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Results from the Functional Foods and Natural Health Products Survey - 2007

by Beau Cinnamon, Statistics Canada



Business Special Surveys and Technology Statistics Division
7-Q, R.H. Coats Building, Ottawa K1A 0T6

Telephone: 1-800-263-1136



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Note of appreciation

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User information

Symbols

The following standard symbols are used in Statistics Canada publications:

- . not available for any reference period
- .. not available for a specific reference period
- ... not applicable
- 0 true zero or a value rounded to zero
- 0^s value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
- p preliminary
- r revised
- x suppressed to meet the confidentiality requirements of the *Statistics Act*
- E use with caution
- F too unreliable to be published

Note to users

The symbol E indicates a coefficient of variation (CV) between 35.0% and 49.9%. When the figure is not accompanied by a symbol, the CV is less than 35.0%. When the CV is higher than 50.0%, the figure will be replaced by the symbol F.

The science and innovation information program

The purpose of this program is to develop useful indicators of science and technology activity in Canada based on a framework that ties them together into a coherent picture. To achieve the purpose, statistical indicators are being developed in five key entities:

- **Actors:** are persons and institutions engaged in S&T activities. Measures include distinguishing R&D performers, identifying universities that license their technologies, and determining the field of study of graduates.
- **Activities:** include the creation, transmission or use of S&T knowledge including research and development, innovation, and use of technologies.
- **Linkages:** are the means by which S&T knowledge is transferred among actors. Measures include the flow of graduates to industries, the licensing of a university's technology to a company, co-authorship of scientific papers, the source of ideas for innovation in industry.
- **Outcomes:** are the medium-term consequences of activities. An outcome of an innovation in a firm may be more highly skilled jobs. An outcome of a firm adopting a new technology may be a greater market share for that firm.
- **Impacts:** are the longer-term consequences of activities, linkages and outcomes. Wireless telephony is the result of many activities, linkages and outcomes. It has wide-ranging economic and social impacts such as increased connectedness.

The development of these indicators and their further elaboration is being done at Statistics Canada, in collaboration with other government departments and agencies, and a network of contractors.

Prior to the start of this work, the ongoing measurements of S&T activities were limited to the investment of money and human resources in research and development (R&D). For governments, there were also measures of related scientific activity (RSA) such as surveys and routine testing. These measures presented a limited picture of science and technology in Canada. More measures were needed to improve the picture.

Innovation makes firms competitive and we are continuing with our efforts to understand the characteristics of innovative and non-innovative firms, especially in the service sector that dominates the Canadian Economy. The capacity to innovate resides in people and measures are being developed of the characteristics of people in those industries that lead science and technology activity. In these same industries, measures are being made of the creation and the loss of jobs as part of understanding the impact of technological change.

The federal government is a principal player in science and technology in which it invests over five billion dollars each year. In the past, it has been possible to say only *how much* the federal government spends and *where* it spends it. Our report **Federal Scientific Activities, 1998 (Cat. No. 88-204-X)** first published socio-economic objectives indicators to show *what* the S&T money is spent on. As well as offering a basis for a public debate on the priorities of government spending, all of this information has been used to provide a context for performance reports of individual departments and agencies.

As of April 1999, the Program has been established as a part of Statistics Canada's Science, Innovation and Electronic Information Division.

The final version of the framework that guides the future elaboration of indicators was published in December, 1998 (**Science and Technology Activities and Impacts: A Framework for a Statistical Information System**, Cat. No. 88-522-X). The framework has given rise to **A Five-Year Strategic Plan for the Development**

of an Information System for Science and Technology (Cat. No. 88-523-X). It is now possible to report on the Canadian system on science and technology and show the role of the federal government in that system.

Our working papers and research papers are available at no cost on the Statistics Canada Internet site at <http://www.statcan.ca/cgi-bin/downpub/research.cgi?subject=193>.

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Highlights

- 689 firms were active in the field of functional foods and natural health products (FFNHP). Of these, 174 firms produced functional foods products, 290 firms produced natural health product products, 177 firms produced products in both fields and 48 firms provided only services to either field.
- Total revenue from all firms in 2007 was \$21.5 billion of which \$3.7 billion (17%) came from FFNHP activities.
- Of the total FFNHP revenue, \$621 million came from firms producing functional foods, \$1.7 billion from firms producing natural health products, \$1.2 billion from firms producing both and \$20 million from service only firms.
- Export revenue from all firms amounted to \$1.2 billion of which \$732 million (61%) was generated from exports of FFNHP products.
- The majority of exports originated from natural health products (\$435 million). The most common destination for exporters was the United States.
- A total of 13,975 employees out of 100,353 individuals employed by all firms (14%) had FFNHP related duties.
- 156 FFNHP firms indicated that they have unfilled positions for FFNHP employees.
- Total research and development (R&D) expenditures from all firms in 2007 amounted to \$209 million of which \$148 million (71%) related to FFNHP R&D.
- 134 firms attempted to raise capital for FFNHP purposes in 2007. Of these, 69 were successful, raising a total of \$229 million.
- Direct retailers, used as a distribution channel generated the highest proportion of FFNHP sales (46%) followed by wholesalers (34%).
- 265 firms registered trademarks, 217 firms developed trade secrets and 93 firms held patents in 2007.
- Firms indicated that there were 22,062 FFNHP product lines on the market, with 17,656 product lines from natural health product firms.
- The number of FFNHP firms, FFNHP revenues and FFNHP exports all saw notable increases over 2004 figures.

Overview of the functional food and natural health product sector, 2007

	Functional food firms	Natural health product firms	Firms active in both fields	Service only firms	Total
	number				
Firms	174	290	177	48	689
Employment	2,887	6,303	4,491	294	13,975
	thousands of dollars				
Revenue	621,073	1,755,639	1,294,843	20,277	3,691,831
Exports	177,565	176,706	377,360	0	731,631
Research and development	62,646	50,639	30,968	3,702	147,955

Note(s): Totals may not add up due to rounding.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

Results from the Functional Foods and Natural Health Products Survey - 2007

by Beau Cinnamon, Statistics Canada

1 What are functional foods and natural health products?

There is no universal consensus in the definition of the terms functional food or natural health product, although they are commonly used around the world.

According to Health Canada, a *natural health product*

"is a product made from natural sources, often sold in dosage form and are designed to maintain or promote health; to restore or correct human health function; or to diagnose, treat or prevent disease."¹

Examples include vitamins and minerals from natural sources, herbal remedies, homeopathic medicines, traditional medicines such as Chinese medicine, probiotics and other products like amino acids and essential fatty acids.

Similarly, a *functional food*

"is similar in appearance to, or may be, a conventional food that is consumed as part of a usual diet, and is demonstrated to have physiological benefits and/or reduce the risk of chronic disease beyond basic nutritional functions."²

Examples of functional foods include fruit juice with calcium, yogurts with probiotics, and omega-3 eggs, milk and meat.

In the 2007 survey the term *nutraceuticals* was replaced by *natural health products*. Qualitative testing was conducted to obtain feedback from respondents and concluded that the broader term *natural health products* was most commonly used and accepted by the industry. This change in terminology also suited the regulatory environment in this sector and would facilitate a better understanding and ease in the reporting on the survey.

For the purpose of the 2007 Functional Foods and Natural Health Products survey the Health Canada definitions were used along with the requirement that the functional food and/or natural health product reported were intended for human consumption.

