

cover photo: ©shutterstock 1342876481

PDF ISBN ISBN 978-92-68-30074-9 doi: 10.2771/6180512 KL-01-25-041-EN-N

FOR MORE INFORMATION AND COMMENTS:

Directorate-General for Maritime Affairs and Fisheries

B-1049 Brussels

E-mail: contact-us@eumofa.eu

TABLE OF CONTENTS

SUMMARY 3
1 OBJECTIVES AND METHODOLOGY OF THE STUDY 4
2 STATE OF PLAY OF DIGITALISATION 5
2.1 General overview 5
2.2 IT systems used for landing forecast and first sales 6
2.3 Landing forecast 7
2.4 State of play by MS 8
3 IMPACTS AND CHALLENGES OF DIGITALISATION 14
3.1 Higher number of buyers in digital auctions 14
3.2 Prices: stakeholders reported positive impacts on prices, not conclusive from statistics 15
3.3 Quality and harmonization of marketing standards 18
3.4 Impacts of landing forecast on the organisation of downstream stages of the value chain 19
3.5 Traceability 20
3.6 Acceptability among stakeholders 21
3.7 New security challenges related to the use of IT systems 21
4 Prospects for the development of digital tools 22
5 Annexes 24
5.1 Stakeholders interviewed / contacted by email 24
5.2 List of auctions involved in MERCAPESCA system 25
5.3 List of Italian auctions using the e-Fish system by Infoteam 26
5.4 Details on digitalisation per Member State 27

SUMMARY

Digitalisation has been a continuous process over the last decades. In the fishery sector, this covers landing forecasts, digitalisation of auctions (with the possibility to access sales remotely) and interconnection of auctions (to access different auctions via the same platform).

At EU level, diverse situations can be observed. Some auctions are highly digitalised and interconnected (mainly in northern Member States), some are digitalised but not interconnected with other auctions, and some remain non-digitalised

Stakeholders generally reported positive impacts of digitalisation in terms of functioning of the internal market. From fishers' perspective, it provides a larger market and allows for remote auctions to attract buyers. From buyers' point of view, it allows for access to a larger offer. However, in some areas, some reluctance towards further digitalisation has been observed by some stakeholders. Mainly, as it may increase competition at first sale stage (with a possible negative impact on prices) and could represent a "game changer" at local level with possible impacts on the structure of the value chain. Overall, the interconnection of sales still faces some challenges related to technical barriers (in terms of harmonisation of procedures and information technology (IT) tools) and stakeholder willingness.

1 OBJECTIVES AND METHODOLOGY OF THE STUDY

This study aims to provide a state of play of the digitalisation of landing forecasts and first sales in the EU for fishery products. The objectives are to:

- describe the progress of digitalisation of first sales and landing forecasts in terms of number of auctions, stakeholders using these tools and technologies and IT system used;
- identify the drivers, challenges and impacts of digitalisation;
- identify the main prospects on the development or improvement of digitalisation tools.

The report is based on desk research and interviews with stakeholders (see list in annex) related to either landing forecasts or first sales in the following Member States (MS):

- The Netherlands,
- Belgium,
- Denmark,
- France,
- Spain,
- Italy.

2 STATE OF PLAY OF DIGITALISATION

2.1 General overview

The digitalisation of first sales in the fishing industry is an ongoing process that began in the late 1990s and early 2000s. In Belgium, digitalisation systems for first sales have been used since 1997. In the Netherlands, Denmark and France, the most frequently used systems were developed in the 2000s. In Spain, digitalisation of first sales was initiated more recently, in the 2010s.

At present, the development of digitalisation tools for first sales is highly heterogenous among MS, and within MS. While the most advanced areas are well equipped and interconnected (for instance in northern EU MS, with systems fully digitalised and interconnected in Denmark, the Netherlands and Belgium), digitalisation is quite low in some southern MS, such as Italy. The situation in France and Spain is intermediate with some recent progress and on-going projects on digital auction, such as the current harmonisation in Brittany region (France) and the auctions using a common system for first sales in Spain (MERCAPESCA, mainly in Catalonia). Thus, the range of digitalisation is quite large from:

- systems fully digitalised and interconnected (Denmark, the Netherlands and Belgium);
- systems fully digitalised but not fully interconnected: for instance, in some areas of France Spain, and Italy;
- systems almost not digitalised (via WhatsApp groups): for instance, in some areas of France, Spain, and in Italy.

2.2 IT systems used for landing forecast and first sales

Several systems have been identified in the various MS covered by the study, for landing forecasts and first sales:

- Aucxis[1] (Belgian company, an EFICE subsidiary):
    - KOSMOS[2]: this system is used in the three interconnected Belgian auctions for first sales. It is also commonly used in France, especially in Cornouaille[3] (South West of Brittany region), where six interconnected auctions are using this system for first sales, as well as in Denmark and the Netherlands with the EFICE network gathering six auctions. The KOSMOS platform is also used outside of EU (in several auctions in the United Kingdom for example).
    - Other Aucxis systems: Aucxis is also supplying systems to several auctions in France and Spain, but those are tailored to each auction and not interconnected.
- EFICE[4] (Dutch company, largest shareholder of Aucxis): the system is used by a network of six Dutch auctions for landing forecasts (E-catch, M-catch) and first-sales (EFICE Auction Clock based on the KOSMOS system).
- PEFA[5]: this Dutch system is used in the Netherlands by six auctions for landing forecasts and first-sales. It is also used by four Danish auctions and auctions in Sweden (Stockholm and Smögen) and Italy (Cattolica auction)[6].
- Agisoft[7]: several French auctions use systems developed by Agisoft (first sales only): six auctions in Pays-de-la-Loire region, four in Normandy and one in Brittany region. In addition, the company developed a system at the French national level for landing forecasts (Prev'Apport).
- MERCAPESCA[8]: this system (first sales only) is used by Spanish, Portuguese and French auctions (list of auctions can be found in annex). Most of the auctions involved are from Spain, and more precisely from Catalonia (13 auctions) and a few others from other regions (two from Andalusia, two from the Comunidad Valenciana and two from other Spanish regions). Four Portuguese auctions are involved, all from the Azores, and three French auctions from the Mediterranean area.
- E-Fish[9]: this Italian system developed by Infoteam is used in 11 auctions in Italy (list of auctions can be found in annex). First sales are digitalised, however, these auctions are not interconnected.
- Alpha Fish: digitalised system developed by the Labronica Producer Organisation used in the Livorno fish market, giving access to products information, synchronized bidding, and streamlined administrative procedures.

