DIFFERENTIATION IN THE ATLANTIC SALMON INDUSTRY: A SYNOPSIS

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Abstract:

The value chain for farmed salmon has experienced substantial changes over the past decades as a result of innovation in production technology, logistics, distribution and marketing that have helped facilitate the rapid production growth. The high level of control over the production environment in principle makes it possible for Atlantic salmon to be tailored on a number of product attributes or dimensions in response to requirements from different customer groups. However, when compared to meat production, differentiation in farmed salmon remains limited, pointing to a still immature industry. Based primarily on interviews with Norwegian producers, we offer an overview of the prominent differentiation strategies today, and discuss barriers for further differentiation.

Keywords: aquaculture, salmon, differentiation

INTRODUCTION

Imagine the fish counter in your local supermarket. You are planning a meal with fish as center-plate and are price-sensitive, but you are also aware of the health benefits related to each species. Salmon is a common choice, whether you are a consumer in the European Union, in the United Kingdom, in North America or in Japan.[1] There may be two to three salmon product options for you to choose from and perhaps a handful of cut options. Each combination will be marketed differently and, in consequence, priced differently. If your local supermarket also displays the origin of the fish, you may notice some points of differentiation, with the denomination of "wild" vs "farmed", species ("Atlantic" vs "Pacific"), and country of origin undoubtedly being most common. Generally speaking, however, your decision with respect to which salmon product to buy as a price-sensitive, health conscious consumer hinges on the supermarket's selection, your personal views conditioned by this selection, and the given details of the salmon attributes.[2] Product differentiation has already happened somewhere upstream in the supply chain.

Atlantic salmon is considered the benchmark of industrial practices for fish farming (Gjedrem, Gjoen, and Gjerde, 1991; Asche, 2008; Asche and Smith, 2018). The historical development of the salmon industry into the intensive production system known today is attributed to having gained a high level of control over the production environment (Asche, 2008; Torrissen et al., 2011). Typically, most improvements happen with suppliers, such as targeted feed, improved fingerlings and production technology (Tveterås and Heshmati,

[1] For instance, salmon is the most popular fresh species in retail sales in Germany (Bronnmann and Asche (2017), France (Landazuri-Tveteras et al., 2018), and the U.S. (Love et al., 2020). In the U.S., salmon is still only the second most consumed seafood species with shrimp more popular at restaurants (Shamshak et al., 2019).

[2] In addition, attributes with respect to convenience of the product in terms of preparation may matter (Torrissen and Onozaka, 2017).

2002; Sandvold, 2016), or downstream in the supply chain in the form of improved logistics or transaction methods (Straume, 2017; Landazuri-Tveterås et al., 2018, Oglend and Straume, 2020). Moreover, market size was increased by reaching new customers through reduced prices, new product development, new distribution channels and sales outlets (Asche and Bjørndal, 2011; Brækkan and Thyholdt, 2014; Brækkan et al., 2018). Norway is the leading producer of farmed salmon, with this species accounting for over 60% of the Norwegian export value of seafood since 2004 (Straume et al., 2020).

The level of control over the farming process in salmon aquaculture, in principle, makes it possible for farmed Atlantic salmon to be tailored on a number of dimensions to meet requirements from different customer groups at different stages of the value chain.[3] However, production, harvesting and primary processing of salmon generally result in a largely homogeneous product. When compared to other successful food industries, such as the meat industry, differentiation in farmed salmon remains rather limited, as it lacks the product diversity and the flexibility upstream in the value chain (Asche, Cojocaru, and Roth, 2018). In this article, we discuss to what extent salmon is currently differentiated, how the differentiation strategies answer customers' quality demands, and the degree to which various attributes offer competitive benefits, leading to advantages or market premiums.

Differentiation is normally based on some physical properties of a product, and with a homogeneous product, the range of product developments and differentiation towards consumers is more limited, concomitantly impacting the possibility for upstream producers to increase their value creation. However, it can also be related to credence attributes such as the

[3] We refer to "farmed Atlantic salmon" as "salmon" or "Atlantic salmon" from here on, unless a clear distinction is to be made between farmed Atlantic salmon and other salmonids.

sustainability of the production process (Osmundsen et al., 2020), relationship specific costs (Kvaløy and Tveteras, 2008) or supply chain costs (Sogn-Grundvåg et al., 2019), and convenience attributes (Torrissen and Onozaka, 2017). Opportunities for differentiation in business-to-business (B2B) marketing differs from that in business-to-consumer (B2C) marketing. Producers and exporters tend to emphasize distribution quality, while importers and supermarkets emphasize product quality (Korneliussen and Grønhaug, 2003). Distribution quality means for salmon companies that they may bring value to customers on more industrial dimensions, such as contracts and guarantees related to volumes, timing of deliveries, feed ingredients, production practices, certifications, traceability and environmental impact. Product quality refers to the physical properties of the salmon, most notably fat content, color, texture, and convenience of meal preparation. This article looks at differentiation throughout the value chain and how it is understood and practiced among industry players, depending on where in the value chain they operate or what customers they serve.