This working paper will show results from the Functional Foods and Natural Health Products Survey undertaken in 2008 to collect data for the year 2007. The survey was sponsored by Agriculture and Agri-Food Canada (AAFC) with content development in partnership between Statistics Canada and AAFC.

The population studied in this survey is functional food and natural health product firms. These are firms that engage in activities such as research and development, production of goods (intermediate or final), sales or distribution of goods (intermediate or final) and/or provide services to the industry. Firms range in size from multinationals to SMEs where all or part of its business come from functional foods and natural health products. Statistics reported here refer to firm's activities in Canada during the fiscal year 2007/2008, unless otherwise stated.

1. Health Products Regulations SOR/2003-196, under the *Food and Drugs Act*, R.S.C. c. F-27, as amended.

2. Health Canada. 1998 "Nutraceuticals/functional foods and health claims on foods." Therapeutic Products Programme and the Food Directorate from the Health Protection Branch. Section 2.2 (accessed December 4, 2006).

This is a census survey with a response rate of 80%. Weights are given to each firm in order to account for non-response. Therefore the total population represents a weighted estimate.

2 Sector Profile

2.1 Number of firms

The survey obtained responses from 689 firms developing, producing, selling or providing services relating to functional foods or natural health products. A breakdown of these firms by sub-sector is shown in Table 1.

The FFNHP sector comprises firms within seven sub-sectors:

- firms dealing with functional foods (FF) only
- firms dealing with natural health products (NHP) only
- firms engaging in services only specific to FFNHPs
- firms dealing with both FF and NHP only
- firms dealing with FF and providing services in either FF or NHP
- firms dealing with NHP and providing services in either FF or NHP
- firms dealing with both FF and NHP and providing services in either FF or NHP

Table 1
Breakdown of firms by sub-sector, 2007

	Functional food only firms	Natural health product only firms	Service only firms	Functional food and natural health product firms	Functional food and service firms	Natural health product and service firms	Functional food, natural health product and service firms	All firms
	number							
Total firms	86	83	48	50	89	207	127	689

Note(s): Totals may not add up due to rounding.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

What is evident in the breakdown of firms by the seven sub-sectors is that natural health product firms are heavily engaged in service activities for either FF or NHP products. Of the 290 NHP firms, 207 (71%) indicated that they provided some type of service to either the FF or NHP industry.

For the purpose of this report, the 7 sub-sectors above will be collapsed into 4 categories; functional food firms, natural health product firms, firms active in both fields (all of whom may provide services to either FF or NHP) and service only firms.

Table 2 represents the 689 firms by type of functional food or natural health product, of them 174 dealt with functional foods, 290 with natural health products, 177 were active in both areas and 48 provided services only.

Table 2
Firms active in each field, 2007

	Functional food firms	Natural health product firms	Firms active in both fields	Service only firms	All firms
	number				
Total firms	174	290	177	48	689
Fortified foods and beverages beyond the mandatory requirement to enrich certain foods with vitamins and minerals	105	...	107	...	212
Foods and beverages that have added active ingredients, excluding vitamins or minerals	118	...	141	...	258
Foods and beverages specially enhanced to contain more of a functional component	62	...	48	...	110
Other functional foods	7	...	7	...	15
Extracted or purified from plants	...	199	119	...	318
Ground, dried, powdered and processed from plant materials	...	210	116	...	326
Produced, extracted or purified from animal or micro organisms	...	161	88	...	249
Produced, extracted or purified from marine sources	...	171	80	...	251
Comprised solely of vitamins and minerals	...	145	78	...	223
Other natural health products	...	9	7 ^E	...	16

Note(s): Firms may be active in more than one field. Totals may not add up due to rounding.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

2.2 Revenue

Results from the survey show that FFNHP revenue from among the 689 firms was \$3.7 billion in the year 2007 out of a combined total of \$21.5 billion from all sources (Table 3).

Functional food firms had \$621 million of revenue from FFNHP, while natural health product firms had \$1.8 billion of FFNHP revenue, and \$1.3 billion FFNHP revenue was generated from firms active in both fields. The remaining \$20 million came from service only firms. It should be noted that these firms did not exclusively develop, produce or sell FFNHP and therefore had other product lines, or provided services to other non- FFNHP sectors.

When identifying the FFNHP segment of revenue by all firms, revenue from functional food products and services were a relatively minor component of total revenue for functional food firms. Considering that total revenue from all sources for functional food firms was \$15 billion, 4% or \$608 million was generated from sales of functional food products or service revenue.

Natural health products firms on the other hand had total revenue from all sources of \$2.5 billion. Sales of natural health products and services accounted for 68% of this revenue.

Revenue from firms active in both fields indicate that twice as much revenue is generated from natural health products or services compared to functional food products or services. The proportion of revenue generated from FFNHP is 13% of overall revenue from all sources.

These findings suggest a major difference between functional food and natural health product firms. FFNHP products or services were a minor component of overall revenue for functional food firms, while natural health products firms derived a majority of their revenue from FFNHP products and services.

Revenue generated from services provided to the FFNHP sector was 8% of the total revenue for service only firms. The distribution of FF and NHP service revenue was relatively equal. It is interesting to observe that there is revenue generated from functional food products by natural health product firms and vice versa. These revenues are a result of service activities in the opposite field.

Table 3
Revenue for functional food and natural health product firms, 2007

	Functional food firms	Natural health product firms	Firms active in both fields	Service only firms	Total
thousands of dollars					
Total firm revenues (all sources)	15,473,385	2,493,362	3,255,339	298,672 E	21,520,757
From functional foods and natural health products	621,073	1,755,639	1,294,843	20,277	3,691,831
From functional food products	607,920	66,932 E	434,541	11,044 E	1,120,437
From natural health products	13,153 E	1,688,707	860,302 E	9,233	2,571,394

Note(s): Totals may not add up due to rounding.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

2.3 Firm activities

When asked what type of participation in the field of functional foods or natural health products firms engaged in directly, most functional food firms (81%) reported product development or scale up of new products (Table 4), while 63% of natural health firms also stated this activity (Table 5). Two thirds of the functional food firms (68%) were engaged in research and development (R&D) activities, compared to half of the natural health product firms (48%).

It appears that a larger portion of functional food firms (70%) manufacture consumer-ready products to be sold without further processing than natural health products firms (44%).

Natural health product firms (60%) have a slightly higher concentration in wholesale operations than functional food firms (51%) and firms active in both fields (41%). Of the surveyed firms, 28% of natural health products firms possessed retailing operations, as opposed to 46% of functional food firms.

