

Input diversity and performance in fish processing firms

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Abstract: The supply of raw material to the Norwegian fish processing industry has always fluctuated heavily, both as far as volumes and quality are concerned. These fluctuations have had major impact on planning of for instance product mix and production capacity. Thus, sea farming has been considered a promising alternative source of raw material, as fluctuations in supply to a large extent has been overcome through technological innovations. In this paper we report the findings from a study where degree of implementation of farmed fish as a source of raw material in the fish processing industry is analysed. We also focus on the impact the raw material diversifying strategies has on performance among the fish processing companies. Three different strategic groups of firms are studied; one that only produce wild fish, one that only produce farmed fish, and one that combine the two inputs. Our findings indicate that traditional Norwegian fish processing firms have played a minor role as buyers of farmed fish. On the other hand, new processing plants have emerged that solely utilise farmed fish, and these specialised firms are controlled mainly by the sea farm industry. The findings and implications - concerning both theory and industry - are discussed.

Keywords: Supply of raw material, strategic groups, performance.

1. INTRODUCTION

Different theoretical approaches have been developed in order to improve our understanding of how industries evolve and firms adopt in order to cope and prosper. The input-throughput-output paradigm states that firms' value creation is brought about by transforming input factors into valuable products and services that are brought to output markets. Thus, in order to operate effectively, firms need adequate and timely supply of input factors.

In most cases, alternative input factors are available. Choice of raw material source(-s) follows from the production strategies of the firm, and perhaps most important – the *product line simplicity/variety*. Closely associated to this decisive process in the firm we find the potential strategic decisions on *diversification/specialisation* and *vertical integration*. Whilst the first one relates to facing external uncertainty internally, the latter finds an external solution to the problem. In meeting industry specific problems, internal solutions therefore must be sought within a frame of possible outcomes, as set by the different boundaries of firms.

In explaining the industry structure as a result of these processes, however, one has to hold some prior knowledge to the industry studied and relate the analysed topic in light of the competitive climate studied. Thus, access to a new source of supply will impact the structural development of an industry triggered by the way the firms - both old firms and new entrants - choose to act towards this emerging strategic option. In this paper we report a case study on the way a new and alternative source of supply, i.e. farmed fish, impact on the development of an old industry, i.e. the Norwegian fish processing industry.

Numerous conceptual models are suited to predict the structural outcome of such a new strategic option. We argue that alternative models might be categorised along two major dimensions. The first is whether the model focuses on the industry level or the firm level. Here we have chosen to limit our study to a single industry. However, data are collected at firm level. The other dimension emphasised here is whether industry development occur due to internal changes in existing firm or as a result of entrance of new and external actors. Bearing this dimension in mind, we have studied the history of the firms within the industry, and accounted for the way they have adopted to the new option for raw material supply.

Although different approaches focus on different dimensions, the models seem to agree that the outcome of this structural process is closely related to the financial performance among firms that have chosen different strategic options. We report the way different approaches among the firms towards the new source of supply impact on their financial performance and also the structural development of the industry.

The paper is organised as follows. Section two presents a brief literature review on different theoretical

approaches to strategic positioning as far as input factors and impact on financial performance are concerned. Then the empirical setting, data, and development of measures are given. The paper continues by presenting the findings and in the last section we discuss the implications of our results.

2. CHOOSING BETWEEN SOURCES OF RAW MATERIAL

The literature on industrial economics, strategy and marketing all stress the importance of choosing proper raw material sources in order to cope and prosper. Different approaches emphasise different aspects of the supply of raw material. The industrial economics literature focuses on costs of for instance raw material, transactions and processing. The winner is, of course, the firm who is able to get the cheapest raw material to a minimum of transaction costs and have the production facilities that give the lowest production costs. The marketing literature, however, put focus on the other end of the product line. In this stream of literature the potential product mix, market positioning and consumer satisfaction are the essentials when choosing sources of supply. Strategy literature, however, emphasise different strategic aspects of the raw material choice in order to improve the competitive position of the firm. Here the focus is put on how to create and exploit market imperfections in supply and end markets. In this literature vertical integration (VI) is considered and often recommended in order to secure the supply of unique raw material to develop unique products and to build barriers for competitors.

