5.9.2 Availability of Standards

For the four categories of products under study, there is a wide variation of product standards, from that of fully developed to no established standards. For example, in the seafood and meat category, the authorities and industry have established well-defined food safety and hygiene standards. At the same time, products such as burgers and sausages are subjected to demands for composition, texture, colour and appearance. Ethnic products, on the other hand, such as *murtabak*, *pau*, *roti pratha*, and *mantau*, have yet to establish any standards. This aspect must be addressed for the sector to progress.

It is not possible to determine the "quality" of a particular food as there is, currently, no quality standard set for local food, other than consumers' perception. Table 5.6 summarises the status of the quality standards for the four categories of chilled and frozen food.

Table 5.6 Availability of Standards for Chilled and Frozen Food

Product Category	Industry	Consumer	
		Local	Overseas
1. Ready Meals	• No specific product standard • MOH established guidelines on hygiene and safety on operations, e.g., guidelines on mass catering and Cook-Chill System.	• Tends to identify product quality through comparison with fresh varieties, e.g., chilled *nasi lemak* against freshly prepared ones.	• No opportunity to compare with fresh products. • Rely on retailer's standards.
2. Snacks	• As per Ready Meals	• As per Ready Meals	• As per Ready Meals
3. Ingredients	• Standards exist for common products, e.g., *santan*, tofu, spices. For spices, there are international players providing full specs, e.g. McCormick, Food Ingredients Specialty (FIS)	• As in Ready Meals, consumers uses fresh product as benchmark for standards.	• No knowledge of ethnic food standards generally. • For spices, standards are known.
4. Meat & seafood	• Regulatory and industry standards are well established. • Additional standards and guidelines provided by DVS.	• Discerning consumers are knowledgeable about quality parameters, e.g. Composition of meat, origin of meat, including sensory profile. • General public are driven by price factor.	• More discerning on product standards due to long history.
Vegetables	• Generally cover under the Food Regulations. • No specific product standards.	• Tends to compare with fresh variety	• Tends to compare with fresh variety

5.9.3 Quality and Food Safety Certification

Table 5.7 shows the number of manufacturers in each category and the various quality and safety certification that they have achieved. Considering that the number of food companies in Malaysia is around 5,000, only a small percentage (<0.5 percent) obtained some form of certification. Only 21 companies have obtained HACCP certification from MOH, out of which 18 companies are from meat and seafood sub-sector due mainly to importing countries' requirements (see Table 5.7).

MAS Catering is the only company in the food service sector who has obtained HACCP certificate. Out of a total of 36 companies, 30 are in the seafood sector have obtained EU No which enable them to export their products to Europe. Currently there is no single chilled and frozen manufacturer who has obtained ISO 14000 certification. ISO14000 certificate deals with environmental issues, which is becoming an important aspect in marketing chilled and frozen food overseas especially to Europe.

By comparison, a total of 155 out of 12,080 food factories in Thailand (1.3 percent) are HACCP certified (see Table 5.8). Similar to Malaysia, a high percentage (58 percent) is in the fishery category due to importing countries' requirements.

Table 5.7 Quality and Food Safety Certification among Chilled and Frozen Food Manufacturers in Malaysia

Product Category	EU No.	Vet. Logo	HACCP	ISO 9000	ISO 14000	Total number of manufacturers
Ready Meals [1]	-	2	1	2	-	5
Snacks [2]	-	1	-	-	-	4
Food Ingredients[2]	-	-	-	-	-	2
Meats and seafood[2]	30 (seafood)	30	18	3	-	69
Others[2]	6	24	2	7	-	52
Total number of certified companies	36	57	21	12	-	132 [3]

Notes:

1. Ready meals category includes catering and food service providers
2. Others category consists of non-chilled and frozen food manufacturers
3. The total number of manufacturers is not equal to the total number of certified companies because some companies may not receive the certification and some companies may receive more than one certifications.

Source: EU No and HACCP listing are from MOH, Vet Logo listing is from DVS and ISO listing is from SIRIM.

Table 5.8 HACCP Certified factories in Thailand

Factories	No. of Food Factories		%
	HACCP	Total	
Non Fishery (Meat and Poultry)	17	621	2.74
Milk	5	101	4.95
Fishery	90	547	16.45
Vegetable and Fruits	15	586	2.56
Seed and Fibre	3	4,639	0.06
Starch and Flour	4	1,645	0.24
Coffee and Cocoa Chocolate Confection	4	556	0.72
Seasoning	6	468	1.28
Unidentified	11	2,917	0.38
Total	155	12,080	1.28

Source: Paper presented at the FoSTAT/PROPAK ASIA 2000 FOOD CONFERENCE, 14-16 June 2000

5.9.4 Food Safety and Incidence of Outbreak from Consumption of Chilled and Frozen Food

Production and distribution of chilled and frozen food, if improperly carried out, may lead to health risks to consumers. There is limited information on local incidences of food poisoning as a result of consuming chilled and frozen foods, hence, it is generally accepted that the incidences are low and mainly occur in private homes.

In developed economies, the number of product recall incidences reported is substantial. Based on information from the United States, in the year 2000 alone, out of the 236 product recalls so far, about 25 percent come from chilled and frozen foods, mainly due to the presence of pathogens (source: website on US National Food Safety Database, 2000). In Malaysia, there is no data available due also to companies' reluctance to report product recalls.

5.10 Research and Development

In the frozen snack category, product R&D is usually undertaken directly by the owner himself who controls the business tightly. Systematic R&D is limited and employs little product development and food technology principles, instead depend a lot on "trial and error" approach. In larger set-ups, where food technologists are employed, there is a trend towards carrying out product development and process improvement (see Table 5.9). Management generally keeps up-to-date with technology and R&D initiatives via trade publications.

Table 5.9 Availability of Technical Facilities in Selected Chilled and Frozen Food Manufacturers

Name of manufacturer	Date of establishment	Factory Design (GMP complied)	Factory Facilities			Certification
			LAB	QA Dept	R & D Dept	
Saudi Cold Storage	Before 2000	Yes	/	/	/	HALAL
Burger Tanjung	Before 1980	n.a.	n.a.	n.a.	n.a.	n.a.
Dinding Poultry	n.a.	n.a.	/	/	/	HALAL Veterinary logo
HSH Sdn Bhd	Before 2000	Partly	n.a.	/	/	n.a.
Kami Food Sdn Bhd	Before 2000	Partly	/	/	/	HACCP HALAL
QL Foods	Before 1995	No	/	/	/	HALAL
UB Food SB	Before 1995	No	n.a.	n.a.	n.a.	n.a.
Rex Canning Co	Before 2000	Yes				HACCP HALAL
Seapack	1991	Yes	/	/	/	EU Certification HAC CP ISO9002 ISO14000 HALAL
Selangor Food Industry	1991	Yes	/	/	/	HALAL Veterinary logo

n.a. = data not available
Source: Survey by study team.

There is little R&D work being carried out by the Government's universities and research institutions, especially in the chilled and frozen food sub-sector. Government initiated projects for food industry research was properly funded beginning with the Intensified Research in Priority Areas (IRPA) in the 5th, 6th and 7th Malaysia Plan. Under the 7MP ending 1999, the Government located a sum of RM1.2bil (less than 1 percent of GDP), however, over the past three years there were only 17 out of a total of 3228 IRPA projects undertaken on chilled and frozen food (see Table 5.10). MARDI is the lead agency for R&D on chilled and frozen foods with universities contributing insignificantly towards industry application.

Table 5.10 List of IRPA Projects Related to Foods under Study

					RM
Cycle 1-1997	MARDI	Agro-Industry	Mohd Zainal @ Zainol bin Ismail	Development of *roti canai* moulding machine	197,300
Cycle 1-1997	MARDI	Agro-Industry	Othman b. Mohamad Top	Development of system for production of steamed traditional cakes	257,000
Cycle 1-1997	MARDI	Agro-Industry	Mohd Ariff Wahid	Development of modified atmosphere packaging system for half Cooked traditional baked and bakery products (chicken pie, *roti nan, popia,* seafood pizza)	185,000
Cycle 1-1997	MARDI	Agro-Industry	Azman Hamzah	Development of handling and packaging system of *satay*	109,000
Cycle 1-1997	MARDI	Agro-Industry	Dr. Hussein Abd Rahman	Development of packaging method for shelf life extension of Intermediate moisture cakes and pastry products	144,500
Cycle 1-1997	USM	Services	Dr. Zuraidah Mohd Zain	Technology Transfer in Small and Medium Scale Industries (SMI's)	92,317
Cycle 1-1999	MARDI	Agro-Industry	Hashima Hafiz Ahmad	Development of ready to use saute ingredients	59,000
Cycle 1-1999	MARDI	Agro-Industry	Salma bt. Hj. Omar	Development of noodles, confection, snacks and green tea from new sweet potato varieties (tubers and leaves)	60,000
Cycle 1-1999	UPM	Agro-Industry	Dr. Fatimah Md. Yusoff	Use of microorganisms in enhancing shrimp health and production	154,800
Cycle 1996	MARDI	Manufacturing	Che Rahani Zakaria	Development of high protein and high fibre snacks	n.a.
Cycle 1996	MARDI	Manufacturing	Mohd. Yassin Haron	Development of restructed and reformed products from meat and poultry	n.a.
Cycle 1996	MARDI	Manufacturing	Yeoh Quee Lan	Development of probiotic and 'lite' products from milk	152,800
Cycle 1996	MARDI	Manufacturing	Rokiah Mohamad	Development of convenience products and seafood sauces from low-value fish species	164,844

Table 5.10 List of IRPA Projects Related to Foods under Study (continued)

					RM
Cycle 1996	MARDI	Manufacturing	Che Rohani Awang	Development of new and improved fishery products	247,500
Cycle 1996	UPM	Manufacturing	Suhaila Mohamed	Development of health food products	164,500
Cycle 2-1997	UKM	Agro-Industry	Zainon Mohd Ali	Chilling injury of selected tropical fruits and methods of alleviation	392,000
Cycle 2-1997	UPM	Agro-Industry	Prof. Dr. Mohamed Shariff b. Mohamed Din	Development of rapid diagnostic technologies for screening and control of commercially important shrimp pathogens	607,500
Cycle 1995	UKM	Agro-Industry	Prof. Abdul Salam Babji	*Penggunaan Punca-punca Protein tempatan*	264,500

The industry's R&D is also very low especially among the small and medium scale food manufacturers. On the other hand, multinational companies (MNCs) such as Nestle Foods (M) Sdn Bhd has an extensive R&D laboratory though significant researches on food are done in its overseas headquarters and at regional laboratories. Similar R&D set-up are also practised by other MNCs such as Ajinomoto (M) Berhad, Unilever (M) Sdn Bhd and Seapack Food Sdn Bhd.