Table 4
Firms by type of participation in the field of functional foods, 2007

	Functional food firms	Natural health product firms ¹	Firms active in both fields	Service only firms	All firms
number					
Scientific research and development	118	22	113	8	261
Product development or scale up of new products	142	28	129	4 E	303
Manufacturer of ingredients or raw materials to be used in functional foods	42	13	48	5 E	108
Manufacturer of semi-finished functional foods to be further processed before sales	x	4 E	42	x	92
Manufacturer of consumer-ready products to be sold without further processing	121	22	87	8	238
Wholesaler of products	89	x	73	x	187
Retailer of products	80	9	45	5 E	139
Provide services or technology or other activities	14	15	42	20	91

1. Includes firms which have functional foods as a service component.

Note(s): Totals may not add up due to rounding. Firms may be active in more than one field.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

Table 5
Firms by type of participation in the field of natural health products, 2007

	Functional food firms ¹	Natural health product firms	Firms active in both fields	Service only firms	All firms
	number				
Scientific research and development	11	138	124	21	295
Product development or scale up of new products	14	183	139	10	346
Manufacturer of ingredients or raw materials or semi-finished natural health products to be further processed before sales	5 E	118	75	8 E	207
Manufacturer of consumer-ready products to be sold without further processing	6 E	127	84	5 E	223
Wholesaler of products	11	174	73	0	258
Retailer of products	6 E	80	44	0	130
Provide services or technology or other activities	F	37	40	x	101

1. Includes firms which have natural health products as a service component.

Note(s): Totals may not add up due to rounding. Firms may be active in more than one field.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

2.4 Exports

Firms reported total FFNHP exports of \$732 million, which was 61% of total exports from all sources and 20% of FFNHP revenue (Table 6). The bulk of these exports came from firms' active in both fields, which exported \$377 million worth of products, almost double the amount exported by functional food firms and natural health product firms. The majority of the export revenue from firms active in both fields (68%) came from the export of natural health products.

For natural health product firms, exports of NHPs accounted for 87% of the total export revenue and 5% of their total FFNHP revenue.

Firms specializing in functional foods did not see the same concentration in export revenue generated from functional foods compared to all other exported products. Functional food exports accounted for 38% of export revenues and 5% of total FFNHP revenue. While figures may vary among individual firms, overall the importance of functional food exports was not as high as it was for the natural health product firms. Firms that had both functional food and natural health product exports had similar characteristics as natural health products firms. FFNHP exports accounted for 71% of total exports and 10% of total FFNHP revenue. Two-thirds of the export revenue generated was from natural health products.

Table 6
Functional foods and natural health products exports, 2007

	Functional food firms	Natural health product firms	Firms active in both fields	All firms
	thousands of dollars			
Total exports (all sources)	F	203,299	533,563 E	1,199,166
Functional food and natural health product exports	177,565 E	176,706	377,360	731,631 E
Functional food	177,565 E	0	118,937	296,502 E
To United States	173,540 E	0	59,992 E	233,532 E
To all other countries	F	0	58,945 E	62,970 E
Natural health product	0	176,706	258,423	435,129
To United States	0	70,980	128,231 E	199,212
To all other countries	0	105,725	130,192	235,917

Note(s): Totals may not add up due to rounding.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

Out of the 689 active firms engaged in FFNHP, 249 firms (36%) were exporters (Table 7). Three out of four exporting firms exported natural health products.

It appears that natural health product firms are more diversified in their export destinations than functional food firms. Firms were able to report that they exported to more than one destination. Almost all of the functional food firms (95%) exported products to the United States. The bulk of FF export revenue \$173.5 million came from the United States compared to a small amount generated from all other countries. On the other hand, natural health product firms' export revenue from all other countries exceeded their revenue generated from the United States. These other countries were primarily Europe, China, Japan and others. The survey results indicate that while the United States was a major market for exports of functional foods, other countries comprise the major market for natural health products.

Table 7
Firms exporting products and services and destination, 2007

	Functional food firms	Natural health product firms	Firms active in both fields	All firms
	number			
Total functional food and natural health product exporters	41	130	78	249
Total functional food	41	0	33	74
To the United States	39	0	27	66
To all other countries	22	0	44	66
Total natural health product	0	128	62	190
To the United States	0	80	55	135
To all other countries	0	135	83	218

Note(s): Totals may not add up due to rounding. Firms may be exporting to more than one market.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

2.5 Imports

Twenty-four percent of FFNHP firms were importers of FFNHP products and services. Almost all firms (90%) that were importers imported natural health products (Table 8). Regardless of whether firms imported natural health products or functional foods the most frequent source was the United States.

Table 8
Firms importing products and services by designation, 2007

	All firms
	number
Total functional food and natural health product importers	166
Total functional food	38
From United States	29
From all other countries	11
Total natural health product	151
From United States	119
From all other countries	75

Note(s): Totals may not add up due to rounding.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

Import expenditures for FFNHP products totalled \$232 million (Table 9). Almost all (95%) of the imports resulted from the importation of natural health products. Of all imports of natural health products, two-thirds came from the United States. Functional food products did not account for much in terms of import expenditures, but again the United States was the preferred source for these imports. The cost of imports of natural health products was considerably higher than that of functional food products. FFNHP import expenditure, accounted for 67% of total imports from all sources.

Table 9
Expenditures for imports of functional food and natural health product products, 2007

	All firms
	thousands of dollars
Total expenditures for imports (all sources)	348,451
Total functional food and natural health product imports	232,154
Functional food	12,222
From United States	10,884
From all other countries	1,338 E
Natural health product	219,932
From United States	140,754
From all other countries	79,075

Note(s): Totals may not add up due to rounding.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

2.6 Employment

FFNHP firms employed 13,975 individuals with FFNHP related duties which is 14% of the total number of all individuals employed by this sector (Table 10). Half of the FFNHP employees were employed by natural health product firms (6,303) while 2,887 were employed by functional foods firms, 4,491 by firms active in both fields and 294 by service only firms.

Not surprisingly, in light of the importance of natural health products for NHP firms, 55% of employees in natural health product firms had FFNHP related duties. On the other hand, only 4% of employees in functional food firms had FFNHP related duties. Forty-four percent of employees in firms selling both types of products had FFNHP related duties.

Table 10
All employees (including permanent, seasonal, casual or contract) and employees with functional food and natural health product related duties, 2007

	Functional food firms	Natural health product firms	Firms active in both fields	Service only firms	All firms
	number				
All employees	76,641	11,844	10,186	1,682 E	100,353
Employees with functional food and natural health product related duties	2,887	6,303	4,491	294 E	13,975

Note(s): Totals may not add up due to rounding.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

Many firms indicated that they had unfilled FFNHP positions (Table 11). This was most noticeable for dual product type firms, where 39% of respondents indicated unfilled positions. These vacant positions tend to be in the fields of sales, marketing or advertising and scientific research and development. NHP firms also indicated issues in recruitment within sales, marketing or advertising positions as well as in quality control. Firms specializing in functional foods did not indicate as many issues with unfilled positions.

Table 11
Firms with unfilled positions and types of competencies required to fill these positions, 2007

	Functional food firms	Natural health product firms	Firms active in both fields	All firms
	number			
Total firms with unfilled positions	23	71	60	156
Scientific research and development	10	32	13	55
Intellectual property	F	3 ^E	19	25
Regulatory	7 ^E	17	23	47 ^E
Clinical trials	4 ^E	10	13	28
Manufacturing or production	19	24	31	73
Technical or engineering	5 ^E	20	10 ^E	36
Quality control	8	18	35	61
Sales, marketing or advertising	12	45	44	102
Market research	7 ^E	8 ^E	10 ^E	24
Management or finance	12	11	17	40
Business development	7 ^E	18	16	42

Note(s): Totals may not add up due to rounding. Firms may have unfilled positions in more than one area.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

A question arises as to why natural health product firms had difficulties in filling positions. The main issue appears to be lack of qualified candidates (Table 12).

