



V

*D*iversification and Value-Added Production: Implications and Challenges

As in any other agri-food sector, the seafood product industry must constantly innovate to maintain its base and market share. Fish processors must deal with a reduced supply of many traditionally important species and, at the same time, adjust to the ever-shorter seasons resulting from quotas and higher fleet yields. To help make up the difference processing companies are turning more and more to the expanding aquaculture industry. A growing number are even acquiring fish-farming operations or arranging partnerships with small aquaculture operators to obtain basic products, while others are establishing strategic and trade links with businesses that have research and development and marketing divisions, companies with good international networks and a foothold in the major fish and seafood markets.

In addition to its ability to innovate in the areas of product content and presentation, the fish-processing sector depends on many other variables to be competitive in the marketplace. We have already mentioned the issue of establishing the right conditions for gaining access to raw materials. At the other end of the chain, however, is the question of a product's consumer appeal, which is not just a function of price but is based on many other factors including format, presentation, convenience, and so on. The availability of an increasing variety of seafood products from around the world is contributing to the internationalization of tastes and consumer habits, a process that is amplified by new standards of quality. Because of this trend toward uniform tastes and standards, offering products that are differentiated in content but presented in attractive and convenient sizes and packaging has become essential. Examples of such products are small vacuum-packs of smoked salmon slices and ready-to-serve seafood spreads (crab, salmon, and shrimp). The introduction of resealable packages, which keep contents fresh longer, has also been well received by consumers in recent years.

These examples show the importance of investing not only in industrial logistics (infrastructure and equipment) but also in

specialized human resources to design new products in various sizes and packaging to suit a specific market niche. In this respect, it is essential that a business be in sound financial health. A business with a positive bottom line is in a better position to innovate and to invest in design and marketing than one that is struggling just to survive. Businesses that fail to generate healthy earnings can hardly reinvest in innovative management practices, launch new products, or tackle new markets.

In both Atlantic Canada and the rest of the world, the seafood industry is going through a crucial transition phase. The factors underlying these changes are multifaceted: overfishing of stocks and pressure on the marine and coastal environment, resulting in new agreements on resource-harvesting conditions (moratoriums and codes of conduct for fisheries);⁸⁵ industrial standardization and the introduction of international criteria of quality for seafood products (HACCP); the advent of trading blocs (NAFTA, the European Union, etc.) and the gradual reduction of customs tariffs on seafood products as a result of the Uruguay Round of GATT negotiations;⁸⁶ the upsurge in technologies that facilitate and accelerate the flow of trade information and trade itself (tools to track suppliers, points of sale, and Internet sales) and contribute to expanding the range of available products while reducing costs (the cases of farmed salmon and shrimp are typical); reorganizing the internal management of companies to adjust to the changes and the resulting need to network;⁸⁷ and,

85. The *International Code of Conduct for Responsible Fisheries*, for example, defines international principles and standards of behaviour to ensure responsible practices and thus the conservation, management, and development of bioaquatic resources through respect for ecosystems and biodiversity. The international code recognizes the nutritional, economic, social, environmental, and cultural importance of fisheries and the interests of all those involved in the fisheries sector. Jointly with 300 fisheries organizations, Canada has also developed a code of conduct for sustainable fisheries. For further information, see *Canada's Oceans Strategy: Challenges and Opportunities for the Commercial Fishing Industry*, a report prepared for the Canadian Fisheries Council (Ottawa: Pro Limited, n.d.).

86. Note that average customs duties on imported seafood products in industrialized countries decreased from 6.6 percent in 1993 to 4.8 percent in 1997, a significant reduction of 2.7 percent (FAO, *International Trade*, 1998); however, serious obstacles remain involving nontariff barriers.

87. The trend towards strategic alliances, mergers, and takeovers has dominated all sectors of the economy for a number of years; the phenomenon seems to have become commonplace in the agri-food sector in recent years and has now extended to the seafood industry. We are also seeing a number of examples of vertical and horizontal integration, in particular the purchase of Clouston Foods (Montreal) by FPI of Newfoundland; the Sogelco-Pêcheries Cap Lumière partnership; the takeover of Paturel (New Brunswick) by Eastcoast Seafoods of Maine; major lobster-processing businesses in Prince Edward Island merging to form a new entity, Polar Foods International; and the takeover by Newfoundland's Barry Group of New Brunswick (Blue Cove Group) and Nova Scotia (Seafreeze Foods) plants.

finally, the progressive review of government involvement in the operations and management of the fisheries as a whole.⁸⁸

In short, the new approach is to fish less and better, to produce more intelligently and at lower cost, to offer a diverse line of products to maintain market share, to comply with established quality standards at all stages of production and distribution, to monitor competition on an ongoing basis in order to adjust to changes in supply and demand (entry of new producers and appearance of substitute products), and thus to plan production more effectively for the medium term. The challenges are many and the implications may be various, depending on the sector, the products being produced, and the type of business operation. Let us look then at some of the challenges where we think that by using their imagination producers in eastern Canada could make their operations profitable and maintain their market share.

