



The restructuring of the Spanish salted fish market

KNUT BJØRN LINDKVIST

Department of Geography, University of Bergen, Fosswinckelsgt 6, NO-5007 Bergen, Norway (e-mail: Knut.Lindkvist@geog.uib.no)

LORENA GALLART-JORNET

SINTEF Fiskeri og havbruk A/S, Brattørkaia 17 B, 7465 Trondheim, Norway (e-mail: Lorena.G.Jornet@sintef.no)

MAI CECILIE STABELL

Department of Geography, University of Bergen, Fosswinckelsgt 6, NO-5007 Bergen, Norway (e-mail: Mai.Stabell@geog.uib.no)

This article discusses how cultural, technological and social factors contribute to the restructuring of the Spanish salted fish market and production systems. The analytical principles used are institutional, evolutionary socio-economic theories on spatial, technological and social change. A major focus of the analysis is the use of production chain theory to analyze the Spanish salted fish market. The main issue is whether Spain, as a traditional salted fish consumer market, is more influenced by technology and supplier strategies than by cultural aspects and consumer traditions. The strategies of Icelandic salted fish suppliers, better preservation systems and new salting methods seem to have influenced the restructuring of the Spanish salted fish market more than cultural factors. Nevertheless, without the Spanish tradition of salted fish, the new light salted fillets and desalted products most likely would not have been accepted by consumers. In addition, the Icelandic influence proves the strength of national Icelandic production systems.

La restructuration du marché du poisson salé en Espagne

Cet article se penche sur la façon dont les facteurs culturels, technologiques et sociaux font progresser la restructuration du marché espagnol du poisson salé et des systèmes de production. L'approche analytique utilisée repose sur les principes théoriques de l'évolution socioéconomique et institutionnelle en matière de changement spatial, technologique et social. Notre analyse porte principalement sur le recours à la théorie de la chaîne de production dans l'étude du marché du poisson salé en Espagne. La grande question soulevée est celle de savoir si l'Espagne, en tant que marché traditionnel de consommation du poisson salé, est davantage influencée par la technologie et les stratégies des fournisseurs que par des éléments culturels et les traditions des consommateurs. Les stratégies mises au point par les fournisseurs islandais de poisson salé, les systèmes de conservation améliorés, et les nouvelles méthodes de salaison auraient eu une plus grande influence sur la restructuration du marché espagnol du poisson salé que les facteurs d'ordre culturel. Cela dit, la tradition espagnole du poisson salé aurait permis aux nouveaux filets légèrement

salés et aux produits sans sel de faire leur entrée sur le marché de consommation. De surcroît, l'influence de l'Islande est une preuve de la vigueur des systèmes de production nationaux islandais.

Introduction

The Spanish market for salted fish products is undergoing a fundamental restructuring. Import volumes of salted fish to Spain almost doubled between 1991 and 2005, from 30,000 to 59,000 metric tons. New products have been introduced, and the entire process of salted fish production has changed. This article aims to determine the key factors responsible for such trends in one of the world's leading seafood markets. Although the Spanish salted fish market is influenced by tradition, the article examines whether modern Spanish salted fish processing for consumption is more influenced by general technological, social and economic factors. These external factors include new salting processes, trends among consumers towards demanding more packaged processed products, and the adoption by Spanish market participants (consumers and processing firms) of Icelandic quality measures for salted fish. In other words, is Spain a technology- and supplier-driven salted fish market? Indirectly, this question addresses whether traditions among Spanish consumers and producers are having less influence.

Theoretical Perspective

Nordic and Spanish research into the salted fish industry has concentrated on technological issues in the production process. Focus has been on salting (Barat *et al.* 2002; Andrés *et al.* 2005), additives for salting and desalting; Thorarinsdottir *et al.* 2001; Esaiassen *et al.* 2005; Fernández-Segovia *et al.* 2006) and fresh fish as raw materials (Lauritsen *et al.* 2004; Barat *et al.* 2006). Social science perspectives on the analysis of production chains in salted fish industries are not common, although technologies are implemented by firms and individuals who act within socio-economic frameworks. However, scientific research seems to indicate that the wrong treatment of the catches on board the fishing vessels

is often the reason for poor end-product quality (Joensen *et al.* 2004).

Many changes in the production chain processes of industries have resulted from an interaction between the use of technology, organizational characteristics related to the different industries, specific demand and action spheres, and the production and demand structures of specific markets (Storper 1997; Dicken and Malmberg 2001; Crevoisier 2004). Crevoisier (2004) linked technology, organization and territories to innovative environments through the agents' ability to make use of the right technology (machinery, know-how and innovation orientation) and organizational arrangements (adapting to governance rules and participation in production networks) within the characteristic material and institutional settings of the specific territories. Collaboration in local production networks in specific territories produces joint production experiences, which are accumulated as non-codified or non-traded traditions, conventions and competence resources. When an innovative environment or milieu of producers also establishes its own insight into what takes place, not only in their own territories but also in the other markets they rely on, the principal actors of such environments may achieve a thorough and relational understanding of the functioning and trade conditions of the whole production chain. The traditions, investments and competence formation that result from the production practices then produce an immobile, localized and socially shared knowledge asset within specific territories, which determines much of the subsequent behaviour (Dicken and Malmberg 2001; Crevoisier 2004). This territorial influence was labelled the 'matrix-effect' by Crevoisier (*op. cit.*).

However, the technological influences may at times be so strong that former systems and technologies are exposed to 'creative destruction' (Hayter 1997). Destruction in this sense means that former products become obsolete and replaced by new products. Moreover, former production environments may lose influence if they

are unable to follow new demand trends. A technology concept that includes new production solutions and new knowledge may enforce new organizational and production practices and be the main explanatory variable for the relocation of industries. Furthermore, new consumer trends may change demand patterns from traditional areas to new products where some of the former producers are unable to compete.