Table 12
Firms indicating obstacles that impacted efforts to fill positions, 2007

	Functional food firms	Natural health product firms	Firms active in both fields	All firms
	number			
Compensation requirements by candidates too high	14	31	19	64
Candidates unwilling to relocate	9	9	12	29
Candidates lack of expertise	14	51	43	110
Capital or resources insufficient to attract candidates	15	36	12	63
Competition for qualified candidates	9 ^E	21	31	62
Lack of qualified candidates	18	51	49	123

Note(s): Totals may not add up due to rounding. Firms may have indicated more than one obstacle.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

2.7 Research and Development

Total R&D spending for all sources by all firms amounted to \$209 million (Table 13). Of this spending, \$148 million (71%) was spent on FFNHP products and services. Functional food firms accounted for the largest share of spending at \$99 million, 63% of which went to functional food R&D. Natural health product firms had the same proportion of NHP R&D spending in comparison to their overall R&D spending. Service only firms and firms active in both fields had an equal proportion of spending on functional food and natural health product R&D.

Table 13
Research and development expenditures by functional food and natural health product firms, 2007

	Functional food firms	Natural health product firms	Firms active in both fields	Service only firms	All firms
	thousands of dollars				
Total research and development spending (all sources)	98,894	64,601	41,527	4,284 ^E	209,305
Functional foods	62,018	9,890	16,266	1,723 ^E	89,897
Natural health products	628 ^E	40,749	14,702	1,979 ^E	58,058

Note(s): Totals may not add up due to rounding.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

2.8 Financing

In 2007, this sector raised a total of \$229 million of capital for FFNHP purposes (Table 14).

Table 14
Firms that attempted to raise capital for functional food and natural health product purposes, 2007

	Functional food firms	Natural health product firms	Firms active in both fields	Service only firms	All firms
	number				
Firms that attempted to raise capital	25	64	35	9	134
Firms that were successful in raising capital	12	34	18	4 ^E	69
	thousands of dollars				
Total amount of capital raised	54,170 ^E	32,690	x	x	229,245

Note(s): Totals may not add up due to rounding.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

The main source of funds for all industries came from conventional funds such as banks, initial public offerings (IPOs) and secondary public offerings (SPOs) (Table 15). Other notable sources were angel investors and other sources. It is noteworthy that there were no funds raised from American-based venture capitalists but funds were raised from other foreign venture capitalists.

Table 15
Amount of funds raised by source, 2007

	All firms
	thousands of dollars
Canada	229,245
Canadian based venture capital	10,846 ^E
American based venture capital	0
Other foreign based venture capital	F
Conventional funds (banks, initial public offerings, secondary public offerings)	88,118 ^E
Angel investors or family members	51,469 ^E
Government's	12,130 ^E
Partner's from strategic alliances	x
Other	x

Note(s): Totals may not add up due to rounding. Firms may have multiple sources of capital.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

3 Aggregate comparison with 2004 data

A comparison between totals for the FFNHP sector in 2004 and 2007 reveals a significant across the board increase in all major variables. As evident in Table 16, there was growth in the number of firms, FFNHP revenues, exports and R&D expenditures for FFNHP purposes. What is interesting is the relatively low increase in the number of employees with FFNHP related duties.

Table 16
A comparison of functional food and natural health product key indicators, 2004 and 2007

	2004	2007	Percentage increase
	number		percent
Functional foods and natural health products			
Firms	389	689	77
Employment	12,872	13,975	9
	thousands of dollars		
Revenue	2,886,538	3,691,831	28
Research and development	74,554	147,955	98
Exports	545,013	731,631	34

Note(s): Totals may not add up due to rounding.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2004 and 2007.

These increases can be contributed to an overall growth in the industry. There are other factors such as changes in methodology that would have contributed to some of these changes as well. The methodological changes were the inclusion of the service only firms, the exclusion of not-for-profit organizations, associations, alliances, unions, universities, government agencies, departments and commissions. In addition all firms that only sold (retail and/or wholesale) functional foods and/or natural health products without any development or production were removed from the 2007 survey.

4 Firm Characteristics

4.1 Service Activities

In total there are 471 firms providing services to the FFNHP sector (Table 17). A high percentage of firms (68%) provided service activities for the FFNHP sector as shown in Table 1. The majority of service providers are natural health product firms followed by firms active in both fields.

Manufacturing or production are the most performed services for all firms except service only firms who perform quality control services more. Overall, scientific research and development (R&D) appears to also be a principal service along with sales, marketing or advertising.

Service only firms (those which do not develop, produce or sell their own FFNHP products) account for a small portion of the industry representing only 10% of firms providing services.

Table 17
Firms providing functional food and natural health product services in Canada, 2007

	Functional food firms	Natural health product firms	Firms active in both fields	Service only firms	All firms
	number				
Firms providing services	89	207	127	48	471
Scientific research and development	63	92	82	18	255
Intellectual property	15	44	49	7 ^E	116
Regulatory	12	90	71	16	188
Clinical trials	5 ^E	25	49	6 ^E	85
Manufacturing or production	68	135	87	16	306
Quality control	36	98	72	21	227
Sales, marketing or advertising	48	120	81	8 ^E	257
Market research	37	52	54	10	152
Management or finance	10	59	50	F	122
Business development	28	77	69	7 ^E	179
Other ¹	15	44	36	0	95

1. Includes technical/engineering services.

Note(s): Totals may not add up due to rounding. Firms may provide multiple services.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

4.2 Distribution channels

Major distribution channels used by all firms include direct retailers, wholesalers and “other” (which represent direct selling to other firms, brokerage and third party sellers). Almost half (46%) of all FFNHP revenue from products and services came from firms which used direct retailers as a distribution channel (Table 18).

A major difference between natural health product firms and functional food firms was found in their choice of distribution channels. Fifty-three percent of natural health product firms generated revenue from wholesalers while only 32% came from retailers. In comparison, 27% of functional food firms’ revenues came from using wholesalers while 52% came from the use of retailers. It appears that a greater number of functional food firms profited more from a direct relationship with retailers, while natural health product firms were much more dependent upon intermediaries (wholesalers) to distribute their product.

Evidently, service only firms profited most from the “other” channels of distribution, such as direct selling to other firms and brokerage and third party sellers.

It is interesting that the use of direct selling or internet sales or mail order only accounted for 4% of revenue.

Table 18

Proportion of sales of functional foods and natural health products by distribution channel type, 2007

	Functional food firms	Natural health product firms	Firms active in both fields	Service only firms	All firms
	percent				
All sales	100	100	100	100	100
Direct selling or internet sales or mail order	6	2	5	6	4
Wholesaler of products	27	53	18	14	34
Direct retailer	52	32	57	12	46
Multi-level marketing or network marketing	0	4	2	0	3
Broker or third party distributor	14	5	14	2	10
Other	1	3	4	66 ^E	3

Note(s): Totals may not add up due to rounding. Firms may have used more than one channel.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

At the same time, 36% of FFNHP sales from functional food firms came from final consumers (Table 19), while only 5% from natural health product firms’ sales did so. A little less than half of the natural health product firms’ (48%) sales came from wholesales, while more than half of the FFNHP sales generated from firms active in both areas came from retailers. The majority of FFNHP sales from service only firms came from private label customers.