■ Primary Supply Challenges

Although dependent on the primary sector, the processing industry must be able to respond to the demands of competition. This means that not only must price be competitive but so too must quality and consistency of supply. In view of the prevailing uncertainty surrounding local primary supply, the industry is trying to diversify its sources by buying raw materials from neighbouring regions and provinces and by increasingly turning to imports and aquacultural production.

Current uncertainty over resource supply (quantity and cost of raw materials) is contributing to the general instability that is preventing medium- and long-term planning by producers, including fisher-owner groups. In some industry segments, particularly snow crab, losing a few vessels to a competitor may be crucial as regards overall costs and therefore gross profit margins. This is particularly true in the most lucrative sectors, where price wars mark the beginning of every season.

Uncertainty over primary supply is the producer's worst nightmare because it could leave a well-conceived management plan in complete disarray. By ensuring an adequate primary supply on realistic terms, however, a producer can organize work schedules, plan equipment and infrastructure investment, and arrange for the many products

88. In Canada, these changes take the form of participative management and are part of the reform of income support programs (employment insurance).

and services required for production, packaging, transportation, distribution, marketing, and so on. With a secure, consistent supply, businesses can also maintain operations and keep work teams active, thus improving economies of scale and maintaining the bottom line. Finally, secure supply ensures consistent output, which helps retain markets that not only are sensitive to fluctuations in both price and supply but also demand consistent product quality and supply.

In each province, the factors limiting value-added processing depend in large part on conditions affecting primary supply (the type of resource available, resource cost, and security of long-term supply). That is why producers of seafood products are gradually incorporating in their plans an import-export strategy to deal with questions about local supply. It also explains the increase in the intraregional flow of basic products as part of interprovincial competition in this area. Although major groundfish companies, such as Fishery Products International and High Liner Foods, have made imports-exports a part of their management strategy for several years, a considerable number of small businesses and large corporations in all sectors are now importing their basic products. As we have seen, imports of seafood products in eastern Canada went from 50,000 tonnes in the late 1980s to approximately 200,000 tonnes at the end of the following decade. Moreover, the variety of products imported has increased and now includes various fish products from the capture fisheries and aquaculture, an assortment of crustaceans, and mollusc meat.

As shown in table 26, the use of imported products primarily involves producers in the provinces of New Brunswick, Newfoundland, and Nova Scotia, where imports increased from 34,400 tonnes in 1990 to 175,000 tonnes in 1999. We should point out that imports of seafood products to the three provinces peaked in 1996 at 199,000 tonnes: the majority, of course, were destined for secondary and tertiary processing. Another interesting fact is that in some cases the volumes imported are close to and even exceed the volumes exported. For comparison purposes, a column has been included in the table to show the ratio of imports to exports. That ratio has changed considerably in each province, with the average for eastern Canada ranging from 13.5 to 60.4 percent. It should be noted that at this time Prince Edward Island does not make use of imports and that processors in Quebec import large quantities of unprocessed and primary-processed products for further value-added processing. In addition, the fisheries in Quebec differ from the fisheries in the Atlantic provinces in that the Quebec market absorbs a significant amount of the provincial

Table 26
Change in Imports of Seafood Products to Eastern Canada,
by Province, 1990 and 1999

Province	Imports				Ratio of Import Volume Compared to Export Volume (%)	
	Volume (in tonnes)		Value (in millions of dollars)		1990	1999
	1990	1999	1990	1999		
Newfoundland	2,589	48,959	0.7	218.4	1.8	50.6
Nova Scotia	7,753	38,477	21.7	133.4	4.4	29.7
New Brunswick	24,057	87,575	52.1	310.3	29.4	100.1
Subtotal	34,399	175,011	74.5	662.1	8.6	57.0
Quebec	25,528	33,315	99.6	176.7	92.8	164.4
Prince Edward Island	–	–	0.2	0.2	–	–
Eastern Canada	59,928	208,326	174.1	839.0	13.5	60.4

Source: Department of Fisheries and Oceans Canada, annual statistics on commercial fisheries and aquaculture; compiled by the author.

production and must therefore rely more on imports. Finally, it is important to note that Quebec's processing sector has a dual profile: first, the industry in maritime regions obtains its supplies locally and essentially for export markets, and, second, the processing and value-added processing industry in metropolitan areas is supplied by imports and sells a large part of its production on the Canadian market.