Obviously, understanding firms' success and the development of an industry must be based on all three approaches. One perspective that draws on elements from the three contributions is the resource-based view of the firm (RBV) (Penrose, 1959; Wernerfelt, 1984; Barney, 1991, 1996; Peteraf, 1993). This perspective is based on the observation that within an industry firms are heterogeneous as far as internal resources, strategic positioning and performance are concerned. The major task of RBV is to give a rational explanation why some firms succeed in creating and maintaining sustained competitive advantages. The model is based on the observation that some firm resources are heterogeneous, immobile and hard to copy. To have the potential of sustained competitive advantage firms' resources must have four attributes: They must be valuable, rare, imperfectly mobile and non-substitutable (Barney, 1991; Peteraf, 1993). Firms develop different capabilities, which applied in a specific setting, will end up in different performances. In a population with strong competition between firms, survivors will be those who have developed the essential capabilities best.

According to RBV firms within an industry will act differently towards a new raw material source, due to opportunities and threats arising from a combination of internal resource positioning and supply of new resources emerging. One essential question, based on this approach, is if every firm will have access to this new raw material source, i.e. degree of resource mobility, or if it is internalised through VI, i.e. degree of internal control. Another is if firms can exploit the opportunities appearing more efficient than other firms do, due to superior internal resources.

One major criticism facing RBV is that it focuses too heavily on internal firm resources and partly ignores the competitive setting (Priem & Butler, 2001). However, other approaches have for a long period focused on the relationship between the firm's competitive environment, its behaviour and performance (Mason, 1939; Thompson, 1967; Bain 1968; Aldrich, 1979). The theoretical framework that was developed is often referred to as the Structure Conduct Performance model (SCP-model). This model focus on industry structure, which determines firms conduct in order to survive and prosper. Porter (1980) is, among others, an exponent for this perspective. The structure issue is of course important as a predictor of how a new option regarding raw material supply impact on structural change and performance among firms that act differently towards this option.

The contradictory between the RBV-models and SCP-models concerning what to focus on, i.e. specific internal firm resources or competitive setting, reveals another interesting question concerning firms ability to change and to act properly to changes in the competitive setting (Burns & Stalker, 1961; Stinchcombe, 1965; Hannan & Freeman, 1977 and 1989). The SCP-model is well suited to propose optimal strategic actions according to opportunities and treats in a competitive setting, but fails when it comes to tell firms how to pass internal barriers of change (Dreyer & Grønhaug, 2002). The RBV-model, however, is well suited for understanding internal barriers to change, but is not suited for monitoring the way external changes in the competitive setting impact on the value of internal resources and proper ways of acting to such changes.

One research tradition on industry structure development, focusing on firms' ability to change, is *organisational ecology* (Hannan & Freeman, 1977, 1989). Here firms' ability to change is considered modest and external shocks that give birth to new firms and wipe out old are predicted to cause most of the changes occurring in industry populations. In such a model industry structure depend strongly on the performance of firms in

different strategic groups (McGee & Thomas, 1986) and changes in the competitive position when external shocks occur, like access to a new source of raw material.

Another dimension concerning strategic positioning and supply of raw material is to what degree firms control the raw material source through ownership, i.e. vertical integration (VI), or if transactions are carried out through an open market exchanges. VI is a frequently applied strategy to secure supply believed to influence firms' performance. Empirical research is, however, so far inconclusive as some studies report positive co-variation between degree of VI and performance, some no relationship while other report negative co-variation between VI and performance (Buzzel, 1983; Stuckey & White, 1993; Dreyer *et al.*, 2001). VI implies that transactions are conducted internally instead of using the market, and has received considerable attention in research literature, because it is a frequently implemented strategy in many firms and industries. VI relates to imperfect markets, since under the conditions of perfect competition it (VI) has no place. In explaining VI, three perspectives dominate: Transaction cost economics, industrial organisation and strategic management.

