

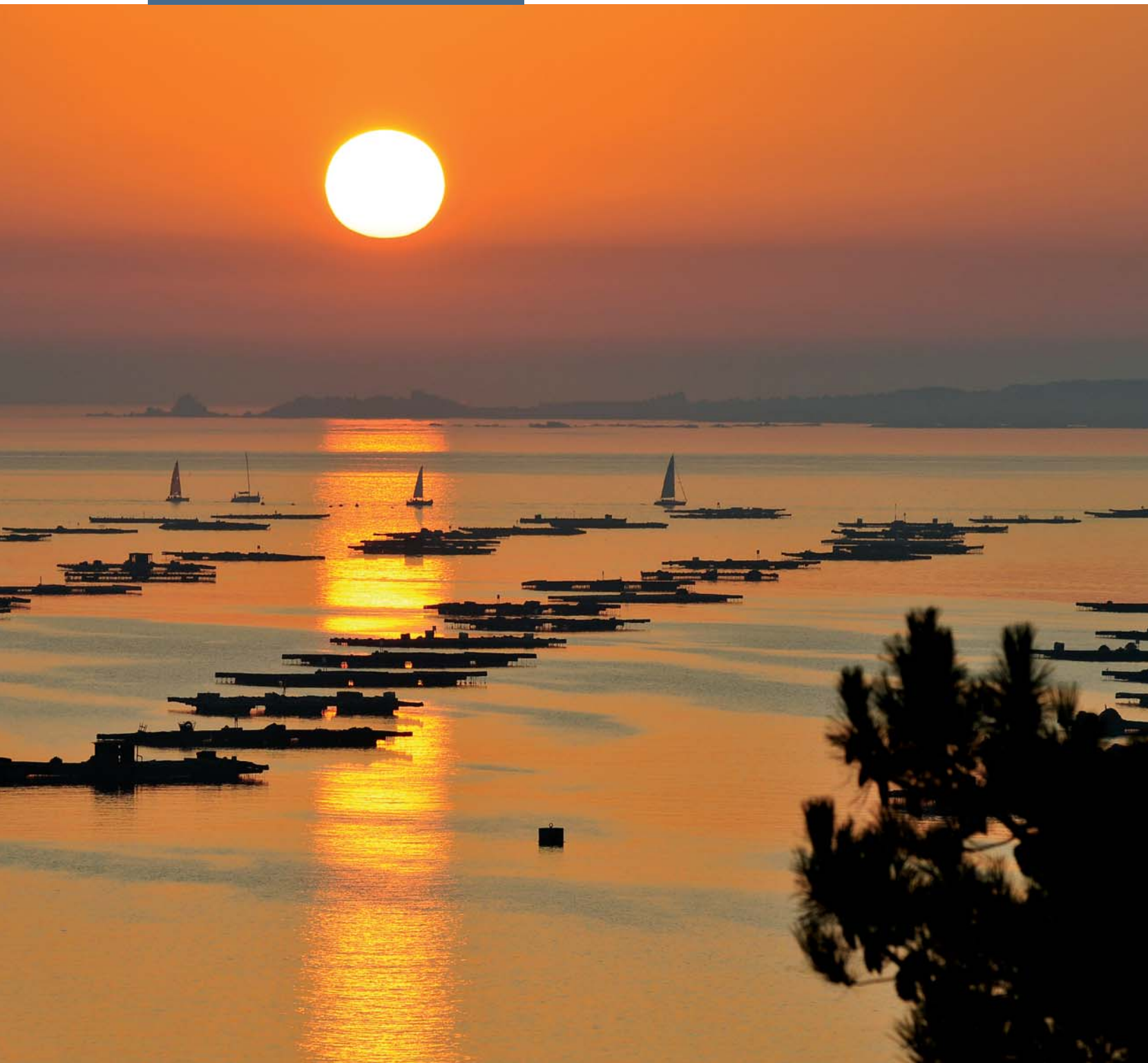
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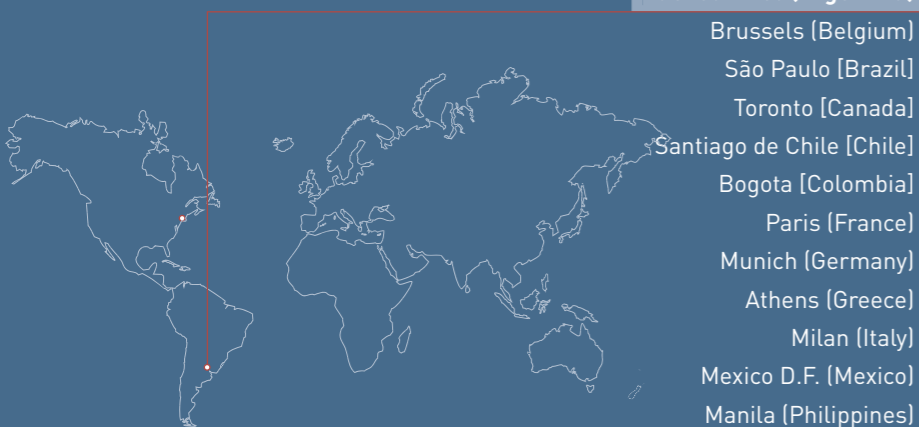
Aquaculture in Galicia (J. Fernández)

Breast cancer (A.L. Villanueva)

Enrique Dans: "Towards permanent connectivity"

Alfonso Valera: "Stability in global reinsurance"





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 and prospects for the next 25**

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Front cover photo:  
 Sunset on floating structures to grow mussels (*bateas*) in Arosa estuary  
 O Grove, Pontevedra. Spain



**editorial**

Aware of the damaging effects of food crises in a relentlessly growing world population, the FAO has recommended considering insects and jellyfish as part of the human diet. More than twenty-five years ago, Spain -and notably Galicia, a seafaring region *par excellence*- decided to end the over-exploitation of the sea and invest in research on fish and mollusc breeding in captivity. Jacobo Fernández Casal, a biologist who has been at the forefront of turbot breeding since 1983, reviews the past and the future of an industry with significant growth prospects but which entails numerous risks that must be properly addressed.

Breast cancer is the primary cause of death among women. While some women who have a proven genetic history of the disease voluntarily undergo a mastectomy, screening is still the most widely used preventive procedure, enabling early diagnosis and hence, appropriate treatment. In this issue, Dr. Ana Villanueva, Chief Medical Officer at MAPFRE RE, describes the biological aspects of this daunting disease and explains the latest diagnosis and treatment techniques. Lastly, she goes on to review their implications for risk assessment.

Enrique Dans discovered technology in 1986, when his father gave him a computer as a present. He has been an adept at maximising its potential ever since. Currently the most influential technology blogger according to Guidance, he is generally regarded as a web guru on IT in the corporate world. Therefore, the notoriously traditional insurance industry will have to pay good heed to his contention that it is burdened by "paralysis by analysis"; in other words, those things are analysed to such an extent that ultimately nothing gets done.

As CEO of Aon Benfield Iberia, Alfonso Valera is in a privileged position to comment authoritatively on the insurance and reinsurance industries. In addition to his professional experience, at Aon Benfield he uses sophisticated tools for business and portfolio analysis, which represent a competitive advantage and offer added value to his clients. All in all, he analyses the particularities of the Spanish market, the challenges posed by the financial and economic crisis -which is being particularly acute in Spain- and the industry's strengths in responding to catastrophic losses, as proven by recent payouts around the world.



# Aquaculture in Galicia: a review of the past 25 years and prospects for the next 25

Jacobo Fernández Casal  
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Recursos Marinos y Acuicultura de las Rías Gallegas*)  
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Aquaculture is not a novelty in Galicia. Over the past 25 years it has brought wealth to the region, particularly with the development of turbot rearing. Galicia is destined to play a major role in flatfish farming thanks to its exceptionally favourable conditions, location, rolling topography and moderate temperatures. But in order to continue as industry leader, it must maximise these advantages while -as ever- paying due regard to social and environmental standards

The origins of aquaculture go back to 3500 BC in China and 2500 BC in Egypt. The oldest known treatise on the subject, which deals with carp breeding, was written by the Chinese politician Fan-Li in 475 BC. In Europe, the first experiences were carried out 2000 years ago in the time of the Roman Empire, where oyster farming was widespread. The Romans grew oysters in marshlands, where they also extracted sea salt and dry-salted fish. In the 14th century, trout culture saw a large expansion in France. Salmonid breeding soon became an important activity in the Nordic countries. Trout were first farmed in 1910 in Norway, where the species was adapted to sea water. By 1950 modern fish rearing had been successfully introduced to the freezing waters of the fjords.

The first precise reference to fish farming in Spain dates from the 12<sup>th</sup> century, when Diego Xelmírez, who was archbishop of Santiago de Compostela in Galicia at that time, ordered the construction of a trout farm in the river Sar (A Coruña province). But it was not until 1866 that the first private fish farm was built in the Stone Monastery in Zaragoza, in the region of Aragón. A few years later, in 1886, the Experimental Zoology and Botany Maritime Station was established in Santander, which eventually evolved into today's Spanish Oceanography Institute. Spain's entry into the European Union in 1986 was a further landmark. Aquaculture expanded rapidly from that year, producing large yields of fish and molluscs.

**The oldest known treatise on the subject, which deals with carp breeding, was written by the Chinese politician Fan-Li in 475 BC**

The first precise reference to fish farming in Spain dates from 1129, when Diego Xelmírez, who was archbishop of Santiago de Compostela in Galicia at that time, ordered the construction of a trout farm in the river Sar (A Coruña province)



Woman collecting shellfish



Trouts

## Aquaculture and research in Galicia

The Practical School of Oyster Farming was founded in Galicia in 1847 in the town of Ortigueira, in Coruña province. The first mussel breeding experiences got under way in 1928, but it was not until 1945 that raft farming was introduced. Modern trout culture in Galicia began in 1968, later to be followed by salmon culture. The first successful mollusc farms in Galicia started operating in 1970, producing oysters and clams. In 1983, industrial farming of turbot began in O Grove (Pontevedra province, Galicia).

Yet none of this would have been possible without research, which has provided the support needed to achieve today's standards of production and recognition in the productive system. Santiago University's Microbiology Department is well known for its accomplishments in producing

vaccines against diseases in turbot. The universities of Vigo and A Coruña also provide considerable support to farmers throughout the different stages of the culture process. More recently, the Galician Aquaculture Technology Centre (CETGA, *Centro Tecnológico Gallego de Acuicultura*) or Galician Aquaculture Cluster was established in 2001 with the clear aim of focusing research primarily on turbot.

According to APROMAR's<sup>1</sup> 2012 report on Sea Farming in Spain, in 2011 Galicia was home to 5 hatcheries, 17 grow-out farms (16 land-based and 1 sea-based) and 3 nurseries.

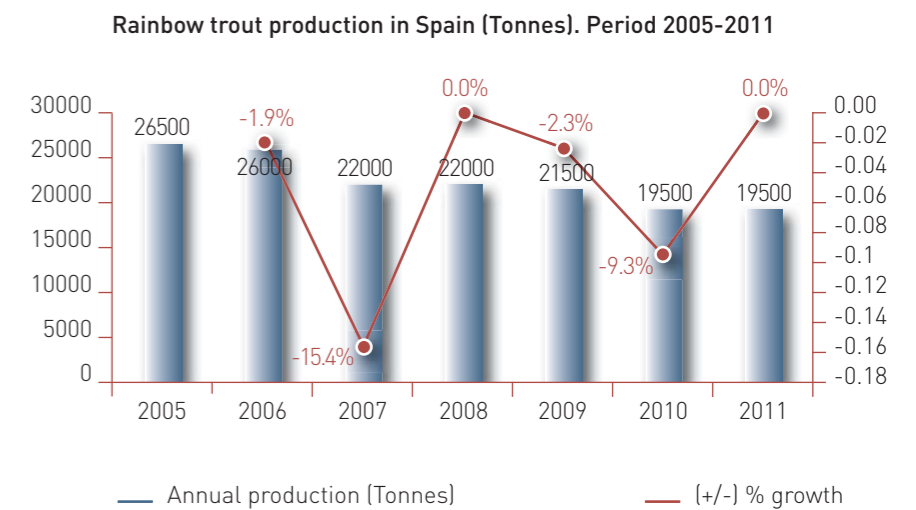
## Trout, the oldest farmed species

Trout rearing is the oldest type of aquaculture in Galicia. The first reference dates from

1129, when a trout farm was built on the river Sar (A Coruña province) at the initiative of Archbishop Xelmírez. The first industrial trout farm in Spain commenced operations in 1940. The number of farms grew in the 1960s and 70s. Most of them appeared in northern Spain, chiefly in Galicia, originally as family undertakings with small productions. Farmers' interest focused on rainbow trout (*Oncorhynchus mykiss*) on account of its easy adaptation to intensive farming.

In the 1980s, farms grew in size and production levels. The real breakthrough, however, came in the 1990s with the introduction of improved technologies (use of oxygen and development of vaccines against the main diseases) and marketing processes, which opened the way to trade in new areas. Towards the end of the decade Galicia's trout production amounted to 8,200 tonnes, namely 27% of Spain's total production.