New Brunswick is a special case. There we see a sustained level of imports of chilled and frozen products and marginally processed products. Moreover, New Brunswick processors are importing increasingly diverse products, three-quarters or more of which are used as raw material for processing plants. The list is fairly impressive. In 1997, for example, the province imported fresh lobster (valued at \$115 million) from Maine and neighbouring states; various groundfish products including frozen cod (\$8.5 million) from Alaska, Russia, and Norway; frozen fish meat (\$13.4 million) from Russia, Alaska, China, and European countries; and hake, pollock, and other species of groundfish. Additional imports include shrimp, mainly frozen (\$10 million) and primarily from Cuba but also from the United States; Alaska crab (\$5 million), scallops (\$2.3 million), and other fresh and chilled molluscs (\$4.8 million); and even fresh herring (\$1 mil-

lion). Apart from those products, which are intended for primary and secondary processing, the province imports fishmeal and fish food (\$20 million) from Chile, the United States, and Peru, mainly for the salmon-farming industry, and fish oils and fats (\$9.3 million) from the United States, Peru, and Iceland.⁸⁹

Based on the evidence of this list, there is no doubt that a large number of processing companies, both in New Brunswick and the other provinces, have adopted an import-export strategy to supplement local supply shortages. The list attests to the extensive expansion of the seafood industry on the East Coast and, even more important, its large export capacity. In Newfoundland, New Brunswick, and Nova Scotia, the value of seafood products imported for processing increased eightfold from 1990 to 1999 (from \$74.4 million to \$662.1 million), while exports rose by 56 percent (from \$1.51 billion to \$2.36 billion). The \$845 million increase in exports is eloquent proof of the adjustment made by these three provinces, especially considering that they are still feeling the effects of the groundfish moratorium.

■ Cost Control

Any business that wants to undertake, or has undertaken, value-added processing is faced with the dual requirement of controlling the supply cycles for basic products and costs. In this regard, businesses active in tertiary seafood processing are not immune to the problems of companies in related fields (processing vegetables, fruit, meat, etc.). Value-added processing of seafood products basically requires complete control of primary supply (simply put, avoiding, as much as possible, fluctuations in the manufacturing cycle that generate major management problems) and beyond that of costs.

Long dependent on conditions of regional supply, most small- and medium-sized businesses in eastern Canada have stagnated in low value-added activities. Accustomed to producing traditional product lines (smoked fillets, single frozen pieces and traditional cures), they have not been able to establish medium- and long-term cost planning, which would enable them to expand upward by producing new products and adding more value to traditional products. Some larger groups, because of their greater knowledge of, and inclusion in, international marketing networks, have been able to introduce just-in-time management to minimize industrial losses and to facilitate amortiza-

89. The figures for imports and exports of seafood products are from Industry Canada's trade database STRATEGIS.

tion. Vertically and horizontally integrated businesses have begun to use more aggressive cost-accounting strategies to maximize their production facilities. The use of imports, new packaging materials, and new value-added strategies (precooked, semipreserved, ready-to-serve dishes) can all be seen as parts of the producer's plan to achieve better cost control. Although costs appear to be increasingly well-adjusted in large groups, there are significant differences based on the type of industrial processing involved, whether deep-frozen, precooked foods (often complex to develop and distribute), canned seafood (simpler but with a low unit value), or products referred to as deli, or semifresh, products (high value added but with extreme variations in depreciation depending on the technology employed).

In general, costs vary considerably, depending on the price of the fresh products to be processed. Obviously, the weighting of different costs changes for an expensive product such as lobster, salmon, or fish roe; a medium-range product such as haddock or pollock; and an inexpensive product such as sardines or herring. In all three cases, processing and packaging costs are practically equivalent in absolute value, but their weight expressed as a percentage of production cost is not comparable. Furthermore, the gap between the prices of fresh foods and value-added processed foods tends to widen for staple convenience goods, which require strict cost control.

Few costs other than manufacturing costs can be reduced by any action taken by the producer. We note that the percentage of overhead and depreciation is moderate. In some industries, such as the canned foods sector, the profit margin is approximately 3 percent, which is relatively low. In that case, it is the volume, not the unit product, which counts. In the semi-preserved and deep-frozen, precooked foods sectors, if manufacturing is the main cost component, the profit margins are higher.

Another important area of cost control is the purchase of raw materials, always one of the central costs for secondary and tertiary processing of seafood products. Processors and fishers have always been at loggerheads over the price of landed fish and seafood, and for good reason. The fact is that raw materials account for over 80 percent of a plant's overall direct production costs, as we will see later, and partly for that reason forming dealer groups to import products in a continuous cycle has become the rule. Also, since costs cannot sustain major fluctuations in prices of local supply, producers for a number of years have had no hesitation in using seafood from China, Thailand, and Mexico or fish from Lithuania, Russia, and Eastern Europe for

value-added processing. With controlled imports, easier access to the international market for basic products, and the increasing use of farmed supply, the general effect has been to “insulate” production prices from any fluctuation in the cost of local products.

Packaging materials for canned goods are another important cost component. For a company like Connors Brothers, a canning industry leader that produces 160 million cans per year, it became imperative not only to manufacture its own metal cans but also to set up a labelling system. In addition to keeping production costs as low as possible, the company can now respond quickly and effectively to the requirements of various markets.⁹⁰ In the case of certain products such as canned mackerel (e.g., Qualimer in Quebec), the price of tin cans is somewhat high compared to the price of the fish, which limits value-added processing. In other sectors such as fresh, value-added, semipreserved foods (fish and seafood spread, shrimp pâté, mousse, etc.), packaging that posed numerous problems a few years ago is no longer an issue, so that processors are now able to focus mainly on the illustrations and convenience of the product (ready to serve, etc.). In general, however, manufacturers complain that they have to pay too much for their cans; ways must be found, therefore, to make substantial savings on the cost of containers, particularly new plastic materials and reinforced cartons.