The transaction cost approach (TCA) provides a coherent framework for investigating the determinants of VI (Coase, 1937; Williamson, 1971, 1985). Arrow (1969) defines transaction costs as being "*the cost of organising the economic system*". Minimising costs that arise, due to transaction specific investments and uncertainty, impact greatly the way production is organised. Transactions are classified according to whether they take place within the firm or are conducted across markets. The market alternative becomes hazardous in recurring exchanges involving transaction specific capital when information is incomplete. In such cases the firm provides a suitable alternative since common ownership of physical capital discourage opportunism among owners, and is the basis of efficient information transfer and long-term ties in the firm and between its employees. In terms of vertically related production processes, the firm will integrate when the transaction costs outweigh internal costs of management (Levy, 1985; Coase, 1937).

According to the industrial organisation (IO) perspective, VI is a valuable instrument in creating competitive advantages. Porter (1980) argues that the strategic purpose of VI is to utilise different forms of economies like; economies of combined operations, economies of internal control and co-ordination, economies of information, economies of avoiding the market, and economies of stable relationship. Furthermore, he argues, as do Pfeffer & Salancik (1978), is VI an important device to reduce external uncertainty and to secure supply of critical input. RBV approaches VI as primarily a differentiation issue (Wernerfelt, 1984; Ramanujam & Varadarajan, 1989), and focuses on firm specific resources prior to - and after - integration.

The three perspectives have different foci. TCA emphasises that vertically integrated firms may have lower cost than do firms utilising the open market. IO emphasises VI as a strategy to achieve competitive advantages and concentrate on industry specific competitive environment as a major moderator on VI impact on performance. The RBV focuses on firm specific resources, stating that VI is a complex and costly strategy.

Although conceptual issues concerning VI have received much attention, predictions of VI and its impact on performance within an industry are rather equivocal. According to the research literature, structure and turbulence in firms' competitive setting affect the degree of VI (Pfeffer & Salancik, 1978; Balakrishnan & Wernerfelt, 1986; Stuckey & White, 1993). When uncertainty is at stake, firms cultivate either vertical integration or market based transactions as strategies for organisation structure (Williamson 1991; Masten, 1984). Pfeffer & Salancik (1978) states that in an open system a firm will have to secure vital resources that enter the production process. When such resources are external, this uncertainty has to be controlled, and VI is one - and often utilised - strategy in this sense. Miller & Shamsie (1999) point out that environmental state uncertainty spurs product variety and may induce firms to new product innovations and broader market scope. Balakrishnan & Wernerfelt (1986) conclude in their analysis that great environmental uncertainty would invoke VI as strategy to avoid this. However, if uncertainty is of technological kind, the end result will be the opposite.

According to literature on VI, hierarchical issues are essential to outline the impact of a new raw material source on firm performance. Here we include VI in our study, and bring another dimension into that gives opportunity to investigate if degree of VI impact on the spread in performance within the strategic groups studied.

This brief literature review opens for some relevant research questions. Our study represents an opportunity to analyse empirically the implementation of a new raw material source at both firm and industry level. Thus, an essential question concerning firm barriers to change is if incorporation of this new raw material source comes as a result of external actors entering the industry, i.e. birth of new firms, or through internal changes among the existing firms, i.e. input diversity. Another research question arising from the literature review is what impact different strategic positioning at firm level has on firm performance. And in particular, when the controversy

between the RBV and SCP-models is allowed for, is the spread in performance between different strategic groups higher than within such groups?

3. EMPIRICAL SETTING

The fisheries industry in Norway is small in terms of GDP share or share of total employment. Though, the employment effect in many coastal communities can not be underestimated. However, it is the second largest export industry when the oil and gas sector is excluded and, in fact, Norway was in 1998 the second biggest fish exporter in global terms, (FAO, 1999). Traditionally the fishing fleet has been the sole provider of raw material to the fish processing industry, though this part of the industry will not be further elaborated. The latter three decades, however, a steadily increasing fish farming industry output has taken rising shares of the production volume in the sector, as well as of the export value. In Figure 1 the total offering from living marine resources in Norway is highlighted, together with the farmed fish share of total supply and export value.