For the chilled and frozen food sub-sector, R&D is almost non-existent, with the exception of a handful of research projects by the MARDI and universities' researchers. Without available or accessible chilling and freezing facilities, it becomes very difficult for companies to venture into chilled and frozen food sector. KFC Holdings can be considered as a local based company that does food product development research. Product innovations associated with market demands such as production for children's market, and fast food outlets are obvious. Those include Kid's Fun Meal, Crispy Strips and Alpha Nuggets by KFC, and Happy Meals by McDonald's.

Industry observers noted that these items help boost up sales. KFC's children's marketing program goes head to head with McDonald's to pull the children market sector. Both have fairly aggressive marketing and promotions programs, using kiddie toys and miniature toys and gifts to attract children. Manufacturers such as Dindings Poultry, Leong Hup, Sin Mah Holdings, Prima Agri Sdn. Bhd., Puteri Pan Pacific, Omar's Deli, Seapack Foods and QL Foods do not do R&D on chilled and frozen foods. Many get equipment and ingredient suppliers to assist them with formulations, new product developments, and trial runs at the factory level.

Packaging companies have contributed to produce better product presentations among local manufacturers. New brand names such as 'Jaitun' fish chips from Perusahaan Kami, seem to sell well among the Malays in the northern region, whereas brand names like Al Wadi Food and Al Fatihah sell well among the Malays in Perak. Yoki, Figo fish chips by Swishun and Tradisi Emas Sdn Bhd with their attractive red and orange packaging seem to be a strong promotional feature in the chilled and frozen seafood and meat products sub-sectors.

Table 5.11 Research and Development Activities in Food Sector in Malaysia

Organisation	Nature of research and development
Government agencies (MARDI, SIRIM, PORIM, MINT)	• Almost total reliance on government funding via IRPA program • The R& D program is driven by anticipated demand by industry/market • Relatively, very few projects are jointly carried out with active participation from private sectors • Government agencies play major role in deciding R & D priority
Institutes of Higher Learning	• Largely funded by IRPA • The research topics are very much decided by the research teams • Relatively, very few projects are jointly carried out with active participation from private sectors
Multinational corporations	• Very little "real R&D" carried out in the country • For some MNCs, their research are confined to application type of research • For other MNCs, totally rely on overseas R&D facilities/headquarters
Small and Medium Industries	• No "real R&D" carried out • R&D sometimes is done by the owner of the business using their own experiences • SMI expect technical support from Government agencies with no/minimum fees

In summary, the industry's R&D carried out outside public research institutions is done during formulation trials in conjunction with the machinery and ingredient suppliers. For Malaysia to become a major player in chilled and frozen food, particularly in ethnic foods, R&D activities need to step up in order for the industry to meet consumer and regulatory demands for quality and food safety.

5.11 Human Resource Development

There are very limited graduates and technical personnel employed in the industry presently. When the business expands, the employment of these professionals will be necessary to cater to the needs of the business.

In the seafood and meat sectors, due to the export market requirement of GMP, HACCP, and Veterinary Logo, the level of technology employed is more sophisticated than that of the frozen snack manufacturers. More food technologists are employed in these sectors.

The industry has yet to fully use trained manpower such as qualified food technologists, mainly because the producers/entrepreneurs are fearful of sharing their experience and knowledge with others. Currently, about 450 qualified Food Science and Technology students are graduating every year but only a handful of them are employed in the chilled and frozen food businesses. Those that are employed are mainly in meat and seafood sector.

Food technologists are mainly employed in production, quality control and supervision of processing plants. There is generally reluctance on the part of SMIs to employ graduates as many owners and entrepreneurs do not want to share their hard-earned experience for fear of losing their 'secrets' and competitive edge. Human resources in R&D is still very low, with few food science and technology graduates indirectly involved. There are definitely no active R&D programs by any of the small-scale manufacturers in this sub-sector.

Table 5.12 Technical Training in Selected Chilled and Frozen Manufacturers

Name of manufacturer	Number of Staff with specific qualification		Technical Training program			Spending for technical training in 1999 (RM)
	Food Scientist/ Technologist	Engineer	Basic Food Hygiene	GMP	HACCP	
Saudi Cold Storage	1	1	/	n.a.	/	10,000-50,000
Ayam Manjung	None	none	/	None	None	n.a.
Dinding Poultry	3	1	/	/	/	n.a.
HSH Sdn Bhd	1	n.a.	/	n.a.	n.a.	<10,000
Kami Food Sdn Bhd	2		/		/	<10,000
OL Foods	4	1	/	/	/	n.a.
U.B. Food SB	1	1			/	<10,000
Rex Canning Co	7	1	/	/	/	n.a.
Seapack	4	2	/	/	/	n.a.
Selangor Food Industry	3	2	/	/	/	<10,000
K.G. Pastry	1	none	/	/	/	<10,000

n.a. = data not available.

a) Availability of Trained Professionals

Food Science and Technology disciplines are offered in various local Institutes of Higher Learning (see Table 5.12). About 450 qualified Food Science and Technology students graduate every year but only an estimated small percentage of food graduates are employed in the food industry. The unwillingness to employ more trained professionals may hinder future development of this sector, as there is a need for a certain degree of expertise in food companies to be able to comply with legislative requirements and satisfy market place's quality standards.

5.12 Barrier to Entry

Generally, the major barriers to entry is R&D and cost of freezing equipment. Substantial investment in R&D is required to under the behaviour of the food and materials used under the chilled and frozen conditions. This is particular crucial for local ethnic foods as there is very little published knowledge and R&D findings on these foods.

Generally, good freezing equipment such as the cryogenic and spiral freezer is very expensive and required high volume for economical production. This may be a major obstacle for local food producers as they are usually small or medium size.

Table 5.13 List of Institutes of Higher Learning Offering Food Science and Technology Courses

Institute of Higher Learning	Level of Programmes	Estimated no. of graduates per year
1. UKM	B.Sc. M.Sc. Ph.D	70 10 1
2. UPM	B.Sc. M.Sc. Ph.D.	240 } 40 }
3. UiTM	Diploma B.Sc.	50 – 60 30 (by year 2003)
4. USM	B.Sc. M.Sc. Ph.D	70 } 40 }
5, UM Sabah	B.Sc. M.Sc. Ph.D	78 n.a. n.a.
6. Politeknik Ungku Omar	Diploma Certificate	36 65

b) Availability of Technical Support Services in Food Industry

Table 5.14 summarises the availability of various technical support services to the local food industry. Government agencies provide various consultancy services but these services are not widely known to the industry, especially to the SMIs. Common complaints expressed by the industry include difficulty in getting access to these public organisations, the procedure involved, as well as the fear of their 'trade secrets' known to others. It is important for public organisations to better understand the industry in order to be more industry friendly.

Though there are many small private laboratories offering analytical services, they prefer to focus on more profitable sectors, such as water, oils, and fats sectors. Price competition among private laboratories, if left unchecked, may affect the quality of their analysis.

Most of the big players in the chilled and frozen food have their own analytical laboratory facilities, which are capable of at least doing basic analysis. For more sophisticated analysis companies send their samples to public laboratories or to their regional laboratories overseas.

Table 5.14 Technical Support Services Available for the Food Industry in Malaysia

Organisation	Analytical services	Training	Consultancy	Other services
Government Agencies MARDI	All types of food analysis	Full range of training, from management to food handling, technology, quality and safety	Including: Product development, equipment fabrication processing, and technology	Including: Advisory services to other government agencies and small-scale enterprises
PORIM	Food analysis particularly dealing with oil, fat, chocolate, vitamin E		Not major activities	Including: Advisory services to other Government agencies
Chemistry Dept.	Food analysis particularly dealing with chemical and micro biological analysis			Including: Advisory services to other Government agencies
Dept. of Veterinary Services	Microbiological and chemical analysis			Including: Advisory services to other Government agencies
Ministry of Health		Train the trainer in food hygiene		Enforcement of Food Act and regulations
Universities/colleges/ institutes **UPM, USM, Universiti Sains Sabah, UiTM, Politeknik Ungku Omar**	Provide training, consultancy, and analytical services involving individual lecturer on project basis.			
UNIPEQ	Provide training, consultancy, and analytical services			
Private Laboratories	Microbiological, chemical, and certain physical analysis			
Private consultancy firms	Limited analytical services	Full range of training, from management to food handling, technology, quality, and safety	Including: System development (HACCP, ISO, GMP) and auditing of factories	

Chapter 6

INTERNATIONAL MARKET

CHAPTER 6

INTERNATIONAL MARKET

6.1 World Demand and Trends

6.1.1 Overview of Global Consumption for Chilled and Frozen Food

The consumption of chilled and frozen food is increasing globally. Demand of major consuming countries is estimated at USD108 billion in 1999 with big markets existing in developed countries like the US, European countries, and Japan. These are generally discerning markets that require good quality of food. The US dominates the world-wide market, accounting for over 60 percent of all sales and UK, the largest frozen food market in the European Union, accounts for approximately 7.5 percent of global market sales.

Table 6.1 illustrates the consumption of chilled and frozen food for the above major economies:

Table 6.1 Frozen Food Consumption of Major Countries 1999 #

	USD (Billion)
European Union	31.3*
United States	67.7**
Japan	8.8***
Total	**107.8**

Notes:

* Figures derived from an estimated 5% annual growth rate. According to sources from Quick Frozen Foods International, Food Processing and Retail Business, the frozen food industry growth rate in Europe is about 5% annually.

UK frozen food market was about £4.96 billion in 1998 (source: Birds Eye Wall's Frozen Food Factfile, 1999), approximate USD7.74 billion (exchange rate about 1.56)

UK frozen food market was about 26% of European Union market, it means European Union market was about USD29.77 billion in 1998. With an estimated 5% annual growth rate it was about USD31.26 billion in year 1999.

UK frozen food market is approximately 10% of the world market for frozen food, it means world market for frozen food was about USD75 billion. With an estimated 5% annual growth rate it was about 91.2 billion in year 1999.