The changes in technology and product markets are followed by organizational restructuring among participants in consumer markets, as well as among producers. Such transactions in the stages between producers and market players and consumers, which define the production chain, are seen within the perspective of Edgington and Hayter (1997), who among others focus on territorial components, governance structures and specific institutional contexts of the production chain. In accordance with the production chain theory and the concept of 'milieu' or production environments, this article defines a market as the specific environments and their involvement in production and transactions in each of the production stations throughout the whole chain. The production chain is then composed of markets with different interdependent functions and transactions; from those stations of the chain that present the raw products in the first place to the different consumer environments (or segments) at the other end of the chain, which express preferences, viewpoints or conventions on the quality of the work performed in the stations prior to the consumer market.

For many producers, who want to strengthen their positions in transactions in the first parts of the production chain, a common strategy is to participate in networks or through different types of alliances. How well such collective behaviour develops often depends on the institutions and production rules and practices (conventions) that prevail in the different production systems of specific regions and the different types of markets that dominate the regions. Successful production environments, which involve value adding of raw products, for instance by salting fish, may try to establish production practices or institutions enabling and strengthening market intelligence, knowledge transfer, interactive learning and innovation among participants of their production environments (Cornish 1995; Storper

1997; Boschma 2004, 2005). And, if one group of producers in the initial stages of the production chain is able to replace customers' market conventions with their own producers' conventions, then the influence of the consumer markets will be reduced, and possibly by less than the influence of the production territories. This article is concerned with this last possibility.

The remainder of this article investigates the changes that are taking place in the production chain and production system of the Spanish salted fish market. Technology, organizational changes and the markets as territorial settings are seen as influencing factors. The main hypothesis is that the forces driving the restructuring of the salted fish production system in Spain are the strategies and actions of suppliers and their processing locations in the value chain. The main participants in both producer and consumer markets of the salted fish value chain are further affected by changes in salted fish technology and by associated socio-institutional processes. The incorporation of technology into the production strategies in accordance with market trends ensures the success of participants.

Figure 1 shows the interrelationship between the variables that create changes in the different stages of the production chain. Every production system must respond to technological changes affecting the different markets through different types of organizational or institutional adjustments. The two markets in the model are the resource and the consumer markets. They are assumed to represent Crevoisier's territorial component. The resource markets are exemplified by countries such as Iceland and to a smaller degree Norway. Although Spain as a consumer market is considered to be divided into different consumer regions with their own specific consumer demands for salted fish (Gallart-Jornet *et al.* 2005a), this article will discuss Spain in general. Technological and institutional influences affect all markets but in different ways according to the tradition and cultural filters that their regionally influenced frameworks and participants have developed (Dicken and Malmberg 2001). Therefore, behind any institutionalized way of implementing new products in markets using new technology or new organizational forms are the firms or other participant groups that influence either supply or buyer markets. Participants implement

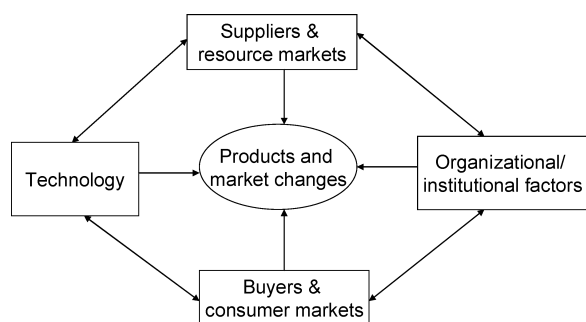


Figure 1
Theoretical model for investigation of market adaptation among salted fish producers

technologies, supply markets, import salted fish, and even consume it. Technology and institutions are expected to have consequences for the salted fish market in Spain, and so are firms that set up strategies and use technologies and new institutional arrangements to gain a competitive advantage in the Spanish market, which in the end is the key factor for change. When the model of market adaptation (Figure 1) contains bidirectional arrows, it indicates that the participants use technology or institutional rearrangements to affect markets and that technology and institutions also influence the behaviour of the participants in the markets.

The remaining discussion is organized around the model (Figure 1) and will focus on product and market changes. First, we introduce the territorial aspects of the model by presenting the *buyer and consumer markets* in Spain through reference to the historical development of the salted fish industry. The *technology* influence is illustrated in the next section using the different salting techniques and the chemical changes that are involved in the development of new salt for fish production. In addition, the economic consequences of using modern salting techniques rather than traditional techniques are discussed. Then we discuss the *supplier and resource markets* using information from interviews with Icelandic salted fish producers and outlines how these Nordic producers restructured Spanish *institutions* and influenced the Spanish consumer market and its perceptions of what constitutes a good salted fish product. The consequences of

these market developments, referred to as *product and market changes* and measured by import statistics and territorial changes, are presented in the next section. They give an idea of how the different influencing factors are able to contribute to change in the traditional home market for salted fish products. The last section sums up the discussion and answers the research questions raised in the introduction.

Data collection

Sixteen, or two-thirds, of the 24 registered importers to Spain of traditional salted fish from Norway were interviewed intensively during autumn 1998. Information was also collected from Norwegian producers and from Seafood Norway's Madrid office. The interviews included firms across Spain, north of Madrid. Although we focused on imports from Norway, all firms imported from other countries as well, and the Icelandic influence was striking. These firms were responsible for most of the total import volume into Spain in 1998. The five most important firms (according to the import volumes obtained from the 1998 interviews) were interviewed again in either 2004 or 2006. In addition, four more companies from the Basque region and Cantabria were included in 2006. Moreover, four other well-established firms were included from the Valencia province to enable us to study the southern Spanish salted fish industry. The coastal region from Barcelona to Valencia was examined by Gallart-Jornet and colleagues, who interviewed 13 storekeepers and producers in 2004 (Gallart-Jornet *et al.* 2005b). The numbers of interviews with firm representatives in Spain were 16 in 1998 and 26 between 2004 and 2006. Production of salted fish in Norway has been examined by Lindkvist and Hauge in 2000 and by Haaland in 2002. Altogether, 40 Norwegian salted fish producers and key informants were interviewed from 1998 to 2002. The section covering the Icelandic strategy of conquering the Spanish salted fish market is based on up to 2 hours of in-depth interviews in 2006 with four of the most central Icelandic salted fish producers exporting to Spain. Their stories confirmed the changing characteristics of the Spanish salted fish industry obtained from the Spanish interviews from 1998 to 2006 and the information

given by the Norwegian investigations referred to earlier. Finally, the discussion of the history of the salted fish industry and salted fish technology is based on works by historians who focus on the traditions of the Spanish salted fish industry. The statistics used were made available by Seafood Norway's statistical department (Lauritzen 2006).