[1] https://www.aucxis.com/fr/
[2] https://e-trade.aucxis.com/en/kosmos/
[3] KOSMOS in Cornouaille: https://www.youtube.com/watch?v=NgR7gKoGIOo
[4] https://www.efice.com/en/
[5] https://www.pefa.com/fr/
[6] https://www.pefa.com/fr/pefa-auctions/
[7] https://agisoft-e.fr/page/agisoft.php
[8] https://www.mercapesca.com/index.php?itemID=6
[9] https://www.efish.it/

Various stakeholders are involved in the development of these digitalisation tools. The SHEEL project, resulting in the Electronic Reporting System (ERS), was initiated by the European Commission. The Breizh'Apport forecast tool was implemented by the economic interest grouping (EIG) "Ports de pêche de Bretagne" and supported by the Brittany region. In Belgium, the development of the Aucxis system was supported by the European maritime, fisheries and aquaculture fund (EMFAF) up to 40%, while PEFA (financed and developed by the fish auctions altogether) and EFICE (fishers cooperation) systems did not benefit from public support. Digitalisation of first-sales in Spain was mainly driven by producer organisations (POs), supported by EMFAF funds through the support provided to POs. The main objective of the digitalisation was to improve prices for fishers, alongside modernising the process and allowing for seamless logistics. In Italy, most of the auctions that purchased the e-Fish system benefitted from public support under the European Maritime and Fisheries Fund (EMFF, programming period 2014-2020) and the European Maritime, Fisheries and Aquaculture Fund (EMFAF, programming period 2021-2027).

2.3 Landing forecast

2.3.1 Data shared by fishers through the electronic logbook

With regard to landing forecasts, fishing vessels of a length of 12 meters or longer have to provide mandatory data through the electronic logbook which is then transferred to the fishing authorities and EU authorities via the Electronic and Reporting System (ERS). Since the implementation of the SHEEL project[10] (Secure and harmonised European electronic logbook, 2006), this data transfer is automated, replacing the manual logbook. Simultanously, fishing vessel data on fishing volumes, species and location is shared with producer organisations (POs).

Depending on the fisher and the digitalisation system used, this sensitive data can be directly shared with the auctions and be made accessible to the buyers, or it can be processed and aggregated before being shared publicly (the EFICE system provides aggregation by auction allowing for buyers to have the volumes and species that will be landed at a specific auction by a group of vessels, but these volumes cannot be directly linked to a specific vessel). If the fishers do not want to share their exact data or only share the data of the first days of fishing, auctions can make estimations and extrapolations based on the volumes shared at the beginning of the fishing trip (PEFA system, auctions in Belgium).

2.3.2 Data access delays for buyers

Depending on the auction, buyers have access to auction information from few minutes up to several days prior to the start of the sale: EFICE and Aucxis systems share first estimates 48-72 hours before the auctions and consolidate the data throughout the fishing journey, PEFA buyers receive data 24 hours before the landings, users of Breizh'Apport (Brittany region, France) have access to the data all along the fishing journey, while buyers in Pays-de-la-Loire (France) obtain

[10] https://www.ices.dk/about-ICES/projects/EU-RFP/EU%20Repository/SHEEL/FP6%20SHEEL%20Final%20Activitiy%20Report.pdf

forecasts the afternoon prior to the auction and those in Boulogne-sur-Mer (France) receive the sale catalogue 30 minutes before the sale.

2.4 State of play by MS

The state of play by MS is provided from northern to southern MS. A synthesis table is provided in the annex.

2.4.1 Denmark

2.4.1.1 General overview on first sales

There are nine auctions in Denmark, the most important being the Hansholm Fiskauction (51% of the national volume and 43% of the national value in 2024), followed by the Danske Fiskauction in Thyborøn (25% of the volume and 30% of the value), and the Hirtshals Fiskauction (14% of the volume and 14 of the value)[11].

2.4.1.2 Landing forecast

The forecast tool used is PEFA. It covers all vessels above 12 meters (covered by the electronic logbook), including both coastal and long-distance fisheries.

2.4.1.3 Digitalisation of first sales

In Denmark, four auctions are using the Dutch system PEFA providing a remote access to the four auctions using this system. In addition, the KOSMOS system is used by the Thyborøn fish auction to organise the supply, sales and after-sales activities. A commonality in the digitalisation that is shared in the Danish first sale sector is the use of the cloud-based ERP system NAVISION, which is currently employed by all Danish fish auctions to improve internal operations by optimising the control and management company finances, auction sales, inbound and outbound logistics and salary.

In Denmark, joining the PEFA digital binding platform was primarily motivated by the need to maintain the flatfish market by reaching new buyers and accessing a larger international market.

2.4.2 The Netherlands

2.4.2.1 General overview on first sales

In the Netherlands, there are twelve auctions[12]. The auctions of Ijmuiden/Velsen and Urk are the most important, representing respectively 23% and 18% of the national volume, and 26% and 17% of the value in 2024[13].

[11] https://fiskeristatistik.fiskeristyrelsen.dk/
[12] https://eumofa.eu/documents/20124/35683/Netherlands.pdf
[13] EUMOFA – data transmitted by the Netherlands Enterprise Agency

2.4.2.2 Landing forecast

The forecast tool used is provided by PEFA (6 auctions) or EFICE (6 auctions). It covers all vessels above 12 meters, including both coastal and long-distance fisheries.

2.4.2.3 Digitalisation of first sales

The twelve auctions are using two different systems:

- Six auctions use PEFA: Scheveningen, Ijmuiden, Stellendam, Den Helder, Den Oever and Colijnsplaat.
- Six auctions use EFICE: Urk, Harlingen, Breskens, Vlissingen, Lauwersoog, and IJsselmeer.

These two systems are also used by some auctions in Denmark and Sweden, which enables a relative harmonisation of the coastal area.

PEFA platform provides a remote access to all the auctions using their systems.

EFICE users have access to six auctions in the Netherlands and they can prebid on lots they want to secure before the start of the sale. Recently, the EFICE network of auctions switched to KOSMOS (each platform is managed by Aucxis company) for the first sales allowing for the migration from PC to web-based applications.