To obtain information with respect to differentiation strategies for salmon, we conducted in-person interviews with a number of Norwegian producers, the majority of them also operating internationally. In light of these dialogues, we identify the differentiation strategies and the areas in the supply chain where they are prominent today, and highlight barriers to further differentiating throughout the value chain. The discussion is concentrated on the Norwegian salmon industry, as it is the leading supplier of salmon as well as the second largest exporter of fish and seafood in the world (FAO, 2019). Nevertheless, the insights are relevant to other aquaculture industries, both developed and currently developing in the Global North as well as in the Global South.

In the next section, the theoretical framework for this study is presented, followed by a description of the interview process. We then present our findings of current differentiation strategies in the Norwegian salmon industry, before discussing barriers to differentiation in this context. The conclusions and implications are drawn in the final section.

THEORETICAL FRAMEWORK

The motivation for product differentiation is value creation and, ultimately, profits achieved by providing benefits not readily available from other substitutes (Barney, 2007). There is both a demand for attributes in the marketplace, as well as a supply of attributes, with Lancaster (1971) having characterized the consumer's demand for the bundle of a product's attributes rather than the classical demand for a product. Moreover, Carpenter, Glazer, and Nakamoto (1994) indicate that successful product differentiation requires a product or brand to be distinguished from competitors, or an attribute that is meaningful, relevant, and valuable for customers.

Although salmon has traditionally been considered a relatively homogenous product, there has been increasing attention to consumer preferences for specific attributes of salmon. These attributes may be intrinsic in nature, such as flesh color, fat content, texture and appearance, but also extrinsic such as country of origin, branding, and ecolabels. For industrial buyers, attributes like production location, processing location, timeliness of delivery and services offered are seemingly also growing in importance (Tveterås and Kvaløy, 2006).

A handful of studies have focused on consumer preferences for intrinsic product characteristics. Steine, Alfnes, and Rørå. (2005) and Alfnes et al. (2006) looked at consumer preferences for salmon flesh color, while Olesen et al. (2010) explored consumers' willingness to pay for flesh color in combination with ecolabeling. Forsberg and Guttormsen (2006) focused on the optimal flesh color to be produced based on the increasing cost of additional color. Consumer preferences for salmon were also found to relate to flesh texture (Badiola et al., 2017). In studies of the French and Japanese consumers, both important export markets for fish and seafood, Norwegian salmon scored well on taste, convenience, health, safety and value for money, rivaling the typically more popular wild species like cod and monkfish (Uchida et al., 2014; Rickertsen et al., 2017). The relatively few studies of consumer preferences for intrinsic qualities may be due to the fact that over time salmon has matured into a uniform primary product and producers often have to look to extrinsic qualities and service elements as means of differentiation.[4] Below we discuss the main qualities that have over time become industry selling points.

Feed

Most of the feed used in salmon production is based on standard recipes formulated by a handful of feed suppliers. Nonetheless, some companies have their own recipe, and use feed content to tell a story, either promoting different qualities of the fish or its origin. The feed mix can affect fat content and color and can be easily manipulated. As a result, salmon is sometimes marketed on the basis of its high content of EPA and DHA.[5] An example of how

[4] It is of interest to note that there are more studies focusing on economic aspects of product quality for salmon than for other fish species, as the production process for most other seafood products have even less control over the product and therefore over the opportunities for differentiation. However, specific attributes have been known for a long time to have value (Carroll et al., 2020).

[5] EPA and DHA are omega-3 polyunsaturated fatty acids that are naturally abundant in fish, shellfish, and some algae. Some plants, such as Camelina Sativa, have been genetically engineered to also produce these omega-3's.

salmon color changes with the feed used can be given from the organic salmon production. If in the beginning organic salmon was closer to white than to a deep pinkish-orange, since 2010 producers have had to adapt their feed mix from using shrimp meal, a marine ingredient, as a source of astaxanthin, to Panaferd-AX (EFSA, 2007), a natural pigment coming from a microorganism called *Paracoccus carotinifaciens*.[6] This innovation allowed farmed organic salmon to resemble wild and conventionally farmed salmon, in answer to consumer expectations.

The originally high content of marine ingredients has been gradually replaced with plant-based products (Asche and Bjørndal, 2011; Oglend, Misund, and Pincinato, 2017), such as soy-meal concentrate and wheat, bringing marine feed content down to 25-30% (Asche, Oglend, and Tveteras, 2012; Aas and Ytrestøyl, 2019).[7] However, this in turn has made the industry dependent on soy production, and vulnerable to its fluctuations (Asche and Oglend, 2016), which dependency has contributed to heightened costs for the salmon producers (Iversen et al, 2017).

Two innovative alternatives have proven fruitful yet remain costly due to their novelty and the absence of economies of scale: algal oil and insect meal. The former has the potential to further reduce the pressure on wild fish, while also increasing EPA and DHA (Kousoulaki et al, 2015). Similarly, the latter has been shown to be a suitable substitute for fish meal in salmon feed, supporting development and growth in a comparable manner, due to its richness in proteins (Lock, Arsiwalla, and Waagbø, 2016). In addition, insects are easy to rear, make

[6] Astaxanthin is the pigment naturally occurring in salmon and trout, as well as other sea creatures, and is what gives these fish their pinkinsh-orange flesh color.
[7] This level is still much higher than in most other regions. In Canada, for instance, it is down at below 10 % marine feed content. For organic salmon, marine content is higher, at around 75% in Norway, and around 30% in Canada.

for sustainable supply, and are generally well received by environmentally conscious consumers (Llagostera et al., 2019).