Salted Fish History and Development of Markets in Spain

Salted fish products have had an important place in Spanish culture. According to Gallart-Jornet *et al.* (2005a), the native Iberians were already drying and salting fish, mainly tuna, in pre-Roman times. Using salt as a means of conserving food was an easy and cheap way to produce durable products. The area, being rich in salt and having a dry, hot summer climate on the Mediterranean coast and on the inland plateau, was naturally well suited for the preparation of dried salted fish. During Roman times, *Hispania* was praised for its high-quality salted fish and the area was considered one of the most important regions for producing and exporting such products. Over time, specific production cultures developed as traditions and skills were passed from generation to generation. During the 'barbarian' and later the Muslim domination of the Iberian Peninsula, the ancient tradition of drying and salting fish declined in importance and almost disappeared. However, in the thirteenth century, the tradition re-emerged and showed that, despite limited production, the fishing techniques and the organizational system for catching and trading tuna had survived (Gallart-Jornet *et al.* 2005a). This was also the period when Christianity in the form of Catholicism became the dominant religion and, because of the strong presence of fish in the Catholic diet, some development within the salted fish industry was inevitable (López Losa 2002). The fish came from water and were thus a 'cold' food, permitted for consumption during Lent and other days of abstinence. In addition, dried salted fish, especially codfish, was a cheap source of high-quality nutrition for poor people, replacing both fresh fish and meat, which were more expensive.

The Canadians, the British and the French were central suppliers of salted codfish to Spain until the twentieth century, when they lost ground to the Nordic countries and to Spain's own trawler fleet. However, the Norwegians were also important suppliers of salted fish before the Nordic countries became the dominant supplier region. Although the first cod cargo from Kristiansund, Norway, had arrived in Bilbao in 1762, it was not until the middle of the nineteenth century that Norway augmented the supplies from Canada. Norway's traders increased their supply of dried salted cod throughout the nineteenth century from between 5,500 and 8,000 tons in the 1830s to between 16,000 and 24,000 tons in the 1860s (Grafe 2004). The New Foundlanders regained importance as suppliers for a short period after the First World War (Gallart-Jornet *et al.* 2005a). Beginning in the early 1920s the Spanish cod fishing fleet was rebuilt, and Spanish trawlers joined in the fishing of cod both in the northwest Atlantic and off the north Norwegian coast (López Losa 2002).

Spanish production of salted cod was at its highest in the 1960s, when more than 100,000 metric tons of *bacalao verde* were landed. However, the catch volumes were falling from their peak in 1967. With this reduction, there gradually came the need to compensate smaller catches through importation, especially from Norway (López Losa 2002). Figure 2 shows the regional distribution of supplies to the Spanish market from 1920 to 1980.

Figure 2 emphasizes how Spanish *bacalao verde* (wet salted split cod produced on board the trawlers) were landed in the Spanish harbours of Pasajes and Vigo from 1920 to 1980 and distributed mainly to the middle and south of Spain. Much of this fish was exported to Portugal and Latin America after little and much drying (strong curation). In northern Spain, most of the fish consumed was imported *bacalao* from Norway, whereas the Spanish *bacalao* was distributed to southern Spain. The product consisted of whole split cod.

Since joining the European Union (EU) in 1986, Spain has experienced a systematic reduction in fishing quotas, resulting in the Spanish cod fishing industry becoming dependent on imports. Operation of the EU's Common Fisheries Policy (CFP)

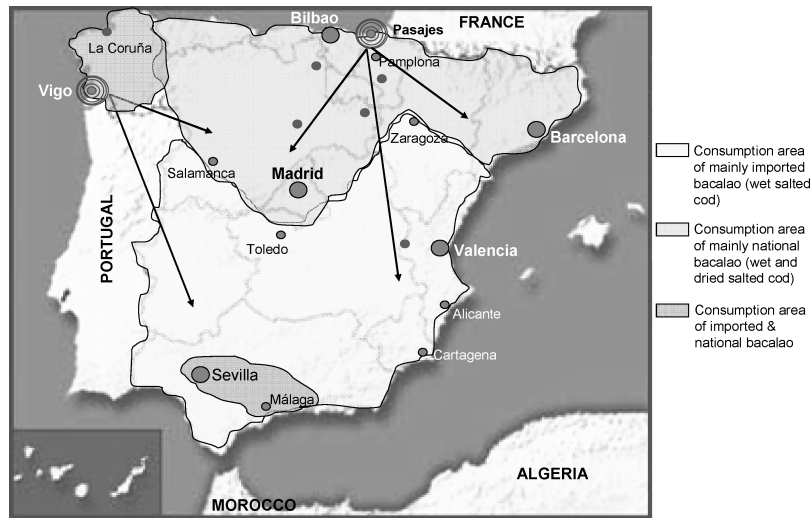


Figure 2

1920–1980: The Spanish salt fish market: Supply and consumption areas. Location of clip-fish producers
 SOURCE: Personal information from respondents

contributed to a continued decline in total catch for Spain during the 1990s and its domestic supply became insufficient to meet total demand (Gallart-Jornet *et al.* 2005a). Because of its need to import both fresh and dried salted fish, Spain represents an even more important market for exports of salted fish in Europe than before. Different countries exporting salted fish products to the Spanish market offer different types of products, in terms of both conventional salted fish and new products. This development has been in accordance with EU regulations (Gallart-Jornet *et al.* 2005a).

Despite a long-term reduction in domestic consumption of salted fish products over the years, Spain still has the second largest annual per capita consumption of salted fish products in Europe. As such, the country offers an attractive consumer market for foreign salted fish products. As this article will show, there are long-term trends indicating an upturn in the consumption of traditional as well as more modern products. In addition to the changes in volumes consumed, there have also been changes in the regional pattern of consumption in Spain. This restructuring led to Spain being no longer divided into regions with distinct market areas that related to the sup-

pliers of *bacalao verde* in the period 1920 to 1980. Although it is still possible to characterize distinct regions, the ‘pattern’ of salted fish consumption within Spain today is much more chaotic and fragmented.