** Retail sales – USD27.1 billion; Food services – USD40.49. Source: American Frozen Food Institute, 2000

*** Figure derived from an estimated 2.4% annual growth rate using the actual figure in 1998 which is USD8.62 billion. Source: Japan Frozen Food Association, 1998

\# Consumption of frozen food for other countries is not available. US, Europe and Japan are the biggest consumers of chilled and frozen food in the world.

Though the global market for chilled and frozen food is high and expanding, it is not easy for exporters to penetrate these markets. Potential exporters need to meet the stringent quality requirements of these countries such as HACCP, ISO 9000 and ISO 14000.

Exporters who comply with these requirements still have to meet the requirements of large supermarket chains, which are the major buyers of chilled and frozen food. The requirements of these supermarket chains are sometimes more demanding than the food import regulation requirements of their countries.

6.1.2 The Growth Scenario

In the past six years, the global frozen food market has grown by an estimated average of five percent per year, with the exception of Norway and Finland, which grew over 10 percent per year (source: Quick Frozen Foods International, Food Processing and Retail Business). Chart 6.1 below illustrates the growth trend of chilled and frozen food consumption in some selected countries.

The chilled and frozen food market is expected to grow steadily and probably exponentially in certain developing countries. This appears inevitable as the factors that drive the consumption in developed countries are also beginning to significantly impact developing and third world countries.

The following describes the main social and economic factors driving global demand of chilled and frozen foods:

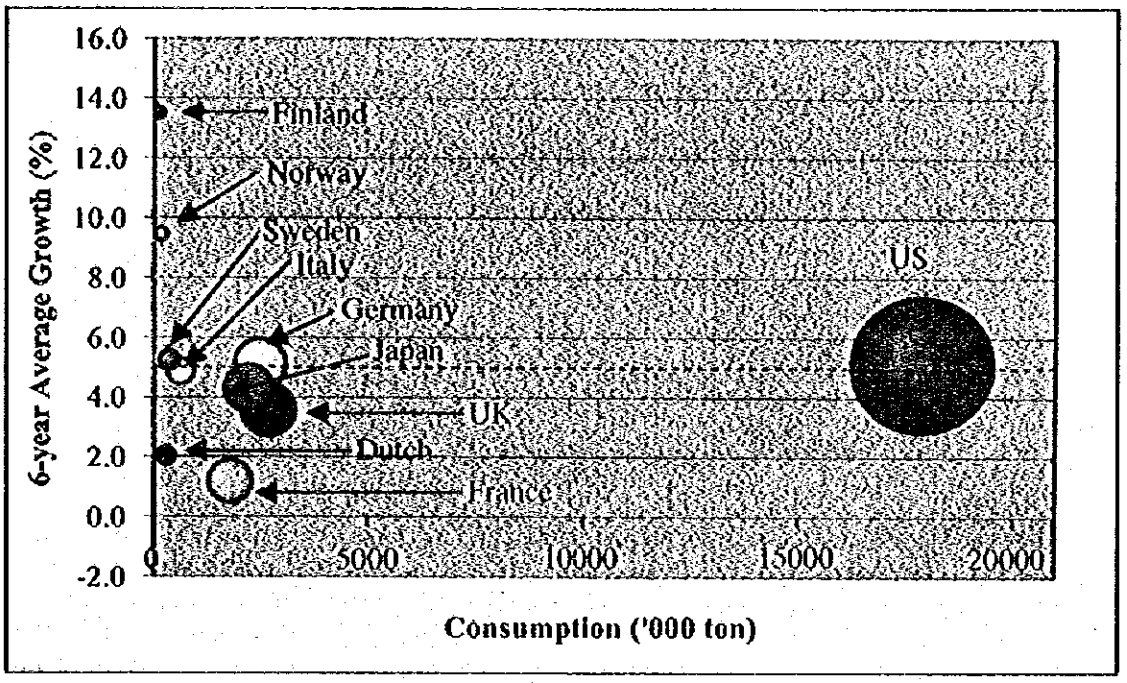
- Increasing number of middle-income consumers and dual income households
- Growing popularity of hypermarkets and supermarkets over traditional wet markets
- Changing role of women in society, and the increasing number of working women requiring easily-prepared convenience meals
- Movement away from regular eating patterns, leading to single or double meals and towards lighter meals, and health and weight consciousness.
- Movement towards modern house design and increasing household penetration of microwaves
- Increasing number of single person households

Convenience, choice, demand for out of season food, flexibility, ease of preparation, quality, and value are the hallmarks of frozen food and are the reasons for its rise in popularity.

Generally in developed countries, ready-to-serve meals and frozen ethnic food are the most promising category of food experiencing double-digit growth for the past few years. South Asia's abundance of fresh produces, its price factors, and the public's negative perception of chilled and frozen food quality are the main barriers to the development of the frozen food industry.

Despite the obstacles that exist in this region, we find that the market for chilled and frozen food will continue to grow, driven by factors that will be presented in later sections of this report.

Chart 6.1 Consumption of Chilled/Frozen Food of Major Countries 1999



6.1.3 European Market

Europe is one of the leading markets for chilled and frozen food. Chilled ready-to-serve meals consumption across Europe is extremely varied as each country's market is in a different stage of the market lifecycle. The size of chilled ready-to-serve meal market in the UK is 20 times greater than in Netherlands. The estimated UK market size of over US$1 billion is four times larger than the aggregate of Dutch, French, and German markets. In addition, an average UK consumer spends over six times as much per year on ready-to-serve meals compared to the Dutch consumer. Based on the overall growth trend, UK appears to be a relatively more mature market for chilled and frozen food as compared to other European counterparts.

Ethnic cuisine is already relatively well established in the UK with Italian and Indian ready-to-serve meals sectors outweighing traditional British snacks. Trends in the UK therefore, reflect the search for new pockets of growth in the form of new cuisine, which can translate into chilled ready-to-serve meals. Ready-to-serve meal retail buyers are sourcing the Far East, Australia and Japan for new ideas.

In France, the largest cuisine sector is the traditional French food, with only recent moves into Chinese, Indian and Mexican food in chilled form. In the Netherlands, the "Indisch" sector is the largest within the chilled ready-to-serve meal market followed by traditional Dutch and Italian. Pure Indonesian and Indian meals are still only niche areas.

Overall, the European frozen food market is a mature market. Frozen food consumption for the nine leading European countries passed the 8.9 million ton mark in 1999 (see Table 6.2). Average per capita consumption of frozen food was 24.5 kg in 1994 with an average growth rate of 4.8 percent in Europe (source: www.bffi.org).

Chart 6.1 Consumption of Chilled/Frozen Food of Major Countries 1999

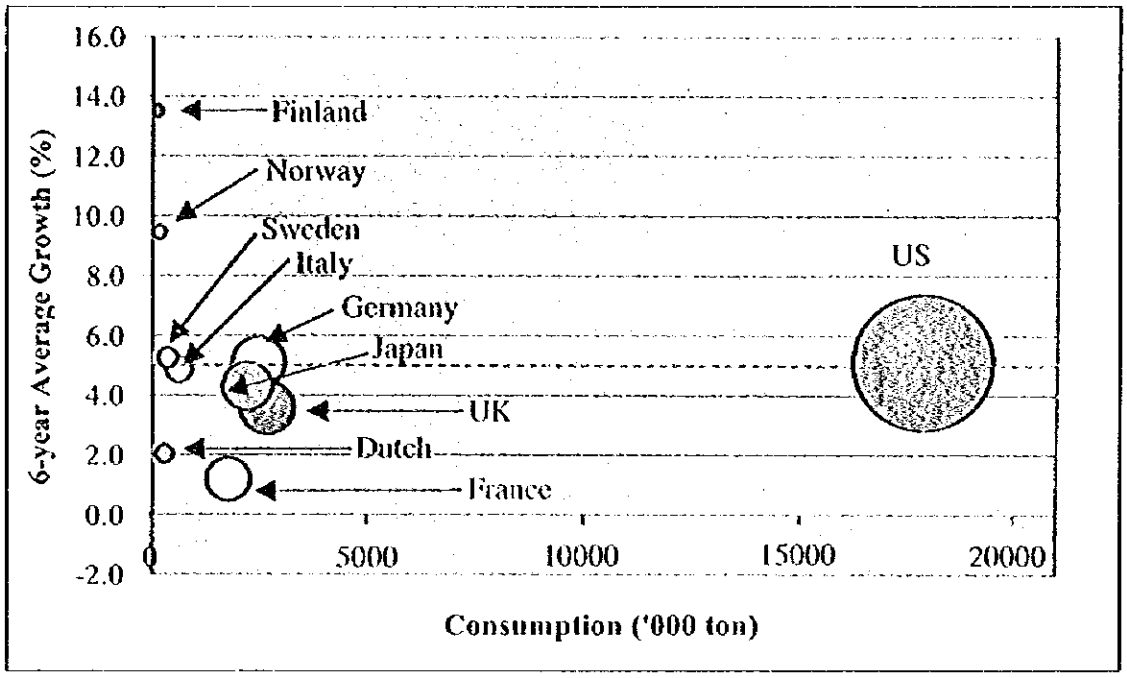


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Table 6.2 European Frozen Food Consumption

	Frozen Food Consumption ('000 ton)						6-year average growth	Per capita consumption (kg)	
	1994	1995	1996	1997	1998	1999	%	1994	1999
UK	2,271	2,533	2,568	2,607	2,715	2,707	3.5	40.3	45.6
Germany	1,959	1,944	2,024	2,127	2,214	2,513	5.1	23.9	30.6
France	1,695	1,729	1,700	1,738	1,733	1,797	1.0	29.0	30.0
Italy	507	556	577	598	623	643	4.9	9.0	11.6
Sweden	292	308	333	346	364	377	5.2	32.7	42.6
Dutch	275	279	294	308	-	304	2.0	17.9	19.8
Denmark	252	264	265	-	-	-	-	48.4	-
Norway	114	120	130	163	172	179	9.4	24.4	39.9
Finland	69	77	85	114	127	130	13.5	13.6	25.1

Source: Japan Frozen Food Association

According to Datamonitor, ethnic frozen ready-to-serve meals show double-digit growth in most countries, even in Belgium, where sales of other frozen meals are in decline. Leatherhead Food Research Association forecasts that while growth rates will slow down, probably 5-10 percent per year in the relatively mature British market, growth rates will be exceptionally strong in the undeveloped European markets such as Spain and Italy. Datamonitor singles out these countries for strong growth and points out that a travelling younger generation is largely responsible for the sector's popularity.