Origin and storytelling

Origin is considered an important attribute of seafood differentiation (e.g., Muhammad and Jones, 2011; Rickertsen et al., 2017; Gordon, 2018). There is, on one hand, consumers' preference for domestic commodities (Alfnes and Rickertsen, 2003; Lusk and Anderson, 2004; Uchida et al., 2014). However, product origin and its effects in the market transcends country boundaries and patriotic consumption. For example, the Norwegian Seafood Council (NSC) have over time invested in the country of origin (CoO) label and in the marketing of salmon beyond Norwegian borders. This generic marketing has contributed to demand growth (Brækkan and Thyholdt, 2014) and increased recognition of Norwegian seafood in the major markets (Myrland et al., 2004), successfully leading to price premiums (Kinnucan and Myrland, 2002).

Nowadays, an inherent differentiation by country of origin is evident and most salmon producers name this as a distinctive criterion in both B2B and B2C marketing of their products. In this regard, Asche et al. (2015) find that some retailers do not charge a price premium for CoO labels, while those that do, increase their prices considerably as a result. In France, one of the largest importers of salmon, the preference for provenance of cold smoked salmon is reflected in the retail price, with French-smoked salmon fetching up to 30% in price difference depending on the origin of the salmon used (Espe et al., 2004). CoO can also make a difference in consumers' willingness to pay for farmed salmon products when correlated with ecolabels specific to environmental quality (Uchida et al., 2014). Similar to

country of origin, the more specific production location (or region) is also expected to provide a means of differentiation. A limited number of salmon producers market salmon based on their regional origin, within Norway or Canada, for instance. Compared to other food sectors, marketing of products with Denominations of Origin (PDO) or products with Geographical Identities (PGI) (Guerrero, 2001), remains limited for salmon. Some producers have started expanding the stories they tell about salmon, to go beyond origin. In supermarkets for instance, offering a vast array of similar and similarly priced salmon products, it might be hard to stand out from the competition. With the difficulty of using technical characteristics, such as quality and/or price, to differentiate products, marketers could profit from gaining more insight into the way in which consumers' purchasing decisions are influenced by their perceived emotions (Barrena and Sanchez, 2009), and this way attaching emotions or feelings to a brand in order to differentiate it from others (Kroeber-Riel, 1984).

Private labels and branding

Private label products are defined by Bronnmann and Asche (2016) to "encompass all goods sold under a retailer's brand (which) can be the retailer's own name or a name created exclusively by that retailer." On the other hand, a branded product refers to products manufactured by a specific company, typically a producer or processor, and under a specific name. Both are common in agricultural products, while in aquaculture products it is markedly more common to observe private labels than it is to observe supplier brands.

The use of private labels and brands has long been a differentiation strategy in seafood production, with the first generally assuming a "value-for-money" position that rivals the

latter in price, but typically for a lesser, though acceptable quality (Sogn-Grundvåg, Larsen, and Young, 2014). For example, Bronnmann and Asche (2016) find private labels of German retail chains to be discounting seafood products by up to 20%, while Ankamah-Yeboah, Nielsen, and Nielsen (2016) find on average a 17% discount for salmon under Danish retailers' private labels and also go on to suggest that private labels may be used by retailers to promote their image through an increase in options presented to consumers.

Studies looking at both private label seafood products and branded seafood products find that the latter category always incurs higher premiums, with differences as high as 21% (Roheim et al., 2007; Roheim et al., 2011; Bronnmann and Asche, 2016). A close look at these studies and the resulting price advantages, reveals that branded products can be seen as the highest level of differentiation to be achieved. Despite the global nature of the salmon market, and the internationalization of many salmon companies, until 2019 the industry had not produced a great number of brands, and no global brands. However, at least half of the top 20 salmon companies are Norwegian owned, which speaks to the strength of the "Norwegian salmon" label.

Ecolabels

In regard to extrinsic qualities, ecolabels have established themselves in the seafood market as a tool to differentiate sustainably produced foods (Mariojouls, 2000). Alfnes, Chen, and Rickertsen (2018) report that there are 48 ecolabels and certifications used for farmed salmon and Osmundsen et al (2020) show for a subset of them that they vary significantly with respect to which environmental attributes they emphasize. Bush (2019) indicates that ecolabels are more likely to be adopted by vertically integrated players, thus increasing with

the vertical coordination tendency in the salmon industry. The impacts of ecolabels have been investigated using various approaches such as stated preference studies (Wessels, Johnston, and Donath, 1999; Uchida et al., 2014), hedonic price studies (Asche et al., 2015; Bronnmann and Asche, 2016), ecological performance studies (Martin et al., 2012), and studies of price premiums reflected at the fishery level (Wakamatsu, 2014; Blomquist, Bartolino, and Waldo, 2015). As the effects of ecolabels cannot be investigated without accounting for other factors influencing preferences or prices, these analyses have also provided important information with respect to preferences and values of other attributes such as brands and product forms.