New production processes and technologies within the salted fish industry have led to a more diversified product assortment, and traditional wet salt-cured and dried salt-cured fish are but two of the many salted fish products offered in the Spanish market. Different regions within Spain prefer different products. Thus, the resulting chaotic map of the origin of the *bacalao* consumed in Spain is also a result of different regions within Spain weighting the attributes of products from salted and cured cod differently (Gallart-Jornet *et al.* 2005a). With the variety of salted fish products available on the market, different regions have developed their specific ‘tastes’.

Some elements in the restructuring of Spain’s salted fish market have been a transition from the *traditional*, with *few* and *known* processes, to the *manifold*—the *flexible*. Behind this development, we find different processes. First, a new, modern social situation with changing working and living conditions represents one process

(Gallart-Jornet *et al.* 2005a). More women are now employed outside the home, and this social modernization results in less time available for food preparation. Women do not have the time to prepare the traditional salted fish, clip-fish. The process of desalting and rehydration takes time, and the water needs changing regularly, making it difficult for women with jobs to process the traditional salted fish products during the day. Second, products such as frozen, light salted fillets, partially desalted fish, portions packaged ready to eat, and ready-to-cook products have therefore become more convenient additions to the conventional salted fish products.

Finally, the third change is the new ways of organizing the market supply of salted fish. This process needs to be seen in conjunction with the modernization of society. Limited time for buying and preparing food has opened up the need for the establishment of more super- and hypermarkets, where it is possible to buy different foods in one location. Instead of supplying the traditional fish dealers, the suppliers are now, to a greater extent, supplying these super- and hypermarkets. Furthermore, they are supplying a greater variety of salted fish products, rather than just the traditional groups of products.

Changes in Technologies of Salted Fish Production

In general, four main methods of salting fish have developed over the years (Klaveren and Legendre 1962; Gallart-Jornet 2006). The salting methods are dry salting, pickling, brining, and brine injection. Dry salting and pickling are the traditional methods used in ancient times, for instance, for the salting of tuna in the Mediterranean countries. Brining, the use of salt solution for the salting of fish, originated in the twentieth century, and brine injection is a very modern phenomenon. By combining these main methods, several subcategories of salting methods can be specified.

The first method for salting cod that has been used for centuries is dry salting or kench curing, where the fish fluids are drained from the fish storage bin. Here, solid salt is rubbed into the fish meat, the fish is then pile-stacked with alternate layers of fish and salt. The salt penetrates

the meat and the extracted fluid is allowed to drain away. Normally kench salting is suitable for lean fish. The pile salting method results in the dehydration of much of the salted fish because of the increasing pressure from the overburden on the fish in the lowest part of the batch. Kench curing or dry salting is the traditional Spanish way of producing *bacalao verde*. Spanish trawlers produce *bacalao national* by dry salting for a 3-month period. This tradition arose because the space onboard schooners is limited, and this is the only reason why this method is still in use in the few fishing vessels still operating. This applies to vessels that catch cod at banks far from the home port. Normally, after this intense salting process, the subsequent preparation has been to dry the fish.

The second method, pickling, is similar to kench curing or dry salting except that the moisture extracted from the fish is not allowed to drain away. The fish are first put in salt cellars and become gradually immersed in a very salted 'pickle' of extracted fluids. The brine obtained is strong, concentrated brine made from the fish tissue fluid, and it usually reaches saturation point. Saturation here means 24–26 percent salt and, at such a concentration, it is not possible to dissolve more salt.

In direct brining, the third method, the fish are soaked into a prepared concentrated salt solution containing, for instance, 5 to 18 percent sodium chloride. The fish may, for instance, be treated in less than saturated brines for a very short period (1–2 days). This method is used for light salted fish and is considered to be sufficient for flavouring purposes. In addition, compared with a faster salting process, a higher yield is obtained because the fish meat retains much of its fluids. The alternative methods here are linked to the manipulation of the salt content of the brine. If the salt concentration of the brine is increased, then a method is obtained that functions as an alternative to pile salting.

The combination of brining and dry salting is still the most common traditional method of salting fish. This is the way that the traditional *bacalao verde* is produced in other salted fish exporting countries. The method involves anywhere from a couple of hours to 2 weeks of pickling (Method 2) and 2–3 weeks with stacking and dry-salting (Method 1).

The different salting methods were methods of storage and transportation. However, the fish had to be prepared for the consumer markets. When the social modernization in Spain changed the basis of the traditional consumer market, the desalting process was left to the producers in the production chain. Before desalting, the producers or retailers cut the whole split cod and big fillets into smaller portions. This salted cod was usually desalted before consumption. Generally, the desalting process is traditional and it has usually been performed by housewives. The normal method was to soak the product in tap water for up to 48 hours. The water is changed once or twice so that it is as little saturated by salt as possible.

The change in production from homes to producers involved new conventions or production rules. Social changes also increased the competition between cheaper food products in the markets. This was a challenge to the producers to achieve more efficient production. In addition, health aspects of food production became important at the same time and production practices were changed. In the 1990s, the focus was on light salting and products that were more suitable for immediate consumption or short preparation times. Light salted products also allow for more focus on health as too much salt has been considered unhealthy. Finally, this development was made easier with the introduction of better storage options for light salted products, such as refrigerators and freezers. All in all, new ways of salting and new products had to be offered to consumer markets. When light salted fish became the solution, other challenges appeared. A critical factor with light salting became the need to produce a safe product (from a microbiological perspective) with a long shelf life, even with better cooler and freezer technologies. An even distribution of salt is important in these matters.

A radical development of salting processes, which was adapted from the meat industry (Lindkvist and Hauge 2000) during the 1990s to meet the new demands, was the use of brine injection using injection machines in the salting process. Injected brine may contain various additives (e.g., phosphates) with the ability to increase weight through water retention. The injection process also has other advantages, such as a more even distribution of salt in the fish muscles compared

with immersion brining. After injection, steps that are more traditional may follow in the salting process depending on where the production takes place in the production chain. If the process is stopped before traditional salting, the product will be a very light salted product, often sold frozen. The combination of salt injection and traditional salting methods are used for the production of heavily salted products.