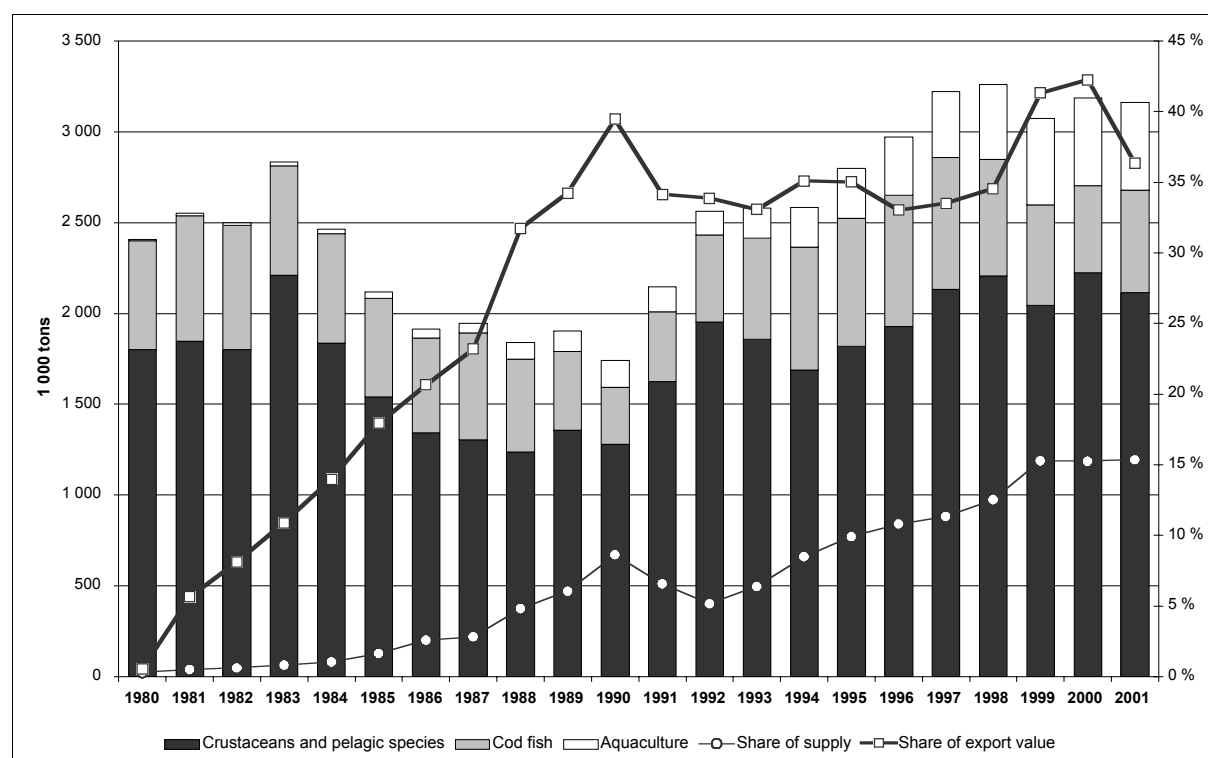


Figure 1: Total supply of wild caught and farmed fish in Norway, 1980-2001. Farmed fish' share of total supply and export value. Source: Directorate of Fisheries, Norwegian Seafood Export Council

The figure shows the increasing importance of the aquaculture industry in the Norwegian fisheries industry. Not only in terms of an increasing supply but also of economic importance when export value is at stake, as the share rose from one to 40 percent within an 11-years period. In the continuation of this paper we will not attach importance to the pelagic part of the fish processing industry or those processing crustaceans, as these in most cases are highly specialised units with a distinct production technology unable to process other fish. Instead we will concentrate on those processing either demersal wild caught fish and those processing farmed fish.

As in the end of the 1980's and the beginning of the 1990's, the end of the 1990's and the introduction of the new millennium was followed by a decrease in the cod quotas. From a peak in 1997, where 900 thousand tonnes codfish was landed in Norway (20 per cent by foreign – mainly Russian – vessels) codfish landings in 2000 were reduced to 633 thousand tonnes, (of which 24 per cent stemmed from foreign vessels). In the last codfish "recession" a law amendment made it possible for foreign vessels to land their catch directly in Norway, and Soviet-/Russian fishing vessel owners have utilised it to it's full, from landing 15 thousand tonnes in 1990 to the tenfold in 2000. However, what used to be landed as fresh cod until mid 1990's is to a larger extent landed as whole frozen, or fillets from cod, today. The most of it is landed at cold-storage plants, intended for re-export to foreign processors or markets. Bendiksen & Dreyer (2002) give a more detailed description of the structural changes in the market for raw fish in Norway.