The Marine Stewardship Council (MSC) certification is the leading ecolabel in recognizing sustainable seafood. An equivalent to MSC in fish farming is the Aquaculture Stewardship Council (ASC) label, intended to inform consumers of the best choice in farmed seafood. [8] Bronnmann and Asche (2017) show that ecolabels can make up for the negative perception of farmed fish as damaging to the environment, and that specifically in the presence of the ASC label, there are positive premiums incurred that even fully match those of the MSC-labeled wild fish. Relatedly, both Scottish and some Norwegian producers have over the years produced salmon for the French label, Label Rouge. This particular label aims to promote taste-qualities by focusing on fish welfare, slow growth and a high content of marine ingredients in the feed (50-70%). Moreover, as it is owned by the French government, it can be used with ease by retail chains (Mariojouls and Wessells, 2002).

Perhaps the most distinguishable ecolabel is that designating an organic product. In the salmon context, very few studies have investigated the preference for organic salmon (Ankamah-Yeboah et al., 2020), while those exploring price premiums incurred by organic

[8] Similarly, there is the Best Aquaculture Practices (BAP) certification.

salmon (Aarset et al., 2000; Asche et al., 2015) have found them to be comparable in magnitude to organic agriculture products (Ankamah-Yeboah, Nielsen, and Nielsen, 2016). To date, the organic salmon serves a niche market, with production around 39,000 tonnes in 2017 (EUMOFA, 2020).[9] After Ireland, Norway is the largest producer of organic salmon accounting for about 43%. While for Norway this constitutes only about 1.4% of all salmon production, for Ireland it represents almost all salmon production. Since half the volume produced in Ireland is consumed locally, Norway might still be the largest supplier of organic salmon to Europe.

Services

The typical customers of the industrial food producer are processors, retail chains, and the food service sector comprising HoReCa (hotels, restaurants, and catering). Wessells (2002) postulated that the constantly growing competitive seafood market in combination with the final consumers' more informed preferences will lead to new developments in the attributes of the seafood products and markets, to eventually closer resemble the agri-food sector. This perspective mainly considered origin, branding and labeling, in addition to intrinsic qualities. In industrial markets, the extrinsic qualities have evolved to include service-related attributes, to better meet demand from retail and ultimately, consumers. Such attributes might be market and product knowledge, transparency of communication, flexibility, timeliness, reliability and consistency of deliveries, and adaptability to demand from the industrial processor's side. It therefore becomes interesting to investigate further the type of producers and processors that make use of such characteristics in the context of salmon aquaculture. Ultimately, we

[9] Ireland is the largest producer of organic salmon, Norway second and Scotland accounts for the remaining production. In 2017, the organic salmon production for each country was about 19300, 17000, and 3000 tonnes, respectively.

would want to understand to what degree these services are of importance to stakeholders throughout the value chain, and whether they would be willing to pay a premium for accessing them.

When speaking of flexibility, the focus may not be only on adapting production quantity or product forms to an everchanging market, but it may also speak to the possibilities of a producer to respond to consumer demands. For instance, consumers have for some time been building awareness of their environmental footprint (Wessells, 2002) and hence may be willing to pay more to have access to salmon raised on alternative types of feed (Ferrer Llagostera et al., 2019).[10] This includes feed formulas that substitute insect meal, algae meal, or vegetable-based meals for the traditional fishmeal and fish oil. Although the knowledge and technology exist to modify and create alternative types of feed, for the moment it remains relatively expensive to do so, and producers are typically reluctant to bear the extra cost and risks associated with leading the change. Following economies of scale in alternative feed production, however, product costs are likely to decrease, with such a reduction expected to be reflected in the price of the feed.

INTERVIEWS

As part of the study, we conducted in-depth in-person interviews with six Norwegian salmon companies and one feed producer. Four of these companies are among the top ten Norwegian companies producing Atlantic salmon. One of the six companies is a smaller producer, while the last company we interviewed is an independent exporter, dealing with Norwegian,

[10] Weihe et al. (2019) discuss feed performance with different levels of marine ingredients.

Scottish and Irish salmon, and serving primarily niche markets. The majority of these companies also operate internationally. The distribution of our sample by size accounts for two large companies with harvest quantities above 100,000 metric tonnes, two medium-sized companies with harvest quantities of more than 30,000 tonnes, and two small companies. The largest companies, and to some degree the medium-sized ones, are mostly vertically integrated. The feed producer is one of two largest independent feed producers in Norway, and which also has international operations, serving or having served the majority of producing companies we spoke to.

The interview questions were predefined and remained generally the same throughout the interview process.[11] The participants held key decision-making positions in the company they represented and were therefore knowledgeable of the plans for differentiation and differentiation strategies implemented by their company. To protect their privacy, we will not link our findings and discussion to their individual answers and identities. Additionally, from the same project, we had access to interviews with customers down the value chain, mostly processors and retail chains in Poland and Germany. These provided valuable information on Norwegian salmon demand and requirements from the most important industrial buyer groups. Secondary sources we used consisted of publicly available annual reports, webpages, and presentations by Norwegian salmon companies. In our findings, we use italics to anonymously quote from our interviews with the various stakeholders.