Beyond the cost of buying basic products, our analysis of costs shows that the processing of value-added seafood products is, first, a marketing issue and, second, a technical issue. Knowledge of the needs and requirements of markets, in-depth marketing studies, excellent advertising campaigns, standardization constraints, and ongoing control of the supply chain are all components that only big companies can handle. That largely explains why real value-added strategies are rarely used by small- and medium-sized regional businesses. It is not that they are not interested, but rather that they cannot reasonably use these techniques because they lack the flexibility to play with medium- and long-term costs. For them, any value-added processing is prohibitive because it reduces profit margins, at least in the first

90. Many factors now come into play in this area. In fact, packaging changes (preservation of sensory appeal, development of individual portions, etc.) have made this cost item particularly important in terms of direct costs (price of materials, consumption of stickers, and labels) and indirect costs (utilization, transportation, and storage processes). Enhanced marketing that can give a product new value by adapting it to a variety of demands from distribution channels and consumers has made packaging highly strategic. It has become a major component of products, because fierce price competition is still being waged, particularly as a result of the concentration of manufacturers in Canada and the globalization of packaging markets.

few years. Most companies do not have the financial reserves to consider taking this risk, and borrowing is out of the question. As well, companies with limited lines are generally very dependent and balk at value-added processing. This state of affairs basically explains why only well-established industry groups are involved in value-added processing in the three main activity sectors (precooked, canned, and semipreserved foods).

This does not mean that SMEs, or even small businesses, are necessarily excluded from value-added processing. In fact, specialized SMEs that are technically, financially, and commercially capable of producing new, high value-added products are entering the sector. In many cases, however, they are connected with more powerful groups and develop targeted production agreements with them, which keep costs realistic and make value-added processing possible.

Apart from these technical and marketing considerations, it goes without saying that the financial profitability of existing businesses is an important factor in value-added processing in Atlantic Canada. In any case, our aim is not to assess the profitability of the region's fish-processing businesses on a case-by-case basis. Instead, we provide an analysis of the entire seafood product processing sector in each province. To do so, we have established various indicators by year (1985–97) and have presented the results, which are from Statistics Canada's *Annual Survey of Manufactures*,⁹¹ in the tables and figures that follow.

A number of conclusions can be drawn from table 27. First, we can see that the processing industry in eastern Canada reached a low in 1994, when the effects of the moratorium were at their height and the groundfish sector had almost finished rationalizing. The number of hours worked that year (27.7 million hours) was only 62.5 percent of the number of hours reported in 1988 (44.3 million hours). Also, acquisition costs for raw materials were very high throughout and increased substantially for a number of years. Resource depletion not only contributed to reducing work time but also exerted additional constraints on the productivity and profitability of production lines. The cost of raw materials as a percentage of production costs increased

91. The *Annual Survey of Manufactures* (cat. 31-203) is based on a representative sample of businesses by activity sector and region. For 1997 the survey selected 337 establishments (plants) and 15,332 production workers (according to the number of person-years): it is well known that there are more than twice that number of processing companies, and the number of employees selected is also much lower than the Statistics Canada (census) estimate, which for 1996 places it closer to 38,500. However, the *Annual Survey of Manufactures* data provide more information on production factors and sector productivity and profitability.

Table 27
Change in Performance Indicators for the Seafood Industry
in Eastern Canada, 1985–97

Year	Number of Plants (sample)	Number of Workers (prod. only)	Number of Hours Worked (in thousands)	Avg. Hourly Wage (\$)	Raw Material/ Total Costs (%)	Performance Indicators				
						Total Costs/ Shipments (%)	Value Added/ Shipments (%)	Value Added/ Wages (%)	Value Added/ Hour Worked (\$)	GPM ^a / Shipments (%)
Fish Products Industry (SIC 1020)										
1985	324	19,976	39,928	6.89	72.3	83.0	36.8	1.82	12.54	17.01
1988	371	22,042	44,326	7.98	74.9	81.9	35.9	1.93	15.43	18.10
1989	383	21,582	42,992	8.46	73.5	85.6	35.4	1.71	14.48	14.42
1990	377	19,284	39,288	8.54	74.3	82.1	36.8	1.93	16.50	17.93
1991	355	18,029	36,225	8.91	75.7	83.7	35.8	1.97	17.57	16.35
1992	345	17,562	34,712	9.97	75.6	85.3	33.5	1.80	16.35	14.72
1993	349	15,176	28,914	8.84	80.6	86.2	30.2	2.05	18.16	13.81
1994	333	14,902	27,714	9.06	82.4	85.3	27.5	2.08	18.85	14.74
1995	320	14,589	28,429	8.73	84.5	89.4	25.2	2.06	18.03	10.63
1996	325	13,899	26,778	9.09	83.8	84.7	27.5	2.29	20.81	15.32
1997	337	15,332	29,106	9.18	83.6	85.8	26.4	2.13	19.54	14.24