Table 19

Proportion of sales of functional foods and natural health products by customer type, 2007

	Functional food firms	Natural health product firms	Firms active in both fields	Service only firms	All firms
	percent				
All sales	100	100	100	100	100
Final consumers	36	5	10	6	12
Retailer	18	25	58	14	38
Wholesaler	32	48	16	13	32
Private label	14	21	12	67 ^E	16
Other	1	1	4	0	3

Note(s): Totals may not add up due to rounding. Firms may have used more than one channel.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

4.3 Partnership agreements and contracting out

Twenty-three percent of firms stated that they had partnerships or collaborative agreements (Table 20). Partnerships involve the active participation in projects between firms, and do not include work that is contracted out. Firms active in both fields had the most number of firms (34%) reporting some type of partnership or collaborative agreement along with the most number of arrangements by purpose and partner type. Functional food firms had 22% of firms reporting some type of partnership or collaborative agreement while there were 18% of natural health product firms doing so. Both firms had a similar number of arrangements by purpose and partner type.

Functional food firms and firms active in both fields chose to partner and collaborate with “other firms” not in the FFNHP sector more often, in comparison to natural health product firms who preferred to partner and collaborate with FFNHP firms.

Table 20
Partnerships or collaborative arrangements by partner type, 2007

	All purposes			
	Functional food firms	Natural health product firms	Firms active in both fields	All firms
	number			
All firms with partnership arrangements	39	53	61	161
Partner type				
Functional food and natural health product firm	83	270	350	702
Other firm	247 ^E	104	492	842
Private non-profit	F	6 ^E	36 ^E	46
Academic institution or hospital	67	59	107	233
Government laboratory, agency or organization	32 ^E	28	126	186

Note(s): Totals may not add up due to rounding. Firms may have more than one type of partnership or collaborative arrangement.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

Functional food and natural health product firms partnered and collaborated primarily for the purpose of production (Table 21). Firms active in both fields allied for the purpose of accessing markets or distribution channels and conducting scientific R&D.

An area where there was a difference in partnerships in terms of purpose pertained to firms active in both fields. These firms, more than the other two types of firms, had more arrangements for regulatory affairs, clinical trials and access to other intellectual property.

Service only firms did not report any significant number of partnerships or collaborative arrangements. When asked, 25% of firms reported they were currently seeking to form new partnerships or collaborative arrangements.

Table 21
Partnerships or collaborative arrangements by purpose, 2007

	All partner types			
	Functional food firms	Natural health product firms	Firms active in both fields	All firms
	number			
All firms with partnership arrangements	39	53	61	161
Purpose				
Conduct scientific research and development	94	89	261	444
Regulatory affairs	10 ^E	33	96 ^E	140
Clinical trials	39 ^E	46	98	183
Production or manufacturing	252 ^E	172 ^E	201	625
Access markets or distribution channels	21	70	339	431
Access capital	7 ^E	17	20 ^E	45
Access patents	5 ^E	10 ^E	22 ^E	36
Access to other intellectual property	4 ^E	21	73	97

Note(s): Totals may not add up due to rounding. Firms may have more than one type of partnership or collaborative arrangements.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

Contracting out of work was also a significant activity for these firms (Table 22). Fifty-three percent of natural health product firms contracted out work, usually for manufacturing or production and regulatory or clinical trials. Comparatively 37% of functional food firms contracted out work. Functional food firms sought assistance in scientific research and development and intellectual property (Table 23). Firms active in both fields (65%) had the highest percentage of contracting out. The main purposes were for sales, marketing, advertising or market research and regulatory or clinical trials.

Functional food firms sought very little contracting work with foreign companies whereas natural health product firms and firms active in both fields contracted abroad several activities such as manufacturing or production and regulatory or clinical trials.

Table 22
Firms contracting out functional food and natural health product related activities, 2007

	Functional food firms	Natural health product firms	Firms active in both fields	Service only firms	All firms
	number				
Firms that have contracted out	64	155	116	12 ^E	347

Note(s): Totals may not add up due to rounding.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2004 and 2007.

Table 23
Firms contracting out functional food and natural health product related activities by purpose, 2007

	Functional food firms		Natural health product firms		Firms active in both fields	
	Canadian	Foreign	Canadian	Foreign	Canadian	Foreign
	number					
Scientific research and development	45	4	52	22	50	8
Intellectual property	28	F	24	9	27	15
Regulatory or clinical trials	12 ^E	3 ^E	92	35	78	35
Manufacturing or production	13	0	111	51	50	41
Quality control	10	F	76	12	42	0
Sales, marketing, advertising or market research	17	F	47	30	92	11
Management, finance or business development	6 ^E	0	15	13	18	F
Other	10	3	9	4 ^E	31	16

Note(s): Totals may not add up due to rounding. Firms may have contracted out for more than one purpose.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

4.4 Intellectual property

Roughly 5% of firms reported granting FFNHP licensing agreements. This was consistent whether firms produced functional foods, natural health products or both; service only firms did not grant any licensing agreements (Table 24). Only 5% of functional food firms acquired FFNHP licensing agreements whereas the other two firm types reported double this amount.

Functional food firms (41%) and firms active in both fields (46%) developed the most trade secrets. Twenty-one percent of natural health product firms and 8% of service only firms developed trade secrets. A little more than one third of functional food and natural health product firms registered trademarks in comparison to almost half of all firms active in both fields. Thirteen percent of service only firms registered trademarks.

The vast majority of firms (87%) did not have patents. For firms that did pursue patents, natural health product firms had the most, with 543 existing patents (Table 25). Functional food firms reported the most pending patents. Overall natural health product firms had the most combined number of existing and pending patents.

Table 24
Firms that developed intellectual property, 2007

	Functional food firms	Natural health product firms	Firms active in both fields	Service only firms	All firms
	number				
Firms granting functional food or natural health product licensing agreements	8	14	15	0	36
Firms acquiring functional food or natural health product licensing agreements	8 ^E	28	18	0	54
Firms developing trade secrets	72	60	81	4 ^E	217
Firms registering trademarks	66	106	86	6 ^E	265
Firms with functional food or natural health product related patents or pending patents	20	53	19	F	93

Note(s): Totals may not add up due to rounding.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

Table 25
Functional food and natural health product related patents and pending patents world wide, 2007

	Functional food firms	Natural health product firms	Firms active in both fields	All firms
	number			
Existing patents	174	543	282 ^E	999
Pending patents	x	362 ^E	x	1,005

Note(s): Totals may not add up due to rounding.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

5 Regulations

5.1 Contacting Health Canada or the Canadian Food Inspection Agency

Overall seven out of ten firms reported that they had some type of contact with either Health Canada or the Canadian Food Inspection Agency in the fiscal year 2007/2008 (Table 26). The proportion of firms having contact with these government agencies did not vary by type.

Table 26
Firms contacting Health Canada or the Canadian Food Inspection Agency, 2007

	Functional food firms	Natural health product firms	Firms active in both fields	Service only firms	All firms
	number				
Total	126	210	137	34	508

Note(s): Totals may not add up due to rounding.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

Labeling and advertising was by far the area where the most contact was sought from both the Canadian Food Inspection Agency and the Health Canada Food Directorate (78%). All other areas did not receive as many inquiries as represented by the higher percentage of 'not applicable' responses (Table 27).

Of the functional food firms and firms active in both fields that contacted the Health Canada Food Directorate, the top three areas of inquiry cited included: novel food designation, labeling and advertising, and submission for a health claim on food. Contact with the Canadian Food Inspection Agency was also frequent for the above mentioned areas along with inquiries concerning allergies and sensitivities, and adverse reaction reporting for functional food firms and export and import of food products for firms active in both fields.