Europe will continue to focus on the health and convenience aspects of food products. The European chilled and frozen food markets are explained below:

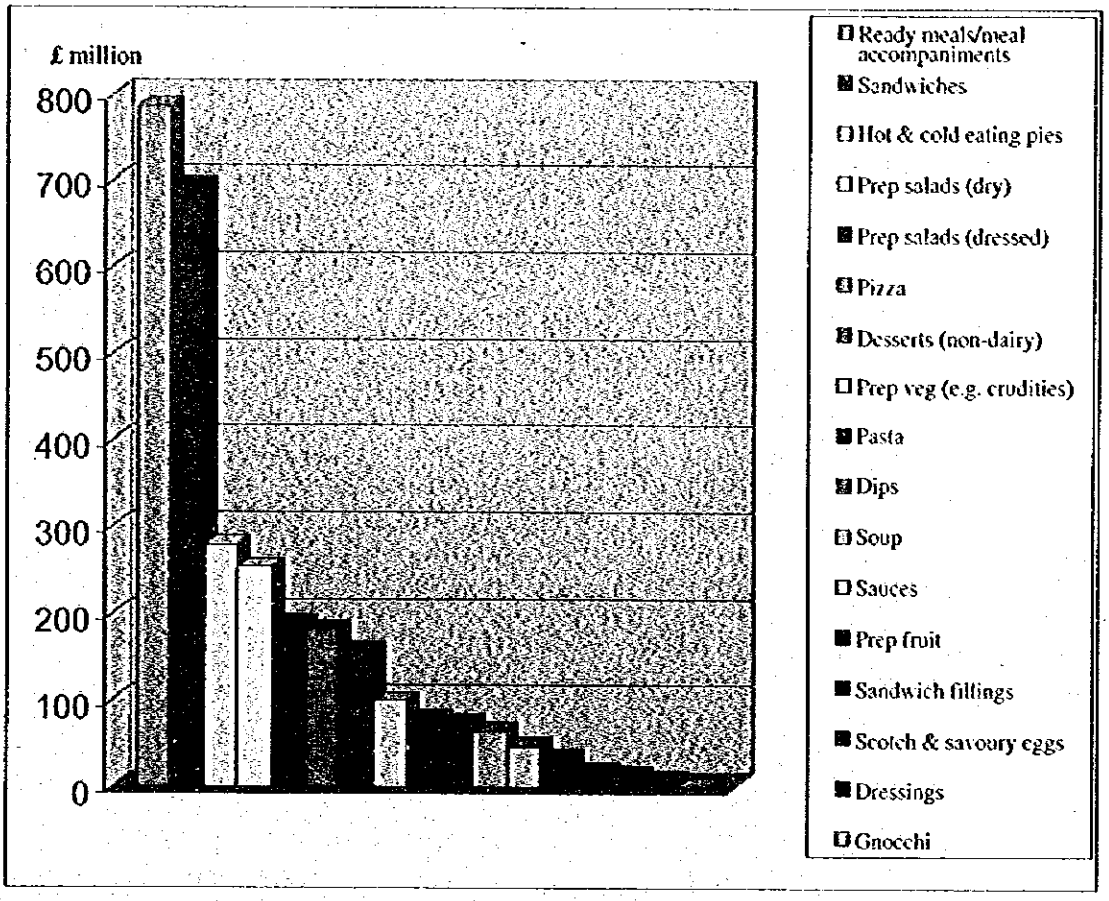
a) **United Kingdom**

UK chilled food market is one of the well-organised markets. Chilled foods represent an extremely competitive and diverse sector of the UK retail grocery market. In 1997, the UK market for chilled foods was valued at £5.1 billion, representing an increase of 5.4 percent on the previous year. Chilled food accounted for 6.3 percent of total grocery sales in 1997.

The market continues to be driven by lifestyle factors such as convenience, health and quality, while taste has also become more important. The estimated retail value of the chilled food market in 1999 was £3 billion.

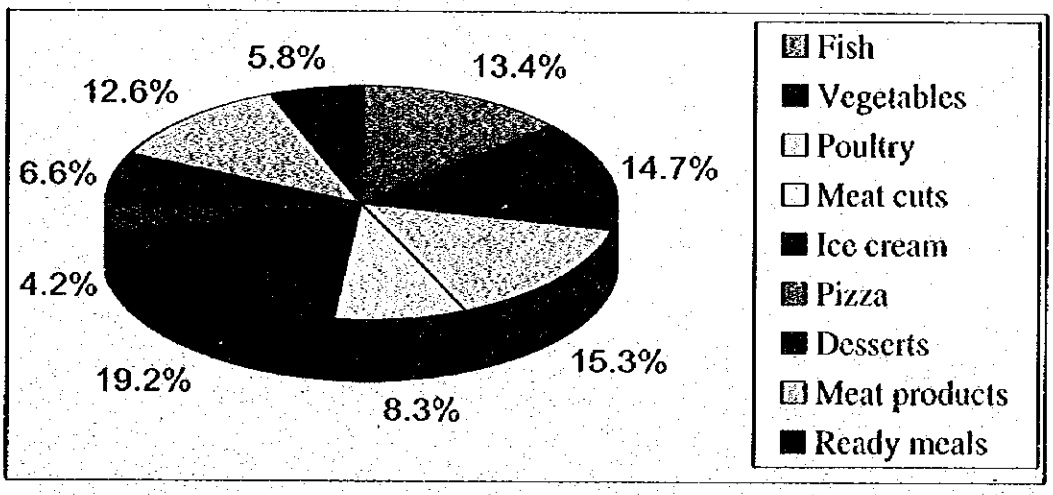
The UK frozen food market was estimated at £4.6 billion in 1995, which is approximately 10 percent of the world market for frozen food. UK is also the largest frozen food market in the Europe. Chart 6.3 below illustrates the various segments which make up of the frozen food consumption in the UK. In 1998, total frozen food market increased to about £4.96 billion (including ice cream). The total sales of frozen food excluding ice cream is about £3.76 billion.

Chart 6.2 UK Chilled Food Market 1999



Note: 1999 Total estimated retail value = £2,992 million.
Source: UK Chilled Food Organisation

Chart 6.3 UK Frozen Food Market 1995 (total market size - £4.6 billion)



Source: Food Processing, May 1997

b) Germany

German frozen food market increased marginally in 1994, up a mere 0.3 percent from 1993 to 1,896,126 tons. Without poultry, consumption posted a more solid 3.5 percent increase, to 1,495,126 tons (see Table 6.3).

Table 6.3 Germany: Frozen Food Consumption (MT)

Category	1993			1994			
	Retail	Catering	Total	Retail	Catering	Total	Change %
Vegetables	202,300	116,640	318,840	209,436	117,580	326,986	2.6
Raw	111,700	113,980	225,680	114,574	114,580	229,164	1.5
Prepared	90,600	2,560	93,160	94,862	2,960	97,822	5
Potato Products	166,000	169,000	335,000	170,500	173,000	353,500	2.5
Fries	118,000	128,000	246,000	121,200	127,000	248,200	0.9
Other	48,000	41,000	89,000	49,300	46,000	95,300	7.1
Fish	96,120	61,500	157,620	96,910	65,240	162,150	1.9
Molluscs/Shellfish	4,600	9,210	13,810	4,650	11,130	15,780	14.3
Pastry Products	101,950	60,255	162,205	108,950	66,320	175,270	8.1
Prepared Foods	216,800	104,725	321,525	228,190	106,200	334,470	4.7
Pizza	97,900	3,875	101,775	103,000	3,800	106,800	4.9
Ready Meals	78,300	88,603	166,365	83,140	87,800	170,940	2.7
Soups	7,300	5,300	12,600	7,250	5,500	12,750	1.2
Baguettes	21,000	925	21,295	22,000	1,150	23,150	5.6
Other	12,300	6,560	18,860	12,800	15,930	20,030	10.4
Fruit	8,086	16,129	24,216	8,310	17,450	25,760	6.4
Meat/Game	16,016	92,000	108,016	16,200	93,270	109,470	-6.7
Poultry	N/A	N/A	446,000	N/A	N/A	401,000	-10.1
Miscellaneous	9,340	7,325	16,575	9,450	8,070	17,520	5.7
Total (Excl. Poultry)	**816,612**	**627,384**	**1,443,996**	**8,479,456**	**647,140**	**1,495,126**	**3.5**
Grand Total	**N/A**	**N/A**	**1,889,996**	**N/A**	**N/A**	**1,896,126**	**0.3**

Source: Quick Frozen Foods International, October 1995

c) Spain

In Spain, frozen food consumption grew by 5.1 percent in 1994, excluding poultry. Overall consumption in 1994 rose by 5.1 percent as compared to 1993 (see Table 6.4).

Table 6.4 Spain: Frozen Food Consumption (MT)

Category	1993			1994			
	Retail	Catering	Total	Retail	Catering	Total	Change %
Vegetables	138,000	60,000	198,000	139,900	68,100	208,000	5.1
Single	137,500	60,000	197,500	93,300	444,800	138,100	5.1
Mixed				46,100	23,300	69,400	
Prepared	500		500	500		500	
Potato Products	21100	58,000	79,100	23,300	59,000	82,300	4.0
Fried	20,900	48,000	68,900	23,000	49,000	72,000	4.5
Mashed	200	10,000	10,200	300	10,000	10,300	0.1
Fish/Seafood	75800	74,200	150,000	48,700	108,500	157,200	4.8
Raw	51,300	56,700	108,000	28,200	84,600	112,800	4.4
Breaded	16,000	10,500	26,500	112,000	16,800	28,000	5.7
Other	8,500	1,000	15,500	9,300	7,100	16,400	-2.5
Molluscs/Shellfish	78,200	102,800	181,000	59,700	121,500	181,200	-
Cooked	N/A	N/A	N/A	21,700	44,000	65,700	n/a
Other				38,000	77,500	115,500	n/a
Pastry Products	6700	56,100	62,800	6,400	67,200	73,600	17.2
Dough	N/A	N/A	N/A	N/A	N/A	10,500	n/a
Bread, etc				N/A	N/A	63,100	n/a
Prepared Foods	33,600	32,200	65,800	36,500	32,500	69,000	4.9
Pizza	7,800	500	8,300	10,000	600	10,600	27.7
Pasta-Rice Dishes	5,900	1,200	7,100	7,100	1,400	8,500	19.7
Soups	400		400	500		500	25
Savoury Bakery	14,500	30,500	45,000	15,400	30,500	45,900	2
Desserts	2,100		2,100	1,500		1,500	-28.5
Other	2,900		2,900	2,000		2,000	42.8
Fruit	5,000		5,000	5,900		5,000	17
Meat	6,300	8,500	14,800	6,300	14,000	20,300	37.2
Burgers	800		800	1,000	6,000	7,000	775
Breaded Item	5,500	8,500	14,000	5,300	8,000	13,300	-5
Total	**364,700**	**391,800**	**756,500**	**326,700**	**470,800**	**797,500**	**5.1**

Source: Quick Frozen Foods International, October 1995

d) Italy

Italy is the fifth place among European countries in frozen food consumption. The country posted one of the highest growth rates in 1994 (6 percent). Prepared foods showed a 17.8 percent increase, and in the native country of pizza, volume was up 41.2 percent. Pasta and rice dishes also did well though snacks and desserts fared poorly (see Table 6.5).