The economy of new technologies

The effects of the new production processes (desalting and injection) must be considered from a production chain perspective, where the different production processes mentioned are systematized. The normal processing of traditional *bacalao* consists of several stages; the first column of Table 1 shows the first stages of the process, up to the production of light salted fish. In the traditional process, the fish is first thawed and filleted (Day 2), then pickle salted for 3 to 5 days (Days 3-7), followed by 14 days of dry salting (Days 8-21). Table 1 shows that during the next couple of days, the production of light salted products takes place. The fish is cut into single pieces and desalted during Days 22-24. However, to produce wet salted cod or *bacalao verde* the process continues with stacking at least twice, depending on the degree of product curing required. Thereafter, the drying stage is optional, depending on the demands of the market. After this process, the homemaker would generally desalt *bacalao* for 2 more days. Because of the modernization trends, the desalting process is, as mentioned, now increasingly performed within the industry. However, the total process of a more or less traditional production chain lasts for at least 1 month. Normally, the weight of the finished product is lower than the weight of the raw fish. Moreover, labour costs have been incurred during the process. Altogether, negative yields and increasing labour costs lead to higher market prices for the desalted *bacalao*.

If the traditional process is compared with the different production processes of the light salted fillets consisting of 2 days of processing (thawing, filleting, salt injection and freezing), it is clear that the traditional process cannot compete (see Table 1). The processing time is reduced to

Table 1

The economy of two production processes in the salt fish industry

Production stages Production process using fresh cod (<i>Gadus morhua</i>)	Production of traditional desalted frozen bacalao		Production of light salted frozen cod 'Bacalao al punto de sal'	
	Day number	Yield	Day number	Yield
Frozen cod h&g	1	1 kg	1	1 kg
Thawing	2		2	
Filleting	2	0.7 kg		0.7 kg
Salting	15–21	0.5 kg	2	0.9 kg
Brine salting	Injection			0.65 kg
Freezing			2	
Final product	18–24	0.8 kg	2	1 kg
Light salted frozen cod 'Bacalao al punto de sal'	Traditional desalted frozen bacalao	Yield 80% Price ~ €7–10		Yield 100% Price ~ €4.20

SOURCE: Private information from a key Spanish salt fish producer.

less than one tenth, and the total weight yield is higher than the traditional process. Therefore, the modern product is sold for less than half the price of the traditional product.

Other consumer trends in the Spanish market are the increased demand for ready-to-use products. The desalting stages of the production processes are therefore transferred from the consumers at home to the salted fish producers. The final products offered to consumers are mainly desalted frozen cod products. In this way, the Spanish *bacalao* industry has introduced new products to save the housewife time and to meet competition from other food products.

So far, we have discussed the changes in the Spanish salted fish market that are linked to new types of production processes and products that have resulted from social changes and new market trends. The consequences are that the Spanish salted fish market has become even more heterogeneous than before and difficult to follow for agents outside Spain.

The Influence of Icelandic Salted Fish Producers

The restructuring of the Spanish salted fish market has been influenced to an important degree by the interactions of Icelandic producers with their Spanish collaborators. The modern Icelandic

influence in Spain started discretely early in the 1980s. Around 1980, three groups of fish producers dominated the Icelandic fishing industries. One group functioned as a monopoly with an exclusive right to export salted fish from Iceland. This group is known as the 'Union' or SIF and represents the Union of Icelandic Salted Fish Producers. Another sales organization was the 'Icelandic', established in 1942 to promote the export of frozen fish. Finally, 'Samband' was started after the Second World War as a parallel establishment for another dominant group for the sale of frozen products.

At the beginning of the 1980s, Iceland exported only 4,000 metric tons of salted fish to Spain, which at that time consumed much less salted fish in restaurants than in the home. However, the Spanish markets were already changing in the first half of the 1980s, and gradually more salted fish was consumed in restaurants. At this time, however, the Icelandic producers were not able to guarantee quality or volume. The fish were caught in gill nets by trawlers. The traditional products were split wet salted fish produced by pickle salting and kench curing.

During the 1980s, the Icelanders worked to improve the traditional salted fish. The first new product was the Tandur fish, which was put in brine for 3 days and then salted in stacks for 3 weeks. The water content of the fish increased and the yield increased from 42 to 48 percent salt content. The first Tandur fish was widely

accepted in Spain, and people also started to eat more in restaurants as incomes increased and female participation in the labour market increased.

Several events fostered Icelandic interests in the Spanish salted fish market. Political and institutional changes opened the Spanish market for external initiatives and, when the country joined the EU in 1986, groups that functioned like monopolies and enjoyed exclusive rights in specific markets were no longer popular. In Spain, one such dominant salted fish group was working from Bilbao and another from Barcelona. As already mentioned, EU membership also meant less favourable conditions for the Spanish fishing fleet in European waters and, therefore, importation of salted fish was necessary. As exporters to this growing market, the Icelandic were unhappy with a situation where two regional monopolies bought 80 percent of all Icelandic salted fish in a market potentially bigger than that indicated by the sales figures and where the producers were without much influence.

The new technologies described above changed market demands and new fish products were introduced. Wet salted fish that were not dried could be sold in larger quantities to consumers than was the case with the traditional dried salted fish. In addition, now that Spanish producers could afford to buy forklifts and set up cold storages, the transportation of wet fish was made easier with the use of containers and pallets. In addition, the establishment of specific production practices in Iceland paved the way for increased exports to Spain. When Iceland still had the monopoly of SIF, the quality standard categories for salted fish production were established. The Icelandic producer associations continued for a while to control the exports within their own product categories, even though their Spanish counterparts had to abolish their institutional market control. The Icelandic also furnished their own producers with technical support when needed and functioned as consultants when the producer members needed market or production advice before important decisions were to be made. They established groups of central players and technicians who developed a common set of competencies and know-how to secure the best production. Thus, Iceland had a strong production system at hand when the competition for the Spanish market started.