Table 27
Firms that contacted the Health Canada Food Directorate or the Canadian Food Inspection Agency for regulatory information by type of information, 2007

	Functional food firms			Firms active in both fields		
	Health Canada Food Directorate	Canadian Food Inspection Agency	Not applicable	Health Canada Food Directorate	Canadian Food Inspection Agency	Not applicable
	percent					
Novel food designation	20	27	70	26	21	71
Submission for health claim on food	12	21	77	28	24	68
Adverse reaction reporting	3	25	73	1	1	83
Clinical trial approval	4	0	95	0	0	72
Labelling and advertising	17	78	22	14	35	38
Allergies and sensitivities	4	42	58	1	10	86
Export of food or natural health products	5	18	82	4	17	64
Import of food or natural health products	1	12	88	4	22	57

Note(s): Totals may not add up due to rounding.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

Almost one third of all natural health product firms and firms active in both fields that contacted the Health Canada Natural Health Products Directorate, did so with respect to seeking information regarding site licenses, product licenses and health claims for natural health products (Table 28). Labeling and advertising inquiries also generated contact with the Health Canada NHP Directorate, more so for dual firms than NHP firms.

Table 28
Firms that contacted Health Canada Natural Health Products Directorate for regulatory information by type of information, 2007

	Natural health product firms		Firms active in both fields	
	Health Canada Natural Health Products Directorate	Not applicable	Health Canada Natural Health Products Directorate	Not applicable
	percent			
Site license for natural health products	68	32	69	31
Product license for natural health products	67	33	77	23
Health claim for natural health products	51	49	65	35
Adverse reaction reporting	10	90	15	83
Clinical trial approval	10	90	29	72
Labelling and advertising	34	59	35	38
Allergies and sensitivities	5	95	4	86
Export of food or natural health products	21	68	26	64
Import of food or natural health products	25	72	36	57

Note(s): Totals may not add up due to rounding.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

Forty-one percent of service only firms reported that they had contact with the Health Canada NHP Directorate concerning inquiries regarding site licenses for natural health products (Table 29). Submission for health claims on food was the principal reason for contact with the Health Canada Food Directorate by service only firms.

Table 29
Firms that contacted Health Canada or the Canadian Food Inspection Agency for regulatory information by type of information, 2007

	Service firms only			
	Health Canada Food Directorate	Health Canada Natural Health Products Directorate	Canadian Food Inspection Agency	Not applicable
	percent			
Novel food designation	8	0	0	92
Submission for health claim on food	23	0	0	77
Site license for natural health products	0	41	0	60
Product license for natural health products	0	27	0	73
Health claim for natural health products	0	16	0	84
Adverse reaction reporting	0	8	0	92
Clinical trial approval	7	15	0	85
Labelling and advertising	12	16	14	70
Allergies and sensitivities	0	4	0	96
Export of food or natural health products	0	4	11	85
Import of food or natural health products	0	12	0	88
Other	0	6	10	90

Note(s): Totals may not add up due to rounding.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

6 Products

6.1 Number of products

There were 22,062 FFNHP product lines on the market in the year 2007 (Table 30). Natural health product firms accounted for the bulk of these with 17,656 products. The 3,704 product lines sold by firms active in both fields included both functional food and natural health products. There were 703 product lines on the market for functional food firms.

Natural health product firms have significantly more product lines than functional food firms (see Table 30). The breakdown of distribution of product lines on the market by firm type are as follows; 3% for functional food firms, 80% for natural health product firms and 17% for firms active in both fields.

The vast majority of product lines were sold exclusively in Canada (74%) with 7% sold only outside of Canada and 19% sold both in and outside of Canada. Service only firms did not report any product lines.

Table 30

Functional food and natural health product related product lines currently on the market, 2007

	Product lines			All firms
	Functional food firms	Natural health product firms	Firms active in both fields	
	number			
Total product lines sold on the market	703	17,656	3,704	22,062
Only in Canada	571	13,723	2,023	16,317
Only outside of Canada	50	1,106	440	1,596
Both in Canada and outside of Canada	82	2,827	1,241	4,149

Note(s): Totals may not add up due to rounding.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

6.2 Product Area

A large number of firms producing, developing or selling functional food products reported that health purposes in four main areas were of major importance to the firms' Canadian operations; vascular health, weight control, energy and overall health and well-being (Table 31). Overall health and well-being was also considered of major importance to firms producing, developing and selling natural health products together with immune system, energy and vascular health (Table 32). This happens in part due to the fact that firms specializing in natural health products tended to have a wider product line than those specializing in functional food.

Table 31
Importance of functional food products (in development, production or sale) to the Canadian operation of firms by health purpose, 2007

	Importance								
	Functional food firms			Firms active in both fields			All firms		
	Major	Minor	Not applicable	Major	Minor	Not applicable	Major	Minor	Not applicable
	number								
Diabetes	50	51	73	70	29	79	120	80	152
Cancer	36	48	90	54	42	81	90	90	171
Arthritis	30	33	111	46	49	82	76	82	193
Vascular or heart health	77	48	49	86	28	63	163	76	113
Bone health	47	31	96	54	44	80	101	75	176
Gut health	63	35	76	84	43	50	147	78	126
Eye health	41	20	113	33	40	104	74	61	217
Urinary tract health	7	29	139	30	42	105	37	70	244
Prostate health	8	27	140	25	56	96	33	82	236
Menopause	9	27	139	36	38	103	44	65	242
Immune system	53	39	83	92	34	51	145	73	134
Energy	64	44	67	95	42	40	159	86	107
Sports performance or endurance	22	59	93	59	48	70	81	107	163
Sexual performance	3	23	148	28	29	120	31	52	269
Mental ability	18	63	93	64	25	88	82	88	181
Weight control or loss or gain	71	32	72	90	24	63	161	56	134
Overall health and well-being	112	51	12	126	30	20	238	81	32

Note(s): Totals may not add up due to rounding. Firms may have products in more than one area.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

Table 32
Importance of natural health products (in development, production or sale) to the Canadian operation of firms by health purpose, 2007

	Importance								
	Natural health product firms			Firms active in both fields			All firms		
	Major	Minor	Not applicable	Major	Minor	Not applicable	Major	Minor	Not applicable
	number								
Diabetes	31	73	186	65	46	67	96	119	252
Cancer	28	48	214	51	49	77	79	97	292
Arthritis	89	82	119	51	60	66	140	143	185
Vascular or heart health	90	76	124	89	43	44	179	119	168
Bone health	84	82	123	51	51	75	136	133	198
Gut health	81	81	128	84	44	50	165	124	178
Eye health	46	60	184	31	40	105	77	100	290
Urinary tract health	37	79	174	35	45	97	72	124	272
Prostate health	44	85	160	37	54	86	81	140	246
Menopause	55	80	155	35	46	95	90	126	250
Immune system	120	71	100	95	41	41	215	111	141
Energy	102	95	93	102	36	38	204	131	132
Sports performance or endurance	59	86	145	60	59	58	120	145	203
Sexual performance	21	66	203	27	28	122	48	94	325
Mental ability	48	99	143	62	57	58	109	156	202
Weight control or loss or gain	81	63	146	93	30	54	173	94	200
Overall health and well-being	191	62	37	137	32	8	329	94	45

Note(s): Totals may not add up due to rounding. Firms may have products in more than one area.