Figure 1: The development of trout farming



In 1994, a further landmark was the establishment of a hatchery in Lugo that provided year-round egg availability. This untethered production, which had previously been limited to a few months in the year. The current production of 250 million eggs a year guarantees continuous supply not just to its owners but to a large part of Spain's fish farms and some overseas clients.

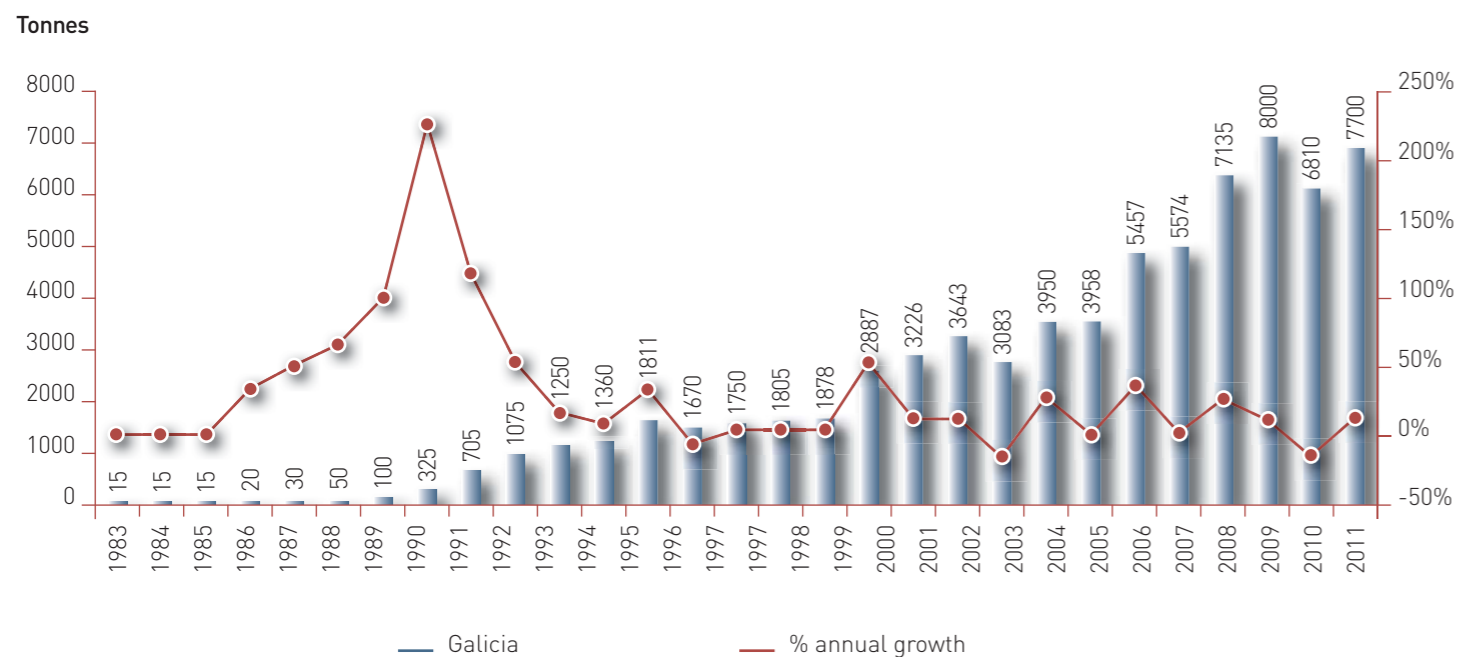
Since 2003, production levels have decreased significantly as a result of falling exports and saturation in the Spanish market. This has been attended by a reduction in production from 9,207 tonnes in 2003 to 6,621 tonnes in 2007 and the close-down of some farms. There are currently 20 rearers in Galicia, operating a total of 25 production establishments, three of them dedicated exclusively to hatching or nursing and the rest to grow-out. The trout farming industry has undergone far-reaching renovation over the last few years to adapt to new market requirements. Still, its future depends on how effectively it can deploy innovation and new brands and quality certification schemes to create value. In 2011, the production of rainbow trout in Spain (see Figure 1) amounted to 19,500 tonnes.

<sup>1</sup> APROMAR: Asociación Empresarial de Productores de Cultivos Marinos de España Association of Spanish Sea Farming companies (www.apromar.es)



Onshore farm at Vitán Cape (Camariñas) in A Coruña, Spain. © Adrián Estévez

Figure 2: Historical turbot annual production growth in Galicia (in Tonnes)

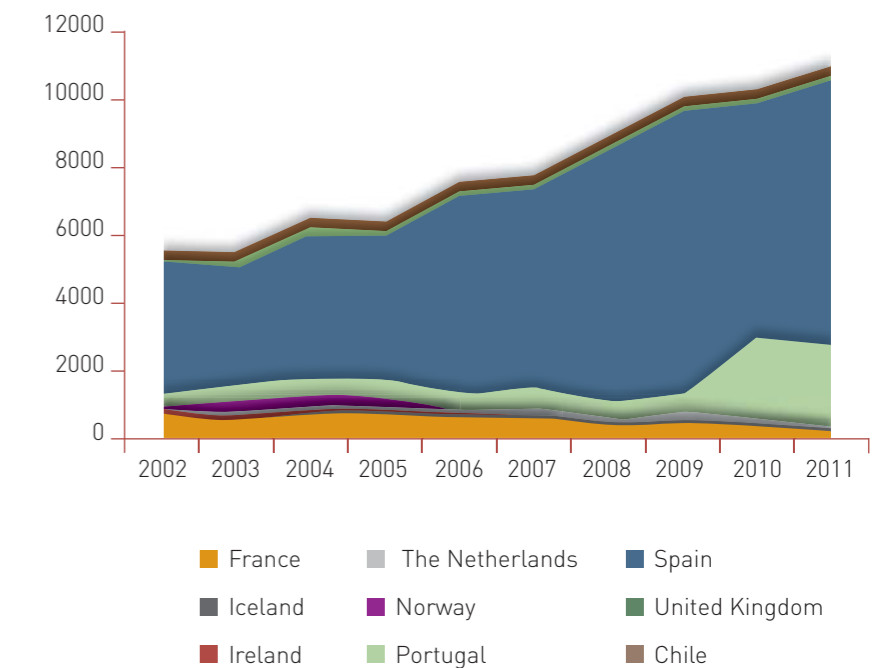


Tank for young turbot



Tank for adult turbot

Figure 3: Global turbot production (excluding China)



### Turbot, a living story

Although turbot farming took its first steps in the early 20<sup>th</sup> century, it was not until 1968 that Alan Jones first attained larvae metamorphosis after 68 days of nursing.

Turbot (*Scophthalmus maximus*) culture in Galicia is a living story that goes back to 1983, when *Insuiña*, the first industrial turbot farming company in Spain, was set up by three entrepreneurs in O Grove. There was certainly no flying start, as everything had to be built up from scratch. But despite all the impediments, the first production of turbot was sold in 1985 at a rewarding 15 euros per kilogram.

In an attempt to stave off an already looming crisis, the Mar Novo Galician Turbot Cooperative was created in 1989, centralising all marketing activities and the procurement of fry and other supplies. The bid proved nevertheless insufficient. In 1992, more than 1,000 tonnes of turbot were released on the market, at a time when a commercial structure had yet to become firmly established. The outcome was an *annus horribilis* for the industry. While production

costs in 1991 were in excess of 7.50 euros, the average sale price that year peaked at 5.42 euros per kilogram. Company losses could not be averted and a restructuring of the industry ensued.

Over the last few years (see Figure 2) production has gradually increased, albeit with some dips caused by health-related problems and fry shortages.

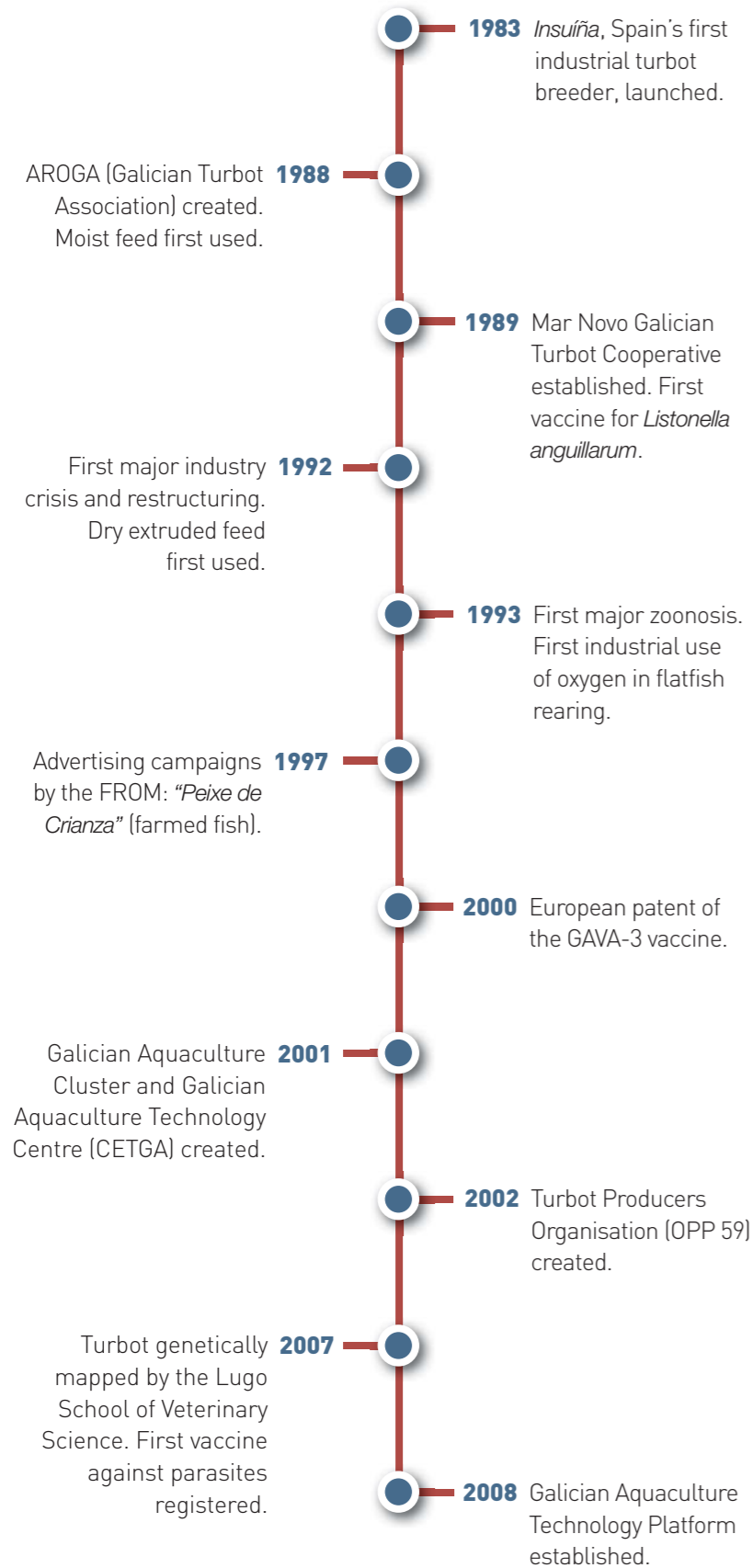
In 2011, farmed turbot production reached 7,755 tonnes (12.2% more than in 2010) according to APROMAR's 2012 Aquaculture in Spain report. Galicia, with 7,690 tonnes, is by far the largest turbot producer among the Spanish regions.

Globally (see Figure 3), turbot production is concentrated primarily in Europe, with Spain and specifically Galicia as the leading producers.

There are currently some twenty flatfish rearing farms and 5 nurseries in Galicia, which produced 7.5 million units in 2007, ensuring the region's self-sufficiency. According to APROMAR, in 2011 the production of fry reached 17,127,000 units, up by almost 27% from 2010.

**In 1992, more than 1,000 tonnes of turbot were released on the market, at a time when a commercial structure had yet to become firmly established. The outcome was an *annus horribilis* for the industry**

## Milestones in turbot farming



## Challenges facing turbot farming in the next 25 years

Paradoxically, the challenges turbot farming will have to face in the next 25 years are the same as 25 years ago, with a few more added:

- ▶ **Diseases:** significant progress has been achieved but some problems (e.g. furunculosis) are still to be resolved.
- ▶ **Nutrition:** a higher standard of research on fish meal substitutes is needed to keep aquaculture sustainable. As for business challenges, new scenarios are expected in product offer, as well as the opening up of new markets.
- ▶ **Genetics:** progress in genetic improvement is essential.
- ▶ **Environmental management:** after more than 25 years of peaceful coexistence with the environment, it is crucial to undertake further detailed studies of coastal water behaviour in order to prevent potential dysfunctions.
- ▶ **Government:** further to an Aquaculture Programme -which is urgently needed for the industry to remain competitive- the key industry players, both public and private, must take educational action to ensure that farming can be carried on normally. Additionally, government support is still vital where legislation, advertising, marketing and finance are concerned.