With the institutional and social changes in Spain after EU entry, the ground was laid for extensive restructuring and the Icelanders decided in 1987 to take greater control over Spanish market developments for salted fish products. The links between the Icelandic salted fish producers represented by SIF and the two Spanish monopolies were cut in 1988. Instead, five collaborating firms in Cataluña and six in the other Spanish provinces were included in an SIF-dominated Icelandic-Spanish sales network.

Development of light salted frozen fillets

The development of the salted fillets market started after the introduction of the Tander fish in the 1980s. The first fillets were salted using traditional processes and were thus traditional salted fish. Involving the other fish processors' organizations outside the salted fish regimes was out of the question. The frozen fish industry operated in other markets and processing categories and was not involved in salting. However, the former Spanish regional monopolies attempted to resist the Icelandic attack in 1988 by importing fresh cod themselves, but in a salt brine solution from Iceland. The attempt was not successful. Nevertheless, this showed that traditional processes could be done differently.

New technologies and innovations meant the crossing of traditional institutional borders between frozen and salted products and opened the possibilities for developing new types of products. One product that has increased its market share of salted fish products is frozen light salted fillets. The processing of soaking the fillets for 48 hours in a brine solution with a salt content similar to seawater has already been described (cf. Table 1). The fillets could also be injected with a similar salt solution. The frozen fillets with 2 percent salt were then sold by the frozen fish monopoly of Iceland. A customer in France with clients in Cataluña, Spain, showed an interest in the product. The new light injected fillets were then considered similar to the desalted fillets already marketed in Cataluña as tasty white fillets, and the product was accepted by the catering segment. Marketing focused on the quality-price relationship and guarantee of delivery. Export of light salted fillets was 7 tons in 1990. Total Icelandic exports to Spain of frozen fillets

of cod and saithe were 800 tons in 1996 and just over 10,000 tons in 2005.

Since the mid-1990s, the brine solution has changed its content and is now supplied with the additives of phosphates and anti-oxidants named 'Carnal', which further increase the water content. 'The injection machines use a solution mixed with Carnal. No one wants to talk about it, everyone knows about it and the market seems to be happy with the development. The fish is whiter and even more appealing', explained one of our respondents with over 20 years of experience in the business.

For the Icelandic producer, the new product still created challenges. A new sales network had to be established. The traditional salted fish network in Spain reacted negatively. 'We were the bad guys who spoiled their industry, traditions and economy', said one sales manager of an Icelandic firm. A new sales network was established that, by the summer of 2006, consisted of around 600 Spanish agents who functioned as distributors in Spain. Central offices are in Malaga, Barcelona, Madrid and Valencia. They are represented by agents in Madrid, The Basque Country, Valencia and Vigo in Galicia. In Malaga, the Icelandic producer has purchased a Spanish factory for transforming the products to even more appropriate sizes. This takeover also required a fleet of vehicles for the distribution of the products in Spain. 'So now we are going one level deeper into the market', the firm representative claimed.

Another factor that triggered sales of frozen light salted fillets from Iceland was the reorganization of a former association of Icelandic frozen fish producers in 1996. It was restructured to become an independent company focusing on frozen fish. That meant a deeper involvement in a global strategy of supplying several products from many foreign producers to their customers. The network of 600 Spanish distributors could then offer every product supplied by the Icelandic producers to their clients. A permanent sales organization with a considerable number of loyal employee representatives had been established as sales channels for the Icelandic firm.

Technology not only makes borders more porous between product species but also allows geographical borders to be more easily crossed. The invention of the injection machine

and chemical solutions were soon adapted by other countries, and imports to Spain of light salted fillets from new producers are increasing. However, data regarding other specific countries who are suppliers are uncertain concerning light salted products. However, although it is obvious that Chinese exports of salted cod products are not impressive¹, the Chinese influence is perceived as increasing. The Chinese product is cheaper but of good quality according to one of our Icelandic informants. The products are produced from frozen fish and frozen again. 'The problem with the Chinese is that you have to be careful with which company is contracted for the production; but if you find the right one, there is no problem with the quality', one of the other respondents asserted in Iceland during the summer of 2006.

The deep structures that have decided the Icelandic success

To sum up the Icelandic influence on the Spanish market, six different factors may be outlined. First, the prime strategy for Icelandic salt cod to Spain was to introduce Icelandic production standards, focusing on product colour, taste and the texture of the fish meat. This is the product appearance. However, this necessary condition was not sufficient to win the Spanish market.

The second condition was that new production practices were established in the salted fish industry, which allowed the use of chemicals in the brine. One such additive is phosphate. Although some of the informants were sceptical at its introduction, the outcome was convincing. The consumers liked the taste, the colour and the texture. What was good for the eye was also good for the stomach, as one of the Icelandic informants remarked. However, even more important was the ability to keep more of the water in the fish meat. Better volume yields were also important for the economy. This secured the profitability for the producers. This factor applies to the production-based conventions and technology.

¹ China's direct exports to Spain are relatively small, less than 900 tons of conventional salted fish in 2005, and about 3,000 tons of cod fillets (all types, salted or non-salted) in the same year (Source: Lauritzen 2006).

The Icelandic ability to deliver exactly what was ordered—with reference to quality, product specification and volume—was another necessary condition. This condition was based on the quota system that came into being in the 1980s, allowing Icelandic factories to own big boats, decide which gear to use to produce the best raw materials and catch the fish when the market needed it. Combined with a system that specified product quality, the Icelandic producers developed the reputation of being reliable and superb producers. This is what the Icelandic call the quota ownership system. However, it is seemingly more accurate to call it *the producer controlled production chain*. A logical derivation of this is the ability of the Icelandic producers to adapt to the possibility of political, social and economic market frameworks being opened for the producers. Such adaptability also required the producer to control the organization of the production chain and the location of production in order to reflect consumer demands. This point concerns market adaptability.

A final related precondition for the Icelandic success was the coordinated and long-term social strategies that were elaborated when SIF was in a monopoly situation. The main idea was to attach oneself closer to the retailers. More recent strategies have only been adjustments of what was agreed upon more than a decade ago. This is the retailer strategy.