In the pioneering period of the aquaculture industry, salmon and trout were farmed in pounds. But as technology gathered speed and the volume boosted, net pens near the shoreline exerted as the natural growth place for fish farming, and salmon outweighed trout as the most important species. At the mid 1980's fish diseases and exaggerated vaccination was the worst enemy of a continuing growth, but as diseases through research was brought under control the growth continued with expanding production and markets world wide. From 1978 farmed fish could only be sold through a monopoly owned by the fish farmers, but a failing freezing arrangement put in effect in 1990, in order to stabilise prices, led to bankruptcy the following year. In addition the US market was effectively closed for farmed fish this year due to implemented trade restrictions. The industry has in later years been greatly effected by the bilateral salmon agreement between Norway and the EU of 1997 - a price-floor arrangement - from which the industry have both profited and suffered from in later years, as the supply from competitors to the EU market have increased. At this point of time, "the Salmon Agreement" is about to be renegotiated and 40 new fish farming licensees have been designated specific areas, and are about to be allotted good applicants. Under these circumstances owners of fish processing plants have expressed great interest in licences, and in some cases claimed that it is a necessity to survive in the industry.

Those firms that has since 1998 undergone several years of poor profitability on average. This has been caused by decreasing product margins in most production opportunities, as the wedge between increasing raw material prices and - in most markets - steadily falling end market prices has been reduced. Especially the white fish freezing industry, which in most cases produce bulk commodities and has relatively high unit labour costs, suffered the most from increasing raw fish prices. For those handling farmed fish 1999 showed a peak in profitability, while the market price reduction later years have reduced profitability analogously.

As can be deducted, different sources of alternative input factors are in most cases, available for the fish processing industry. The choice of supply is therefore guided by the self-serving interest in operating effectively, but influenced by uncertainty. Dreyer (1998) underlines that the Norwegian fish processing industry, heavily relying on wild caught fish, indeed is a sector exposed to primary uncertainty, for example highlighted by an almost stochastic supply. The traditional fish processing industry form a highly competitive business environment, where the day to day competition in the raw material market is harsh, as well as in the end markets (*op cit.*). Fluctuations in supply, due to biological and climatic variations, as well as the seasonal character of the fisheries, form the managers' daily situation, where adapting to the landings in many cases is the only strategy when input is at stake.

4. RESEARCH DESIGN, DATA AND MEASUREMENTS

Measuring diversification is no simple task, as boundaries between markets, products and industries are not easily defined, as is the case with measuring industry concentration. Our approach has been kept as simple as possible, merely in order to distinguish the various types of strategic adaptation from one another. Based on the aim of our study, the literature reviewed, the research questions raised and the setting chosen we will introduce our research design, data and measurements in this section.

Our study is limited to a single industry with the firm as focus. A prime reason for focusing on one industry only is to eliminate for the so-called industry effect, i.e. variation across industries that may affect the phenomenon to be explained. This paper address how firms act towards access to a new source of raw material, and the impact different adaptations have on performance. The chosen population must therefore meet two prerequisites. First, the firms within this industry must have access to alternative sources of raw material. Second, the industry studied must consist of firms that are heterogeneous as far as use of alternative raw material sources is concerned, in order to account for the needed variation.

Based on these claims the fish processing industry in Norway was chosen to study. To study this we need to divide the industry into strategic groups of firms that have chosen to act differently towards the new source of raw material. Here an old industry, the Norwegian fish processing industry, which has two distinct sources of raw material, i.e. *wild* and *farmed* fish, represents our research setting. The industry has evolved through many hundred years, and has based its production on catches at sea. The last twenty years, however, a new alternative source of supply has emerged on the raw fish market - namely farmed fish. Uncertainty in supply from farmed fish is far less compared to the traditional harvesting of wild fish. The emerging of this raw material source, which could have entered the production process with few institutional or technological hurdles, has taken place at the same time as traditional processing industry has sought ways to overcome its volatile raw material supply.