CURRENT DIFFERENTIATION STRATEGIES

[11] Some adjustments to the questions were made based on the company interviewed and their practices.

What is differentiation in practice and how is it viewed by the salmon industry? Is differentiation mainly based on the physical qualities of the product, or do the extrinsic qualities extend to offer competitive benefits? Do the characteristics of the company, such as size or position in the value chain, result in variation in terms of the differentiation strategy undertaken? Most producers point to the difficulties of differentiating salmon, as over time it has mostly become a homogeneous product, making "*it harder to see how (one) should differentiate salmon*". Compiling the answers provided by our interview participants, we identify a common thread in that all are ultimately interested in achieving higher prices, well above what it costs to produce. However, it is not surprising that differentiation is understood differently among industry players, depending on where in the value chain they operate, or what customers they are serving.

Intrinsic factors of differentiation

Despite salmon having become an essentially homogeneous product, some larger Norwegian producers continue to claim that their differentiation strategy begins with them offering a superior raw material. Brood stock, feed used for growing the fish, farming methodology, fish harvesting and grading, are all channels that alone, or in combination, allow the attributes of the raw product to be molded to the desired objective. Typically, producers will adapt their brood stock and feed to target various levels of fat content, flesh pigmentation, firmness, and EPA/DHA. Even though these qualities may not be directly observed by the final consumers, they can make a difference in the final product's quality. For instance, a high-quality smoked fillet is based on a raw product that has a relatively low fat content. As such, various degrees

of price premiums can be achieved for smoked products based on the qualities of the raw material.

Feed

While most salmon are fed on general/standard recipes, some firms have their own recipes that might to some degree be used for differentiation. The majority of Norwegian companies view alternative feeds, such as algae-based and insect-based feeds, as an opportunity for further growth in salmon production, and are also considered for differentiation purposes. As reasons for their support, they cite reliability and predictability in production, a decreased impact on the environment and wild fish stocks, increased cleanliness compared to using the wild North Sea stocks in the current feed mixes, and a promotion of high levels of omegas in salmon resulting in at least an equally healthy product. In particular, one company we spoke to produces a "concept salmon" rather than a generic Norwegian salmon. This salmon is differentiated by being fed a diet of microalgae and insect protein, and it is said to deliver higher levels of DHA and EPA.

It is not solely the producers who push for this differentiation. Suppliers of the said new, healthy, and sustainable ingredients are actively pursuing salmon producers, feed producers and retail chains, and promoting these new ingredients.[12] Salmon producers are working closely with retail chains and feed producers to develop products based on new recipes. Interestingly, however, there is little to no direct contact between retailers and feed

[12] Some producers said they prefer to deal directly with the providers of alternative ingredients, in order to not to fall prey to the bargaining power of feed companies (which is now admittedly weak but has at times been very strong).

producers, something that has changed from the common practices some ten to fifteen years ago. This is primarily due to the larger producers today keeping control over their product development and differentiation.

Extrinsic factors of differentiation

Additional points of differentiation refer to the functional benefits achieved by having factories as close to the customers as possible (resembling the setup in the meat industry), by the way in which the salmon is raised, slaughtered, cut or sliced, smoked, and finally, packed, as well as by the relationship that suppliers build with their customers. These flow into the extrinsic values, which often cannot be considered disjointly from the intrinsic ones.

Origin

"Norwegian Salmon" or "salmon from Norway", terms widely used by producers in advertising, have gained momentum on the market following campaigns by the NSC. Our participants note that this might also have discouraged further differentiation, as salmon has been sold with ease under the "Norwegian" brand. Additionally, they recognize that building an own brand is challenging as Norwegian salmon is already reputable enough to motivate a lack of willingness to pay additional price premiums for, in most aspects, the same product.

Some take origin a step further, promoting the region within Norway in which the salmon is raised, or promoting salmon as "raised in the Arctic". Referring to the Arctic, for example,

works very well in Asia. Other major producers seem to be putting less emphasis on CoO, whereas their local origin may be more important, or the origin of their strain of eggs.

Storytelling

Origin and storytelling often go hand in hand. Although "storytelling", to our knowledge, has not yet been incorporated into consumer preference studies on Norwegian salmon, anecdotal evidence suggests that it is a popular marketing trait used by Norwegian producers. Reference is often made in marketing to the salmon being raised in "breathtaking surroundings", under the Aurora Borealis, in the cold and clear Arctic waters, in the picturesque Norwegian fjords, hand-in-hand with nature, or being "family-owned". Many Norwegian producers have, in addition to common marketing by the NSC, found their own way to inspire those downstream in the value chain to make the salmon production practices more visually appealing and relatable.

For several producers it has become important to connect to consumers through telling the story of their salmon production. Some refer to this as "*emotional differentiation*", which speaks to "*the value you attach to your (product)*" to be able to better differentiate. Emotional differentiation, through storytelling, is normally based on some physical properties of the product, but also brings the product closer to the consumers by studying their insights and so making the product relevant to their lifestyle.