Source(s): Statistics Canada, The Functional Foods and Natural Health Products Survey, 2007.

7 Summary

The functional foods and natural health product (FFNHP) sector in Canada continues to grow. Results from the Functional Foods and Natural Health Products Survey 2007 estimate that 689 firms were active in this sector with total revenues of \$3.7 billion, of which over \$700 million worth was exported. A total of 13,975 employees had FFNHP related duties. FFNHP import expenditures were \$232 million. This sector has a wide range of products with over 22,000 product lines currently being sold on the market both nationally and internationally.

This dynamic sector of food processing continues to enhance its growth through the spending of \$148 million in research and development. New developments of value added processing and extraction of nutritionally valuable components, produce products with increased health benefits, usually in the area of overall health and well being, vascular health and improving our immune system.

Our understanding of this emerging sector and the firms active in the development, production and sales of FFNHP products and services are further examined in detail tables which can be made available upon request.

8 Methodology

Description

The objectives of the survey are to produce statistical information on the functional food and natural health product sector and a profile of firms engaged in functional food and/or natural health product related activities in Canada. Information from this survey may be used by businesses for economic or market analysis, by trade associations to study industry performance, by government departments and agencies to assist policy formation, and by the academic community for research purposes.

Subjects

- Biotechnology
- Food, Beverage and Tobacco
- Manufacturing
- Science and Technology

Target population

All firms participating in functional food and/or natural health product related activities (for the purpose of human consumption) in Canada, as identified by Agriculture and Agri-Food Canada, and firms that indicated they were involved in such activities in the 2007 Survey on Emerging Technologies. The establishments of an enterprise located in the same province were grouped to form the statistical unit. Excluded from the survey were not-for-profit organizations, associations, alliances, unions, universities, government agencies, departments and commissions.

Instrument design

The questionnaire was prepared in active co-operation with partners and in consultation with a group of functional food and natural health product experts offering a range of expertise and interests. Following the initial design work, the questionnaire was field-tested with potential respondents, whose comments on the design and content were incorporated into the final version.

Sampling

This is a census survey with a cross-sectional design.

Agriculture and Agri-Food Canada (AAFC) provided the Science, Innovation and Electronic Information Division with a list of firms involved in functional food and natural health product related activities. This list was further modified to exclude not-for-profit organizations, associations, alliances, unions, universities and government agencies, departments and commissions. Furthermore firms that were considered to only develop or produce organic foods, fortified flour, gluten free foods and cosmetics were taken off this list. The Science, Innovation and Electronic Information Division of Statistics Canada also provided a list of companies that had indicated they were involved in functional food and/or natural health product related activities from the 2007 Survey on Emerging Technologies (ETS). All firms that responded “yes” to developing, producing or selling fortified foods, foods with added active ingredients, and foods with a functional component and/or natural health products were included in the sample. Firms from the ETS that responded they only sold (retail or wholesale), therefore no development or production activity for the above mentioned foods and/or natural health products were removed from that list. Firms that responded in the 2005 Functional Foods and Nutraceuticals Survey (FFN) and those found from external sources comprised another list. All these lists were merged and duplicate units were identified. Pre-contact was conducted for those firms appearing on the AAFC list, those from the 2005 FFN survey and external list as well as firms that did not respond to the ETS coded to NAICS 311990: All Other Food Manufacturing.

Data sources

Responding to this survey was compulsory. Data were collected directly from survey respondents.

Data were collected using a paper mail-out, mail-back questionnaire. Pre-contact was made by telephone prior to the mail-out. Follow-up was also conducted by telephone.

Error detection

Questionnaires were manually edited and outliers detected as they were received during collection. A series of edit rules were developed and invalid or inconsistent entries were corrected using these rules. Follow-up was conducted for missing entries that could not be manually edited.

Imputation

Donor imputation was used to impute qualitative questions. It was also used, combined with ratios, to impute some quantitative questions. Thus, a donor was randomly selected within a receiver’s imputation group when required. Imputation groups were based on question 1a), 2a) and 3a) that had seven possible values: functional foods only, natural health products only, services only, functional foods and natural health products, functional foods and services, natural health products and services, and functional foods, natural health products and services.

Donor imputation was also used to impute quantitative questions. A donor is found based on a distance between it and the receiver. The donor with the smallest distance is selected. This is called the nearest neighbour method.

Estimation

All tables were produced with the Generalized Estimation System (GES) in Excel. Totals and proportions were estimated.

Quality evaluation

Data quality was evaluated on the basis of the quality standards in force at Statistics Canada, namely the standards for data relevance, accuracy, timeliness, accessibility and interpretability. Data quality was evaluated in co-operation with methodologists and subject matter experts. In the event of poor quality, the data concerned are not published. Comparisons between the results from the 2004 and 2007 databases should be attributed in part to differences in the methodologies of the two surveys.

Disclosure control

Statistics Canada is prohibited by law from releasing any data that would divulge information obtained under the Statistics Act that relates to any identifiable person, business or organization without the prior knowledge or the consent in writing of that person, business or organization. Various confidentiality rules are applied to all data that are released or published to prevent the publication or disclosure of any information deemed confidential. If necessary, data are suppressed to prevent direct or residual disclosure of identifiable data.

Data accuracy

The data accuracy indicators used for the Functional Foods and Natural Health Products Survey are the standard error and the coefficient of variation.

The standard error is a commonly used statistical measure indicating the sampling error of an estimate. The standard error and the coefficient of variation (standard error expressed as a percentage of the estimate) were used in statistical tables to provide an indication of the data quality level of the estimates. Please note that the coefficient of variation (CV) was not calculated for percentage tables.

The results were weighted to reflect the entire count of firms in the selected industries. Estimates were vetted for compliance with confidentiality rules. Data quality was assessed in consultation with the methodology team, and when the data were unreliable, they were not published.

Alphabetic symbols representing the size and range of the standard error and the CV were used in the statistical tables to provide an indication of the extent of the sampling error of the estimates. Some data with a higher standard error or CV (in the 'E' category) are sufficient enough for some purposes; however one should proceed with caution. The letter 'F' indicates that the estimate has a high standard error and was not published.

The response rate for this survey was 80%.