An often-used typology within organisational ecology is the distinction between “specialists” and “generalists” (Hannan & Freeman, 1977; Carroll, 1984), or other strategic groups. This applies also within some fields of strategy literature where the focus is on strategic groups (McGee & Thomas, 1986; Thomas & Venkataraman, 1988). According to this we have chosen to compare three strategic groups - Specialist 1; **S1** (i.e. process wild fish), Specialist 2; **S2** (i.e. process only farmed fish) and Generalist; **G** (i.e. process both farmed and wild fish). This enables us to incorporate and refine our findings further on strategic groups, as proposed in the literature.

Problems concerning firms capability to change and diverse have received much attention in the research literature. In order to study if the industry manage to implement the new source of raw material through old firms diversifying or by birth of new firms entering this industry we have mapped the history of the firms in the different strategic groups.

Comparisons between strategic groups when VI is concerned are not straightforward, as different firms/groups may compete in different markets, have different historical development and be in different phases of their life cycle. In an earlier paper (Dreyer *et al.*, 2001) measurement problems is discussed in greater detail, and ways to overcome them are proposed. As recommended, we emphasise the need for continuous measurements of VI adjusted to the industry studied (de Koning, 1994; Eckhard, 1979; Martin, 1986). We analyse the magnitude of firms in the total population that process farmed fish, in order to study structural issues in the population, like specialisation and division of labour. However, this only captures the differentiation dimension of VI as emphasised in RBV. Therefore, we incorporate ownership as an important dimension of VI, and construct two measures of ownership, i.e. share of processing plants owning fishing vessels (**VI1**) and share of processing plants owning fish farms (**VI2**). A third dimension is to what degree the processing plants are supplied with raw material from units they own, independent of type, i.e. wild or farmed fish. The next two variables therefore capture the share of total raw material supply stemming from vessels or fish farms where the processing plants have proprietary interests. In order to establish systematic differences in adaptation of VI between the strategic groups, **VI3** measure the share of supply from own vessels, and **VI4** the share from own fish farms.

Our data include financial statements, and are well suited for measuring financial performance. To assess performance we have applied two financial key figures: the rate of EBT (earnings before tax) to turnover and Return on Total Capital (RTC). The data originate from "Driftundersøkelsen i Fiskeindustrien", a yearly, ongoing profitability survey (Bendiksen, 2001). The survey provides the main accounting and production figures at firm and industry level, and allows as well for comparisons of performance among different strategic groups. The data is well suited for developing continuous measurements on degree of VI, and because the same companies are surveyed each year, it also allows for the construction of a "panel data" set. Available performance measures for every firm also makes it possible to map the firms' relative competitive position every year. Additionally, telephone interviews were conducted with general managers in the industry, focusing on VI issues and raw material needs towards both wild and farmed fish. The telephone interview data was collected to capture the history of the firm as far as strategic positioning towards sources of raw material.

5. RESULTS

We will start this section by presenting findings concerning implementation of framed fish as a source of raw material at industry level. In the year of 2000 there was about 550 fish processing units in Norway. The number of producers included in the annual profitability study was about 450, due to lacking account figures, varying company constellations, etc. With regards to materials, about 60% of the units make use of caught whitefish (i.e. **S1**), 20% farmed salmon or trout (i.e. **S2**) and about 5% both wild and farmed (i.e. **G**). The remaining firms utilise pelagic species or crustaceans (mainly prawns). As about 80% of all farmed fish are exported round, only 36% of those who handle farmed fish process the fish further than merely slaughtering and packing. Thus, our findings indicate that the industry is still dominated by firms processing only wild fish and that a small, but strongly specialised strategic group utilising farmed fish has emerged. This new group of firms consists of young companies, indicating that implementation of the new source of raw material has taken place due to birth of new firms. A rather small group of old firms has chosen to diversify into the farmed fish market. However, as most of the processing of farmed fish from Norway take place abroad - it strengthen the conclusion that new actors have played the major role in processing the farmed fish.