Table 6.5 Italy: Quick Frozen Food by Product Group 1994 (MT)

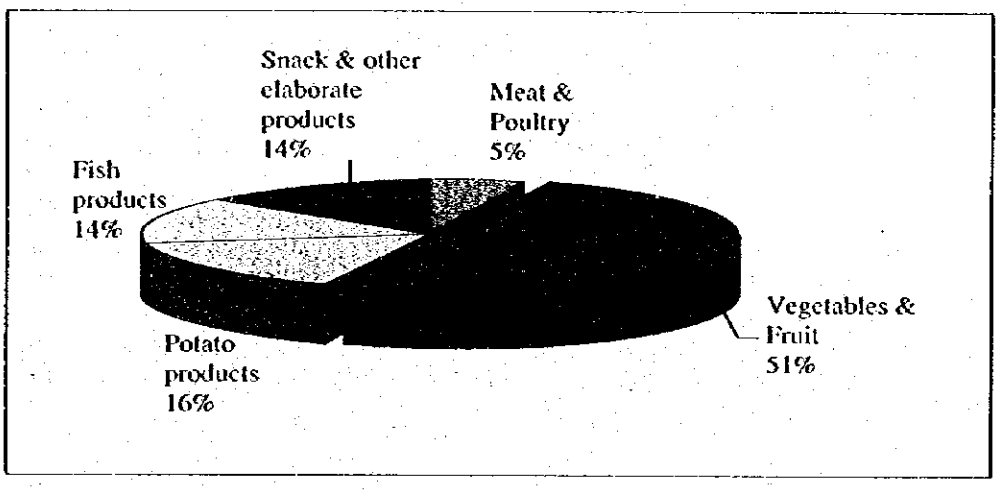
Product Group	Retail	Catering	Total	Change %
Vegetables	150,000	108,400	258,400	4.80
Single	96,870	89,400	186,270	8.20
Mixed	45,620	16,100	61,720	4.30
Prepared	4,970	2,900	7,870	278.50
Other	2,540		2,540	
Potato Products	35,000	40,950	75,950	2.40
Fried	30,820	36,600	69,420	1.20
Mashed	190		190	16.60
Other	3,990	2,350	6,340	
Fish	48,300	6,480	54,780	2.90
Raw	12,950	2,410	15,360	-21.20
Breaded	16,100	1,850	17,950	-10.40
Other	19,250	2,220	21,470	59.00
Molluscs/Shellfish	12,100	2,750	14,850	15.90
Pastry Products	9,650	1,020	10,670	15.40
Dough	8,900	720	9,620	N/A
Bread, etc	750	300	1,050	N/A
Prepared Foods	50,320	15,050	65,370	17.80
Pizza	20,250	4,950	25,200	41.20
Pasta-Rice Dishes	10,910	4,800	15,710	15.50
Other Meals	1,500		1,500	N/A
Savoury Bakery	13,560	2,800	16,360	-2.70
Desserts	4,100	19,000	6,000	-14.30
Fruits	380	1,100	1,480	23.30
Meat	5,100	4,150	9,250	-15.10
Burgers	4,315	2,250	6,565	-10.70
Cuts	685	1,900	2,585	-27.10
Game	100		100	
Poultry	10,250	6,100	16,350	11.20
Whole	1,450	600	2,050	5.10
Pieces	8,800	5,500	16,350	28.80
Total	**321,100**	**186,000**	**507,100**	**6.00**

Note: Percentage represents volume change over 1993
Source: Quick Frozen Foods International, October 1995

Despite the fact that Italy remains on Europe's lower frontier of frozen food consuming countries (8.7 kilos per capita), there is plenty of room for growth. The total frozen food market in Italy was about 507,100 tons in 1994, with vegetables and fruits accounting for almost 25 percent of the volume at 259,880 tons (see Table 6.5).

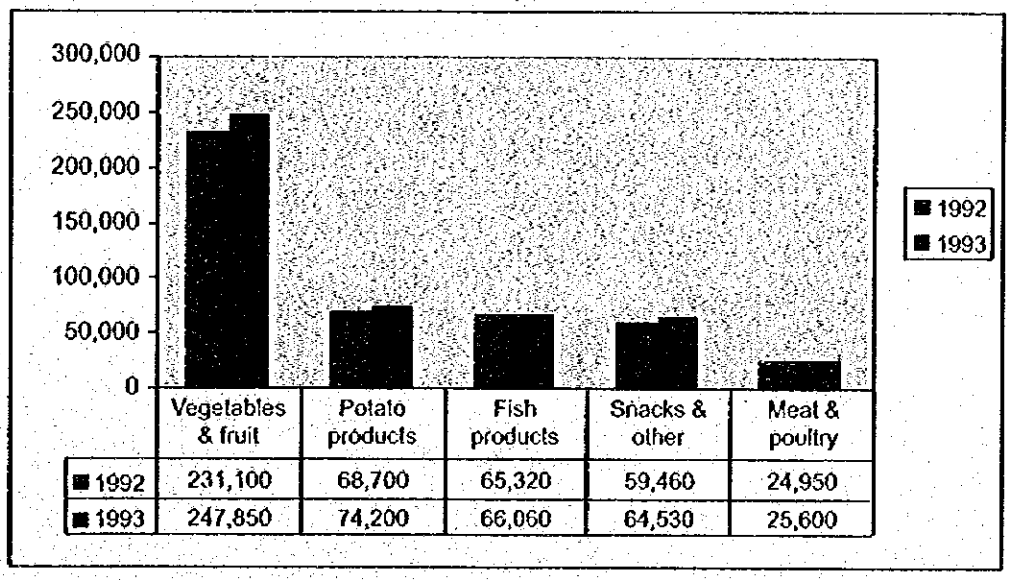
The rising use of frozen products in Italy's restaurant sector has helped push up the market, even though there has been a general decrease in eating away from home. This is due to the fact that more frozen foods are used to replace traditional raw materials because of their greater flexibility, which simplifies cooking. Furthermore, they are available throughout the year, and, therefore, allow for better planning among menu makers.

Chart 6.4 Italy: Frozen Food Category Market Shares in Italy 1993



Source: Quick Frozen Foods International, July 1994

Chart 6.5 Italy: Frozen Food Consumption 1992-93



	Vegetables & fruit	Potato products	Fish products	Snacks & other	Meat & poultry
1992	231,100	68,700	65,320	59,460	24,950
1993	247,850	74,200	66,060	64,530	25,600

Source: Quick Frozen Foods International, July 1994

e) The Netherlands

Growth in 1994 registered four percent without poultry and perhaps less with it though there were a sharp contrast between value-added and commodity categories.

Consumption of prepared foods volume was up 16.7 percent to 43,700 tons, and within that category, desserts showed a 19.8 percent increase to 13,300. Fish and seafood consumption was up 27.1 percent, and while a breakdown was not available, it was estimated that most of the increase was in value-added products. Consumption declined slightly in vegetables, by contrast, and meat was up only slightly (see Table 6.6).

Table 6.6 Netherlands: Frozen Food Consumption (MT)

	1993			1994			
Category	**Retail**	**Catering**	**Total**	**Retail**	**Catering**	**Total**	**Change**
Vegetables	30,700	16,000	46,700	31,500	15,000	46,500	-0.40%
Potato Products	57,200	30,000	87,200	62,050	30,000	92,050	5.60%
Fish	10,586	26	11,016	11,175	2,825	14,000	27.10%
Molluscs/Shellfish				125			
Pastry Products	2,600	NA	2,600	2,550		2,550	-1.90%
Prepared Foods	20,776	9,075	29,860	30,950	12,750	43,700	16.70%
Desserts	7,900	3,300	11,100	9,750	3,550	13,300	19.80%
Fruit	100	400	500	100	400	500	
Meat	36,000	38,200	74,200	35,700	39,800	75,500	1.80%
Total	**164,750**	**99,476**	**264,226**	**174,150**	**100,650**	**274,800**	**4.00%**

Source: Quick Frozen Foods International, October 1995

f) Sweden

Swedish frozen food consumption was up 7.8 percent in 1994 compared to 1993, the highest growth rate in Europe, to 292,173 tons, with retail and catering volume growing pace (see Table 6.7).