2.4.3 Belgium

2.4.3.1 General overview on first sales

There are three auctions in Belgium with the two most important (Zeebrugge and Oostende) accounting for 98% of the volume and 98% of the value[14].

2.4.3.2 Landing forecast

The forecast tools used are not automatised. Although electronic logbooks are onboard, this data is not directly shared with the auctions. Forecasts are based on data shared by the fishers to the auctions that then extrapolate and share the forecasts to buyers via the auction website.

2.4.3.3 Digitalisation of first sales

The two main auctions are managed by the same authority, therefore using the same systems allowing for harmonization at local level. The three auctions are connected and accessible on the Kosmos system for buyers.

[14] EUMOFA – data transmitted by the Vlaams Ministerie van Landbouw en Visserij

2.4.4 France

2.4.4.1 General overview on first sales

In France, in 2024, first-sales took place in 34 auctions (two in the Hauts-de-France region, five in Normandy, 13 in Brittany region, five in Pays-de-la-Loire, five in Nouvelle-Aquitaine and four in the Mediterranean coast). In 2024, the auctions of Boulogne-sur-Mer and Lorient (Brittany region) were the most important in volume (14% and 7% respectively of the total first-sale volume in France). Boulogne-sur-Mer was also the biggest auction in terms of value (10% of the total value in 2024), alongside the auctions of Les Sables-d'Olonne (7%), Lorient (7%) and Guilvinec (6%)[15].

2.4.4.2 Landing forecast

At the French national level, the Prev'Apport system was developed by Agisoft in the late 2000s. However, as the landings forecasts were not considered accurate, auctions shifted towards other systems. Strong differences among geographical areas can be observed, with examples in the Brittany region, Pays-de-la-Loire region and Boulogne-sur-Mer.

In the Brittany region, a regional system has been developed since 2006 for fishers to share in real time their captures with buyers. The Breizh'Apport system first consisted in a shared Excel sheet. It then evolved into a second version consisting in an application for buyers where they can access the forecasts by species and by auction provided by POs. The Breizh'Apport tool is only designed for long-distance fisheries, but is planned to be extended to coastal fisheries in the coming years.

In the Pays-de-la-Loire region, auction authorities share information on the species and volumes on sale during the coming auction the afternoon before the sale via a WhatsApp group. This information is entered manually when the fish is landed. Each auction in the region has one WhatsApp group to inform buyers.

The auction in Boulogne-sur-Mer does not provide any landing forecast as there is an intermediate stakeholder between fishers and auction authorities, namely the "*écoreur*". During landing, products are not directly transferred to the auctions, but goes through the "*écoreur*" who gathers all data and proceed to the manual entry. This data is then shared with the buyers via a link or a message. In parallel, the "*écoreur*" shares the landings data with the auction which can edit the auction catalogue that is shared with buyers few minutes before the start of the sales. In Boulogne-sur-Mer, the fleet consists of coastal fishers only, which explains the difficulty of providing landings forecasts.

[15] EUMOFA – data transmitted by FranceAgriMer

2.4.4.3 Digitalisation of first sales

Among the 13 auctions in the Brittany region:

- six auctions located in the same area (Cornouaille, South-West of Brittany region[16]) and managed by the same authority, use Kosmos platform (developed by Auxcis) and are interconnected;
- six auctions[17] use tailored Aucxis systems but are not interconnected;
- one auction (Brest) is using another system.

At regional level, two organisations have been established to strengthen the co-ordination of fishing ports: "groupement inter-portuaire" established in 2019[18] and economic interest grouping "Ports de pêche de Bretagne" established in 2021[19]). Among other actions, these organisations implement projects on digitalisation and the interconnection of auctions.

In the Pays-de-la-Loire region, auctions are not connected and do not start at the same time; the softwares used for first sales are managed by Agisoft but are not interconnected. Some projects are include the establishment of a sale catalogue (as already done in Brittany region), allowing for buyers to know approximately at what time the species they are interested in will be sold instead of having to follow the entire auction.

The auction of Boulogne-sur-Mer is using an Aucxis system for first sales but is not connected to any other auction.

In the Mediterranean area, some auctions are involved in the MERCAPESCA system (which is mainly developed in Catalonia in Spain): Grau d'Agde, le Grau du Roi and Sète.

2.4.5 Spain

2.4.5.1 General overview on first sales

First-sales in Spain take place[20] in 196 auctions. The most important places of sales in 2024 were Bermeo (9% of national first-sale volume, 6% of national value), Vigo (8% in volume, 10% in value) and A Coruna (7% in volume and 6% in value).

2.4.5.2 Landing forecast

In Spain, there is no national tool for landing forecasts and none of the stakeholders interviewed mentioned a locally developed landing forecast tool. Currently, data is introduced after landing when sale batches are created. Buyers are either physically present at the time of landing or the auction authorities can directly inform buyers of the products availability. Auction managers can

[16], Concarneau, Loctudy, Le Guilvinec, Saint-Guénolé, Audierne and Douarnenez
[17] Quiberon, Lorient, Roscoff, Saint-Quay-Portrieux, Erquy and Saint-Malo
[18] https://www.bretagne.bzh/actualites/peche-de-bretagne-lancement-dun-groupement-interportuaire/
[19] https://www.bretagne-economique.com/actualites/les-concessionnaires-des-13-criees-creent-le-gie-ports-de-peche-de-bretagne/
[20] https://www.mapa.gob.es/eu/pesca/temas/mercados-economia-pesquera/listadodelonjasyestablecimientosautorizados2021_tcm35-561019.pdf

inform buyers on the day of the sale of the species present via WhatsApp groups, for example. Buyers also rely on their experience, regarding the weather and how it impacts fisheries.

Stakeholders reported some projects to develop landing forecast tools in some auctions. This would require fishers to upload data during fisheries, so the first barrier is to convince fishers to share their data. The Ondarroa auction aims to integrate the system with the billing programmes used by the shipowner companies so that it will be fully compatible with the accounting and invoicing system used. The ultimate goal is to integrate batch traceability, invoicing, accounting, and health records into a single, streamlined system to allow for full traceability.

2.4.5.3 Digitalisation of first sales

Based on the interviews conducted in the context of this study, digitalisation of first sales is well developed in Spain. However, most of the auctions are not involved in a common system, with the exception of MERCAPESCA which is mainly used in Catalonia, and some auctions using the KOSMOS platform (e.g. Vigo and Burela).