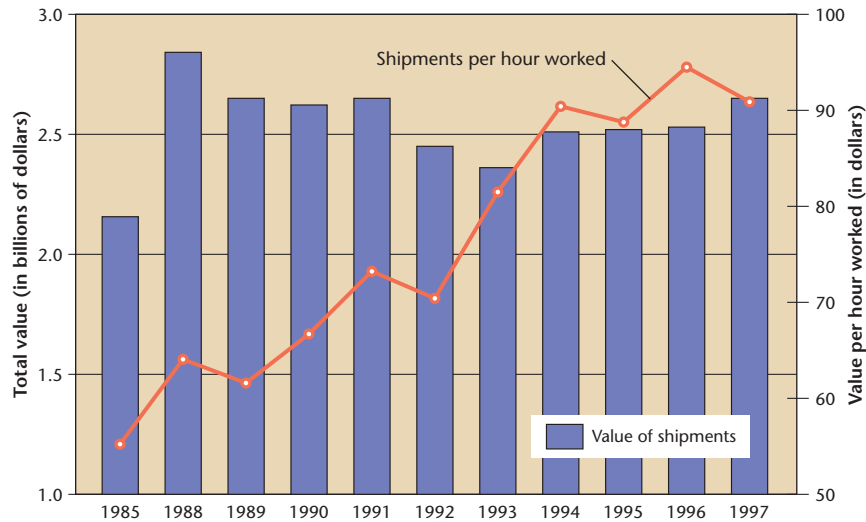
All Manufacturing Industries												
1985	12,600	432,617	886,036	10.44	77.3	73.6	39.4	3.03	31.65	26.36		
1988	14,147	485,881	1,007,308	11.61	76.0	69.7	44.3	3.26	37.88	30.33		
1989	13,478	471,224	977,438	12.32	76.0	69.8	44.2	3.25	40.11	30.15		
1990	15,318	450,555	924,711	13.00	75.6	70.6	43.9	3.17	41.25	29.43		
1991	13,630	394,573	817,936	13.61	75.8	71.0	42.3	3.14	42.69	29.04		
1992	12,903	382,136	789,736	14.05	75.6	70.9	42.9	3.17	44.47	29.14		
1993	12,269	377,121	779,146	14.34	76.9	70.4	42.6	3.36	48.21	29.62		
1994	11,838	389,066	803,630	14.46	77.9	67.9	44.1	3.78	54.61	32.06		
1995	11,773	397,528	825,505	14.76	78.9	67.6	44.2	4.01	59.27	32.44		
1996	11,902	396,050	823,133	14.78	79.1	67.9	43.6	3.99	58.90	32.09		
1997	12,067	430,649	874,167	15.15	79.1	68.5	43.2	3.92	59.40	31.53		

Source: Statistics Canada, *Annual Survey of Manufactures in Canada*, cat. 31-203; compiled by the author.
^a GPM (gross profit margin) is the difference between the value of shipments and total production costs.

from 74.3 percent in 1990 to approximately 84 percent at the end of the decade, directly affecting plant profitability, which is expressed as gross profit margin (GPM). As a percentage of shipments, it dropped from 18.1 percent in 1988 to 10.6 percent in 1995 and subsequently recovered.

Contrary to popular belief, it is not wages that have the greatest impact on the profitability of fish processors: wages represented only 14.5 percent of total production costs in 1997. We can also see that hourly wages were relatively static in this sector in the 1990s (increasing by only 7.5 percent), which, with the increased use of new technologies, largely explains the improvement in productivity indicators. For example, the value of shipments per hour worked increased considerably from \$62 in 1989 to nearly \$95 in 1996, an increase of over 50 percent (see figure 13).

Figure 13
Value of Shipments in the Seafood Industry (SIC 1020)
in Eastern Canada, 1985–97



Source: Statistics Canada, *Annual Survey of Manufactures in Canada*, cat. 31-203; compiled by the author.

Within the region, the industry shows a number of differences according to the province. Although the cost of raw materials is high everywhere, it was lowest in Newfoundland, at least for 1997. This difference is partially explained by the increase in the supply of shrimp and snow crab, two products that now account for a very large percentage of the output of the Newfoundland fisheries. In addition, wages represent a higher percentage of production costs in

Newfoundland, reducing the percentage for raw materials. In fact, the average hourly wage is 15 percent higher than the regional average. The industry also shows greater productivity in Quebec, Nova Scotia, and Newfoundland, as judged by the value added per hour worked (see table 28). The presence of an integrated sector dominated by a few large companies with large fish and seafood quotas contributes significantly to improving performance in these provinces. In the case of Quebec, it is more the location of large segments of the industry (large processors in urban centres) and the focus on secondary and tertiary processing that foster higher value added and, as a result, better performance indicators.