The Changing Spanish Salted Fish Market

By the end of the 1980s, the Spanish markets were affected by the competition between Icelandic and Norwegian salted fish producers. New regimes of deregulation were introduced in the Nordic countries early in the 1990s. Export monopolies were abolished and more initiatives were seemingly left to the individual producers. The Norwegian influence in Spain grew quickly until the mid-1990s (Table 2). In 1996, Norwegian salted fish producers were responsible for more than one third of exports to Spain, a situation that remained until 1998. Norwegian exports started to fall before the turn of the millennium. Iceland lost market share in the beginning of the 1990s but since 2005, they have taken over half

Table 2

The supply of salt fish to Spain from different countries

Market share	1991	1996	1998	2005
Norway	12.1%	34.4%	34.7%	9.6%
Iceland	46.9%	32.7%	45.4%	49.0%
Faeroe Island	18.1%	11.1%	10.8%	13.1%
Other countries	22.9%	21.8%	9.1%	28.3%
Total	100%	100%	100%	100%
Total import to Spain (metric tons)	26,146	37,746	36,526	58,859

SOURCE: Lauritzen 2006.

of the total Spanish market. This article will not directly discuss the failure of the Norwegian producers in Spain, although it seems to be part of a long historical cycle of ups and downs in the trade relationships between countries in this market (cf. Section 2).

The restructuring processes have introduced significant regional changes in the Spanish salted fish market. In 2006, the picture (see Figure 3) is very different from the situation in the years before 1980 (see Figure 2). The triangle drawn between Bilbao, Madrid, and Barcelona indicates the main importing regions, which means that the important consumer regions also have become the

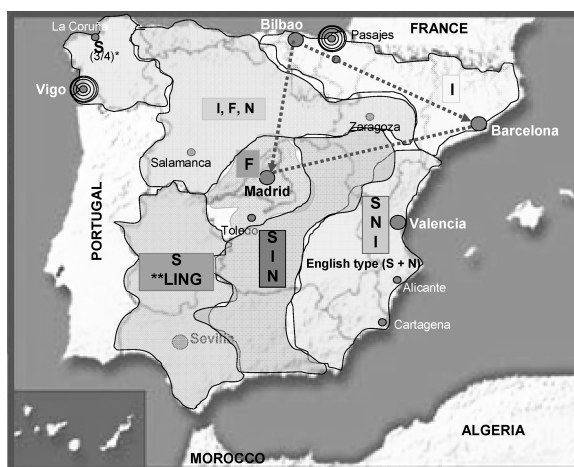


Figure 3

Spanish salt fish market, 26 October 2006

SOURCE: Personal information from respondents. Notes to Figure 3: S = Spanish national, I = Iceland, N = Norway, F = Faeroe Islands

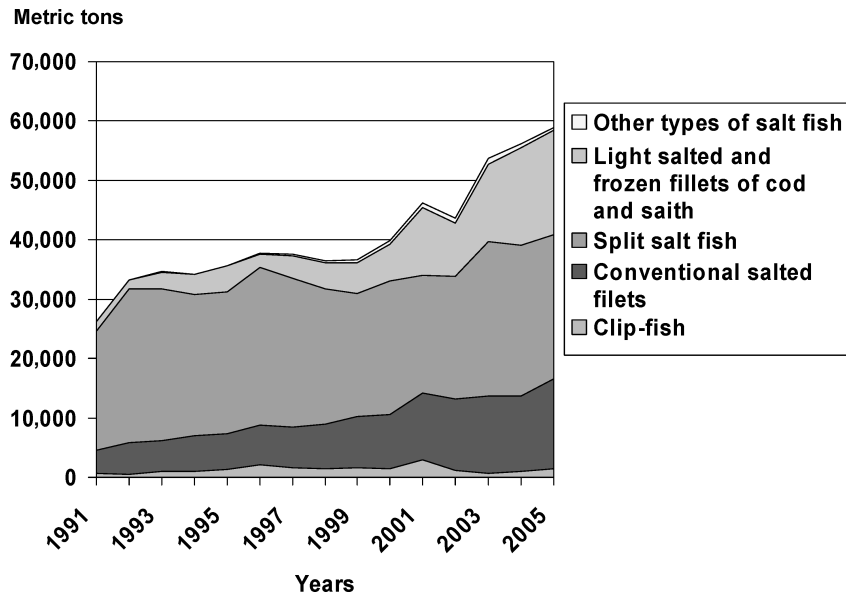


Figure 4
Spanish import of salted fish
SOURCE: Lauritzen 2006

main importing regions. Galicia is still important, although the tendency in Galicia is to import unsalted fish and process the fish in the province. Nevertheless, the main trend is that more countries are becoming suppliers. Norway has lost its previous dominant position, and the suppliers from Iceland are now dominating most of the Spanish regions.

The other tendency, as displayed in Figure 4, is that Spain is a rapidly growing market for the traditional salted fish, but is using newer salting technology. Most of the traditional salted fish from Iceland and the Faeroe Islands is first injected with a brine solution and thereafter dry salted.

Spain has increased its imports (see Figure 4) of traditional salted fish products. Imports of split salted fish, clip fish and salt fillets increased from 24,600 metric tons in 1991 to 41,300 tons in 2005, an increase of nearly 68 percent. Since 1998, the increase in Spain's imports of traditional salted fish has been more than 9,000 tons, or almost 29 percent. During these years, the Norwegian producers have had problems keeping their market shares in Spain. The decline for

Norway from 1998 to 2005 has been significant: 7,200 tons, or more than 57 percent. Norway is thus losing ground in a rapidly growing market.

In the Spanish salted fish market, new products both within the traditional segments and outside are replacing older products. Figures 4 and 5 show a significant increase for two specific groups of products, namely, conventional salted fillets and frozen fillets of cod and saithe. The data used to make Figure 5 are aggregated for three time periods: the years 1991-1995, 1996-2000 and 2001-2005, and then presented as averages for each period (see Figure 5). The aggregation contributes to a smoothing of fluctuations over time, and thus brings out structural changes. Figure 5 shows that the import of conventional salted fillets has increased significantly from 1991 to 2005, from about 5,300 tons on average for the years 1991-1995, to about 7,700 tons for 1996-2000 and then to almost 13,000 tons for the last 5-year period, 2001-2005.