Table 6.7 Sweden: Frozen Food Consumption (MT)

	1993			1994			
Category	Retail	Catering	Total	Retail	Catering	Total	Change %
Vegetables	21,484	13,333	34,817	21,175	13,682	34,857	
Single	11,305	8,587	19,892	10,934	8,962	19,896	
Mixed	10,179	4,746	14,925	10,242	4,449	14,691	-1.5
Potato Products	20,547	19,882	40,429	21,653	22,267	44,920	11.1
Fries	18,905	16,501	35,406	18,553	19,759	38,312	8.2
Mashed	NA	NA	NA		1,400	1,400	31.6
Other	1,642	3,381	5,023	3,100	2,108	5,208	
Fish	18,784	10,290	29,074	18,863	10,479	29,342	0.9
Raw	14,141	6,807	20,948	13,747	6,806	20,553	-1.9
Breaded	4,549	1,048	5,597	5,028	965	5,993	7.1
Other	94	2,435	2,529	88	2,708	2,796	10.6
Molluscs/Shellfish	14,595	4,539	19,134	15,870	6,104	21,974	14.8
Cooked	NA	NA	NA	15,620	5,874	21,494	N/A
Other	NA	NA	NA	250	230	480	N/A
Pastry Products	2,410	9,287	11,697	2,683	10,908	13,593	16.2
Dough	NA	NA	NA	440	9,593	10,033	N/A
Bread	NA	NA	NA	2,245	1,315	3,560	N/A
Prepared Foods	24,263	13,039	37,302	29,602	28,018	57,620	54.5
Pizza	2,382	830	3,212	3,499	1,029	4,528	41
Ready Meals	20,466	6,448	26,914	24,364	21,338	45,702	69.8
Soups	116	157	273	88	138	226	17.2
Savoury Bakery	1,104	613	1,717	1,215	3,799	5,014	192
Desserts		452	452	263	455	718	58.8
Other	195	4,539	4,734	175	1,257	1,432	69.7
Fruit	1,181	874	2,055	1,616	2,028	3,644	9.1
Meat	12,179	34,810	46,989	7,774	13,887	21,661	53.9
Burgers	4,208	8,948	13,156	4,428	9,504	13,932	1.8
Cuts	769	1,203	1,972	3,346	4,383	7,729	291.9
Poultry	38,787	8,837	47,624	43,012	7,041	50,053	5.1
Whole	32,648	2,737	35,385	33,994	3,026	37,020	4.6
Pieces	6,139	6,100	12,239	9,018	4,015	13,033	6.5
Total	**155,089**	**115,985**	**271,074**	**166,734**	**125,439**	**292,173**	**7.8**

Source: Quick Frozen Foods International, October 1995

g) Denmark

In contrast to Sweden, the growth rate was a relatively slow 2.1 percent, but there may be an anomaly here: raw, breaded and other frozen fish products are shown declining by virtually identical percentages and this may reflect an attempt to correct over-reporting of consumption for 1993 (see Table 6.8).

Table 6.8 Denmark: Frozen Food Consumption (MT)

	1993			1994			
Category	Retail	Catering	Total	Retail	Catering	Total	Change %
Vegetables	20,851	9,347	30,198	24,839	8,573	33,412	10.6
Single	10,890	8,038	18,929	12,346	7,184	19,530	3.2
Mixed	9,960	1,309	11,269	12,493	1,389	13,882	23.2
Potatoes	13,972	9,926	23,697	15,344	9,946	25,290	6.7
Fries	8,161	5,524	13,686	9,206	5,572	14,778	8
Mashed	5,511	4,401	9,911	5,677	3,183	8,860	6.1
Other				461	1,191	1,652	
Fish	15,786	9,492	25,278	14,186	8,537	22,723	-10.1
Raw	10,967	8,408	19,375	9,854	7,556	17,410	-10.1
Breaded	2,661	958	3,619	2,393	858	3,251	-10.2
Other	2,158	136	2,294	1,939	123	3,062	-10.1
Molluscs/Shellfish	8,434	3,462	11,896	7,579	3,111	10,690	-10.1
Cooked	NA	NA	NA	4,886	3,078	7,964	N/A
Other	NA	NA	NA	2,693	33	2,726	N/A
Pastry Products	31,536	5,196	36,732	31,536	5,196	36,732	6.1
Dough	NA	NA	NA	11,093	2,246	13,339	N/A
Bread	NA	NA	NA	20,443	2,950	23,393	N/A
Prepared Foods	41,448	9,154	50,602	43,177	9,400	52,577	3.9
Pizza	4,417	612	5,029	4,306	428	4,734	-5.9
Ready Meals	17,077	4,569	21,646	19,091	5,149	24,240	12
Soups	13,234	777	14,011	13,249	771	14,020	
Savoury Bakery	3,828	596	4,373	3,325	497	3,822	12.6
Desserts	1,594	555	2,194	1,681	590	2,271	
Other	1,298	2,096	3,395	1,525	1,965	3,490	2.8
Fruit	771	1,393	2,164	527	1,054	1,581	26.9
Meat	11,515	9,606	21,020	9,010	9,900	18,910	-10
Burgers	936	2,492	3,427	812	2,558	3,370	-1.7
Breaded	213	1,164	1,367	247	1,014	1,261	-7.8
Cuts	6,476	3,381	9,857	5,038	3,564	8,602	-12.7
Other	3,891	2,478	6,369	2,913	2,764	5,677	-10.8
Poultry	27,473	19,991	47,464	29,097	20,942	50,039	5.4
Total	**169,816**	**77,219**	**247,038**	**175,295**	**76,927**	**252,224**	**2.1**

Source: Quick Frozen Foods International, October 1995

h) Belgium

The retail frozen food consumption accounted for 125,955 tons (67 percent) of the total frozen market (188,155 tons) in 1994 (see Table 6.9).

Retail volume grew dramatically in most categories in 1994, with an overall growth of 8.1 percent. However, the catering segment contracted by 5.8 percent. Not surprisingly, French fries' growth rate was among the highest, and volume was up 13.8 percent last year (other potato products lagged at a mere 4.2 percent).

Table 6.9 Belgium: Frozen Food Consumption (MT)

Category	1993	1994	Change %
Vegetables	22,765	23,900	5.0
Raw	17,000	18,000	5.8
Prepared	6,856	5,900	(14.0)
Potato Products	53,740	60,600	12.8
French Fries	36,900	42,000	13.8
Other	17,840	18,600	4.2
Fish	10,676	11,900	11.5
Raw	5,666	6,175	8.9
Breaded	3,710	3,945	6.3
Other	1,300	1,780	36.0
Molluscs/Shellfish	2,400	2,700	12.5
Prepared Foods	21,210	21,555	1.6
Pizza	3,660	3,800	3.8
Ready Meals	8,200	8,250	0.6
Soups	4,360	3,980	(8.7)
Savoury Bakery	1,100	5,525	8.3
Other	4,000		
Meat	2,800	2,950	5.3
Poultry	1,450	1,575	8.6
Whole	n.a	900	n.a.
Pieces	n.a	675	n.a.
Total Retail	**116,460**	**125,955**	**8.1**
Catering	66,000	62,200	(5.8)
Grand Total	**182,460**	**188,155**	**1.5**

Source: Quick Frozen Foods International, October 1995

i) Austria

Better reporting probably accounts for some of the 3.7 percent increase, to 121,600 tons (exclusive of meat and poultry) reported for Austria in 1994. A 66.7 percent rise in pizza, for example, appears suspicious, and a 550 percent increase in savoury bakery products even more so.

With ready-to-serve meals showing a 29.9 percent decline, it would appear that some products reported under that heading for 1993 must have been shifted into "other", which ran up a 67.5 percent increase (see Table 6.10).

Table 6.10 Austria: Frozen Food Consumption (MT)

Category	1993	1994	Change %
Vegetables	43,350	44,330	2.3
Potato Products	27,100	27,900	2.9
Fish/Seafood	14,100	14,700	4.2
Prepared Foods	3,100	33,000	6.5
Pizza	3,660	6,100	66.7
Ready Meals	8,200	5,750	(29.9)
Savoury Bakery	1,100	7,150	550.0
Other	8,360	14,000	67.5
Fruit/Juices	1,350	1,800	33.3
Total	**117,300**	**121,600**	**3.7**

Source: Quick Frozen Foods International, October 1995

j) Norway

Norwegians consumed 7.4 percent more frozen food in 1994 than in 1993, according to Norwegian Frozen Food Institute. However, they were consuming a lot more in 1993 than previously reported: in its annual report for 1994, the Institute revised its 1993 catering total from 28,500 to 41,570, and its grand total from 85,500 to 98,570.

At 105,900 tons for 1994, Norwegian consumption reached 24.6 kg per capita, better than Germany and the Netherlands. In 1994, growth was all in the retail sector, up 13.3 percent to 64,600 tons, and the largest single category increase was pizza, up 38.4 percent (see Table 6.11).

Table 6.11 Norway: Frozen Food Consumption (MT)

Category	1993			1994			
	Retail	Catering	Total	Retail	Catering	Total	Change %
Vegetables	10,500	4,600	15,100	11,600	4,400	16,000	6
Potato Products	4,500	6,650	11,150	5,300	6,800	12,100	8.5
Fish/Seafood	10,500	1,300	11,800	11,100	1,250	12,350	4.7
Raw	3,850	300	4,150	4,100	400	4,500	8.4
Prepared	6,650	1,000	7,650	7,000	850	7,850	2.6
Molluscs/Shellfish		550	550	900	550	1,450	
Pastry Products	4,500	2,000	12,800	4,600	8,500	13,100	2.3
Prepared Foods	10,850	2,100	NA	14,300	1,950	16,250	
Pizza	7,950	250	8,200	11,000	250	11,250	37.2
Ready Meals	245	1,350	3,800	2,900	1,250	4,150	9.2
Desserts	450	500	1,520	400	450	850	
Fruit		570		100	550	650	
Meat	7,350	15,500	22,850	7,800	15,200	23,000	0.7
Raw		NA	NA		2,500	2,500	
Prepared	7,350	NA	NA	7,800	12,700	20,500	
Poultry	8800	2,000	10,800	8,900	2,100	11,000	1.9
Total	**57,000**	**41,570**	**98,570**	**64,600**	**41,300**	**105,900**	**7.4**

Source: Quick Frozen Food International, October 1995

k) Finland

At 10.6 percent, Finland showed the greatest increase in QFF consumption for any country in Europe, and it was a startling rebound from 1993 when consumption actually slipped slightly (see Table 6.12).

Table 6.12 Finland: Frozen Food Consumption (MT)

Category	1993	1994	Change %
Vegetables	15,606	17,564	12.5
Potato Products	17,340	18,558	7.0
French Fries	13,447	14,300	6.3
Other	3,893	4,258	9.4
Fish	9,111	9,984	9.6
Raw	5,596	5,951	6.3
Breaded	3,515	3,219	(8.4)
Other		814	N/A
Molluscs/Shellfish	479	454	(5.2)
Pastry Products	4,500	7,678	70.6
Prepared Foods	5,727	6,739	17.7
Pizza	2,585	2,579	
Ready Meals	5,194	3,244	47.9
Soups	948	916	(3.4)
Fruit	2,987	3,197	7.0
Meat	2,247	2,342	4.3
Poultry	4,618	3,034	(34.1)
Miscellaneous	279		
Total	**62,894**	**69,550**	**10.6**

Source: Quick Frozen Foods International, October 1995

6.1.4 American Market

The total sales of frozen food in food service sector were USD67.7 billion in 1999. Food service sector and retail sales accounted for USD40.6 billion and USD27.1 billion respectively. Supermarket sales contributed about USD25 billion of the total retail sales and the balance was from mass merchandisers sales (source: America Frozen Food Institute, 2000).