> *"You always need to have product differentiation… and based on that, you can then attach the emotional part. But you obviously cannot tell a story which is not grounded in a product that really delivers specific benefits to your consumers."*

Telling a story based on some discernible difference in the physical product is difficult unless the quality of the product is easily controlled. As it is hard to produce given qualities for given customers, much of the differentiation must be done through strict grading and sorting. Some producers sort or grade their products to fit customers with varying degrees of exigence. The best fish are sold to the most demanding customers, as some customers will have lower tolerance for flaws (e.g., the sushi segment will have lower tolerance for gaping and melanin spots; producers of branded products that will be sold side by side in supermarkets will have low tolerance for variable color variations).

Brands

Apart from the geographic-placed brand associated with the CoO, the Norwegian salmon industry is not very mature when it comes to own brands. Branded salmon products are expected to fetch a price premium of 30-40% over private retail labels. So far, only a few companies have launched their own brands, and that has only happened recently. Some of the larger producers have regional brands in their portfolio, and only one is currently working on the gradual roll-out of a global brand.

Other producers recognize the importance of branding and are looking to follow suit in launching their own (global) brand. However, they communicate that they have not yet found a good steppingstone and acknowledge that it would be a challenging journey.

> *"The focus from the retail to show that they have some special salmon is not very high. People buy salmon a few times a year and then they buy salmon, not 'that' salmon. This is a topic we are constantly working with and we believe that branding within salmon is becoming more and more*

important and will become even more so. The main reason for that is basically (that) now more than ever, the consumers want to know where the food they eat comes from."

Ecolabels

Norwegian producers report a growing interest for ecolabelled salmon, particularly for ASC-certified salmon. ASC-certification comes at a significant price and producers, although applying very similar practices between farms, choose to only certify some of them. Thus, more Norwegian salmon farms produce ASC-worthy fish, but not all will expend on officializing it.

"All our farming concepts are ASC-ready, but we choose not to certify them until our customers are willing to pay for it."

For producers, the question remains: how much of a price premium can be achieved on ASC-certified fish? Interview participants report that there used to be a 5% price premium on ASC-labeled salmon, whereas now that figure is closer to 2-3%. In this respect, Rangan and Bowman (1992) find that product differentiation only provides a temporary advantage, with customers getting accustomed to the additional benefits and over time lowering their willingness to pay a premium.

Overall, Norwegian producers perceive ecolabels as a growing phenomenon, and such as anecdotal evidence indicates to be the case for the GLOBALG.A.P. label, they expect price premiums to dwindle and ASC-certification to become a "license-to-operate" in the future.[13]

> *"In a few years, you will see that it becomes the same as GLOBALG.A.P. is today, and what MSC is today… it is what you need in order to be allowed to supply, it's not a point of differentiation."*

As most production is ASC-ready, and a generally high level of automated and documented production exists, some producers see potential for differentiation in the collected data.

> *"We will try to capitalize on what we already are doing (and our data). We can show (to the end consumer) what kind of treatments the salmon got when it was an egg, what kind of brood stock was used, what kind of treatments they've gotten in the whole value chain, what kind of vaccines, what kind of temperature was in the water leading up to the slaughtering."*

Such information may for example be used to document different attributes and tailor information packages to different customer groups, or for storytelling.

In what concerns the "organic" label, only a handful of producers have taken up organic production in Norway and they typically bundle their sales of conventional and organic salmon. Of these producers, one owns all licenses to produce organic salmon, while a few produce organic on standard licenses.

[13] G.A.P. stands for *Good Agricultural Practices*. GLOBALG.A.P. is a non-governmental organization of supermarket chains and their suppliers in Europe. They consider food safety, workplace safety, animal welfare, and environmental regulation in setting independent standards for production practices and accompanying labels.

Our respondents inform that the demand for organically produced salmon has been increasing exponentially over the past decade, and that it follows a pyramid structure, where the largest segment of consumers are families looking to make health-conscious decisions for their children's diets in particular.[14] Similarly, industrial customers that typically buy organic salmon are also keen on other standards, such as ASC and GLOBALG.A.P.

What is perhaps most interesting for organic salmon is the price rate of change hovering near zero.

> *"When retailers are planning their product portfolio, they plan for a long-time horizon. And they want to be different from all others. I think they plan it with a certain price, and if their ordinary (salmon prices) go up and down, they don´t change organic that much. It is a special niche."*

Data series for organic salmon are hard to come by. However, interview participants estimate the cost of producing a kilogram of organic salmon somewhere between 20% and 30% above that for conventional salmon. EUMOFA (2020) calculate the extra cost to be 0.98 EUR per kilogram in 2015 (i.e., closer to 30%). Respondents also emphasize the predictability and constancy of organic salmon prices, while conventional salmon prices can reportedly fluctuate by 20-40% over short periods. This can be a consequence of the short supply of organic salmon (Asheim et al., 2011), but it can also be related to the pricing strategy for organic products.

[14] It's been reported that at the top of the pyramid are the well-off consumers who buy organic because they are following a trend. Next come the so-called "true organics" who tend to mostly purchase organic because they believe it is healthier and comes with a lesser environmental footprint. Then comes the "organic-by-chance" or "opportunistic organic" consumers segment, who purchase organic only as substitutes. Finally, the majority of organic consumers are families with children.