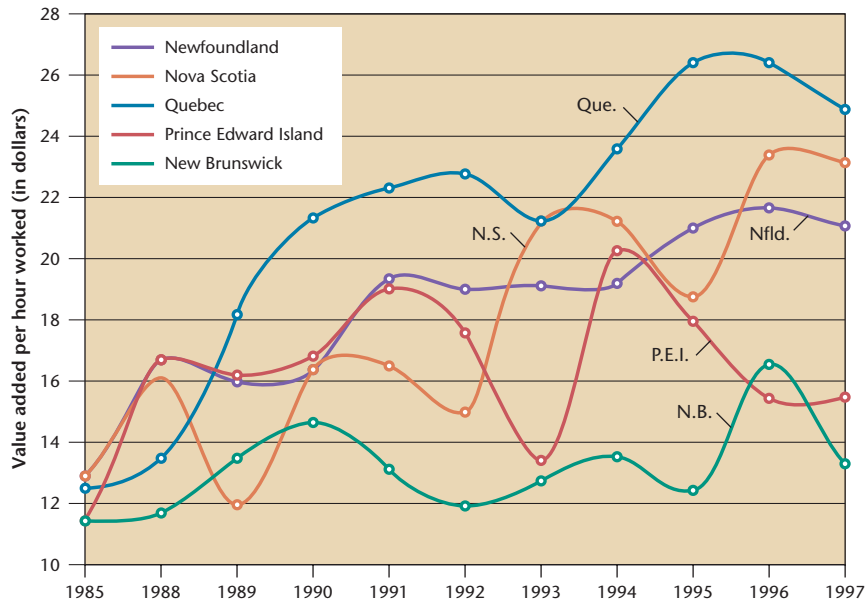
Table 28
Comparative Performance of the Fishing Industry,
by Province, 1997

Province	Average Wage/ Hour Worked (\$)	Share of Production Costs (%)		Performance Indicators for the Production Sector			
		Wages	Raw Materials	Value Added/ Wages (%)	Value Added/ Shipments (%)	Value Added/ Hour Worked (%)	GPM/ Sales (%)
Newfoundland	10.58	19.2	78.2	1.99	32.3	21.08	15.8
Prince Edward Island	7.74	11.4	87.1	2.00	21.0	15.48	7.4
Nova Scotia	9.43	12.6	85.7	2.45	26.0	23.15	15.9
New Brunswick	8.38	14.0	84.4	1.59	20.5	13.30	7.9
Quebec	8.45	14.6	83.1	2.95	32.8	24.89	23.9
Eastern Canada	9.18	14.5	83.6	2.13	26.4	19.54	14.2
British Columbia	15.22	16.3	82.2	2.26	30.4	34.43	17.4

Source: Statistics Canada, *Annual Survey of Manufactures in Canada*, cat. 31-203; compiled by the author.

The positioning of the provinces varies, of course, from year to year, but overall, the trends are steady and the gaps may even widen. The value added per hour worked has thus fluctuated significantly in each province depending on the year, but the hierarchical order has not changed and the differences among the provinces have increased, as is shown in figure 14.

Figure 14
Productivity of the Fish-Processing Industry in Eastern Canada,
by Province, 1985–97



Source: Statistics Canada, *Annual Survey of Manufactures*, cat. 31-203; compiled by the author.

■ The Technology Challenge

Barriers to innovation are not just conceptual; they are also social, institutional, and political, particularly in the seafood industry. There, the technology challenge is to improve the capacity for innovation in the areas of new products and services, production (preparation and packaging), and distribution and management. This does not necessarily involve developing new tools and processes within the sector or a company something that often requires major investments in research and development, but rather adopting current techniques and innovations and adapting them to suit a company's needs. In fact, it is well known that the performance of most manufacturing and service industries is based largely on using ideas and products developed by others. That explains the sense of urgency felt by government everywhere to implement mechanisms to support the adoption and dissemination of technology, particularly in small- and medium-sized businesses. Improved technological capacity is

intended to position a company so it can make more effective use of its human and material resources, which generally, though not always, involves the adoption of new tools and procedures.

Too often in maritime fishing communities, technology challenges are associated with capture efficiency, i.e., speed and quantity of catches. Generally, the fisheries have tried to increase productivity by replacing fishing fleets and gear, with the aim of catching greater volumes of fish in a shorter time. As we have seen, however, catching a predetermined quota of a species in record time does not necessarily improve competitiveness. It may even be harmful to it, and in the end investment may be killing investment.⁹²

As in every other activity sectors, a better way to meet the technology challenge in the fisheries is to approach it from a global perspective. The focus of attention then becomes such issues as product innovation,⁹³ the reorganization of work, an overhaul in vocational training, even the adaptation of economic, institutional, and regulatory frameworks. For the fisheries, the concerns appear to be mainly with production organization (supply strategies and technology input and expertise, particularly in presentation and packaging and product quality) and with distribution-marketing (industrial and trade strategies).

Rapid globalization of the market for seafood products is making the marketing of these products more complex. Companies must be flexible, effective, and innovative to be competitive, which is why it is important to focus on listening and responding to demand, meeting quality requirements, and incorporating technical innovation across the industry. Although these strategies are an inherent part of increased market globalization and industry reorganization, they are dictated by the expansion of supply and the growing specialization in the demand for seafood products.