Appendix A — Catalogued publications

Science, Technology and Innovation statistical publications

88-001-X	<i>Science statistics</i>
88-003-X	<i>Innovation analysis bulletin</i>
88-202-X	<i>Industrial research and development, intentions (with 2004 preliminary estimates and 2003 actual expenditures) (annual)</i>
88-204-X	<i>Federal scientific activities (annual)</i>
88F0006X	<i>Business Special Surveys and Technology Statistics Division working papers</i>
88F0017M	<i>Science, Innovation and Electronic Information Division research papers</i>

88-001-X Volume 33 – 2009

No. 1	Biotechnology scientific activities in federal government departments and agencies, 2007/2008 (March)
No. 2	Estimates of Total Spending on Research and Development in the Health Field in Canada, 1997 to 2008 (March)
No. 3	Research and Development Personnel in Canada, 1997 to 2006 (June)

88-001-X Volume 32 – 2008

No. 1	Research and Development Personnel (R&D) - 1996 to 2005 (May)
No. 2	Biotechnology Scientific Activities in Federal Government Departments and Agencies, 2006/2007 (June)
No. 3	Estimates of Total Spending on Research and Development in the Health Field in Canada, 1996 to 2007 (July)
No. 4	Estimation of Research and Development Expenditures in the Higher Education sector, 2006/2007 (August)
No. 5	Industrial Research and Development, 2004 to 2008 (September)
No. 6	Scientific and Technological Activities of Provincial Governments and Provincial Research Organizations, 2002/2003 to 2006/2007 (October)
No. 7	Federal Government Expenditures on Scientific Activities, 2008/2009 Intentions (November)

88-001-X Volume 31 – 2007

No. 1	Research and development (R&D) personnel in Canada, 1995 to 2004 (January)
No. 2	Estimates of total spending on research and development (R&D) in the health field in Canada, 1989 to 2006 (March)
No. 3	Biotechnology scientific activities in federal government departments and agencies, 2005/2006 (May)
No. 4	Estimation of research and development expenditures in the higher education sector, 2005/2006 (August)
No. 5	Scientific and Technological (S&T) Activities of Provincial Governments and Provincial Research Organizations, 2001/2002 to 2005/2006 (October)
No. 6	Industrial research and development, 2003 to 2007 (November)

- No. 7 Federal government expenditures on scientific activities, 2007/2008 (intentions) (December)
- No. 8 Gross Domestic Expenditure on Research and Development, 2007 intentions (December)

88-001-X Volume 30 – 2006

- No. 1 Distribution of federal expenditures on science and technology, by province and territories, 2003/2004 (February)
- No. 2 Biotechnology scientific activities in federal government departments and agencies, 2004/2005 (March)
- No. 3 Estimates of total spending on research and development in the health field in Canada, 1988 to 2005 (May)
- No. 4 Industrial Research and Development, 2002 to 2006 (August)
- No. 5 Estimation of research and development expenditures in the higher education sector, 2004/2005 (August)
- No. 6 Federal government expenditures on scientific activities, 2006/2007 (September)
- No. 7 Total spending on research and development in Canada, 1990 to 2006, and provinces, 1990 to 2004 (September)
- No. 8 Nature of Research and Development, 2000 to 2004 (December)
- No. 9 Distribution of federal expenditures on science and technology by province and territories, 2004/2005 (December)

88-001-X Volume 29 – 2005

- No. 1 Distribution of federal expenditures on science and technology by province and territories, 2002-2003 (January)
- No. 2 Research and development (R&D) personnel in Canada, 1993 to 2002 (May)
- No. 3 Biotechnology scientific activities in federal government departments and agencies, 2003-2004 (May)
- No. 4 Industrial research and development, 2001 to 2005 (June)
- No. 5 Estimates of total spending on research and development in the health field in Canada, 1988 to 2004 (July)
- No. 6 Estimation of research and development expenditures in the higher education sector, 2003-04 (December)
- No. 7 Federal government expenditures on scientific activities, 2005/2006(December)
- No. 8 Total spending on research and development in Canada, 1990 to 2005^p, and provinces, 1990 to 2003 (December)

88F0006X Working papers – 2008

- No. 1 *Innovative Exporters and Intellectual Property Regimes in Selected Service Industries: Evidence from the Canadian Survey of Innovation 2003 (February)*
- No. 2 *The Business of Nurturing Businesses (March)*
- No. 3 *Understanding Internet Usage Among Broadband Households: A Study of Household Internet Use Survey Data*

88F0006X Working papers – 2007

- No. 1 *Innovativeness and Export Orientation Among Establishments in Knowledge-Intensive Business Services (KIBS), 2003 (April)*
- No. 2 *Where Are the Scientists and Engineers? (April)*
- No. 3 *Results from the Functional Foods and Nutraceuticals Survey - 2005 (May)*

88F0006X Working papers – 2006

- No. 1 *Provincial distribution of federal expenditures and personnel on science and technology, 1997/1998 to 2003/2004 (April)*
- No. 2 *Buying and selling research and development services, 1997 to 2002 (May)*
- No. 3 *Characteristics of Growth Firms, 2004/2005 (May)*
- No. 4 *Scientific and Technological Activities of Provincial Governments and Provincial Research Organizations, 2000/2001 to 2004/2005 (July)*
- No. 5 *Research and Development in the Field of Advanced Materials, 2001 to 2003 (July)*
- No. 6 *Conceptualizing and Measuring Business Incubation (July)*
- No. 7 *Characteristics of Business Incubation in Canada, 2005 (July)*
- No. 8 *Size and Persistence of R&D Performance in Canadian Firms, 1994 to 2002 (August)*
- No. 9 *Estimates of Canadian Research and Development Expenditures (GERD), Canada, 1995 to 2006, and by Province 1995 to 2004 (September)*
- No. 10 *Are Small Businesses Positioning Themselves for Growth? A Comparative Look at the Use of Selected Management Practices by Firm Size (October)*
- No. 11 *Survey of Intellectual Property Commercialization in the Higher Education Sector, 2004 (October)*
- No. 12 *Provincial Distribution of Federal Expenditures and Personnel on Science and Technology (December)*

88F0006X Working papers – 2005

- No. 1 *Federal government expenditures and personnel in the natural and social sciences, 1995/96 to 2004/05 (January)*
- No. 2 *Provincial distribution of federal expenditures and personnel on science and technology, 1996-97 to 2002-03 (January)*
- No. 3 *Industrial R&D statistics by region, 1994 to 2002 (January)*
- No. 4 *Knowledge sharing succeeds: how selected service industries rated the importance of using knowledge management practices to their success (February)*
- No. 5 *Characteristics of firms that grow from small to medium size: Industrial and geographic distribution of small high-growth firms (February)*
- No. 6 *Summary: Joint Statistics Canada – University of Windsor workshop on intellectual property commercialization indicators, Windsor, November 2004 (March)*
- No. 7 *Summary: Meeting on commercialization measurement, indicators, gaps and frameworks, Ottawa, December 2004 (March)*
- No. 8 *Estimates of research and development personnel in Canada, 1979 to 2002 (May)*
- No. 9 *Overview of the biotechnology use and development survey – 2003 (April)*
- No. 10 *Access to financing capital by Canadian innovative biotechnology firms (April)*
- No. 11 *Scientific and technological activities of provincial governments and provincial research organizations, 1995-96 to 2003-04 (September)*
- No. 12 *Innovation in Information and Communication Technology (ICT) sector service industries: Results from the Survey of Innovation 2003 (October)*
- No. 13 *Innovation in selected professional, scientific and technical services: Results from the Survey of Innovation 2003 (October)*
- No. 14 *Innovation in selected transportation industries: Results from the Survey of Innovation 2003 (November)*
- No. 15 *Innovation in selected industries serving the mining and forestry sectors: Results from the Survey of Innovation 2003 (November)*
- No. 16 *Functional foods and nutraceuticals: The development of value-added food by Canadian firms (September)*
- No. 17 *Industrial R&D statistics by region 1994 to 2003 (November)*
- No. 18 *Survey of intellectual property commercialization in the higher education sector, 2003 (November)*

- No. 19 *Estimation of research and development expenditures in the higher education sector, 2003-2004 (December)*
- No. 20 *Estimates of Canadian research and development expenditures (GERD), Canada, 1994 to 2005, and by province 1994 to 2003 (December)*