## Challenges facing aquaculture in Galicia

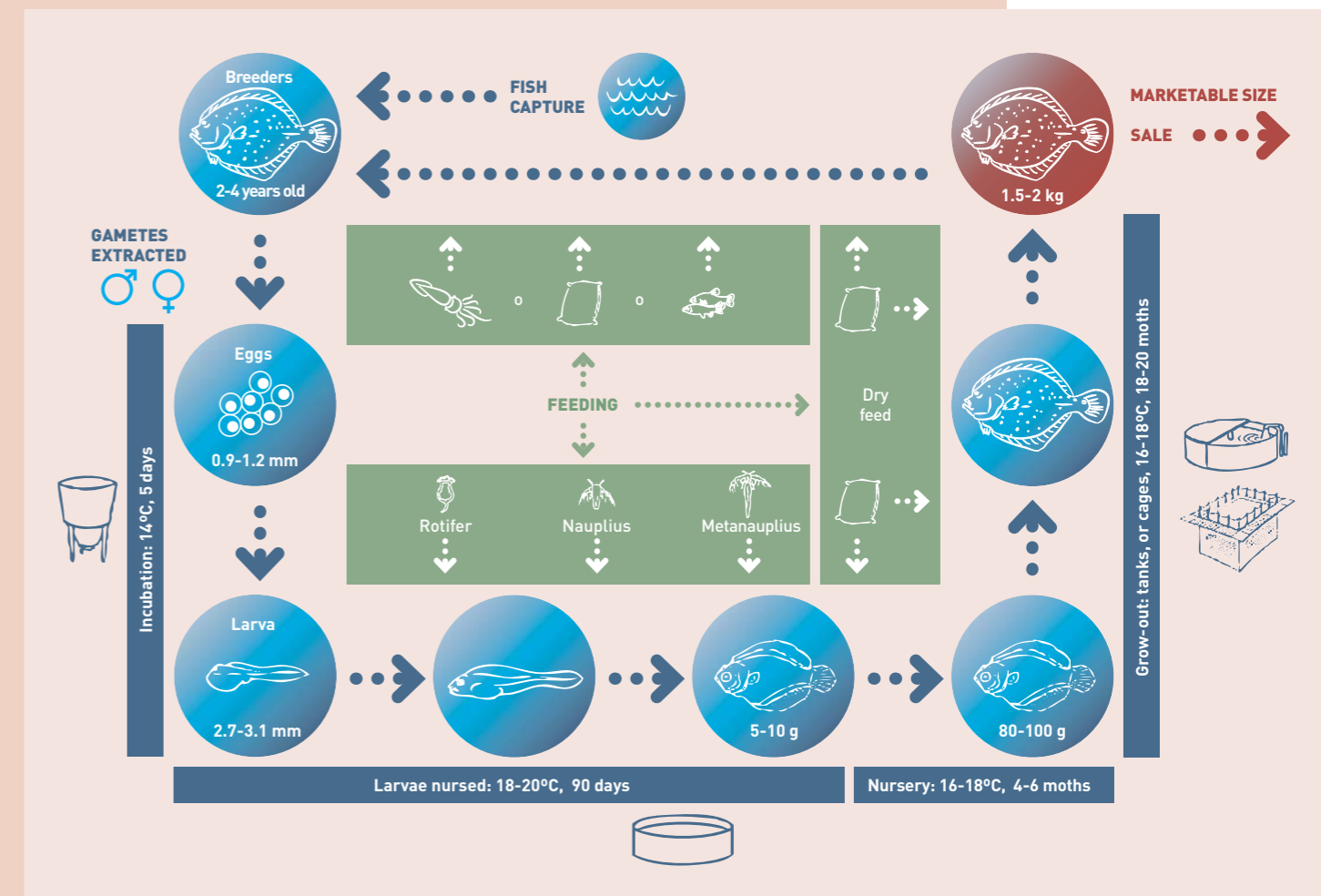
What will happen henceforth? What future lies ahead for Galician fish farming? What size will the companies have? Will they diversify the species they grow? Continental fish farming has reached its maturity and is not going through one of its finest hours at the moment. Still, growers are managing to keep costs in check and so maintain production levels.

## Turbot farming

The turbot's rearing cycle begins in a hatchery, where the breeding specimens are housed. From the third year, the breeders start laying gametes, which are carefully fertilised. Then, the resulting spherical, pelagic eggs are incubated for 4-5 days at a controlled temperature. Once hatched, turbot larvae are over 2.7 mm long. They are fed daily with live food: rotifera, artemia and phytoplankton. The ideal temperature for larvae nursing is 18 to 20 °C.

The fry are kept in square -or round- shaped tanks (10 to 30 m<sup>2</sup>) with an open-circuit sea water pumping system. Oxygen is often added to the tanks. The fry are fed manually or automatically with balanced dry feed. This stage of the rearing process, known as nursing, spans the fish's development from 10 to 100 g and lasts for approximately 5 months. Juvenile turbot are also reared in land-based tanks measuring 30 to 100 m<sup>2</sup>. Again, an open-circuit sea water system is used, although some experience with closed-circuit systems has been gained.

They are fed with extruded pellets, which are distributed manually or automatically. Water temperature is the key factor for optimal development. The ideal growth temperature is 14 to 18 °C, although turbot will stand extreme temperatures of 8 to 24 °C. The rearing period until the fish are ready to go to market, with an average weight of 1.8 kg, is 18 to 24 months.



## Farming experiences with other species

### Salmon: rearing discontinued

Salmon was first farmed in Galicia in 1976 in the Ortigueira estuary in A Coruña province by using traditional cages. Initially, only Atlantic salmon (*Salmo salar*) was reared. Later, Coho Pacific salmon (*Oncorhynchus kisutch*) was introduced. From the late 1980s, Atlantic salmon culture developed rapidly in Galicia. It was at that time that round polyethylene cages started to be deployed, similar to the models being used in Norway. Since 2005, there have been no salmon farms in Galicia for a number of reasons, including diseases, production surges in other countries and inadequacies in farm locations. In the first years of this decade, some experimental batches were reared in Galicia's southern estuaries (*Rias Baixas*), albeit with uncertain results.

### Sea bream: size issues

The first sea bream (*Pagellus bogaraveo*) rearing experiences in Galicia were conducted in 1991 at Vigo's Oceanography Centre (IEO<sup>2</sup>). A stock of breeders was formed with wild specimens captured in their natural environment. The first tonnes of farmed sea bream were marketed in 2002. Production volumes grew year by year and in 2007 the total output reached 195 tonnes. A variety of hurdles have been overcome, including obtaining eggs in captivity and improving survival rates and larvae quality, but the considerable time this species takes to reach its marketable size -3 to 4 years- still constrains production growth. According to APROMAR, Galicia produced 200 tonnes of sea bream in 2011, an amount similar to the previous year's, which represents 100% of Spain's production.

### Sole: a hopeful future

Most experiences with this species have been carried out by using Senegalese sole (*Solea senegalensis*), although some studies are currently being conducted with common sole (*Solea solea*). In 2005, a corporate group marketed the first 8 tonnes of sole farmed in Galicia. Production rose to 30.2 tonnes in 2006 and to 40.3 tonnes in 2007. According to APROMAR, in 2011 the yield reached 79 tonnes (down from 170 tonnes in 2010). Yet there are many aspects still to be developed before production can increase significantly, above all obtaining eggs from specimens held in captivity and controlling disease. The research conducted on common sole has produced encouraging results which may serve as a starting point for the industrial development of the species.

### Pollack and gilt head sea bream

The first experiences rearing pollack (*Pollachius pollachius*) were conducted in the late 1990s. In 2003, eggs were obtained and the first fry produced, which were later grown out in cages. The first marketable yield of this species was produced in 2005 and amounted to 0.15 tonnes. The output reached 39.6 tonnes in 2007. No farms have reared pollack since 2008. Experiences have also been carried out in Galicia to assess the prospects of farming gilt-head sea bream. Wild specimens were reared in tanks between 1989 and 1991 but the growth results were considerably lower than those obtained in other regions. Consequently, the rearing of this species was discontinued in Galicia.



**Globally, turbot production is concentrated primarily in Europe, with Spain and specifically Galicia as the leading producers**

Sea fish farming, and particularly turbot rearing, is in a different stage of its development. According to the FAO's recommendations on the needs of the sea's food store, stepping up production seems the right way to go. The limits should be set by consumption, demand and production cost margins, as well as social and environmental considerations. A look at the official fish production figures for Europe (Figure 4) reveals that turbot production is far below the industrial production of other fish species.

Medium-term projections envisage turbot productions of 15,000 tonnes a year. Provided that the necessary adjustments are made to investment costs, these figures should give no cause for alarm. Galicia's



**In over 25 years of mariculture, Galicia has learned to respect and farm its seas in much the same way as it grows crops and rears cattle**

<sup>2</sup> Instituto Español de Oceanografía  
Spanish Institute of Oceanography

### Strengths

- Galicia has more than 1,100 km of coastline and plentiful, unpolluted water bodies.
- A strong fishing tradition and high consumption of sea products.
- Good sea product marketing channels.
- Galicia has a recognised brand image for quality.
- Galicia is Europe's leader in the production and marketing of mussels, the world leader in the production and marketing of turbot and the largest producer of sea bream and trout in Spain.
- Extensive scientific research support with a specialist, cutting-edge aquaculture training centre.
- Government support for R&D&i.

### Opportunities

- Special oceanographic and topographic characteristics for sea farming (temperature, salinity, pH, bacteriology).
- Strong potential for new marine species. Farming for restocking purposes possible.
- Increased production needed to meet global demand.
- Continuously expanding industry. Food source.
- Logistic and business potential in sea products trade.
- Map of coastline use favours aquaculture.
- A source of employment in sparsely populated coastal areas.
- The establishment of a Galician Aquaculture Technology Cluster.
- Investment in improving production technologies.

### Weaknesses

- Sea industries growing below their potential.
- Atomisation and dual structure (small and large growers).
- Diseases.
- Complex, adverse government framework and highly restrictive legislation on coast use.
- Shortcomings in the real stance of public agencies supporting aquaculture and in the implementation of the Strategic Plan on Aquaculture.

### Threats

- Strong increase of pressure from environmentalist groups.
- Tighter environmental requirements.
- Competition with aquaculture products from other countries.
- Higher prices of raw materials used in feed production.

outstanding conditions for flatfish farming -including location in a temperate part of the world and a gentle, rolling topography-mean the region has a key role to play in this industry. It should not miss the opportunity to continue leading the sea fish farming industry.

In over 25 years of mariculture, Galicia has learned to respect and farm its seas in much the same way as it grows crops and rears cattle. Though some may strive to portray it as different from agriculture and animal breeding, the truth is that fish farming is more than 4,000 years old and must be viewed as a food industry, duly respecting social and environmental standards. Only time will prove us right.

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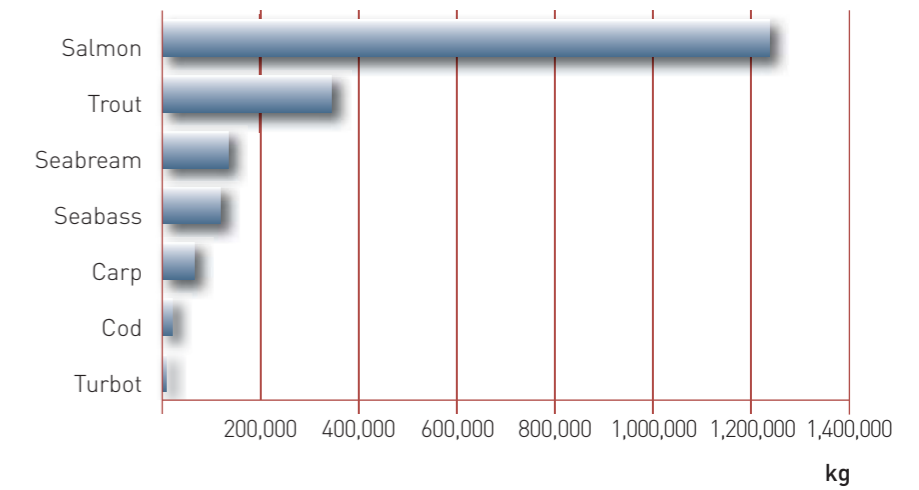
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Spanish Institute of Oceanography <http://www.ieo.es>

Figure 4: Main species bred in Europe



**Medium-term projections envisage turbot productions of 15,000 tonnes a year. Provided that the necessary adjustments are made to investment costs, these figures should give no cause for alarm**

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# Insurance in aquaculture: an overview

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## Introduction

Industrial aquaculture as we know it is a technique with barely 50 years of history, although fish farming was already known to several cultures in antiquity. Today, aquaculture enjoys unprecedented growth the world over as a result of the depletion of extractive fisheries and like any other area of economic activity, it requires insurance products that are adapted to its specific needs and particularities.

## Insurance and aquaculture

Aquaculture is broadly divided into fresh -or brackish- water farming, and salt-water farming. Farms can be land-based, where the fish are grown in tanks of different shapes made with natural or artificial materials, or else offshore, with the fish in cages, rafts, baskets or long-line systems. Insurance schemes must be adapted to the environment and the rearing system, as the risks involved are different. There is little similarity between growing trout in a river-based operation and growing sea bream in offshore cages.