92. Generally speaking, fishing beyond a certain level causes production to stagnate and profits to decline. It is a classic illustration of the law of diminishing returns, a case where it can be said that investment is killing investment. The lobster and crab fisheries provide typical examples: modernization of vessels and equipment constantly pushes the profitability threshold upward. The phenomenon of overinvestment is particularly evident in the crab fishery, where the profitability threshold reaches significant levels given the type of fishery (midshore with traps) and the relative proximity of the resource.

93. Product innovation should mean differentiated production and not necessarily the designing of new products. Clearly, this means better-adapted presentation (packaging and format), an improved recipe (the addition of new ingredients such as spices and sauces), and new ways to attract consumers (targeted marketing strategies and orchestrated advertising campaigns).

It must be remembered that more than a steady supply of natural resources, technological expertise and innovation are determining factors in competitiveness. The consensus is that in the new economy, innovation in the use of human resources (competencies), capital (technology), and ideas (knowledge and expertise) is the key to long-term growth. It is a principle that applies equally to industries that produce both goods, traditional or modern, and services, which is why investment in R & D, education and training, and new work organization structures are so important to productivity and growth.

It has also been established that a company's market orientation is closely linked to its size, which also determines its technological capacity. In other words, the larger the company in terms of employment, the more extended its export area is, and the more open it is to incorporating new technology. It is not so much the intrinsic capacity for technological development that should be the focus of local companies as their ability to absorb and integrate new technology and procedures to improve their competitive position. Technological capacity, in fact, depends on a whole set of factors, including the presence of specialized infrastructures and services in the technical and financial areas of management and marketing and an effective educational and training system. It goes without saying that a highly trained workforce is a primary asset, because in most cases it is the skilled workers in a company who incorporate new practices and technology. All the factors involved in integrating new technologies combine to create what is called an "innovative environment," i.e., an environment open to entrepreneurship and new ideas.

It is clear, however, that the dissemination of technology is mainly dependent on the company itself, i.e., its access to and participation in information networks, contacts with other firms, strategic monitoring of the competition (technical analysis of competitors' products is an important source of information), client-supplier relations, and even subcontracting. In outlying regions, where most Atlantic coast fish processors are located, manufacturing SMEs generally turn to their suppliers to improve their technological capacity. Clients, who determine the requirements, particularly for subcontracting, are also of great importance, as are consulting firms, research institutes, and industry partners. A study conducted in Quebec reports that six out of ten SMEs are subcontractors, and 29 percent of SMEs delegate some tasks to subcontractors.⁹⁴ It is not surprising then that they cooperate

94. "La tournée des régions" [tour of the regions], the 8 March 1997 issue of the Montreal publication *Les Affaires*, devoted to the Gaspé Peninsula and the Magdalen Islands.

with their contract givers, who are increasingly imposing recognized quality standards, the standards in question being ISO certification.

The ISO 9000 series of international standards is a set of concepts and guidelines applicable to quality management and assurance. Besides instilling confidence in a product because it meets a set of rigorous standards that are recognized around the world, they also contribute to improved control over internal manufacturing, management, and marketing processes. Sixty countries, including Canada, the United States, and Japan, have made the ISO 9000 series their national standards, and it has increasingly become a fact of life in the global market; ISO 9000 certification is now virtually essential in exporting and is on the list of requirements of major contract givers. Because it is well known that proportionately more SMEs that meet ISO standards export their products, there is mounting pressure on subcontractors to obtain their ISO certification.

■ **Industrial Standardization: Issues and Constraints**

The more aware consumers are of issues of safety and quality concerning foods, the greater the pressure to strengthen regulations in this area. The recent increase in diseases transmitted by food products (Creutzfeldt-Jakob syndrome, or mad cow disease, salmonellosis, and listeriosis) has only heightened consumer fears. Although seafood products have enjoyed public favour for some time, mainly because of their healthy image and nutritional benefits, they are not exempt from incidents that periodically undermine consumer confidence.

That does not mean, however, that the purpose of industrial standardization is simply to bolster consumer confidence. Despite the additional constraints it imposes on a business, particularly on an SME, standardization has a number of real advantages, both inside and outside a business. Inside a business, ISO standards encourage all staff to meet a common quality objective. It helps improve productivity by reducing the incidence of malfunctions, which are sometimes numerous, especially in food processing, and it gives the manufacturer increased confidence in the product, manufacturing method, and organization. The benefits of certification are even more evident externally: it allows the manufacturer or supplier to respond more effectively to the demands and concerns of industry clients and consumers regarding product quality, because the manufacturer now has a legal responsibility to comply with established standards. Certification also facilitates trade by helping a company avoid delays

that may hamper the competition. Finally, and this is a definite asset, ISO certification reduces the frequency and intensity of audits by buyers and eliminates burdensome procedures between suppliers and clients, thereby contributing to the creation of group and industry synergy. This is extremely important to major seafood product processors with an integrated network of various suppliers of basic products (seafood, molluscs, and fish), products added (vegetables and various additives), and packaging (tracking the quality of biocompatible plastics and metals for preserving). Although few processing companies in Atlantic Canada fall into this category, the list is likely to grow when industrial certification is introduced throughout the fisheries industry. The forty members of the New Brunswick Fish Packers' Association that are exporters now have to incorporate the QMP quality control plan, which includes the main components of the HACCP system. Some lobster processing plants in particular have had to make major investments, of up to \$250,000, to meet QMP standards. Investments of that magnitude are probably a heavy burden for small processors engaged in value-added processing.⁹⁵

Industrial standardization thus requires some streamlining of production, management, distribution, and marketing activities. However, when prices are competitive and approved standards of quality are in place, it is the companies and consumers who will stand to gain. Producers will also gain when their products are identified with publicly sanctioned standards, because they will find it easier to win client loyalty and to target market strategies.