Table 6.13 United States: Sales of Frozen Food in Various Sectors

Frozen Food Service Sales (Technomic, Inc. 1999)	USD
Bakery Products	3.0 billion
Dairy Products	5.3 billion
Fruits/Vegetables	5.7 billion
Juices	860 million
Meat/Fish/Poultry	22.5 billion
Prepared Foods	2.46 billion
Soups/Sauces	660 million
Frozen Foods in Supermarket Sales (IRI 1999)	
Appetizers/Snacks	507 million
Baked Goods	385 million
Breakfast Foods	886 million
Desserts/Toppings	760 million
Dinners/Entrees	5.8 billion
Fruit	198 million
Ice Cream/Sherbet	4.3 billion
Juices	1.1 billion
Meat	829 million
Novelties	1.9 billion
Pasta	247 million
Pies	382 million
Pizza	2.3 billion
Plain Vegetables	1.6 billion
Pot Pies	309 million
Potatoes/Onions	857 million
Poultry	1.5 billion
Prepared Vegetables	111 million
Seafood	990 million
Side Dishes	236 million

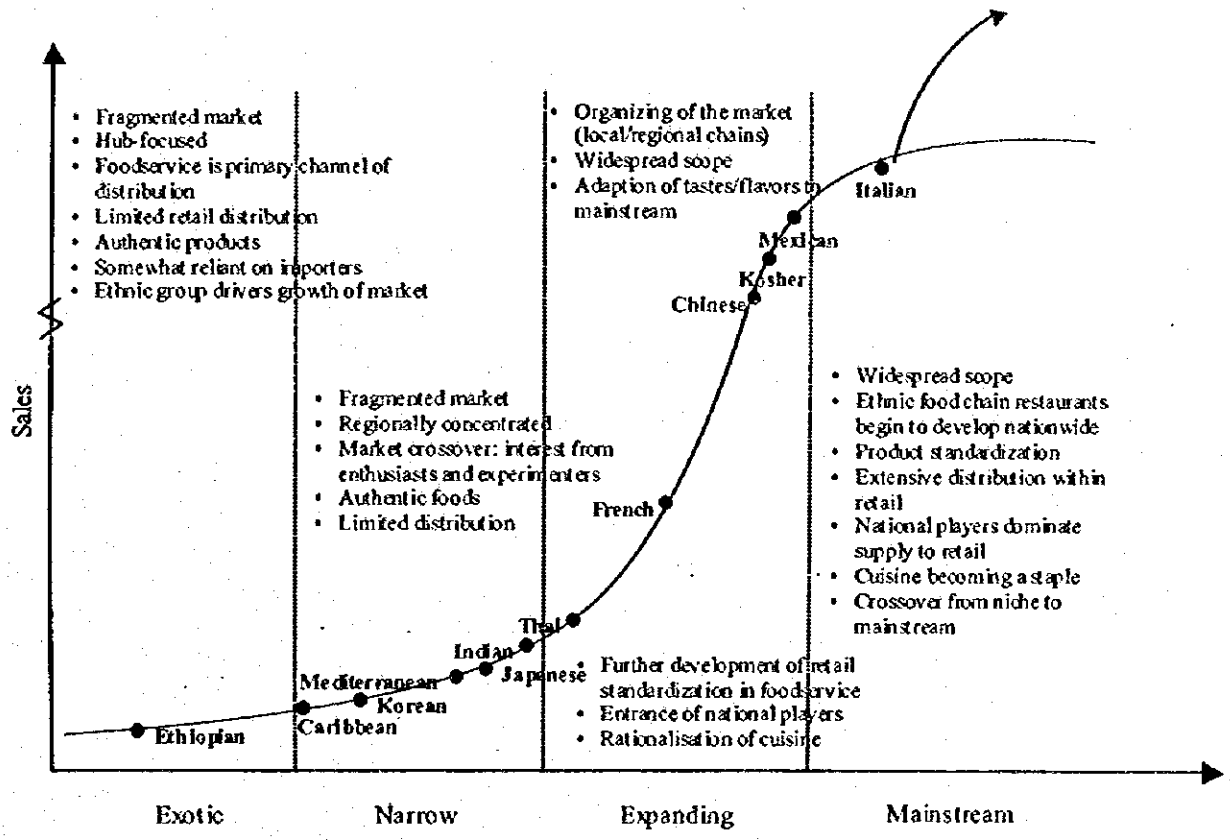
Percentage of Total Supermarket Sales
7 percent (FMI and IRI 1999)
Percentage of Total Food Service Sales
33 percent (Technomic, Inc.)
Total New Frozen Product Introductions in 1998
1,527 (New Product News)
Average Space in Supermarkets for Frozen Section
700 linear feet
Number of Employees
169,100 (Bureau of Statistics 1997)
Source: America Frozen Food Institute, 2000

According to a report by the Frozen Food Age magazine and the American Frozen Food Institute (AFFI) the US consumers behave more positively toward frozen food. They recognise frozen products as effective home meal solutions and appreciate the ease and quickness of preparation.

US job growth and the increase of women in the work force have spurred the movement toward meal solutions, which presents an opportunity for the frozen food. On average, frozen food in supermarkets have gained 20 percent more space over the past 10 years, and dollar sales of frozen food products in supermarket increased by 3.2 percent between 1996 and 1997. The marketing of frozen foods as dinner solutions already had an impact on sales, as the fastest growing categories are dinner solutions, with frozen pizza, poultry, meat, seafood, and dinners/entrees topping the list. The marketing of frozen products as healthy and great tasting may provide a strategic marketing positioning for the frozen food category.

Another good opportunity for the frozen food is to target the ethnic groups, in particularly Hispanics, which is the fastest-growing ethnic market. Local consumers have also been experimenting ethnic cuisines and these cuisines are becoming more popular. The following is Promar International Inc (PROMAR)'s graph of selected ethnic cuisines' development and market characteristics in the US market:

Chart 6.6 Illustrating the Market Characteristics for Selected Ethnic Food in the US Market



PROMAR's research broadly segregates the ethnic food markets into four phases, namely exotic, narrow, expanding, and mainstream. The food products, which are charted at the exotic and narrow stages, are those in very young "start-up" industries. As the products become more established, they will enter the expanding stage like Caribbean, Korean, and Vietnamese foods. These markets grow rapidly with accelerating demands. In contrast, food products that reach the mainstream phase, such Italian, indicate that the market has already entered a mature stage whose more competitive nature inevitably leads to a slower and steadier growth rate.

There appears to be a number of emerging (exotic, narrow and expanding) ethnic food segments. For the purpose of this study, it is appropriate to highlight that Chinese and Thai food markets are expanding and have attracted some national players. The research also indicates that most of the products are channelled through food service or retail outlets. Product standardisation is common in the food service sector for these food markets.

The Korean, Vietnamese, Japanese and Indian food markets are emerging markets and as such, they are fragmented, and regionally concentrated with limited distribution. The consumer groups of these products are enthusiasts and experimenters. On the whole, authentic types of cuisines are more popular among consumers.

As for the overall US frozen food market, the food service market accounts for 60 percent of U.S. frozen food sales. Frozen food makes up 32 percent of total food service sales in 1995, totalling USD98 billion. Categories of frozen products used in food service include meat, fish, poultry, fruits, vegetables, and dairy and bakery products, prepared foods, soups, sauces, and juices. The frozen meat/fish/poultry category represented the largest share of the food service sales in 1999 (source: American Frozen Food Institute, 2000).

The food service operations indicate that frozen food helps reduce labour costs, is more convenient and easier to store. The main reasons food service operations use frozen food are first, availability, followed by product consistency, reduced preparation time, portion control, high quality, ease of storage, price stability and low costs. According to the US National Restaurant Association survey, more than half of respondents agreed that frozen food is more nutritious than non-frozen food (source: America Frozen Food Institute, 2000).

Total retail sales of frozen foods in the US reached more than USD25 billion in 1999, up over one billion dollars from 1998. The frozen dinner and entrée category continue to be the largest within the retail frozen food market with more than USD5.3 billion in annual supermarket sales. The frozen seafood and dinner/entrée category experienced the largest growth from 1998 to 1999, with sales of the seafood category increasing by 13.2 percent and the dinner/entree category increasing by 11.4 percent. A recent study conducted by FIND/SVP indicates that the Home Meal Replacement market has surged to USD85 billion in 1999, and it is expected to grow at 8.6 percent p.a. reaching USD109 billion by 2002 (source: America Frozen Food Institute, 2000).

According to recent studies, frozen entrees are now among the top 10 most frequently served in-home suppers. Both the ice cream and frozen novelty categories experienced an astounding 150 percent growth in sales over the past decade. For the five-year period from1998 to 2003, the market for frozen appetisers and snacks is expected to increase dramatically from USD411 million to USD662 million.

A.C. Nielsen, an international market research firm, has charted the US national market trends, consumer profiles of frozen food customers, their attitudes, and purchase behaviours. The following are the summarised findings:

- Heavy consumers of frozen food tend to buy a lot of prepared entrees and dinners, while light users generally stock up on ice cream and frozen novelty products.

- The older one gets, the more frozen foods are purchased for personal consumption though families remain the heaviest users in absolute terms.

- Vegetables are still the universal frozen food with the largest buyer base and profile. 53 percent of 17,000 households surveyed by Nielsen responded that frozen vegetables are more nutritious than canned or shelf stable offerings. In almost every other category, the perception was that frozen and canned or shelf stable product qualities are equal.

- Overwhelming across most segments, consumers choose frozen above non-frozen products because of their convenience and ease of preparation. The big exception was ice cream, where 54 percent of those surveyed replied that quality and taste are of paramount concern in deciding their selection. In other product lines quality and taste are generally rivalled price are generally second in importance. However, variety of selection ranked second for those buying snacks and hors d'oeuvres as well as vegetables and ice cream.

In a survey asking Americans to name the top items which they would least want to live without, frozen food products were placed among the top three items (source: American Frozen Food Institute, 2000).

6.1.5 Asian Market

During the last two years, the food industry has gone through a slow-down in new developments and production. The food industry is now recovering as more consumers begin to appreciate the freshness, quality, and convenience found in chilled and frozen foods.