Relations and services

Perhaps a less obvious element of differentiation is the relationship and trust level between supplier and customers, built around the level of service, knowledge, and degree of transparency that each producer is prepared to offer. This is particularly true for smaller to medium-sized Norwegian producers, who invest time and effort into consolidating the bond with their customers in hopes of outperforming competition. This goes both ways. On the one hand, producers must prove sufficiently flexible, live up to the product safety and quality expectations, and be a dependable supplier, while on the other hand customers must be able to pay producers and uphold their reputation on the market. Without exceptions, where a relationship has been built or is being built, Norwegian producers report they strive to be close to their customers, and regularly seek their feedback on products and services provided and cite transparency in communication as a differentiation means.

> *"We differentiate by having a flexible setup or pinpointed setup for the customer; and we can differentiate in the product scope that we can deliver and secure, and in end-consumer knowledge – how to be an expert seafood salesman, help the stores or the retailers or food service with expertise around the product itself."*

Finally, it is important, particularly to smaller and medium-sized producers, that they differentiate themselves from their competition through their social commitment, by remaining respectful of and relevant within their own communities. These usually refer to coastal communities that derive their livelihoods from the fish industries and associated businesses. This may not be visible to the consumer (unless actively used in storytelling), but is still relevant, as building relations with a customer is often about finding partners of a similar size, ownership structure and philosophy.

"...it's about being a family company, and the responsibility that we do take in the local municipalities, where we are based. Our people live all around (the coast) and it's important for us that all these small places are good places to live. So that's what we are trying to differentiate on when it comes to the company. The second part of that is sustainability... that we believe we do things different than the others, (that) we are creating the future, (that) we are in the forefront of changing the whole production, the industry."

Differentiation by chance

During our interviews, it became clear that some customers like to inspect the boxes used to transport the salmon, looking for the producer number that is typically printed on the label.[15] The number indicates the processor and the specific processing location. Buyers have different experiences with salmon from different plants and therefore have expectations when it comes to the best quality-producing location. In such cases, instead of a deliberate and informed differentiation, a "differentiation by chance" takes place. Buyers looking for a given producer number as a sign of good quality implies that there is a certain demand for quality-based differentiation.

BARRIERS TO DIFFERENTIATION

[15] Each producer in the fish-processing industry is given a unique producer number, consisting of the first letter of the county and a three-digit number. For salmon, therefore, it is does not refer to one producer, but rather to the slaughterhouse (which might also slaughter for more producers and do some processing).

Salmon continues to be mostly produced and sold with limited differentiation, especially when compared to other food products offered to consumers, such as meat products. Our interview participants report a number of barriers that are instrumental to increasing differentiation throughout the salmon value chain. These are barriers that relate to policy and regulation, environmental footprint, ecolabelling, market prices, and innovations.

A primary obstacle to further differentiation is the strong origin-based brand that is the "Norwegian salmon". Many years of generic marketing have contributed to a growing demand, but also to a strong knowledge among consumers of "salmon from Norway". There was a general consensus on this among the companies we interviewed.

> *"The "Norwegian salmon' brand is so strong that (...) if you want to differentiate from that then you really need to do something dramatic."*

> *"(retailers) are not so interested in fat and color these days, because they kind of expect Norwegian salmon to be Norwegian salmon."*

Second, the consistently high prices in recent years (Straume et al., 2020) have diminished the motivation for suppliers to try to obtain price premiums through differentiation. On the retailer and food service side, the high prices have also made it difficult to charge an even higher price or add a premium for differentiated products.

> *"When you have a more balanced situation between production and market, where let's say the price level comes to a more normal state as you see in chicken or pork, meat production, where the profits for the producers are more normalized, between 5 and 8%, then, you can see a much higher degree of marketing and a higher degree of differentiation of the salmon, because then you need to work to differentiate (your product)*

from all the others. But right now, that's not the focus because the prices are so high."

Third, a reliable supply is a prerequisite for motivating development of more differentiated products. Most markets prefer an even supply and stable prices. Supermarket chains, for instance, require that the products are available year-round, while consumers have been accustomed to this convenience and expect it. However, salmon producers continue to experience a seasonality in growth. The regulatory system, for example, has been identified as one obstacle to growth in salmon production (Asche et al., 2013; Hersoug, 2015). As such, before broadening differentiation strategies throughout the value chain, Norwegian producers wish to have more freedom in taking control of their supply. Irrespective of company size, all indicate a need for stability in the amount of salmon produced at each point in time, so that they are able to honor existing customer contracts and foster growth by attracting new ones.

"If we could have a stable supply, we would be able to have our own brand for instance. Because then we would be able to supply all year round. But now we are not able to. We stop our factory normally three weeks in the wintertime. I think the slaughterhouse was closed for (about) six weeks (and) it was even longer last year. So of course, that's a big barrier. I see there is no reason to create a very nice brand if you are not able to supply your customers all year around."

Regulatory barriers, although commonly linked to the policies of the country where production takes place, may also be found in market countries. For instance, in France, a mature market for salmon, there are retailer rules that say they cannot purchase more than 30% of a supplier's turnover. This maintains price competition in the market, but limits possibilities for differentiation. Our study participants point out that:

"That puts a limit on how deep you can cooperate with someone in France. That is also why the French market has stagnated when it comes to product development and assortment."