First, an itemised appraisal is carried out of the biomass and other assets contained in a farm, taking into account the type of facilities to be insured.

In a hatchery or a nursery, the eggs, larvae, fry and breeding specimens are valued. While the last are valued according to their species, breeding potential and age (sometimes reaching considerable values, even in excess of 1,000 euros per unit), the eggs, larvae and fry are valued on the basis of the farm's fixed and variable costs allocation. The estimated value of farms in this category on the whole remains largely constant with time.

In growing farms, the value is determined as the cost of purchasing the fry plus the fixed and variable costs allocation in euros per kg.



To calculate the insured value, which can vary widely over the course of the year, the producer submits the farm's "breeding programme" or "production programme", detailing the number of fish and kilos of biomass for every individual month. An examination of the 12-month breeding programme allows identifying the month of maximum value, which corresponds to the insured amount. Additionally, the mean value can be calculated as the aggregate value of all the months in the year divided by 12. The mean value serves as the basis to calculate the premium rate, which in turn allows determining the deposit premium. The deposit premium must be adjusted at the end of the insurance period based on monthly stock declarations, which indicate the real mean premium for the risk concerned.

In an offshore operation, insurance schemes provide cover against the hazards which the biomass is exposed to, i.e. storm damage, pollution, poisoning, collisions with boats and other objects, theft, malicious acts, de-oxygenation due to high water temperature or

benthic upwelling, and disease. On the other hand, if the farm is located on a river, as in a trout rearing facility for example, the risks covered will include pollution, floods and landslides, poisoning, drought, theft, malicious acts, electrical and mechanical failure, and disease.

As regards insurance for the facilities, the schemes must be adapted to the type of farm concerned.

In an offshore facility, all the constituent elements need to be taken into account, including nets, cages, ropes, deadmen and anchors. Insurance schemes commonly cover damage caused by storms and collisions with boats and other seaborne elements. An offshore farm will also include onshore offices and storage buildings for materials and stock. Some may also have net cleaning machines. And, being sea-based operations, they will also have specially adapted watercraft.

In a land-based facility, the insurables span civil construction elements, equipment, ma-

chinery and ancillaries. Schemes commonly cover damage by fire, explosion, lightning, miscellaneous risks and theft.

Liability is another significant area. All the activities covered need to be clearly defined in the policy. Products offering minimal protection may cover civil liability, employer's liability and product liability.

Personal insurance plays a major role in the aquaculture business, as fish farms require a sufficiently large workforce to operate. Depending on the type of facility, a large proportion of the employees may be qualified specialists, including biologists, vets, boatmasters and seamen, divers and feeders. Under Spanish law, all employees must have accident and life insurance.

Other forms of insurance are also needed, such as transport, vehicle, and industrial schemes for processing and packaging plants. There is a vast array of possibilities, all of which must be properly analysed and understood in order to cater for them competently and professionally.

# New aspects of breast cancer

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Madrid - Spain

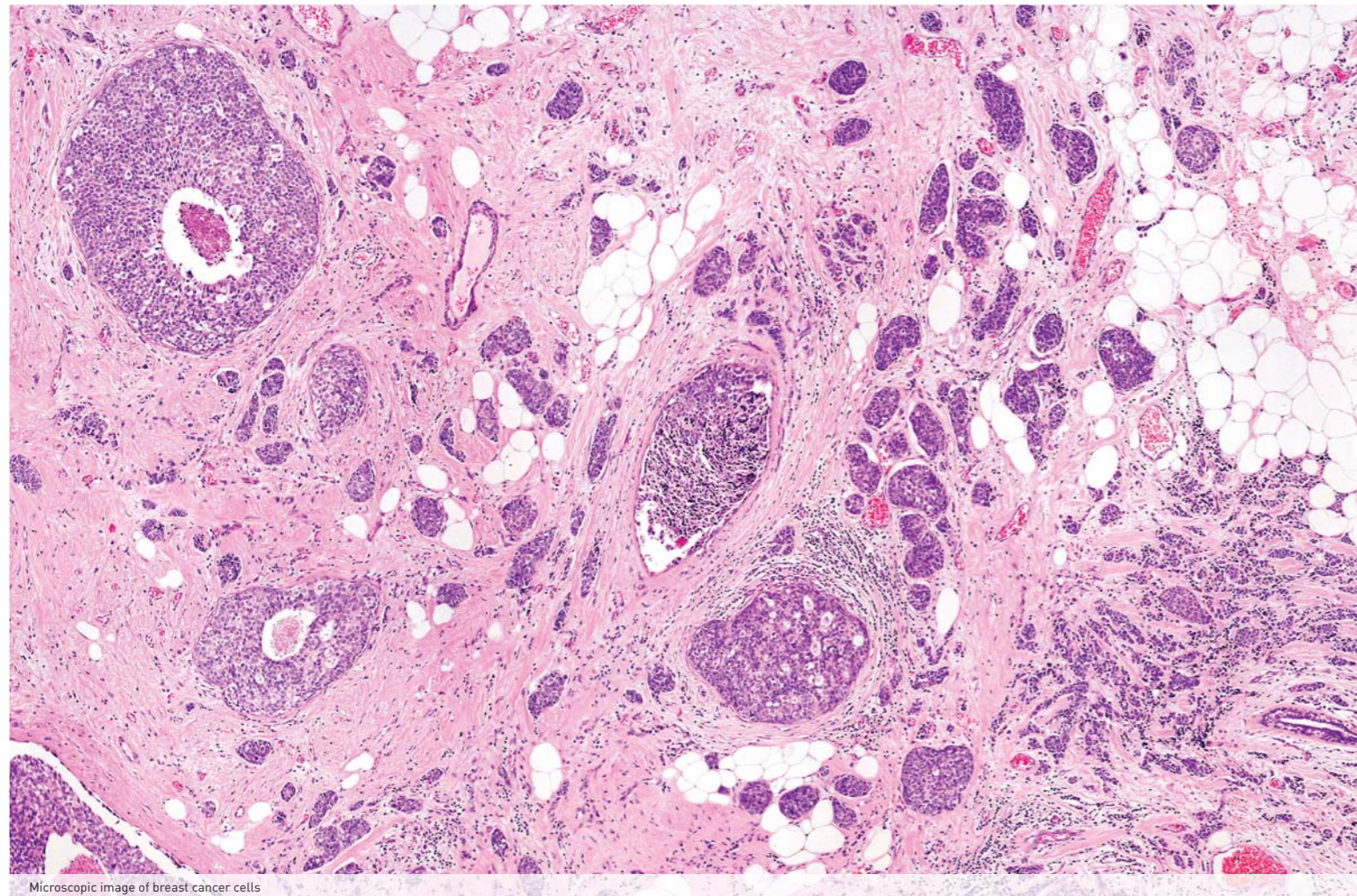
Our body is made up of many different types of cells. They grow and divide in a controlled way to maintain vital functions and the normal functioning of the body. Sometimes, this orderly process goes wrong. The genetic material, or DNA, of a cell can become damaged, producing mutations or changes that affect normal cell growth. When this happens, cells do not die when they should and new cells and structures appear, creating blood vessels for nutrition and developing a mass of tissue called tumour or cancer.

Breast cancer is one of the most important diseases present in the population of Western countries. It is the most frequent malignant tumour in females as well as the first cause of death, although its incidence varies depending on geographical areas. Differences are attributed to different lifestyles, environmental factors and diagnostic methods. The incidence of this type of cancer increases with the economic status, more than half of the worldwide cases come from developed countries.

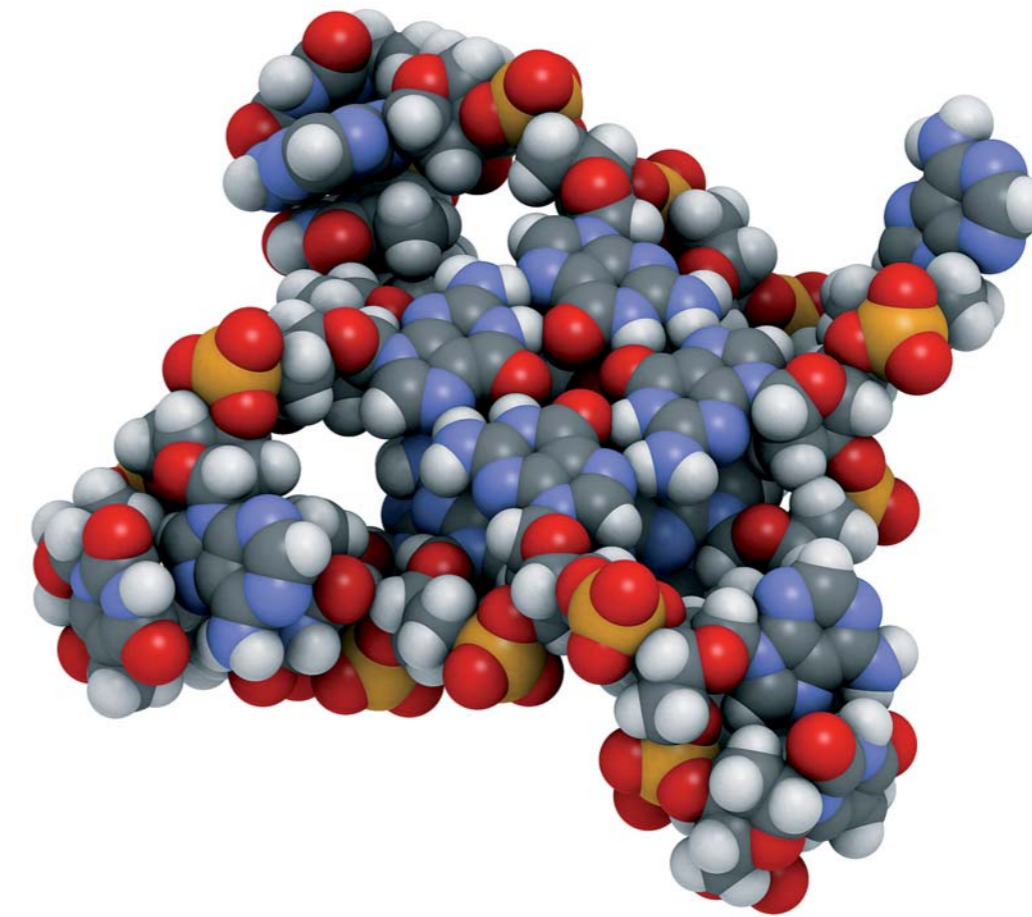
According to the International Agency for Cancer Research, IACR, the incidence of this disease is higher after the age of 40, increasing after the fifties. While adjusted mortality rate is 18.5%, a clear downward trend has been observed. It is rarely present in males, accounting for less than 1% of all breast cancers. In these cases, there is often a delay in diagnosis since this possibility is not usually considered and progression of disease is faster than in women due to the lower volume of the breast.

Thanks to population based screening programmes, the incidence rate has increased and improvements in diagnosis and treatment have placed women survival rate above 80% in Spain, according to EURO CARE-4 study.





Microscopic image of breast cancer cells



Structure of human telomeric DNA. Atoms are represented as spheres with conventional color coding: hydrogen (white), carbon (grey), oxygen (red), nitrogen (blue), phosphorus (orange)

Breast cancers frequently display heterogeneity in phenotypic features such as:

- ▶ Cell morphology.
- ▶ Gene expression.
- ▶ Cell surface markers.
- ▶ Growth factors.
- ▶ Hormone Receptors.
- ▶ Metabolism.
- ▶ Angiogenesis.
- ▶ Motility.
- ▶ Proliferation.
- ▶ Immunogenicity
- ▶ Metastatic potential.

### Biological aspects of the disease

Biological aspects define those processes and changes characteristic of tumour cells. It is important to know them to understand the development of the disease and the diagnostic methods used.

#### ▶ Metabolic reprogramming

Tumour cells have a different glucose metabolism than those of other tissues due to multiple cellular and environmental factors. This results in energy inefficiency and a higher flow of glucose. This feature is used in imaging diagnosis with a positron emission tomography scan (PET scan - Positron Emission Tomography).

This disorder results in a stimulus to cell growth, avoidance of apoptosis or programmed cell death, endless

replication potential, increase in blood vessel growth or revascularization, tumour invasion, metastasis and escape from immune system.

#### ▶ Hypoxia or lack of oxygen

This feature is closely related to aggressiveness, progression and resistance to certain chemotherapeutic drugs, besides induction of various gene expressions through transcription factors.

#### ▶ Angiogenesis

This is the physiological process of developing new blood vessels from pre-existing ones. While this situation occurs in normal conditions such as healing, it is an important phenomenon for tumour to develop and grow, not only in their original place but also in metastasis.

Tumours stimulate angiogenesis by releasing vascular endothelial growth factor.

#### ▶ Senescence – telomerase activity

Cellular senescence is defined as the limited capacity of cells to divide over a certain number of times. When cells avoid this process, they become immortal. This fact is related to chromosomal telomeres or specialised structures placed at the ends of the chromosome, which shorten with each cell division so that they reach a point where they cannot divide any longer.

#### ▶ Presence of associated macrophages

Until recently, the presence of macrophages in tumours was considered as a host response to the tumour. Now, we know they play an important role in tumour

progression and invasion since their function is to phagocyte foreign bodies penetrating the body.