Buyers log into the MERCAPESCA platform and can join several auctions simultaneously, and can view the product pictures before the buyers physically present at the auction. This provides an advantage to the remote buyers when bidding.

In Conil, Rota and La Atunara (Andalusia), auctions are already digitalised; their objective is to enhance transportation logistics to ensure that the products from these auctions reach fish markets such as Mercabarna and Mercamadrid as fast as possible, in the best conditions and at lower costs. Another objective is to implement a notification system for stakeholders that cannot stay connected to the digital sales, to be informed when the batch they are interested is entering the auction.

2.4.6 Italy

2.4.6.1 General overview on first sales

In Italy, there were 108 places of sales in 2024[21]. The Ancona and Chioggia auctions were the most important in terms of volume, representing respectively 12% and 10% of the national volume in 2024. In terms of first-sale value, the biggest auctions were those of Porto Tolle (11% of the national value) and Mazara des Vallo (10%), and to a lesser extent Ancona and Chioggia (7% each of the national value).

2.4.6.2 Landing forecast

In Italy, there is no national tool for landing forecasts. A PO interviewed reported being constantly in touch with the fishing vessels while they are fishing, but there is no forecast communicated to buyers. In the case of this PO, the absence of forecast tool is also explained by the difficulty of making accurate estimations for the species fished (blue fish). Some auctions receive information on the volumes and types of captures directly from the fishers via WhatsApp message. The

[21] Source: EUMOFA – data transmitted by the Ministero dell'agricoltura, della sovranità alimentare e delle foreste (MASAF)

information is then forwarded to buyers once products arrive at the port. In some auctions, buyers can request specific quantities and products to be set aside.

For the one auction using the PEFA system, the auction of Cattolica, there might be a landing forecast system as it is part of the PEFA offer; however, the tool is partly automated and partly manual with the fishers sending data to the auction which then provides estimates to buyers. The extent to which Cattolica auction uses forecast tools has not been identified in the context of this study.

2.4.6.3 Digitalisation of first sales

Based on the data collected in Italy, about two thirds of the auctions are digitalised (25 auctions digitalised over a total of about 40 auctions considered by stakeholders interviewed). Among these 25 auctions:

- 11 are digitalised with e-Fish system developed by the Infoteam company (see list in annex),
- One auction (Livorno) is digitalized with the Alpha Fish system developed by the Labronica Producer Organisation,
- One auction (Cattolica) is digitalised with the PEFA system (also used in the Netherlands and Denmark),

These digitalised auctions are not interconnected. In the other auctions not digitalised, the auction is conducted by voice.

3 IMPACTS AND CHALLENGES OF DIGITALISATION

Several positive impacts have been identified in the context of landing forecast and digitalisation of first sales:

- it allows for fishing companies to reach a larger market and, possibly, to get higher prices;
- it allows for sellers to join their products, and thus create a larger place of sale, more attractive for buyers;
- it allows for buyers to access a larger supply, and thus access to the specific products they need;
- it allows for buyers to purchase remotely, in different auctions, and then save time and costs;
- it allows for improving the implementation of traceability system.

Thus, several positive impacts of digitalisation are highlighted, allowing for a better functioning of the market. It also contributes to restructuring the value chain, in terms of number and location of buyers, and flows within the value chain. It may also increase the competition within the value chain. Thus, beyond positive impacts, some reluctance from some stakeholders may also be observed.

The following section provides an overview of the impacts and challenges related to digitalisation.

3.1 Higher number of buyers in digital auctions

Digitalisation of first sales resulted in an increase of buyers in all auctions, with the majority being remotely connected to the sale. For instance:

- more than 250 buyers are registered to the PEFA system (100 to 140 buyers connected daily),
- around 200 buyers are registered to the EFICE system,
- around 170 buyers connect to the Belgian auctions,
- in the Saint-Quay-Portrieux auction (North of Brittany region, France), the number of buyers went from 60 before the implementation of digital first sales in 2006 to 180 currently (digitalisation strongly accelerated since 2013),
- in Italy, auctions using the e-Fish system reported a 10 to 20% increase of the number of buyers.

Fewer buyers are present physically at the auctions: around five buyers at the Scheveningen auction, 10 to 15 buyers present in Belgian auctions, and similar trends are observed in auctions in French auctions (Brittany region and Pays-de-la-Loire).

Overall, the physical presence rate (% of buyers physically present compared to the total number of buyers) to the auction with digital tool is around 10-40%, with some exceptions. The auction in Boulogne-sur-Mer (France) is one of them, with a large number of buyers coming physically to the auction (about 70% physically against 30% remotely connected). The absence of pictures of the lots available for the remote buyers is one of the explanations for this high presence rate. In Italy, according to data collected, although digitalisation allowed to reach remote buyers, most of them

are locally/regionally located, while only a small share is nationally distributed (less than 10%). In the Italian auctions still conducted by voice, all buyers must be present physically at the place of sale. In Saint-Quay-Portrieux (France), which is a medium-size auction, 10% of the buyers are present physically. In Denmark, one of the auctions interviewed created an in-house auction room housing eight computers with access to the online auction system. The auction is 100% digitalised and it allows for buyers to see physically the batches before the sale.

There was a shift in the type of buyers as well, many stakeholders have started to buy directly from the auction remotely instead of going through a wholesaler. Digitalisation has enabled direct commercialisation, allowing for new buyers such as fish shops, restaurants, and large-scale retailers to access fish auctions. One of the Spanish buyers interviewed indicated participating to fish auctions for several months, accessing data on which vessels were landing and which species were available. Thus, he could make more informed decisions based on his needs. The number of foreign buyers is also increasing, especially for specific products such as squid or red mullet, purchased in French auctions (Boulogne-sur-Mer) by Spanish buyers, or for plaice purchased in Danish auctions by buyers from abroad (German, Swedish, French, Dutch, Belgian, British).

