

Management of Multimodal transport solutions for Norwegian fish transport

Question

By measuring these factors and investigating the logistic organization of the Norwegian fish transports to European countries, please suggest supply chain organization from supply to distribution as far as transport modes are concerned.

Introduction

The Norwegian fish industry has for some time been able to exploit efficient transport solutions and low transport costs. We know that growth in the fish farming industry will affect the volume and structure of future fresh fish transports in Norway.

The demand for freight transport and the structure of global freight transport suppliers is changing rapidly.

In the fresh fish segment, markets are often characterized by global competition with a number of multinational players. The industry has gone through a number of structural changes during the last five years:

- Economies of scale have led to increased industrialization, market power, stability of deliveries and reduced geographic risk.
- Vertical integration has resulted in improved logistics and product development.

Better feeding, better salmon vaccines, routines and processes.

The increased efficiency and the higher production level in the sector leads to an increased use of road transports, and this will demand investments in road infrastructure. In Norway and in many other European countries, the authorities wish to transfer goods from road to sea due to capacity problems, congestion and pollution. Norwegian engineers are therefore trying to find technological solutions which allows faster fresh fish transports at sea.

Theoretical Framework

The definition of value creation varies a lot. Porter (1985) introduces *the value chain* as a basic tool when analysing the sources of competitive advantage.

In figure 1 the company structure of a large salmon producer is visualized. This is an example of a typical value chain in the sector.

Figure 1. Value chain of a salmon producer.



A question is, in which part of the value chain value should be created. Decreased

value creation in the transport sector due to lower transport costs, may lead to opportunities for higher market shares and increased value creation in the other value chain activities.

The value of a product bought by a consumer is defined as the sum of the increased values each industry add to the product. Mathematically, the value a industry adds to a product is the value the product achieves after the value-adding activity, minus the use of services/products produced by other industries.

To gain competitive advantage over its rivals, a firm must deliver value to its customers through performing these activities more efficiently than its competitors, or by performing the activities in a unique way that creates greater differentiation.

The increased performance in the supply chain might occur through:

Lower costs: Cost efficient solutions (as reduced costs through larger volumes, lower use of fuel, lower demand for labour force etc.) and lower external costs.

Faster transport and higher transport quality: Higher frequency, door-to-door transport and/or faster transports, flexibility (volume, departure time etc.) and perfect order achievement and ability to deliver.

Faster transports often leads to higher product prices, especially in fish markets.

Better service as flexibility with respect to delivery times and the possibility for door-to-door transports will in some situations, when transporting fresh fish for instance, be necessary to deliver products of high quality.

Distribution of Norwegian fish products

Norwegian seafood products are carried by road, sea or air transport. Because of longer transport time, sea transport is primarily used for frozen, dried or canned seafood. For fresh or chilled seafood, road or air transportation are the main alternatives.

Transport by road is the usual way to distribute fresh fish from Norway to the European continent. Fresh seafood is transported by air to remote destinations such as Asia and North America. Fish carried by plane is often transported via continental airports like Frankfurt and Amsterdam. For fish transported to the European market, railway from Northern Norway to Oslo and ferries from Southern Norway to Denmark and Great Britain is also often used.

Large volumes transported by fully loaded trucks is crucial for achieving low transport costs for fresh fish. The cost also increases when smaller quantities of seafood is transported to larger terminals.

Table 1 shows costs per kilo fish for transports to different markets. The rates are mainly based on door-to-door transports (full loaded trucks), but as table 2 shows (costs of extra services) the real prices may vary a lot.

Table 1. Estimates on transport costs and transport times for road transport of fresh fish to Europe.

NOK is Norwegian currency 1 NOK = 0.10 €

Transport costs (NOK per kilo fish)					Transport time (days)			
To	From Bergen	From Trondheim	From Nordland County	From Troms County	From Bergen	From Trondheim	From Nordland County	From Troms County
Oslo	0,45	0,40	0,90	1,30	0,5	0,5	1,0	1,5
Padborg	1,10	1,05	1,55	1,95	1,5	1,5	2,0	2,5
BeNeLux	1,40	1,35	1,85	2,25	2,0	2,0	2,5	3,0
Northern France	1,60	1,55	2,05	2,45	2,5	2,5	3,0	3,5
Madrid	2,30	2,25	2,75	3,15	3,5	3,5	4,0	4,5