Among the functions of the tumour-associated macrophages there is the release of stimulating and activating factors to enhance vessel growth, migration and tumour invasion, immune suppression and protection against treatment.

#### ▶ Stem Cells

These cells account for less than 0.1% of tumour cells and are characterised by their self-renewal and production of stem cells able to differentiate into mature and differentiated cells. These cells are more resistant to the action of drugs, including chemotherapy and radiation therapy. They are currently used as therapeutic targets.

► **Metastatic potential – Bone metastases**

83 per cent of patients with breast tumours have bone metastases, most often osteolytic (bone destruction), although 15 to 20% are osteoblastic (bone formation). Bone is involved by the interaction of the tumour with the bone environment by realising stimulating factors, which facilitates cell migration, adhesion of tumour cells to bone matrix, bone development and survival and proliferation of tumour cells in the bone.

**Classification**

Histopathological assessment of breast cancer remains the main source of prognosis and most powerful predictive information and the main discriminating factor for specific adjuvant therapy.

Histological type and size of tumour, number of nodes involved and presence of metastases are key factor for tumour staging.

**Breast cancer staging according to the American Joint Committee on Cancer (AJCC)**

Stage	TNM
0	T0N0M0
I	T1N0M0
A	T0, T1N1M0 T2N0M0
IIB	T2N1M0 T3N0M0
IIIA	T0, T1, T2, N2 M0 T3N1 N2M0
IIIB	T4 any N M0
IIIC	Any TN3M0
IV	Any T any N M1

Current personalised management of breast cancer mainly combines a constellation of histopathological characteristics (tumour size, histological type and grade, number of lymphatic nodes involved and metastases) with other biological factors such as sensitivity to endocrine therapy, using biological parameters as the expression of hormone receptors for estrogens (ER), progesterone (PR) and HER2 (Human Epidermal Growth Factor Receptor 2), an important marker and cancer therapeutic target, especially for breast cancer.

**New classification – molecular classification**

In recent years, several sophisticated genetic analysis techniques have been used to study breast tumour cells.

The relevance of this molecular classification is essentially based on improving treatment outcome, either by saving patients with good prognosis from side effects of unnecessary treatment or by choosing a subtype of patients with high chance of response to specific therapy.

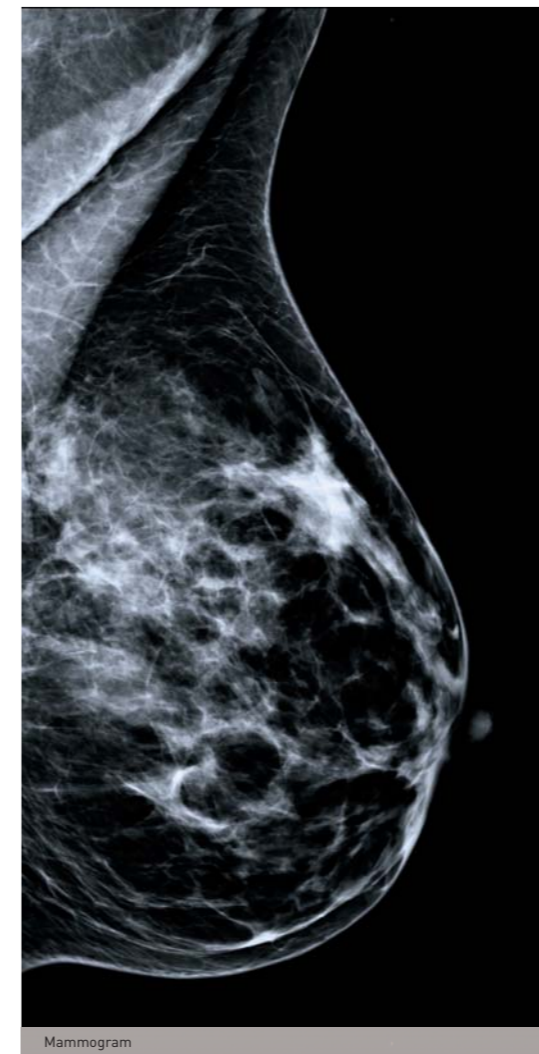
**Screening and diagnostic tests**

According to the World Health Organisation (WHO), screening is the presumptive identification of unrecognized disease or defects by means of tests, examinations, or other procedures that can be applied rapidly. In breast cancer, these tests are vital for early detection, diagnosis and treatment of disease. Let us go through them.

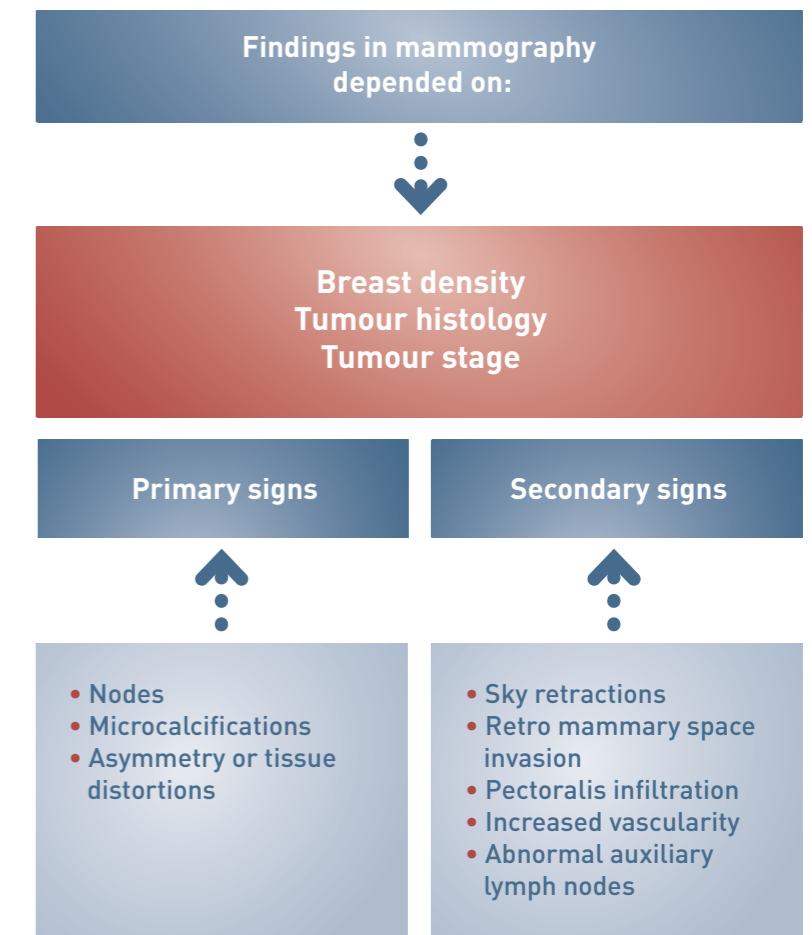
**Mammography**

Mammography is the ultimate test in the diagnosis of breast cancer.

It is the most common and reliable method with a sensitivity close to 80 per cent that changes according to several factors: internal structure of the breast, type of lesion, morphology, place, breast volume and the quality of image.



**Imaging signs in breast cancer**



Between 10 to 15 per cent of cancers with histological (tissue) analysis, have no radiological findings. Based on this fact, we need to have updated imaging techniques and if possible, complete the study with an ultrasound to increase sensitivity.

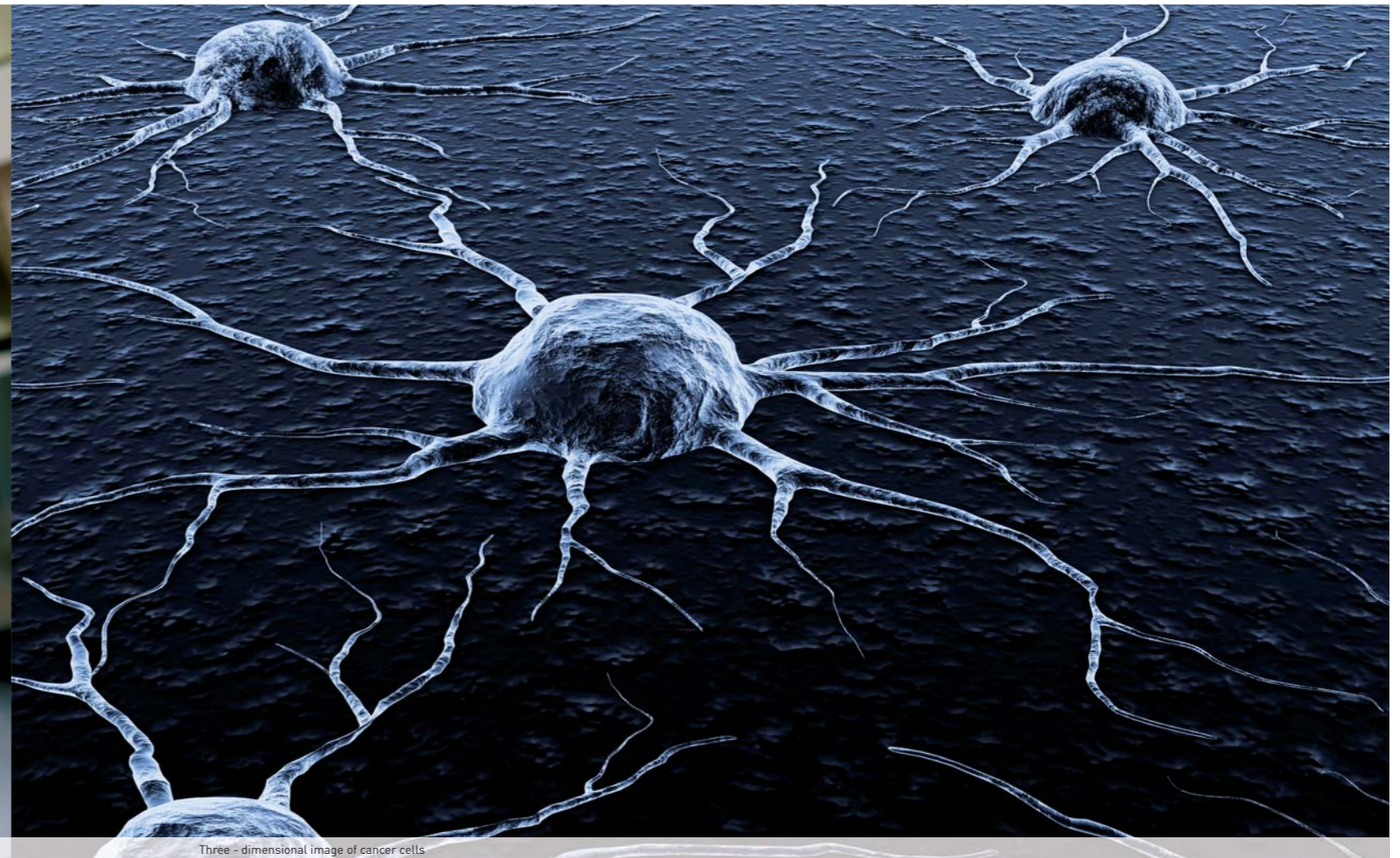
*Before having a mammography, medical history and clinical findings should be analysed. This will help looking for images of any symptoms patients may refer or the reason of medical consultation. Therefore, imaging techniques should adjust to medical and clinical findings. The reading of a mammography requires a skilled professional, capable of correlating image data with that provided by the patient.*

Mammography has achieved great technical developments, leading to improvements in diagnosis. New digital equipment and imaging manipulation techniques show us that the real warhorse is subclinical cancer, which early diagnosis and treatment ensure higher survival rates and a better plastic effect.

**New imaging techniques**

**Digital mammography or digital mammograph**

This technique eliminates the need for film, taking advantage of digital technology for screen display, printing or filing. It optimises the image, providing a uniform thickness of the gland thanks to a better view of the subcutaneous tissue. It allows image manipulation, resizing, rotation, changes



Ultrasound transducer placed on the breast

Three - dimensional image of cancer cells

in brightness and contrast, storage in a CD or an electronic file or even printing in a high definition laser printer. Radiation from exposure is reduced, as there is no need to repeat projections.

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***Do not forget that a conventional mammography performed in optimal conditions can provide high diagnostic information even if printed on a film and the image cannot be manipulated.***

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This digital technique is especially useful in microcalcifications. These are the most common radiological diagnosis in *carcinoma in situ*, and very important in early detection. It gives a clear view of the shape and distribution of deposits, which are the most accurate determining parameters when malignancy is suspected.

#### **Digital Breast Tomosynthesis (DBT)**

This revolutionary three-dimensional technique let us have multi-slice individual projections, which later on are reconstructed in the different space axis, providing high resolution images. This implies a better reading of the tissue as it avoids image overlapping. It is especially useful in nodular lesions and unstructured areas.

#### **Ultrasound**

In a few years, this technique has gone from just being used to differentiate solid from cystic images to be an essential complement to determine the degree of suspicion of a radiological undetermined breast lesion. Among its advantages, the ability to evaluate the internal structure, orientation, morphology and margins of the lesion, both in fatty breasts as well as in dense ones where mammography is more limited.