3.2 Prices: stakeholders reported positive impacts on prices, not conclusive from statistics

From a qualitative perspective, it has been reported by interviewees that IT tools used in the fishery sector over the last 20-30 years have allowed for, under different circumstances, better prices for both fishers and buyers. The following phenomena have been reported by stakeholders:

- as the buyers are informed of the species and the estimated volumes landed, they can decide in advance if they are interested, allowing them to put higher prices on lots they really want to purchase;
- the increasing number of buyers via digital first sale systems results in an increased competition and therefore driving up the prices for the sellers;
- the increasing number of buyers also ensures that lots always find a buyer, improving the prices for fishers;
- buyers may take advantage of the digitalisation tools as they have access to many auctions at the same time, either using one unique system gathering several auctions (PEFA, EFICE for example) or by connecting to different systems on different devices. They can easily compare the prices as well as the lots quality or origin and purchase the cheapest products.

Spanish auctions interviewed claimed that fishers saw the benefits of online auctions allowing them to expand the geographical scope of their market and thus obtain higher prices with buyers who had higher interest in their products than buyers from the local market. As a result, more and more fishers joined the digital system. Italian auctions using the e-Fish system reported price increases for fishers from 15% to 20%.

The quantitative impacts of digitalisation is difficult to assess. A few cases of positive impacts on prices have been reported by stakeholders in the interviews, specifically on smooth clam and hake in Spain. However, the detailed analysis of sales data from EUMOFA does not allow to provide a clear conclusion on the impact of digitalisation (see details below), as the price increases are observed in a context of decrease in volume sold.

Smooth clam in Spain

In more detail, the auctions of La Atunara, Conil de la Frontera and Rota shifted to an online auction system in 2018. Based on EUMOFA data, a strong increase of first-sale prices initiated in 2019 can be identified and even stronger since 2021. Between 2018 and 2024, the price increase has been +502% in La Atunara and +297% at national level. Stakeholders interviewed make a direct link between the rise of prices and the implementation of digital sales and even report prices up to 20,00 or 22,00 EUR/kg on some markets (compared to an average price around 11,00 and 12,00 EUR/kg in 2024 in from EUMOFA data). However, digitalisation may not be the only reason for the price increase as an evolution in volume sold can also be observed: a peak in 2019 and a decrease between 2019 and 2024.

Figure 1: First-sale prices of* smooth clam *in La Atunara (tonnes, EUR/kg)

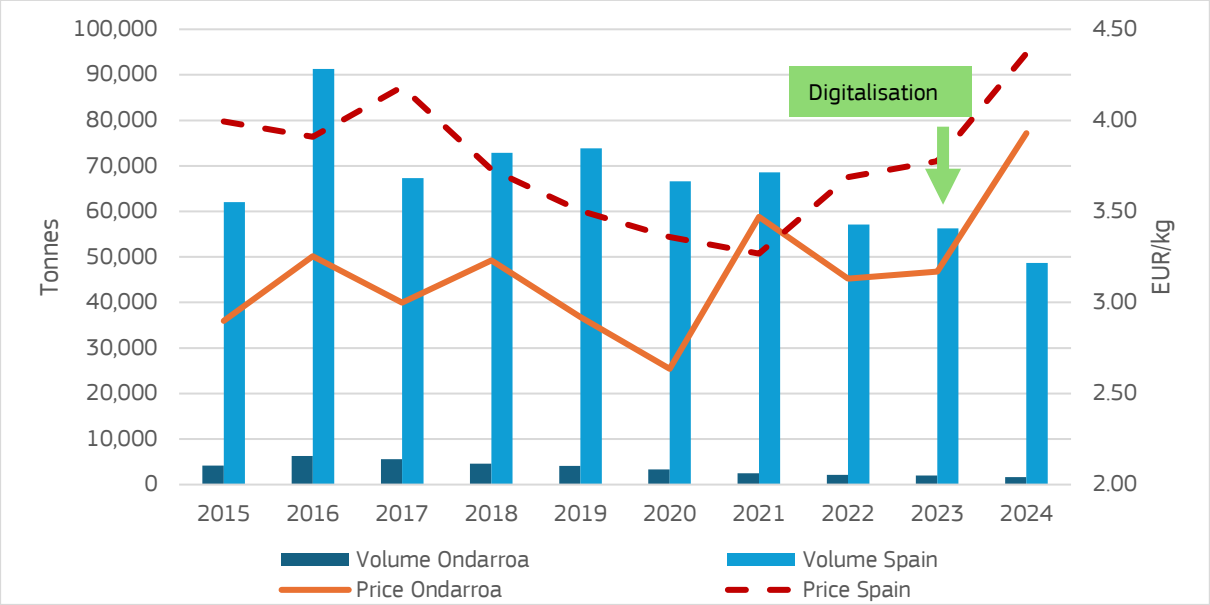


Source: EUMOFA elaboration of data transmitted by Ministerio de Agricultura, Alimentación y Medio Ambiente (MAPAMA)

Hake in Spain

The Ondarroa auction shifted to an online auction system in September 2023 with the aim to increase the average prices for fishers. The main species of this auction include hake, alongside monkfish and megrim. According to EUMOFA data, prices of hake increased by 24% in Ondarroa and by 16% on average in Spain between 2023 and 2024. At the same time, first-sale volumes of hake decreased by 19% in Ondarroa and by 13% in Spain. Thus, compared to the previous example of smooth clam, it is not clear whether the rising prices are due to the digitalisation of the auction or to the decrease of the offer.

Figure 2: First-sale prices of* hake *in Ondarroa (tonnes, EUR/kg)



Source: EUMOFA elaboration of data transmitted by Ministerio de Agricultura, Alimentación y Medio Ambiente (MAPAMA)

3.3 Quality and harmonization of marketing standards

EU marketing standards allow to harmonise the terms used to describe the size and quality of fish at the first sale. Additional information is often used in auctions for some specific species, for instance, additional size or quality grades may be defined for species that are sold a lot in an auction, which allows to charge higher prices for larger sizes and higher quality. However, while standards used in auction are based on EU standards, the terms used may not be homogeneous from one auction to another (for instance, size 1 may refer to the largest pieces or the smallest pieces). In Spain, for example, a buyer reported that in one of the auctions they list prawns simply as "size 1" without specifying whether it corresponds to largest or smallest. Buyers must therefore rely on other parameters to assess the fish size, such as the starting price of the auction—if it starts at high prices, they assume it must be a larger size. The challenge of size harmonization was also mentioned by Italian stakeholders, alongside with the use of local / in dialect names. Thus, harmonisation of terms used in auctions is a great challenge and the digitalisation and interconnection of auctions render addressing this challenge more urgent.