Among the major industrial sectors, the agri-food sector generally lags behind when it comes to standardization. So far, the demand by the Canadian agri-food industry for actual standardization has been lukewarm, except perhaps in testing and analysis. Clearly, this is a major task that will require considerable effort before it is completed, particularly in the Atlantic provinces. Until now, only Quebec has truly introduced a standardization process in the seafood products sector to supplement the national regime in effect in Canada. Those initiatives are still inadequate, however, and limited to too few products and services. Overall, we are still far from having a wide range of value-added products that are certified and recognized as such by major US and European purchasing pools. Nor is the problem confined to exports. There is also a relative lack of standardization in the

95. Discussion with Peter Dysart, executive director of the New Brunswick Fish Packers' Association.

development of Canada's domestic market, which prefers to import the majority of its tertiary-processed seafood products. For example, restaurant chains (Marriott and McDonalds Restaurants of Canada) have had to stop serving lines of seafood products from Atlantic Canada for the simple but compelling reason that the level of standardization is too low. This calls into question not only the ability of regional businesses to aggressively promote a product but even local expertise.

Aware of the problem and the need to solve it quickly, the provincial and federal governments have taken a number of measures in recent years to enhance the image and to guarantee the quality of Canadian products, particularly seafood products. For example, recent improvements in plant inspections and sanitary management have resulted in a drop in product rejection. As well, DFO has undertaken numerous quality management initiatives to bring producers, particularly SMEs, closer to ISO compliance. In launching a new triple-barrelled program, i.e., product, quality, and safety identification, DFO is supporting common promotional efforts of the agri-food industry as a whole.

The QMP, jointly developed by the fish-processing industry and DFO and introduced in February 1992, is an important step toward consistent quality standards. To begin with, the QMP is an improved inspection program that requires all registered processing plants to develop and implement in-plant quality-management programs. It ensures that fish products in Canada comply with regulatory requirements. The program offers some benefits for producers, including a streamlined certification process for finished products destined for export (thus facilitating market access), the privilege of displaying the "Official Inspection — Canada" logo on products, and reduced government intervention in ongoing operations. Since the QMP is increasingly recognized internationally, particularly by the EEC and the United States,⁹⁶ Canada also gains a competitive advantage over other countries.

The QMP is based on five of the seven HACCP principles. The initials HACCP have become synonymous with safety in the food

96. Since its implementation, the QMP has undergone a number of reviews and analyses to determine its effectiveness, including regular internal reviews by DFO; it was reviewed by the Food and Drug Administration and the National Marine Fisheries Service in the United States. In September 1995 it was also reviewed by an international committee of fish-processing and quality assurance specialists.

industry throughout the world; no other system or method can provide the same degree of safety and ensure the same quality. Using this method, companies can identify potential problems more easily and solve them quickly during processing before the product gets to market. Many countries have already incorporated, or are in the process of incorporating, HACCP principles in their food inspection programs. Largely based on standardization in high-tech industries (new materials and genetic engineering), the HACCP system is now required by the US Department of Agriculture in all meat-processing plants. HACCP standards have also been applied in the seafood products sector in the United States since December 1997.⁹⁷ The European Union has adopted some measures to harmonize HACCP implementation within its member countries, measures that go as far as recognizing the equivalency of inspection systems based on HACCP principles in use in nonmember countries. The new requirements will have an impact not only on the local food-processing industry in this country but also on food processors that export products to the US and EU markets.

Standardization developments of this kind could have a harmful effect on exporters of Canadian fish and fish products if a redesigned management program is not established to bring them even closer in line with international quality standards.⁹⁸ Efforts are also underway to incorporate all seven of the HACCP principles, instead of just the five in the QMP.

Industrial standardization is thus an extremely topical issue among all players in the agri-food industry. The fact that Maritime processors are increasingly using official certification bureaus and recent ISO 9000 certification procedures undertaken by various research centres in eastern Canada are proof of changing attitudes within the industry.

97. The Seafood HACCP Regulations of the Food and Drug Administration came into effect on 18 December 1997. In compliance with these regulations, all sectors of the seafood-processing industry, including processors, packers, warehouse managers, and importers, are required to implement systems that incorporate the seven HACCP principles.

98. "Latest News on QMP Re-engineering," *QMP Newsletter* (5 May 1997); published by the Canadian Food Inspection Agency.