► As initial diagnostic technique, it is used in young women under the age of thirty with symptomatic dense breast as well as in breast feeding or pregnant women.

► As a complement to mammography, it has an important role in breast with prosthesis, milk ducts study in patients with nipple discharge, negative mammography with palpable lump, women with risk factors and dense breast and in confirmed malignant cases with information on tumour size, skin and chest involvement, multifocality and multicentricity.

► Ultrasound is also a guiding tool in interventional procedures and pre-operative marking.

#### **3D-4D Ultrasound**

The implementation of a specific software to ultrasound technique provides a three-

dimensional view of the tumour lesion to study its morphology and environment. This sophisticated software makes projections in several planes in space to assess, in terms of volume, the infiltration and deeper / superficial extension processing. It also helps placing the biopsy needle in the right position regarding the lesion.

#### **Elastosonography**

This recent technique is based on the principle of palpation of breast, providing an estimation of tissue strain and hardness.

There are currently two types of elastosonography:

Strain imaging, which identifies tissue stiffness and supersonic shear wave imaging, which identifies parameters such as maximum, mean

or minimum elasticity (stiffness) of the studied structure.

This technique should be considered as a benefit to ultrasound, allowing confirming the ultrasound benign hypothesis thus reducing the number of unnecessary biopsies and providing guidance to low-risk patients for a better follow-up.

#### **PET - CT**

Positron Emission Tomography, better known as PET, traces metabolic process, which anticipates anatomical abnormalities. Tomography or Computerized Tomography, also known as CT scan, produces multiple images of cross-sections of the body. The hybrid technique PET/CT shows abnormalities in metabolic activity, providing qualitative and quantitative information for diagnosis, treatment and prognosis. In breast cancer, the spatial resolution is limited since it does not visualize lesions with a diameter less than 10 millimetres.

#### **PEM**

PEM or Positron Emission Mamography comes in use thanks to the limitations mentioned above. Although currently under clinical study, it is already giving better results than magnetic resonance.

This technique is used for surgical planning and monitoring of neo-adjuvant treatment response and relapse. The main disadvantages are cost and technical difficulty in handling the radiopharmaceutical.

#### **Molecular imaging**

Molecular imaging is defined by the American Society of Nuclear Medicine as the visualization, characterization and measurement of biological processes at the molecular and cellular level in humans and other living systems. This technique enables real-time monitoring, no tissue destruction and can be used in all phases of cancer management, from screening to most advanced situations. It is associated with all imaging techniques, from simple to complex ones such as computerised tomography, magnetic resonance, ultrasound and PET, as well as non-ionizing electromagnetic imaging.



### **How to treat Breast Cancer**

Improved understanding of the mechanism of dissemination of the disease and the set up of population based screening programmes have resulted in an increase of early stage diagnosis and a very important development in treatment.

#### **Oncoplastic surgery**

Oncoplastic surgery provides surgical solutions to aesthetic breast reconstruction after mastectomy or during conservative surgery, as well as correction of any other sequelae from other treatments. It includes several mammoplasty techniques, breast reconstruction and risk-reducing surgery.

Breast reconstruction usually requires more than one surgery to get the proper aesthetic outcome. It may be indicated as prophylactic surgery in cases of high risk as well as in early or advanced stages of disease, which will condition reconstruction to be performed in the surgical act or later on.

#### **Hormonal Therapy**

From studies to identify hormonal receptors we know that patients who are positive for both estrogens and progesterone receptors response to therapy in more than 50 per cent of cases. The greater the number of positive cells with a higher concentration of receptors, the better the chances of response. Depending on the case, it also helps reduce the presence of contralateral breast cancer.

#### **Chemotherapy**

Chemotherapy together with targeted therapy and hormone therapy are the current systemic therapy approach for breast cancer. The success of the treatment is based on reduction or ideal final elimination of any chance of relapse, which likelihood is directly related to therapy efficiency and inversely proportional to inherent tumour risk of relapse, determined by prognostic factors.

#### **Elements in Therapeutic decision-making**

Prognostic factors are those that provide information on the clinical outcome at time of diagnosis, regardless of the therapy to apply.



ELIOT being used in a conventional operating room

The most well known current prognostic factors are:

- ▶ TNM classification.
- ▶ Tumour phenotype: tumour grade, hormone receptor status, lymphovascular invasion or HER2 expression.
- ▶ Age < 35.

At the XI Conference of the International Breast Cancer Group (IBCG) in 2009, it was agreed that decision-making based on predictive factors of treatment response was more appropriate than that based on risk prognosis factors. This way risk categories were eliminated to give way to therapeutic recommendations according to chance of response to treatment, hormone receptors (HR) and HER2 expression, as the only known predicting factors.

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**Prognostic factors require a series of features to be accepted as such. Their use should be simple, low resource consumption, reproducible, easily accessed and interpreted by clinicians. The only markers available meeting all requirements are: TNM classification, histological grade, menopause state, hormone receptor HR (expression), histological type and age.**

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### Radiation Therapy

For more than thirty years, the usual standard therapy for patients with breast cancer, after conservative surgery, was external radiation therapy, involving daily radiation doses for a period of six weeks.

In the last ten years, two new techniques have developed; one related to duration of treatment, implying fewer fractions with higher doses, the other related to the amount of breast tissue exposed to ionizing radiation.

All this brings two new approaches:

#### ▶ Partial Breast Irradiation (PBI)

PBI limits treatment to tumour bed and adjacent breast tissue, giving a margin of 1 to 2 cm, not including the whole breast.

#### ▶ Intraoperative Radiation Therapy (IORT)

This technique delivers an external single dose to different types of tumours.

Since the beginning of this century, a combined technique with the above mentioned has just started to be used: the Electron Intraoperative Therapy or ELIOT, which delivers a single radiation dose equivalent to the total fractionated external doses, after a wide resection or quadrantectomy, by using a mobile linear accelerator at the operating room.

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**It is advisable to choose a medical centre with the latest technology and a multidisciplinary team for a personalised therapeutic decision.**

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### Perspectives for Insurance

Continuous scientific developments, both diagnostic and therapeutic, involve not only an increase in life expectancy but also a better quality of life. For insurance purposes, this implies a constant update, not only in developing new products but also in the use of this new technology in the services provided in the policy.

Including in Health Care Insurance new tests such as screening, prognostic factors, genetics, all very useful for proper treatment, involve a significant increase in cost as well as an improvement in the quality of the offered services. This leads to a better position for the insurance company at the time of decision-making for the potential insured, a positive change in consumer's perception and, in some cases, a rise in premium.

The crisis we are going through does not help investing in more sophisticated equipment but it is generating new products with more specific benefits, such as critical illness for specific types of cancer or screening testing related to other elements in preventive medicine.

For risk assessment in personal insurance, these developments imply a new approach for health questionnaires and test requirements. Early diagnosis together with therapy for advanced diseases are providing a better risk classification, implying the acceptance of a higher number of cases with a premium adjusted to the real situation of the applicant.

The input of more accurate information to claims assessment will speed up the decision-making process and update the risk assessment process to make such decision easier.

The introduction of these scientific developments has brought a change in legislation. The predictive value of some of these new tests has made regulators to limit the use of the provided information, preserve the right to privacy and avoid discrimination.

Personal insurance has the challenge to integrate these changes to improve products and service and redefine risk classification.



### Acknowledgements

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# interview with

## Enrique Dans

Information Systems researcher and lecturer  
IE Business School  
Madrid - Spain



*“The burgeoning companies would be those with the best capabilities to manage clients information, without being intrusive”*

Enrique Dans was born in A Coruña, Spain, on 14 May 1965. His grandfather was a professional insurance broker from a small village in the northwestern region of Galicia. He completed a degree in Biology at the University of Santiago de Compostela and a PhD in Management, specialising in information systems, at UCLA's John E. Anderson Graduate School of Management. He pursued postdoctoral studies at Harvard Business School and obtained an MBA from IE Business School in Madrid. Since 1990 he has been a lecturer on Information Systems at IE Business School in Madrid. In his role as a technology researcher, adviser and general guru, he studies its effects on businesses, individuals and society at large. In addition to his teaching and knowledge-spreading work, he provides advisory services to a number of startups and established organisations. He is a regular contributor to newspapers and magazines including *El País*, *El Mundo*, *ABC*, *Público*, *Expansión*, *Cinco Días*, *Libertad Digital* and *PC Actual*.

He runs a personal blog which he started in 2003 and has his own name: [enriquedans.com](http://enriquedans.com). In 2006 he was shortlisted for the BOB awards in the best Spanish language blog category, and *El Mundo* newspaper included him in its list of the 100 best blogs in English and Spanish in 2009. In 2010 he published a highly successful book called *Todo va a cambiar* (Everything is going to change). He has an impressive record of Spanish and international academic honours, including: six from UCLA between 1997 and 1999; Principal Investigator, European Commission, Information Societies Technology (IST) Program, e-Broker Project, years 2000 and 2001; CommerceOne – SAP Research Grant, year 2001; and Accenture Research Grant, years 2003, 2004 and 2005.

The future of insurance and reinsurance is also bound up with the new society being shaped by IT Mobility and the communication and storage capabilities supplied by the web, the cloud and social networks open up new scenarios and potential advantages for business. Multi-channel distribution is already common in the industry and it is time to bring on new approaches to business and customer-company relations, with two-way interaction as a priority.

**Life is now inconceivable without mobile information systems. How has technology evolved since you have been a lecturer?**

The key change has been thinking about technology as a tool to do the same things, only better. In other words, companies and individuals use technology to do what they usually do but in a faster and more efficient way. Technology enables you to do things you never even imagined: keeping continuous contact with your clients, your employees, working from different places. There are many possibilities that did not previously exist. Technology allows doing different things, getting the best out of other things, thinking up other possibilities, interacting with people in different ways. Technology gives you tremendous capabilities for two-way interaction. Corporate communications have changed a great deal.



**What do you expect of communication? I want what I receive to spark a reaction in me, I want to comment on it, share it, make it go viral**





**What does a company need? People who link to those contents, comment on them and share them. We want the content to become viral. Social networks are the channel that enables you to achieve all that**

online influence. Many companies look for candidates with a strong online influence when they want to recruit an executive.

**What is your opinion on social networks?**

They create an environment where humanism and the value of the individual prevail. What we have is a new interpretation of classical humanism, where the individual is enhanced. Now the individual is at the centre of relations with the people around him or her, the people he or she communicates with. Take me, a simple lecturer at a business school. The possibility of inviting the chairman of a bank to have lunch used to be pretty remote. Now, I can do that.

**Are we moving towards a world pervaded by personal management, both of business and of technology and influence?**

We are only as important as our persona is. Today you are here, tomorrow you are there and the next day you are somewhere else. Nowadays, the logo on your business card is not as relevant as what people see when they look up your name. How do HR managers go about recruiting in the modern world? They google the names of the applicants. That is where they get information, the CV is merely a reference. If you say you have done a certain course, a Google search with the name of the university should bring up something relevant. More and more we are what the web, which is in everything we do, says about us.

**In Spain, social networks like Twitter, Facebook and LinkedIn are very successful, and the same goes for others like Tuenti. But others are not quite managing to take off. Is there not too much disparity between the different networks? Could the future lie in each company creating a network of its own for its employees, clients and so on, in line with its corporate interests?**

I do not think so. It is not usually a good idea to reinvent the wheel. The main thing you need in a network is the network effect, i.e. it has to include the people you want to contact. This is the main entry barrier. It is highly unlikely that a user will think it worthwhile to be on a network and feed the network just to communicate with you. People are on a network and feed a network for a broader purpose, which is why networks have become increasingly horizontal.



The network that has come to prevail in the professional world is LinkedIn.

**Do you think LinkedIn will finally find a way to fund itself?**

It is one of the most profitable companies. It is the one that is doing best, precisely because its business model is based on people paying when they are looking for work so that they can contact anyone. Additionally, there are companies that pay to recruit people on LinkedIn. There is also advertising, which can be segmented quite efficiently by geographical area. Facebook is the general-purpose horizontal network *par excellence*. I believe networks are what you put in them. Google+ does not seem

**Insurance and Social Networks**

**Many companies have lagged behind in terms of their web presence and use of the Internet. This is clearly the case in the Spanish insurance industry, which is beginning to need community managers to deal with the exchanges taking place on social networks. Is this a profession with a bright future?**

The role of the community manager has an enormous potential. Many of the areas we currently view as customer service, including call centres and numerous aspects of corporate communications, will be associated with a role very similar to today's community managers. In the modern world, a communications manager is not someone who issues press releases. The format itself is outdated. Today's corporate communications managers constantly monitor key influencers, who tend to disappear as fast as they spring up. The old list of journalists you used to send your press releases to is no good now.