One stakeholder mentioned the challenge of harmonization regarding specific species such as sole or other types of flat fish that display different sizes or different sub species.

According to several stakeholders, harmonisation of quality standard in the different auctions has not been an issue for digitalisation. Stakeholders even reported that digitalisation fostered quality because of increased competition between fishers and buyers. All auctions align with the EU regulation standards[22] (products are assigned a quality grade, E+, E, A+, A or B) and can be rated according to further categories within these standards. A discussion group gathering all Dutch auctions was convened to agree on the quality assessment of the fishery product and harmonize the standards. They also send buyers to the auctions to assess the parameters of the fish not included in the harmonised standards, such as the smell or the aspect (texture, feel) of the product. Such information is shared with the other buyers via digital systems. Sub-qualities and sub-ratings were also implemented in Belgian auctions, as well as in auctions in Brittany region, in the view of aligning with EU standards without losing the local specificities that drive up the quality of the fish. Belgian and Danish auctions also adopted a quality grading system beyond the national standards including intermediary quality grades such as E/A+, A+/E, A/A- and more. This allows for crates[23] to be more flexibly packed with different qualities of fish (i.e. E/A+ quality crates are packed with 80-90% E quality fish and 10-20% A quality fish).

Control agents are in charge of ensuring that the product quality is conforming, and report any irregularity to buyers who can access the comments of the control agents in the digital system. The quality index is essential for remote buyers, and can be complemented with photos of the lot.

The quality assessment has been highlighted as a barrier for digitalisation in Italy only. In most of the fish auctions in Italy, buyers are physically present because they consider it is essential to assess the quality of the fish based on its appearance and find it difficult to implement this quality check through an online platform.

[22] Council regulation (EC) No 2406/96 laying down common marketing standards for certain fishery products
[23] Containers for products (Cambridge Dictionnary)

3.4 Impacts of landing forecast on the organisation of downstream stages of the value chain

Regarding logistics, landing forecasts allow for the auctions or the stakeholder in charge of the landings to better adapt in terms of required workforce for the landing, sorting and rating steps. Buyers can also better organise their purchases to satisfy their customers, or they can inform their customers of the species that will be available or not. Landing forecasts enable a better management of transport flows, of the stakeholders in charge of transportation, as the auctions, buyers or a third parties depending on the auction, can better anticipate and estimate the number of lorries that will be required.

Alongside the logistical benefits, forecast tools also had a major impact on commissioners. Buyers used to employ several commissioners that went to auctions to purchase fish on behalf of the buyer. With the possibility for buyers to purchase online and in various auctions, there is no need for commissioners anymore. This evolution allows buyers to limit their expenditures, and it reduces the uncertainty linked to the commissioners (such as the price of the fish, against the price indicated to the buyer). In this context, some Spanish buyers interviewed estimated a 15% saving of costs resulting from the elimination of intermediate stakeholders.

Stakeholders in Spain indicated that the overall time dedicated to post-auction tasks has been reduced, and the auction itself now takes about 20% less time than the traditional method. This is especially important for fresh fish, as the ability to save 20% in auction time allows the fish to leave the auction earlier, saving approximately 40 minutes, which is significant at national level to reach marketplaces in Madrid (Mercamadrid) or Barcelona (Mercabarna) for example.

Despite improved logistics, some auctions are still suffering from the decrease of the natural fish resources. Some auctions in Brittany region, especially in the southwest of the region, are struggling to maintain their activity, and the new buyers brought by the digitalisation do not balance the diminution of the volumes landed and the increasing exploitation costs. On the contrary, in Denmark, digitalisation allowed the three auctions interviewed to maintain their activity, avoiding the negative impact due to the downturn in the national processing industry in Denmark.

Logistical challenges of digitalisation are mostly linked to the expansion of the number of buyers and their locations (possibly abroad). In the auction of Boulogne-sur-Mer, the auction authority is only responsible for the sale, transport to the buyers is managed by private logistic companies that have a fleet of lorries and a third party owns the crates in which the fish lots are transported. The company rents the delivery crates to the buyers for 48 hours with increasing prices after this delivery delay, often extended for buyers in Spain for example. These additional costs for buyers represent an important barrier to the development of remote purchase, as delivery to buyers abroad and the return of the crate can easily exceed 48 hours. In Denmark, the issue reported was about “hidden logistical fees” that buyers were surprised of when the transport for the third party logistics were added in to the final price for the auction. The company owning the 3 auctions solved this challenge by including a 100% transparency principle regarding the total fee. Given that buyers are often international and therefore require delivery of purchased lots, there will be a delivery fee and processing fee added to the bid price. In some instances, the delivery fee itself can on occasion surpass the price of the fish. Therefore, to ensure that the buyers are not caught by surprise, the delivery fee and other fees are listed separately from the bidding price when a bid is about to be placed.

3.5 Traceability

Most of the stakeholders did not consider traceability as a challenge for digitalisation. On the contrary, the mandatory information from the electronic logbook sent to the public authorities could be shared to the auctions or on the landing forecasts/first sale systems as it is of great interest for auctions and downstream stakeholders. The IT tools are helping the registration and traceability of the fisheries products, and should facilitate adaptation to the new Control Regulation. Overall, digitalisation allowed for transitioning from a paper system to a more standardized and automatized system, more efficient in terms of time and costs. Some further initiatives have been implemented to improve traceability systems at regional and local levels. In the Brittany region, the regional association of the fisheries products buyers[24] developed the TRACABAPP[25] tool to adapt to the Control Regulation[26] by digitalising and transmitting traceability data between the operators in a fast and easy way.

The IT company Aucxis together with Vlaamse Visveiling (managing authority of Belgian auctions) implemented the Tracking & Tracing project[27]. It consists of equipping every fish crate with a radio frequency identification (RFID) chip and a 2D barcode ensuring traceability from the boat to the final customer. The technology is based on a single identification of each crate using the GS1[28] standard. This project enables the sector to implement the EU norms and recommendations concerning traceability and food safety, and facilitates logistics by reducing crate loss during client delivery. In Cornouaille (South-West of Brittany region), the six auctions using the KOSMOS system also use the RFID solution developed by Aucxis ensuring a better traceability. Several Italian auctions using the e-Fish system mentioned the introduction of RFID technology as their next steps regarding digitalisation, enabling tracking and tracing reusable fish boxes throughout the entire first-sale process.