The increase has been even larger for frozen fillets of cod and saithe injected with 2 percent brine. Since the mid-1990s, this new product has become more and more popular in Spain.

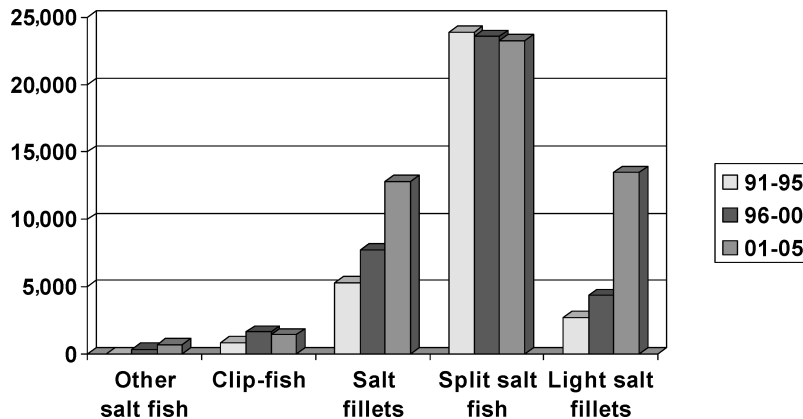


Figure 5
Product segments in the Spanish salt fish market from 1991 until 2005
SOURCE: Lauritzen 2006

In the period 1991–1995, 2,700 tons of frozen cod and saithe fillets were exported to Spain (see Figure 5). Exports then increased to an average of 4,300 tons for the years 1996–2000, and further increased to about 13,500 tons for the last 5-year period. An illustration of the size of this increase is that total imports to the country were 17,500 tons in 2005 (see Figure 4). The Nordic countries delivered about 10,000 tons of these frozen fillets in 2005, and only 7,000 tons came from other countries.

The distribution network for frozen fillets is the hotel, restaurant and catering (HOREC) market in Spain. As indicated already, the Icelanders have built their distribution network independently of the traditional distribution network for salted fish. The Icelanders have thus included completely new groups of customers in their sales strategy.

A third group of products in the ‘family’ of salted fish, but still only amounting to a small part of total volumes, is ‘other salted fish products’. These have, however, shown a significant increase in sales in the Spanish market. A fourth group is clip fish, where imports increased until the turn of the millennium, only to decline somewhat until 2005. This small group of products make up only 2.5 percent of the total import volume.

The biggest group is still conventional wet salted fish that are imported whole into Spain (Figure 5). Regarding volume, there are few

changes for this product. Imports have nevertheless declined somewhat, from almost 24,000 tons in the period 1991–1995 to about 23,000 for the period 2001–2005. This group of products is characterized by stagnation, even with only a slight decrease in volume. However, this reduction is still relatively significant. From constituting nearly 77 percent of the market in 1991 and 63 percent in 1998, wet salted fish constituted 41 percent in 2005, a reduction of 36 percent over 15 years.

Conclusion

This article discussed how cultural, technological and social factors are contributing to the restructuring of the Spanish salted fish markets and production systems. The analytical principles used are evolutionary socio-economic theories of technological and social change. The Spanish market is structured by social modernization in general, new salting methods, and the increasing dominance of Icelandic salted fish producers who have been able to establish Icelandic production conventions as market conventions in Spain. Nevertheless, traditional salted fish production prevails in the Spanish market. The result is a heterogeneous market consisting of products that modern families can consume without investing too much time in cooking. Such products may be purchased in smaller quantities and may involve many



participants in the production process. Still, the Icelandic producers have obtained a dominant position in the Spanish market.

The Norwegian answer to the Icelandic takeover in Spain has so far been to seek other markets (for instance Brazil) where competition has not been as strong. However, the total income of salted fish sales has fallen for the Norwegians from 1991 to 2005, and social changes are also becoming visible in the 'escape countries'. Still, the next Norwegian move may be to introduce farmed cod from a new and growing industry as raw product in salted fish production when problems related to standardized feeding and quality are solved. In 2007, salting of Norwegian farmed cod is still at an experimental stage and is not profitable compared with marketing the fresh fish for European restaurants (private information).

The discussion seemingly does not wholly support Crevoisier's (2004) point that the territory, or the Spanish production and consumer region in this case, have a matrix influence. The external, influential processes involving new technology that makes production more efficient and cheaper seem stronger than the local traditions and local production systems. Instead, the interference in the Spanish market by the Icelandic producers seems to be especially influential, and Icelandic producers have proved capable of adapting to new methods and ousting their competitors. The Icelandic strategic moves have therefore had a decisive influence. They have been able to change Spanish production institutions and distribution systems. With their light salted frozen fillets, they have established innovative and new products that have required a new distribution system and that meet the demands of modern customers in the markets. In addition, new salting methods, cooling systems and the distribution networks of supermarkets are global phenomena that have influenced the direction of market changes. Therefore, when the question was asked in the introduction as to whether Spain was a technology- and supplier-driven salted fish market, the answer must be partly yes. On the other hand, when markets are located to territories and linked to each other from a production chain perspective, then the Icelandic supplier or producer territory no doubt has a matrix influence, according to Crevoisier's

theory, to stimulate its agents to take the lead in Spain.

Although it seems that Spanish consumers have adopted new products and conventions, the new products also seem to have evolved from demands resulting from modernization processes within Spanish society. Furthermore, it is most likely that, without the Spanish tradition for salted fish in general, the new light salted fillets and the desalted products would not have been accepted by consumers. Therefore, within such a social context, Crevoisier's point (2004) on the importance of earlier territorial influences must also be accepted. Spanish consumer traditions have influenced, and to some degree modified, the external influences from external production systems and technology.

In a theoretical context, this discussion may help us to focus more on aspects of Crevoisier's theory of innovative environments. If territories are forced to confront each other in a process of economic competition, the territory with the strongest competitive ability may be said to exercise the matrix effect. The matrix effect is relative and dependent on a relational effect from other territories.

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