In order to study the impact on performance of different approaches towards the new raw material source, we have compared financial performance between firms in the three different strategic groups. Our tests include the years from 1998 to 2000 and the results are presented in Table 1, where mean and standard deviation are given for the group in bold types.

Table 1: Performance in – and between – strategic groups, 1998-2000

t-test		EBT/Turnover			Return on Total Capital		
		Mean	St.dev.	t-value	Mean	St.dev.	t-value
2000	S1 – S2	-0.0217	0.058	-1.51	0.0249	0.148	-1.29
	S2 – G	0.0232	0.131	-0.10	0.0768	0.160	-0.10
	G – S1	0.0200	0.070	-2.36*	0.0720	0.153	-1.17
1999	S1 – S2	-0.0191	0.074	-1.83	0.0381	0.153	-0.99
	S2 – G	0.0328	0.121	-1.07	0.0863	0.202	-0.50
	G – S1	0.0029	0.037	-1.69	0.0625	0.078	-0.89
1998	S1 – S2	0.0493	0.053	1.73	0.2101	0.193	3.02*
	S2 – G	-0.0067	0.137	0.16	0.0046	0.273	1.14
	G – S1	-0.0012	0.070	2.86*	0.0777	0.064	4.41*

*) Significance level < 0.01

As can be seen from Table 1 no overall significant differences in performance between the strategic groups can be found over a rather turbulent period of time. However, an exceptional good year in the white fish branch (S1) in 1998 leads to significant better results in this group that year than among generalists (G). Also significant better than those who only process farmed fish (S2), when return on total capital is in question. Further, the relatively high standard deviations indicate that the spread in performance within the groups is substantial.

These results contribute to explain why old firms have been rather restraint towards the new source of raw material. According to our findings processing of farmed fish have not proved to be exceptionally profitable. According to our interviews with managers in the old firms, in fact, poor profitability in processing farmed fish have been the major barrier for them when considering farmed fish as an alternative source of raw material. These findings also contribute to a better understanding why most Norwegian farmed fish are processed abroad.

A major task here has been to study VI – both the spread of VI in different strategic groups and the way degree of VI impact on performance within these groups. Table 2 shows that there are major differences between the three strategic groups as far as degree of VI are concerned. On average S1-firms have the lowest degree of VI, and receive on average 16% of its fish supplies from vessels they own. The highest degree of VI we found among S2-firms that on average received 78% of their supply from farms they own. The generalist (G) firms received almost 30% of their annual raw material supply from their own vessels or fish farms. Another conclusion is that there is a significant difference in degree of VI between the groups, as shown by the *t-value* in the last column of Table 2.

Table 2: Degree of VI in – and between – three strategic groups: S1, S2 and G in 2000

t-test	Vertical Integration			
	N	Mean	St.dev.	t-value
S1 – S2	57	16.087	20.137	-8.85*
S2 – G	21	78.048	29.661	-5.27*
G – S1	19	29.737	28.287	-2.30*

*) Significance level < 0.01

Another important finding concerning VI in the strategic groups is that the direction of VI differs in the way that firms processing farmed fish are owned by farming companies, i.e. downstream VI. Firms processing wild fish seem to prefer upstream VI, i.e. ownership in vessels. These findings underline that it is fish farmers that have played the leading role when establishing firms suited for processing farmed fish and that these are almost totally dependent on raw material supplies from their owners.

Another research question raised in this paper is the way degree of VI impact on performance among firms within different strategic groups. Table 3 reports the test results concerning this question, and it indicates that there is seemingly no impact of VI on performance within this industry (between VI3 and VI4 and EBT/Turnover and RTC). Further tests on these relationships reveal that changes in margins at product level imply heavier impact on performance than VI does.