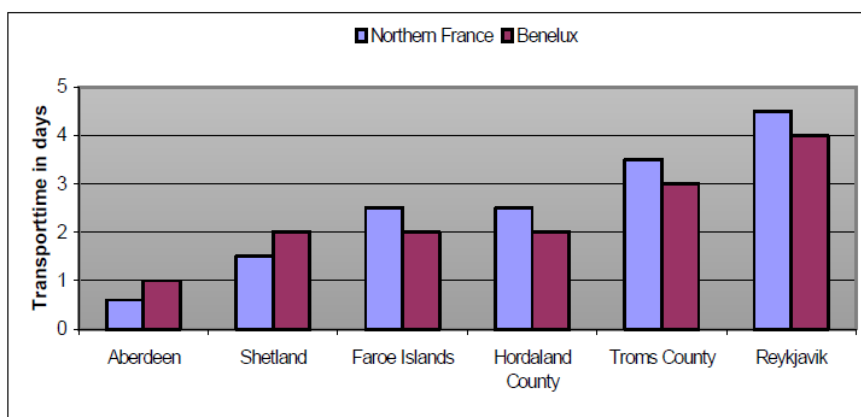
Costs of different services

Service	Cost	In % of total transport cost	In % export-price
Two drivers	+ 10 % on transport rate.	10 %	1 %
Transport of fish to terminal	Southern Norway: 0,15 to 0,40 NOK per kilo Northern Norway up to 1,00 NOK.	7-33 %	1-4%
Reloading	1000 - 2000 NOK per cargo.	5%	0,5%
Transport as general cargo	+ 40-70 % on transport rate.	40-70 %	4-7 %

Transport time from Northern Norway is often 24 hours longer. In the negotiations with continental buyers in a market with large supply, this could force the seller to lower his price.

A reason why exporters with long transport distances can achieve high product value, is probably the adaptability of the farmers and the exporters. A way of delivering value to the costumers, is to perform activities in a unique way that creates greater differentiation. Because of lower sea temperatures in Northern Norway the fish grows slower. This is sometimes used to differentiate between weight classes of farmed fish. This differentiation of products makes the price less sensitive to transport distances.

Sea transport is assumed to represent half of the aggregated transport costs, while most of the other costs are related to road/ferry or air transports. The large share of sea transports is explained by the fact that 71 per cent of the fish products is carried at sea. However, there are problems by calculating these costs, because the estimates are primarily based on border-crossing transports. When intermodal transports are used, considerable costs might occur when transporting the fish by road transport



to ports.

Norwegian fish transports and the European market

To measure the performance of transport companies carrying Norwegian fresh fish products, we compared the results from the study with indicators from similar transports from Scotland and Iceland.

The logistics from the three exporting countries is rather different for the fresh fish transports. For Norway France, Japan and Denmark are important markets. From Norway the sea transports are largest in quantity, but considerable volumes of fish is transported by road. For fresh fish products, we find a large degree of preparation abroad, especially in Denmark.

For Iceland, Great Britain, USA and Germany are important markets. Sea and air transport is used for fresh fish transports to the European continent. As from Norway, there exist sea transports of frozen pelagic fish to Eastern Europe.

For Scotland, France is the most important market for fish products exported from the United Kingdom. Germany and Russia also represent important markets. Fresh fish from Scotland and England is often transported through the Eurochannel, which ensures fast deliveries, typically 10-15 hours to Boulogne. Great Britain is also a large consumer of fish products, and this reduces the export volume.

The geographical location of the production areas causes some of the differences between the three fish exporting countries. In figure 2, examples of transport times to Northern France and Benelux is visualised. We have assumed a combination of sea and road transport for fish products from Iceland and Faroe Islands.

Figure 2. Transport times for fresh fish from different production areas to Northern France and Benelux

Time and cost sensitivity

According to the supply chain theory, improved performance through higher service quality, lower transport time and/or lower transport costs will improve the efficiency in the supply chain, and also increase the value creation in the value chain. This is also the reason why considerable resources are used to develop faster transports at sea and to achieve reduced road transports.

A conclusion is that Norwegian fresh fish transports is efficiently organized when it comes to costs and transport time. However, the analysis indicates that a higher level of value creation could be reached through faster transports of fresh fish.

If we assume the export price to represent 40% of the price to the consumer, the transport cost is a total of 5% of the final price. An increase of 20 % in the transport cost, will represent a 1 % increase in the consumer price. Table 3 shows scenarios resulting in similar conclusions.

Table 3. Increase in road transport costs compared to consumer price

Market	Increase in transport costs		Increase in transport costs in per cent of consumer price	
	in	in	in	in
Northern France	5 %	NOK 0,08	0,1 %	0,2 %
Transport cost:	20 %	NOK 0,32	0,3 %	0,6 %
Approx. 1,60 NOK per kg fish				
	50 %	NOK 0,80	0,8 %	1,6 %
Madrid	5 %	NOK 0,12	0,1 %	0,2 %
Transport cost:	20 %	NOK 0,46	0,5 %	0,9 %
Approx. 2,30 NOK per kg fish				
	50 %	NOK 1,15	1,2 %	2,3 %

The significance of the variations in the transport costs seems low compared to value of time. It is difficult to estimate the time costs for fresh fish, but we know the price offered to the exporter often is reduced by 20-25 per cent after 2 days. The value could be reduced to zero after 4 days. This means that when the transport time exceeds certain limits, the value of the product could be reduced by 10 per cent or more measured against the price to consumer. This indicates that higher transport costs for these fish products will not reduce the volume of road transports significantly.