For PEFA users, a digital traceability system is integrated, ensuring complete digital traceability along the value chain. The Danish auctions using the PEFA system also indicated their compliance with the national traceability regulation. They mentioned that traceability was not a challenge nor a driver for shifting towards digital platforms.

Spanish stakeholders were the only ones mentioning traceability as a challenge as they are struggling with the crucial step of batch digitalisation. They are currently looking for solutions to implement the digitalisation of labelling, traceability and other related processes.

[24] Association Bretonne des Acheteurs de Produits de la Pêche (ABAPP)
[25] https://abapp.com/tracabapp
[26] Council Regulation (EC) No 1224/2009
[27] https://youtu.be/2Gql4BNhz20?si=nX8HKWMa9VuscIGn
[28] Bar code system allowing the identification and traceability of a product via a unique bar code

3.6 Acceptability among stakeholders

Digitalisation is based on the sharing of sensitive data by fishers, acceptance by these stakeholders is a key element. Stakeholders responsible for developing the landing forecast tools implemented strict protocols and data policies to protect the fishers.

The Dutch system EFICE proceeds to data processing before sharing data with buyers and other users of the system. It consists in aggregating the data by fishing areas or landing port for example, so that it is impossible for users to identify the information of a specific vessel. This is essential because the fishing information is very sensitive. This is explained by a rather competitive sector in which fishers do not want their competitors to identify the precise area where they fish. In addition, some fishing companies consider that the uncertainty on the volumes landed could result in higher prices for fishers, thus, there may be some reluctance for some fishing companies to reveal highly detailed data.

Other forecast systems do not aggregate data before sharing it with users, but they provide estimates of landings based on extrapolation of data shared by the fishers during the first days of fishing. This allows for maintaining a relative uncertainty of the volumes, thereby protecting the fishing vessels.

From the fishing companies' perspective, beyond the possible reluctance on data sharing, digitalisation is generally perceived positively as it allows for reaching new clients and possibly higher prices.

On the buyers side, acceptability of digitalisation was not an issue in most of the MS as online auctions are more convenient for international and national buyers. However, in Spain and Italy, some local buyers who have always attended the auction in person may be reluctant to the new online auction platforms, viewing it as a significant competitor.

Moreover, some buyers may also be hesitant to buy remotely as they prefer to see fish to assess its quality. This issue was mainly reported in Spain and Italy. In Italy, some auctions are still conducted by voice and buyers wish to see and touch the product before buying it. To overcome the issue of quality assessment of the product, the Spanish auction interviewed mentioned the project of implementing smart weighing scales, which provide pictures of each fish lots. Another auction interviewed does already provide picture of the products to the buyers. Based on the interviews conducted in Italy, the IT skills of buyers and their possible reluctance to with the adoption of new IT tools is a strong barrier for the digitalisation of first sales.

3.7 New security challenges related to the use of IT systems

The use of completely digitalised systems shed light on a new challenges such as cyberattacks and IT technical issues. These risks have been highlighted by stakeholders who experienced them. For instance, a buyer mentioned that the online platform he uses for purchases had been recently off for three consecutive days.

4 Prospects for the development of digital tools

In the context of this study, the prospects identified for improving the landing forecasts and digitalisation of first sales are:

- further implementation of digitalisation in some areas;
- further interconnection of auctions;
- better data sharing between the different stages of the value chain;
- implementation of innovations.

Further implementation of digital tools and interconnection of auctions

The interconnection of auctions is an objective in some areas to join the volume of several areas in order to increase the volume sold and become more attractive for buyers (for instance in some part of the Brittany region). Some Dutch and Belgian stakeholders (where digitalisation is already well advanced) mentioned that the ideal would be for fishers to land wherever they wanted to and to choose in which auction they would like to sell remotely (mainly to get better prices for fishers). For instance, this would allow to land in the country of the buyer (and thus lower the costs of transport by road) but still benefit from Dutch first sale prices.

However, a greater interconnection of auctions (at national or EU level) is challenging and raises diverse opinions from stakeholders. While some positive impacts are highlighted (in particular higher prices for fishers and better choice for buyers), some possible negative impacts are also feared (in particular by interviewees in Spain and Italy, and to some extent in France (see example of Boulogne-sur-Mer below)), such as an increased competition and possible impacts on the structure of the value chain (for instance relocation of processing companies).

To illustrate possible reluctance for a further interconnection: Boulogne-sur-Mer auction authorities tried to develop a partnership with Urk auction (Netherlands) a few years ago, with the objective to attract more volume in the auction. This has not been implemented as the local fishers were opposed to the project. This auction being the first one in France, stakeholders did not see the interest of joining a network of auctions, risking attracting foreign vessels to land and thus increase competition at first sales level.

The interconnection of auctions would also require the following conditions:

- setting up of collective organisation, gathering the various auctions (such as those in the Brittany region);
- interoperability of the different IT systems, as several systems are currrently being used;
- warranty systems around payments could be an issue (identified in Belgium). Currently, a buyer in a Belgian auction has to give a warranty that allows them to make purchases. Once the total amount of the warranty is reached, the buyer cannot purchase more. The buyer has seven days to proceed to the payment to the auction which has to proceed to the fishers payment in the meantime. In case the buyer overshoots their warranty, it leads to cash problems for the auction and the fishers. A common warranty already exists between some auctions (e.g. the Dutch United Fish Auctions working with Denmark auctions) but it gathers relatively few auctions and in a close geographical area.

Improved data sharing among the different stages of the value chain

Currently, digital tools are used at every step of the value chain but data is not necessarily shared resulting in a lack of continuity and a loss of information between the operators.

For instance, French, Italian and Spanish stakeholders reported their aim to streamline the connection between buyers and sellers, with data digitalisation already from the fishing vessel and all along the value chain. A Danish stakeholder also indicated that the main prospects regarding digitalisation were about an increased data transfer, for instance between systems for logistics and bidding platforms.

Innovations

IT systems are evolving quickly and there is room for improvements from a technical point of view. For instance:

- measure to increase the speed of data traffic are being investigated to reduce sporadic bottlenecks that could occur during peak auction hours on the bidding platform;
- some stakeholders mentioned the possible use of blockchains, in order to improve data sharing between stakeholders;
- the rapid development of artificial intelligence may also lead to innovation in the digitalisation of first sales. For instance, to provide more accurate landing forecasts with the data available.