**How does the insurance industry fit into this evolving environment?**

Insurance is traditionally quite a conservative industry, but there is already talk of social network strategies. Many companies have realised it is important. There has been talk about being on the social networks but I do not think it is a good idea to focus on that alone. It is not just a matter

of being there, you need to devise a strategy for online presence, and that means creating content. How do you create those contents? How do you go about maximising their impact using the social networks? Where? How? Through which channels? And so on. All this involves more than simply having a Facebook page. There is an approach that is not right. Many companies are falling prey to paralysis by analysis, which means repeatedly analysing to such an extent that they end up not doing anything. That is where I see a good deal of lost profit. Which companies have more business? Those which are most active online. Why is online selling associated with cheap selling? It is senseless! The people who buy online are not the people who buy cheapest. In fact, as online buyers, we have a higher purchasing power and are able to make more informed buying decisions. So, why is online selling regarded as a low-cost channel or a channel solely aimed at buyers? There are many other possibilities. If I improve the ways in which I can interact with my customers, ensuring there is a much more direct line between them and me, this enables me to do several things: I can give them much more support, I can set up a direct channel with or without intermediaries depending on what I think is best, and so forth. There are endless possibilities beyond "I am on the social networks".

to be going too strong in Spain, but it is the only network where I have half a million followers from different places. If you feed the networks, the networks bring back what you give them. The Internet is like the sea: you throw good things in it and it brings good things, you throw rubbish and it brings you rubbish. If you share contents on a network like Google+ and find that people comment on them, provided that you do not just abandon the conversation but look after it now and then, you will realise that investing more gives you more in return. I am absolutely fascinated by Google+. There are days when some of my entries have more comments on Google+ than on the blog itself. Now I am starting to play around with the communities Google has just launched. They are really interesting.

**One of the hardest tasks today is gathering information on the Internet and interacting on social networks all day. On the other hand, with all the technology available it seems anyone can do a journalist's job.**

Nowadays, many of the answers journalists look for are just one click away. This does not mean it is a good idea for journalists to spend all day clicking away. They need to be on the ground, interviewing people and so on. But there is a lot of information out there and all you need is a certain degree of skill. A commentator is not a journalist. There are many commentators, people who write a column from a secure position. And then there is something that is quite different: writing that is properly worked through, which requires

**Spanish language has a strong presence and very large new natural markets, some of them showing tremendous growth. Latin America is an extremely attractive market**

When companies finally embrace two-way interaction and begin to learn how to use it, they realise it applies to everything, even politics



## Towards a new communication society

### What kind of communication society is emerging?

A society where everything is permanently in contact, in every sense. In the insurance industry there used to be companies that had contact with the customer once, when they signed their policy. In the case of life insurance, you did not see the customer, but his or her heirs. Today, people are looking to have a much more ongoing relationship, where they can ask a lot more questions about all manner of things they are unsure about. What I want is my insurance company or my credit card company to automatically notice I am, say, at an airport terminal when I check in. Would you like to buy an insurance policy for that ticket to make sure you are protected? I would probably go for that product. Companies today should be analysed in terms of how much information their operation can generate and how efficiently they can use that information while avoiding invasiveness and keeping a respectful distance. How much information can an insurance company generate about its customers? Maybe at the time of signing the policy it can generate a fair amount but after that, is there any further interaction?

**Perhaps there is not any further interaction, but they do have a lot more information than banks do. If a given customer has policies**

**for health, life and home insurance, we can generate their profile.**

That is something you need to capitalise on. For instance, in the past few months I have adopted a healthier lifestyle. I want my insurance company to ask me for the relevant information to verify that my habits are much healthier now so that my risk profile can be updated and I can receive offers for other products. Maybe I can get a reduction on my health insurance and be offered policies aimed at people who do sports more often.

### How would you call the kind of society we are moving towards?

The key concept here is two-way interaction. Nowadays, TV advertising does not prompt a reaction in the user. There is no feedback. Plus, the third time it is shown, it says nothing new, so you are wasting money on branding that could probably be done more efficiently in a different way. What do you expect of communication? I want what I receive to spark a reaction in me, I want to comment on it, share it, make it go viral and so on. I want to engage with you if I find something interesting. When companies finally embrace two-way interaction and begin to learn how to use it, they realise it applies to everything, even politics.

looking things up, doing research, appraising the quality of your information, checking. All this is journalist work, which I do not do. I have worked with journalists in the past and I have a lot of journalist friends. I try to make their work as easy as possible.

### How do you think it will all evolve? Will social networks provide a springboard for business in the future? Have they become that already?

If you are not on social networks, you are missing out on a valuable resource. Many people who make purchasing decisions on your product get their information from the Internet. So what is it that really determines whether your information comes across on the web? The number of incoming links. Google

gauges you and ranks you primarily according to the number of incoming links you have, not visits or what you buy or do not buy. It is the number of people who link to your site. I have been producing information that people link to for the past ten years. Therefore, there are many roads pointing to my contents and lots of Google-indexed links that make me easy to find. Take a company that produces contents about its products, its promotions, how it interacts, its approach, its value proposition and so on. If all those contents are tucked away somewhere on their website without any links to them, they are not much use. So what do we need? People who link to those contents, comment on them and share them. We want the content to become viral. Social networks are the channel that enables you to achieve all that.

### How significant is a language like Spanish on the Internet?

Quite significant. It has a strong presence and very large new natural markets, some of them showing tremendous growth. Latin America is an extremely attractive market. Ultimately, it is all a matter of deciding where your market is and how you are going to reach it. I do not post any entries in English, even though I am bilingual. I do not blog in English because I have an established audience in Spanish and blogging in English would simply amount to translating myself. Going beyond translation and reinterpreting your own writing means not just a little more work but doubling your effort, which is not worthwhile. But in the end, what you have to consider, as a business manager, is where your clients are. If this is where they are,

you will have to relate to them however best fits their needs.

### If you had to name a few burgeoning industries for the next five years, which would they be?

The companies with the brightest prospects are those with the best capabilities to manage information, to obtain information from their clients and use it without being intrusive. Any intangibles- and information-based business has good prospects. Others do not have it so easy. For instance, a company whose business is preventing others from accessing information will find a great deal more difficulties. A record company or a publisher will struggle. If you are selling physical media, these sometimes change. Some of them are even no longer used. But if you manage information, you have excellent business prospects.

# interview with

## Alfonso Valera

CEO of Aon Benfield Iberia  
Madrid - Spain



Alfonso Valera was born in Madrid in 1968. He is married with five children and has devoted his entire career to reinsurance. He holds a degree in law and an Executive MBA from the IE Business School. He is also a certified translator of English. For most of his professional life he has been with Aon, which he joined in 1993 from a law firm. Until 1997 he was a Lloyd's broker at the London office of Gil y Carvajal & Partners. Since then, he has held a number of different positions within the group. In 1999, Gil y Carvajal was merged into Aon. He has been managing director of Aon Re Iberia since 2003 and CEO of Aon Benfield since 2008.

*“The payouts on recent catastrophe claims are ample evidence of the industry’s solvency, regardless of ratings”*

Reinsurers have a stable, low-volatility market in Spain. Their only source of concern lies in natural disaster risks, which are covered by the Insurance Compensation Consortium (CCS- *Consortio de Compensación de Seguros*). Boasting industry-exclusive technology, Aon Benfield, the world leader in reinsurance brokerage and consultancy, operates extensively in risk protection. The company’s top executive for Spain and Portugal reveals the details.

### What are the key milestones in the development of the group’s reinsurance division in Spain?

Aon Re was already the world’s largest reinsurance broker back in 1999 following a number of acquisitions, with revenues marginally below USD 1 billion. After the takeovers of the 1990s, Aon Re found itself controlling five companies in Spain which were all in the same business: Reaseguros Gil y Carvajal, Le Blanc de Nicolay, Alexander Howden, Sedgwick Re and Jauch & Hübener, with a total of 120 employees. In 1999 they were all merged together. But the breakthrough came in 2009 with the acquisition of the brokerage and consultancy firm Benfield, which was listed on the London Stock Exchange. Everybody wanted to get hold of it but it was Aon Re that finally clinched it. We increased our size by about 50 per cent. Our revenues took a leap from USD 1 billion to 1.5 billion and our workforce went from 2,000 to 3,500 strong. And that was not

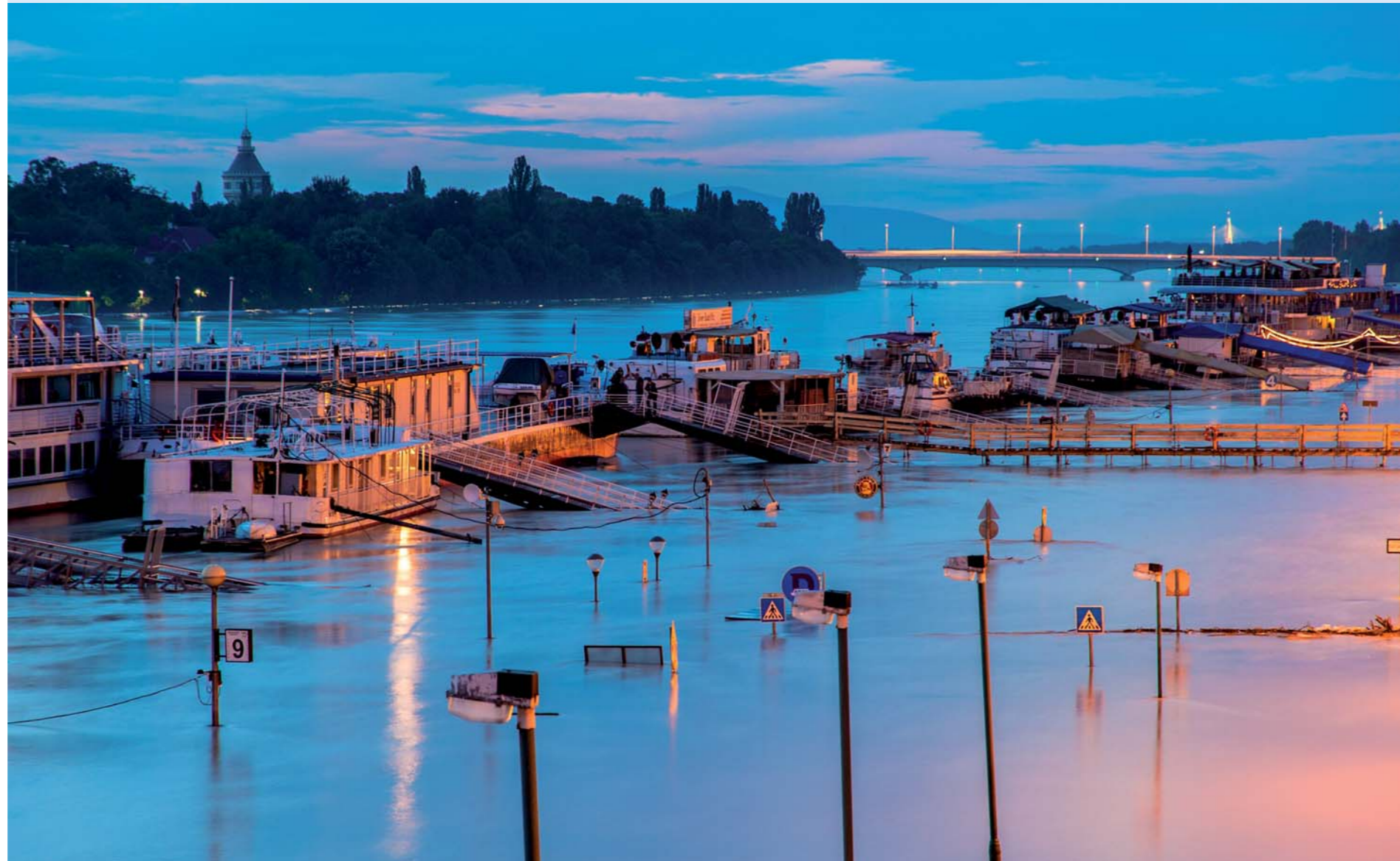
the last deal. Aon as we know it is the result of 435 acquisitions. Two years later, the Aon group bought Hewitt, an HR and outsourcing consultancy firm. That was a huge shake-up for the group. So, consulting currently accounts for 40 per cent of our revenue, although we obviously capitalise on synergies.

### What role does Aon Benfield play within a major global brokerage and consultancy group?

Aon Benfield has built a huge presence in Europe by buying other companies. It is now the leader in Spain, Germany, France, Italy and the vast majority of other European markets. In Spain, Aon Benfield Iberia forms part of Aon Benfield, the Aon Group’s reinsurance business line. We work separately and independently from the group’s direct insurance division, Aon Risk Solutions. 60 per cent of Aon’s business is in the risk category, which includes direct insurance and reinsu-

**Aon Benfield has built a huge presence in Europe by buying other companies. It is now the leader in Spain, Germany, France, Italy and the vast majority of other European markets**

Danube river overflowed when passing through Budapest last June 2013. Hungary



**The catastrophe management unit plays a crucial role for insurance companies**

rance. Aon Benfield is a specialised, fairly independent unit reporting to the group CEO. Our role is different from the role of Aon Risk Solutions. Our clients are insurance and reinsurance companies, not the actual policyholder. Beyond risk-related businesses, the Aon Group's consulting operations are mainly channelled through Aon Hewitt, which focuses on human resources.