Fourth, the ASC certification has become a means of differentiation on extrinsic qualities fueled by environmental concerns. This form of ecolabeling is said to be gaining in popularity and is sometimes even a prerequisite for attracting customers. Due to it being expensive, and with each farm needing to be certified individually, many producers confirmed the process to be cumbersome, especially so since the price gain is only marginal. Moreover, as not many ecolabels exist for aquaculture, they eventually become a standard for all to abide by, rather than an opportunity for differentiation.

Last, not being able to explore genetic modifications in feed ingredients as well as in the fish itself (GM), also imposes limitations. In Norway, only the triploid or sterile salmon rearing has been pursued, with a handful of production licenses having been granted (Benfey, 2016), and as of recent, populations of female-only salmon have been taken into production.[16] GM organisms remain a restricted, debated, unpopular subject in Europe and some parts of Asia, such as in Japan. Asche and Smith (2018) briefly discuss the case of Verlasso, a Chilean salmon producer that attempted to bank on a GM feed ingredient to replace fishmeal and was ultimately pressured into changing that approach. Norwegian producers choose to specifically indicate in their marketing that they produce "non-GM salmon", or that the feed used is free of GM ingredients. GM tolerance differs from importer to importer and producers feel they need to be sensitive to these preferences, especially when the destination country is

[16] Since November 2015, GM salmon has been approved for consumption in the US, with the advantage that this fish is more predictable, can grow larger, and at a faster rate than salmon raised through traditional farming practices. However, consumer acceptance, market impact, performance, and effects on conventional producers remain to be evaluated (Smith et al., 2010).

a major market for Atlantic salmon. Nevertheless, producers recognize the missed opportunities:

> *"But I do think that genes are important when it comes to diseases: if you manage to produce a healthier fish that doesn't need any kind of treatment, for instance, or if you can find something that makes the lice not stick to the skin, or (if) you don't even have to use vaccines anymore because you have removed those kind of genes that attract the diseases."*

CONCLUSION

In recent years, the salmon industry has experienced extraordinary profits. Differentiation is normally seen as a means of increasing profits. So why is it relevant to analyze differentiation in an industry with already high profits? First of all, profits will most probably decrease or normalize over time, while the development of more products will contribute to growing the salmon category and securing high profits also in the future. Moreover, from a producer country's perspective, it is of interest to know more about where in the supply chain value creation takes place, and what can be done to secure more of it.

For the salmon industry, a differentiated product is a product that benefits the customer either directly through its physical qualities, or indirectly through services offered, like ecolabels and certification, origin and storytelling, or branding. A differentiation benefiting the consumer comes with the expectation of incurring a price premium. Following a set of interviews with established Norwegian producers, we identify that differentiation in salmon aquaculture takes place mostly on the extrinsic factors rather than on the intrinsic ones.

Although, in theory, the level of control achieved in the production process may allow tailoring to the customer's needs, differentiation throughout the value chain has been limited. There are relatively few products differentiated by Norwegian producers, and volumes for these products are small. This is to say that salmon is usually sold in intermediate markets as commodities, with mostly standardized specifications, and price is primarily affected by supply and demand, effectively locking much of the Norwegian industry into highly competitive markets wherein large price fluctuations prevail. Most of the differentiation observed in supermarkets is done by processors, or products are sold under the retail chains' private labels.

Over the past few years, the Norwegian industry has benefited from very high prices on whole salmon, demotivating producers from developing their differentiation schemes further. Our general findings point toward a wish for growth in supply to motivate the implementation of more in-depth differentiation strategies at various levels throughout the supply chain. The biological uncertainty and the seasonality in current production practices make it difficult to differentiate more than a share of the production, as guaranteed levels of delivery must be close to the lowest monthly or weekly production. More specifically, the more upstream in the value chain and the more the actual product is altered, the more costly it becomes to differentiate and the harder it is to facilitate. Changing the physical product is costly and implies risks, as it requires changing practices, more investment in equipment and optimizing production on a smaller scale. Costs thus incurred may be impossible to cover through a reasonable price premium.

As long as demand is growing faster than supply, profits for producers will remain high, and producers might comfortably enjoy being well positioned in a commodity market. In this

case, not much more differentiation can be expected. Salmon producers aiming to increase supply to a growing market may actually find that differentiation at the farm stage through differentiated feeds and production practices can have adverse effects on their production volumes as production logistics becomes more complicated and production risk increases. Nevertheless, some producers have attempted to elude the competition by pursuing own brands and might be well positioned to reap the benefits of having the stronger brand once the supply catches up with the growing demand. This is in line with Porter (1980) findings that over time, successful companies may achieve brand identification and customer loyalty, leading to new entrants having to spend heavily to overcome existing customer loyalties.

It is expected that the recent COVID-19-induced changes might influence the salmon value chain in lasting ways. Building on John Stuart Mill's arguments that innovation can alleviate scarcity, it will be interesting to observe the resiliency of this industry, and which players may turn this global crisis into a window of opportunity to pursue innovative, differentiated products and strategies.

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