Table 3: VI and performance in strategic groups in 2000

Sample	EBT/Turnover			RTC		
	Regr. coeff.	St. dev.	R ²	Regr. coeff.	St. dev.	R ²
S1 (n=57)	-0.012	0.001	0.002	0.064	0.098	0.008
S2 (n=21)	0.038	0.101	0.008	-0.040	0.123	0.006

G (n=19)	0.085	0.055	0.119	0.036	0.131	0.004
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6. CONCLUDING REMARKS

This paper addresses issues concerning strategic positioning towards a new and emerging raw material source and its choice impact on performances. Three different strategic approaches towards farmed fish are compared as far as financial performance and firm history are concerned. Additionally, the impact of VI on performance within these groups is studied. The results presented give support to models emphasising that firms are facing barriers to change, and that industries adaptation towards major changes in the competitive setting mostly are implemented by entrance of new firms. Here it is shown that it is new companies, both domestic and international, that process Norwegian farmed fish. The old firms in the processing industry have shown little interest for this source of raw material. However, inspecting the performance among processors of farmed fish give support to models emphasising the importance of profitability when firms act towards new raw material sources. This is also confirmed when asking firms why they have chosen not to process farmed fish.

Our findings indicate that the impact of VI on performance is minor both in young industries and industries with heavily fluctuating supply of raw material. The spread and degree of VI seems to be highest in the youngest part of the industry (i.e. farmed fish) and lowest in the oldest part (i.e. wild fish), that processes from the most volatile raw material source. The direction of VI varies, as downstream VI dominates in the young and stable supply industry, whilst upstream VI dominates in the old and uncertain supply part.

This study has emphasised the importance of focusing on how to measure VI. In the setting studied we have demonstrated high degree of VI at firm level among the farmed fish processors. However, when focusing on VI at industry level, we observe that most of the farmed fish are sold unprocessed to foreign actors, and that the fish farming industry is severely integrated towards the wholesales market. This indicates low degree of VI at industry level, but high degree of VI among the existing processors of farmed fish in Norway. Further, it emphasises the need for thorough knowledge to the industry studied, as measurements on different stages in the value chain – even at different industry levels – can result in spurious regressions and, hence, wrong conclusions.

Our findings give support to the RBV focus on VI as mainly a differentiation issue. Although the older part of the fish processing industry were given the opportunity to integrate towards a new and stable raw material source, our findings indicate that they did not seize this possibility. In stead, history indicates that the industry has separated into two directions: one specialising in processing wild fish and the other farmed.

Additionally the RBV may also contribute to a better understanding of the contradicting empirical results concerning impact of VI. Obvious, some firms experience positive pay-off from VI, while others, in the same setting and period of time, are unable to harvest these benefits. This indicate that in order to obtain a better understanding of the impact of VI on performance the portfolio of other firm specific resources must be included when this impact is to be studied further.

An indication of new directions of further research on VI might be found among the answers given by top managers in the established processing plants on the question why they did not take the opportunity to integrate towards farmed raw material. According to them this was not connected to technical, institutional or competence barriers, but rather to profitability concerns. Due to high prices on raw material and strong global competition on farmed fish, the profitability in processing among farmed fish producers, as shown in table 3, has been rather low and for long periods losses have been substantial in this part of the industry. This indicates the need for focusing on profitability concerns when considering VI.

In this study we have shown that the differences in performance among the strategic groups studied are next to nothing. However, the variation among firms within the industry and within the strategic groups is considerable. This indicates that strategic positioning towards raw material sources impact modest on performance. This also seems to be the case when control of supply (i.e. degree of VI) is considered. Our findings have revealed some major problems concerning measurements when it comes to empirical studies of strategic groups and financial performance. First of all what is a strategic group – for instance when it come to supply of raw material we can chose to put the border between groups as we did by the dichotomous variable use farmed fish or not. Another way is to include the variable VI. Both ways, however, raise the question concerning different level of the category variable. As we have demonstrated in this study, the level of use of farmed fish and degree of VI varies considerably within the strategic groups that are vertically integrated and utilise farmed fish. Another measurement issue arising is how to limit the population to be studied. One question we had to consider is if the industry processing farmed fish is so specialised that it is to be considered a new population rather than a strategic group within the Norwegian process industry. Perhaps it would have been a more proper design to

include all firms processing Norwegian farmed fish – also firms located outside the Norwegian border in our study. Such design might have been more relevant in order to explain the spread in performance among farmed fish processors. However, such design would have failed in order to explain why the vast majority of the old firms have almost ignored the new potential source of raw material.

7. REFERENCES

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