5 Annexes

5.1 Stakeholders interviewed / contacted by email

- Belgium
  - Fish auction - Vlaamse Visveiling
  - Software developer - Aucxis
- Denmark
  - Three auctions owned by the same company
- France
  - Fish auction – Saint-Quay-Portrieux
  - Région Bretagne
  - Fish auction – Boulogne-sur-Mer
  - PO – Pêcheurs artisans de Noirmoutier (OPPAN)
  - Association of fisheries product buyers (ABAAP)
- Italy
  - Organizzazione di produttori di pesce azzurro Ancona
  - Organizzazione di produttori ittici di Labronica
  - Wholesale market - Centro Agroalimentare Roma C.A.R. ScpA
  - Software developer –Infoteam
  - 11 auctions using Infoteam system (e-Fish)
- Netherlands
  - Software developer – PEFA
  - Software developer – EFICE
  - Wholesaler – Seafood Centre
- Spain
  - Wholesaler – Laymar
  - Wholesaler – Sachafish
  - PO - Organización Productores Pesqueros Artesanales Lonja de Conil
  - PO - Organización de Productores de Pesca de Altura de Ondárroa

5.2 List of auctions involved in MERCAPESCA system

Spain:

- Catalonia
    - Ametlla de Mar
    - Badalona
    - Blanes
    - Cambrils
    - L'Ampolla
    - L'Estartit
    - Llançà
    - Palamós
    - Port de la Selva
    - Roses
    - Sant Feliu de Guíxols
    - Tarragona
    - Vilanova
- Andalusia
    - Ayamonte
    - Chipiona
- Asturias: Avilés
- Comunidad Valenciana
    - Gandia
    - Santa Pola
- Baleares: OP Mallorca Mar
- Murcia: Mazarrón

Portugal (Azores):

- Corvo
- Ponta Delgada
- São Jorge
- Faial

France (Occitanie):

- Grau Agde
- La Graulenne
- Sète

5.3 List of Italian auctions using the e-Fish system by Infoteam

- Civitanova Fish Market
- Giulianova Fish Market
- Livorno Fish Market
- Manfredonia Fish Market
- Pescara Fish Market
- Porto Garibaldi Fish Market
- Porto Santo Stefano Fish Market
- Schiavonea Fish Market
- Sciacca Fish Market
- Siracusa Fish Market
- Termoli Fish Market

5.4 Details on digitalisation per Member State

		Denmark	Netherlands	Belgium	France	Spain	Italy
Landings forecasts	**Landings forecast tool**	PEFA (4 auctions)	PEFA (6 auctions) or EFICE E-catch and M-catch (6 auctions)	Data manually shared by the vessels with the auctions that share it on the auction website	Prev'Apport (national level) Breizh'Apport (in Brittany region) WhatsApp group	Depends on the auctions: - KOSMOS (2 auctions) - No tool - WhatsApp group	Depends on the auction: - PEFA (1 auction: Cattolica) - WhatsApp message No tool
	Fishing fleet	all fishing vessels >12m	all fishing vessels >12m	all fishing vessels >12m	Long distance vessels for digital tools	-	-
	Days/hours prior to auction	Real-time or forecasts 2-3 days in advance based on extrapolation	Real-time or forecasts 1-2 days in advance	2-3 days in advance based on extrapolation	Real-time for digital tools Afternoon before for WhatsApp few hours before (Boulgne-sur-Mer)	-	Few hours before, once volumes have been landed
	Data type	species, weight, boat, grade	species, weight, boat, grade, photo (for PEFA users)	species, weight, boat, grade	vessels, volumes, species, grade	-	Quantity and species
	Data accessibility	Buyers (everyone with subscription to the platform)	Buyers (everyone with subscription to the platforms)	Buyers (everyone with subscription to the platform)	Buyers with access to the platform Buyers part of the WhatsApp groups	-	Buyers in contact with the auction
First-sales	**First-sale tool**	PEFA (interconnected with all auctions using PEFA)	PEFA (6 auctions interconnected with all PEFA users) EFICE (6 auctions interconnected via KOSMOS platform)	KOSMOS (3 auctions interconnected)	KOSMOS (6 auctions interconnected) Aucxis system (not interconnected) Agisoft (accessible on the same software)	MercaPesca (3 French auctions, 14 Spanish auctions, 1 Portuguese auction) Systems developed by POs KOSMOS (2 auctions)	Depends on the auction: - Infoteam (e-Fish) (11 auctions) - Alpha Fish (1 auction: Livorno) - PEFA (1 auction: Cattolica) - Other system (10-15 auctions) No tool

	Buyers	PEFA: 250-280 registered (80% digitally)	PEFA: 250-280 registered (80% digitally) EFICE: 200	Around 170 buyers 10-15 present physically (9%)	Saint-Quay-Portrieux: 180 buyers Noirmoutier: 100 buyers (30% remotely) Overall increasing	Overall increasing	Overall increasing
	Location	Denmark, Germany, Sweden, the UK, France, the Netherlands and Belgium	all over Europe	Mainly Belgian buyers, North of French and South of Netherlands	Regional/national buyers, more and more abroad buyers (especially Spanish)	Local buyers, expansion to regional/national level	Local buyers, expansion to regional/national level
	Functionning	Access to all auctions using PEFA	Access to 6 auctions for PEFA users Access to the 6 auctions at the same time + prebid possible for the buyers using EFICE	Access to the 3 Belgian auctions Prebid possible few hours before the sale Sale catalog with lots, size, quality, etc communicated to buyers few hours before the auction Sale via Kosmos platform, buyers have access to all information, including photos and videos of the fish	Majority of auctions have their own system (provided by Aucxis but not interconnected) 6 auctions in Brittany region interconnected via Kosmos system Several auctions using Agisoft system No photos for Boulogne-sur-Mer but comments uploaded concerning quality and aspect if needed	Access all 18 auctions on the same platform Data available: vessel, species, quality, size, presentation, photos	Several auctions have their own system (provided by Infoteam or other company, but not interconnected) In some auctions, buyers can request products to be set aside, and restaurants can check the prices of specific products through an application

Source: interviews conducted by EUMOFA in the context of this study