**What is the relative size of the individual businesses in your portfolio?**

Life reinsurance in Spain is worth some EUR 400-500 million in terms of total premiums, and Non-Life is worth about EUR 3.2 billion. In Spain, 20 per cent of our revenue comes from the Life branch and we are working to grow that further,

but the figures are not that impressive in terms of reinsurance. Liability accounts for another 20 per cent and the rest is damage. It did not use to be like this, though. Revenues from liability were much more significant but the volatility in this market is quite low. Motor insurance was mayhem but now it is quite restrained. Problems are so few it could almost be considered as a commodity. We place our business mostly with the leading international reinsurers and, in the case of marine and aviation risks, special schemes and retrocessions, with the London Exchange. Domestic business usually stays in the Spanish reinsurance market. Aon Benfield Iberia places reinsurance premiums from the Spanish and Portuguese markets worth approximately EUR 350 million in total.

**Aon Benfield is the market's leading brokerage firm. What is your greatest strength?**

Our capacity and our analytics capabilities are what makes a difference. Aon Benfield Analytics is made up of more than 400 experts in a range of disciplines including actuarial sciences, mathematics, meteorology and geology. This division includes our catastrophe risk management unit, Impact Forecasting, which has developed its own, industry-exclusive forecasting models (most recently a flood model for Eastern Europe and an earthquake model for North Africa), as well as catastrophe management instruments such as Impact on Demand. The catastrophe management unit plays a crucial role for insurance companies and we believe

Aon Benfield is the clear market leader in this area.

As regards other elements that make a difference, we have *ReMetrica*®, Aon Benfield's proprietary dynamic financial analysis software, which we use in reinsurance optimisation and actuarial analysis studies. As well as being used by us as our chief analytics tool, we have licensed more than 250 insurance and reinsurance companies to use it for internal calculation purposes. Every year a host of companies ask us to provide advice on the purchase of their reinsurance. We study the volatility of their portfolios and work out the expected profit for the reinsurer or the cost of capital for the reinsurance ceded.

**Reinsurance premiums have remained stable for the last ten years without any increase. Global reinsurance is absolutely stable**



**The Spanish market is quite nicely proportioned. There is a large supply of reinsurance but the demand is not so plentiful, particularly taking into account that in Spain natural disasters are covered by the CCS**

**How efficient would you say Analytics and ReMetrica® are at assessing loss ratios and catastrophe scenarios?**

Focusing on the Spanish market, I would say it is pretty predictable. Natural disasters represent the biggest challenge in terms of predictability. In Spain, these risks are covered by the Insurance Compensation Consortium (CCS) in a number of insurance classes. We do not work with the CCS because it is self-sufficient in its role. Besides, disasters are not that common in Spain. Aon Benfield invests USD 100 million every year in its analytics department. In Spain we have six actuaries working to cater for companies that ask us not only for reinsurance optimisation studies but also for an analysis of their portfolio.

**Are these software applications designed to analyse uncommon risks, such as offshore oil rigs for instance?**

Major risks are usually placed on facultative reinsurance. Aon Benfield Analytics and ReMetrica® are used to analyse our clients' portfolios, which are reinsured on a treaty basis. We are in no doubt about who our clients are: insurance companies. We give them guidance and advice.

**What do insurance firms expect from reinsurance today? Are the major insurance groups not increasing their retentions?**

Traditionally, insurance companies have turned to reinsurance for financial protection. This is still the case. Reinsurance premiums have remained stable for the last ten years without any increase. Global reinsurance is absolutely stable.

**The market has seen movements towards consolidation to a certain extent. Does this mean there are now fewer reinsurers?**

Everywhere you go you see concentration. In Spain too there are fewer insurance companies. But I do not think there has been a significant reduction in the number of reinsurers.

**Leaving aside captives registered in tax havens, what is the current situation in the reinsurance market?**

It is certainly complex because everything is changing. For example, thanks to a number of incentives, up to 35 reinsurance companies have established themselves in Zurich over the last five years. Globally, there are still two leaders: Munich Re and Swiss Re, which operate in every market

## HQ in Europe

**Aon has been headquartered in London since 2012. How is Aon Benfield organised?**

Basically, we are divided into two regions: the Americas, including North and South, with head offices in Chicago, and then the rest of the world, which is led from London and is split into EMEA and Asia-Pacific.

**What risks is Aon Benfield most concerned about?**

The prime risk for reinsurance is natural disasters, i.e. earthquakes, storms, floods, and the like. These set the standard. As such, they are the risks Aon Benfield and all the other major reinsurers devote the most time to. They are also where the stakes are highest. This is where capital markets and traditional reinsurance capacity converge. In Bermuda there is a huge market revolving almost exclusively around underwriting catastrophic risks in a commendably opportunistic, short-term spirit.

**The UK has lost its triple-A rating for the first time in history. Any consequences?**

A downgrade from triple-A to double-A does not entail too many problems. Currently, only 11 countries still have a triple-A rating, four of which are in the euro zone: Finland, Germany, Luxembourg and the Netherlands. The other four European nations that have their own currency and a triple-A rating are Denmark, Norway, Sweden and Switzerland. There is only one Asian country, Singapore, one in the whole of the Americas, Canada, and lastly Australia. These are the 11 countries with the highest credit rating according to the three agencies. At one point, reinsurance companies had their credit ratings downgraded across the board. After that, many of them were not too concerned about recovering their previous rating. They learned to live with the double A because the general view is that the triple A requires having too much idle capital. Nobody is out to find triple-A reinsurers - there would be no point. The payouts on claims are ample evidence of the industry's solvency, without the need to meet this requirement.

**How has the global reinsurance market been affected by the financial crisis?**

One of the first issues we need to take into account is the duration of the crisis. It is proving so long, there is quite a mixed bag. But the fact is that when the bank meltdown occurred, apart from AIG the insurance and reinsurance industry hardly produced any other major problems. This holds especially true in the case of reinsurance. The top 25 reinsurance companies survived. Focusing on Spain, we are already seeing some downgrades as a result of the global crisis. But these are more down to the global and the domestic situation than to any management issues. Recently, a reinsurer was telling me how they undergo stress tests every year. But paying for huge catastrophic claims in Japan, Australia, New Zealand and Thailand in the middle of a financial crisis is a major stress test in itself! All reinsurers have fulfilled their payment obligations. One advantage of reinsurance is that it is a high-capital industry.

**Some insurance companies are not large enough to have a reinsurance division. What moves insurance companies to seek your services?**

It depends. Every company is a world itself and every market is different. In the English-speaking world, reinsurance is for the most part brokered. In the UK, 90 per cent of business is placed through a reinsurance intermediary. In the US that share is probably 70 per cent, whereas in Germany it might be just 20 per cent. The reasons that drive an insurance company to use a reinsurance broker vary. Some use them merely for convenience's sake. Others actually need help, or risk and financial flows analysis, or placement analysis, or relations analysis because they do not have these capabilities. Obviously, we believe we provide valuable advice and we have seen the brokerage share grow substantially over the last few years. We think this trend will endure.





**Focusing on Spain, we are already seeing some downgrades as a result of the global crisis. But these are more down to the global and the domestic situation than to any management issues**

with very substantial turnovers. Then, there are minor variations in the top ten list. I do not really believe there is a high degree of concentration. Ultimately, all the discussions going around in the market boil down to the fact that there is a constant demand and a growing supply. This has been the case for the past ten years. The Spanish market is quite nicely proportioned. There is a large supply of reinsurance but the demand is not so plentiful, particularly taking into account that in Spain natural disasters are covered by the CCS. In other markets you see capacity shortcomings, supply contraction and rising prices, which have never happened here.

That is why Spain is extremely stable where reinsurance prices are concerned. In all my career I have only seen one instance of supply contraction and it was a consequence of 9/11. There have not been any similar situations since.

**Reinsurance has always been a highly international market. Which country transfers the most risk through reinsurance?**

The largest market in the world is the US, undoubtedly. Within the US, the largest transferor to reinsurance is the state of Florida, which is to be expected, given the great frequency of hurricanes and high exposure of people and property there.

**What role does Aon Benfield play in relation to captive reinsurers?**

Very few of the captives belonging to industrial or financial groups take on third-party business. Aon Benfield provides advisory services in this field. Ultimately, captives provide these corporate groups with a means of self-insurance and a way to optimise their resources and tax policies. We also provide advice for reinsurance company set-up and financing.

**What about risk securitisation services?**

Aon Benfield is the leading operator in the placement of catastrophe bonds, ahead of all our competitors in this area, which include some large investment banks. We have a dedicated unit for this area, Aon Benfield Securities, which operates as an investment bank providing advisory services and catastrophe bond placement and underwriting for our issuer clients.

**With good returns for bond holders?**

Usually, yes. That is why these bonds continue to be issued and placed on a recurring basis. There were moments of uncertainty at the beginning of the financial crisis because Lehman Brothers was the guarantor, but those issues were recomposed. Our job is placing the issues; we operate as an investment bank.

**What other lines of business does Aon Benfield engage in?**

In addition to analytics and investment banking, the group provides advisory services

## Stable Spain

**How is the Spanish reinsurance market viewed from outside?**

The fact that the disaster business is almost inexistent makes Spain a highly individual market and therefore largely stable. The country's situation has had an impact on ratings and this has been discussed at length within our dedicated department because when ratings drop, alarm bells start ringing and everything is put under the microscope. Fortunately, Aon Benfield has had the good sense not to take any measures with regard to Spanish entities. Although there has naturally been a great deal of concern.

**Who is your main client in Spain?**

MAPFRE, by far. Namely accepted reinsurance, more than ceded reinsurance.

**To what extent is the Spanish market appealing to international firms at the present time?**

We will soon find out. At the moment, we are closely monitoring Cesce's privatisation, which is under way. Credit insurance is a very special business. In 2012, we took part in a huge life financial reinsurance deal. This becomes an option at times of momentary capital needs. It simply involves monetising certain flows. Enormous profits were produced. Basically, it concerns the banks, which have a choice of three options: they can keep their business unchanged, sell it or resort to financial reinsurance, which avoids having to sell the company and allows them to recover it at a later stage. This is recorded as a real sale and is indeed a real sale. There is scope for more transactions like this in Spain and in Europe as a whole. In the deal Aon Benfield Iberia arranged, we managed to secure a purchase by Berkshire Hathaway, much to the surprise of many and proof that a market like Spain always arouses interest.

**What are you concerned about at the moment?**

We are concerned about growth, like everyone else. In Spain and Portugal, the insurance and reinsurance markets are undeniably going through a stage of contraction.

Between Spain and Portugal combined, we bring in just under EUR 14 million in brokerage fees. The actuarial analytics resources we use in Portugal are based in Spain. The Portuguese reinsurance market is completely different from the Spanish market. It has high volatility, high catastrophic risk, and it is smaller in size. One area where we can help our clients is support and access to the Aon Benfield network. You have to realise we place reinsurance premiums worth more than USD 30 billion, with a high degree of geographical diversification. We have offices in many countries around the world.

**Turning to the motor insurance branch, how does the official Disability Percentage Table *Baremo* affect your reinsurance placements?**

This goes back to the 1990s, when the claim ratio in the motor branch was extremely complicated and volatile. There was no way of knowing how much compensation would be payable for personal injury. Once the Table became mandatory by law -which is unique in Europe- the problem ended. Moreover, the accident rate has improved. It is now at a similar level to the 1960s, when there were only one million cars on the roads, compared to 31.4 million cars today, so the situation is altogether different. For the purposes of reinsurance, this has meant increasingly higher retentions. Reinsurance works on a stop-loss basis in this branch. In other words, the reinsurer pays the losses exceeding, say, EUR 1.25 million, although some companies retain much larger sums. Only a very small proportion of losses are transferred to reinsurance.





Flood in Bangkok on November 2011. Thailand

**The country's situation has had an impact on ratings and this has been discussed at length within our dedicated department because when ratings drop, alarm bells start ringing and everything is put under the microscope**

and reinsurance programme placement. We have a number of speciality areas (energy and marine, credit and suretyship, civil liability, retrocession, etc.) and we are market leaders in reinsurance programme placement, including both facultative and treaty reinsurance. We are currently placing approximately USD 30 billion in reinsurance premiums globally, which gives us not only scale and negotiating leverage but also a thorough understanding of the market. We additionally offer support services in client relations with rating agencies and advice on insurers and reinsurers. We are familiar with the capital models used by the leading agencies and we provide guidance on how they work and what effect certain decisions can have on a client's rating.

**What is your view on Asia?**

Asia is an extremely interesting region which is very much a focus of attention for Aon Benfield. It includes large, well established markets like Japan, where Aon Benfield has had a long, significant presence. There are also large developing markets where significant growth is expected in the near future, such as China. Reinsurance is crucial for businesses in this region due to the high incidence of natural hazards. Proof of this is the fact that in 2011 two of the largest losses in history took place in Asia: the Tohoku earthquake and the Thailand floods. In addition to Japan and China (Beijing, Hong Kong and Shanghai), Aon Benfield has offices in India, Pakistan, Thailand, Vietnam, the Philippines, Taiwan, Indonesia, Malaysia and Singapore.



Due to Mr. Juan Antonio Pardo's farewell and in order to show him gratitude for his work as Chairman of Trébol magazine, Mr. Pedro de Macedo, President at MAPFRE RE and member of the Editors Board gave him a commemorative plaque.

agenda

COURSE ORGANISED BY FUNDACIÓN MAPFRE

Course	Method	Beginning	End
Reinsurance	E-learning	14 October 2013	7 February 2014

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