The recent food consumption trend has indicated that Asian food products are more popular than Western food products like pizzas, wedges and lasagne. For example, dumplings are more popular among the Chinese in Asia compared to Western food. The current Asian market trend also indicates that there is a continuous growth in demand for typical Asian convenience food products (such as instant noodles, processed meat, seafood (fish balls), and frozen dim sum). It is forecasted that demand for Asian food products will grow further if the quality of Asian food is compatible to Western convenience food, and if the distribution channel is more effective and efficient. The market has also indicated that there will be high growth potential for traditional Asian health foods that are enriched with new nutritional ingredients.

Asians are becoming more discerning in food selection and are demanding higher quality, nutritious, and tasty food. Food producers who intend to penetrate the Asian market have to be more sensitive to the changes in consumption behaviour taking place among Asian consumers.

Table 6.14: World Imports and Exports of Seafood and Meat Products in ASEAN, Asia, Europe, North America, and the World 1997*

	Asia	Europe	North America	ASEAN	World
Crustaceans	US '000	US '000	US '000	US '000	US '000
Import	4,440,859	2,441,728	3,485,063	150,915	10,545,636
Export	4,356,976	1,192,366	1,176,297	2,647,235	9,294,864
Chilled & Frozen Fish Fillet					
Import	983,176	3,010,927	1,462,520	44,593	5,738,287
Export	751,924	2,599,741	504,468	198,006	5,117,287
Cephalopods					
Import	1,151,074	1,135,770	157,428	60,239	2,500,135
Export	875,198	415,970	164,317	345,350	2,347,320
Fresh, Chilled, and Frozen Meat*					
Import	10,669,996	19,250,482	4,142,292	444,856	35,897,592
Export	2,854,340	18,536,246	7,510,289	162,249	35,578,376
Demersals					
Import	983,176	1,602,961	975,929	28208	3,098,149
Export	215,054	1,554,282	347,509	114223	2,953,072
TOTAL IMPORT	**18,228,281**	**27,441,868**	**10,223,232**	**728,811**	**57,779,799**
TOTAL EXPORT	**9,053,492**	**24,298,605**	**9,702,880**	**3,467,063**	**55,290,919**
TOTAL. IMP LESS TOTAL. EXP	**9,174,789**	**3,143,263**	**520,352**	**-2,738,252**	**2,488,880**

Note: *The figures for Fresh, Chilled, and Frozen Meats were from 1998

From the above analysis, we can conclude that Europe, Asia, and followed by North America are the main regions for the import and export of frozen and chilled seafood and meat products. ASEAN appeared to be a net exported of chilled and frozen food, mainly crustacean.

The chilled and frozen food markets in various Asian countries are explained below:

a) Japan

(1) Historical Development Of Japan's Chilled And Frozen Food Industry

This industry began in early 1900 with frozen seafood. The modern frozen food development in Japan started in 1920s, with the introduction of foreign refrigeration technology from the US and Denmark. After a major earthquake in 1922, the Japanese Government realised that frozen meat and seafood, which could be stored longer, were useful during emergencies. They initiated the promotion of frozen fish by giving grants for several years to private companies who built refrigerated warehouse and boats.

During the war period (1941 to 1945), frozen food was supplied for mainly military use. After the war, the Japan frozen food industry focused on export of frozen seafood and supplying to central kitchen for school lunches. In 1960s, the development of frozen food was accelerated with the local production of plastic packaging film. The Tokyo Olympic Games in 1964 was a turning point to the Japanese frozen food industry. It spurred the Japanese to change their diet custom toward more meat-based meals inspired by world-class athletes. Many new small and medium sized producers began to enter the frozen food industry subsequent to the Olympic games.

The Japanese Government had initiated a massive "cold chain" promotion programme in 1965. The overall purpose of the programme was for "modernisation of food distribution system, towards the systematic improvement of dieting custom". The following are the objectives of the cold chain programmes:

- Improve health of citizens
- Reduce wastage of agricultural products
- Streamline the supply of food, i.e., to stabilise seasonal fluctuations of supply and price, and to expand food supply from remote areas

The cold chain programme included the following:

- Establishment of the cold chain (including production, storage, distribution, and retailing)
- Establishment of food standard, grading, packaging standard and inspection system
- Database on food distribution
- Processing facilities at the point of production and distribution
- R&D on time-temperature tolerance (T-TT) of food
- Publicity and promotion (including introduction of a cold chain logo)

The Government agencies involved were the Ministry of Agriculture, Ministry of Health and Ministry of Trade and Industry. Under the cold chain programme, a massive experimental study was carried out. The experimental study included setting up of 30 agricultural production areas, demonstration truck (equipped with freezing facility) trip for two years, and also involved the biggest wholesale markets in Tokyo and 45 retailers.

By 1969, the production of frozen food in Japan recorded a growth of six-fold from approximately 20,000 tonnes in 1964 to 120,000 tonnes. Beginning 1970's, the frozen food industry had developed rapidly with the introduction of fast food, supermarket chain, and popularity of electric home appliances (e.g., refrigerators and microwave ovens).

(2) Institutional Development In Japan's Chilled And Frozen Food Industry

In 1949, four major players in the industry established the Japan Frozen Food Inspection Association for Export to ensure the good quality of exported frozen food. In 1958, the Frozen Food Promotion Association was also set-up. The Frozen Fish Association, established in 1964, promoted the consumption of frozen fish and other frozen food. The Government had subsidised the promotional activities of the association and in 1967, they also subsidised refrigeration showcase purchased by retailers.

In connection with the rapid industry growth in 1960s, the Frozen Food Promotion Association and Frozen Fish Association were reorganised in a new association in 1969, namely the Japan Frozen Food Association (JFFA).

In 1970, JFFA introduced a self-regulation programme to secure product quality and hygiene of its members. Members who achieved the standard set by JFFA will be given a certificate and are allowed to display it on their products. Monthly audits are carried out randomly and the certificate withdrawn if members failed to maintain the standard.

In addition, the JFFA also carried out educational and promotion campaigns on frozen food consumption, which were subsidised by the Japanese Government for 10 years.

Through the Frozen Food Related Industries Liaison Committee of JFFA, a Handling Manual Throughout the Cold Chain was released. The manual provided guidelines for the proper manner of handling cold storage, transportation, chilled and frozen food retailing manners, and consumption of chilled and frozen. This committee consisted of members from production-storage-transportation-distribution-retail channel, equipment manufacturers, consumers, scholars and ministries and Government agencies. The objective of this committee is to secure frozen food safety throughout the cold chain.

(3) Current Development

Total sales of frozen food in Japan recorded 2.2 million metric tons in 1998, valued at approximately 861 billion Yen (source: Japan Frozen Food Association). Prepared food is the core segment of the market and accounted for half of the industry's sales.

Production of frozen food in Japan has risen by more than 2.5 times since 1980, by 45 percent since 1990, and by an average of 3.4 percent between 1994 and 1998. Domestic production accounted for around 70 percent of the total supply with imports making up the balance (source: Japan Frozen Food Association). Japan relies heavily on imported raw material for its food production, especially for its fisheries products.

Food production and food service industries for institutional players dominated the Japanese Frozen food market and accounted for 72 percent of the total production in 1998. The production for retailers has been on the up trend for the past five years (1994-1998) with a higher compounded annual growth rate of 5.0 percent as compared to 2.4 percent for the production for the production for institution uses.

The following Table 6.15 shows that the prepared foods as a whole in 1998 increased 0.4 percent, out of which, fried foods decreased 3.0 percent and foods other than fried were up 2.3 percent from 1997. Fishery products decreased 2.7 percent and farm products increased 1.1. Confectionery increased 6.3 percent and livestock products increased 5.3 percent.

Table 6.15 Production Volume & Value of Frozen Food by Categories 1997 & 1998

		Volume	Growth		Volume	Growth
Category	1997	1998	1998/97	1997	1998	1998/97
	(MT)	(MT)	%	million yen	million yen	%
Fishery products	103,485	100,651	97.3	90,054	87,860	97.6
Farm products	88,892	89,894	101.1	21,866	23,084	105.6
Livestock products	22,370	23,562	105.3	15,064	16,075	106.7
Fried foods	445,223	432,068	97.0	235,138	226,500	96.3
Prepared foods other than fried foods	771,333	788,808	102.3	356,272	365,523	102.6
Prepared foods total	1,216,556	1,220,876	100.4	591,410	592,023	100.1
Confectionery	50,734	53,927	106.3	27,496	28,472	103.5
Sum Total	1,482,037	1,488,910	100.5	745,890	747,514	100.2

Source: Japan Frozen Food Association, 1998

Japanese consumption of frozen food reached 2.2 million tons in 1998, valued at 861 billion Yen. The compounded annual growth rate of frozen food consumption in Japan for the period of 1994 to 1998 was 4.5 percent per annum and the growth rate has been quite stable (see Table 6.16). In 1998, the per capita consumption of frozen food in Japan was 17.4kg.

Table 6.16 Japan Frozen Food Production and Consumption

	1994	1995	1996	1997	1998
	'000 ton	'000 ton	'000 ton	'000 ton	'000 ton
Frozen food production	1,319	1,365	1,420	1,482	1,489
Frozen vegetable imports	501	548	604	627	706
Total frozen food consumption	1,829	1,913	2,024	2,109	2,194

Source: Japan Frozen Food Association

Chart 6.7 Japan: Production Volume by Categories 1998

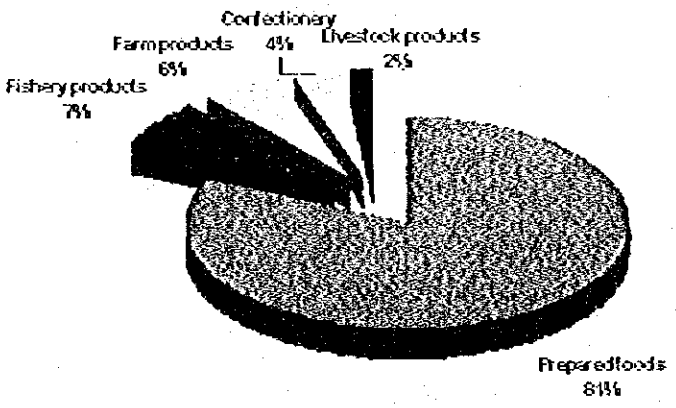
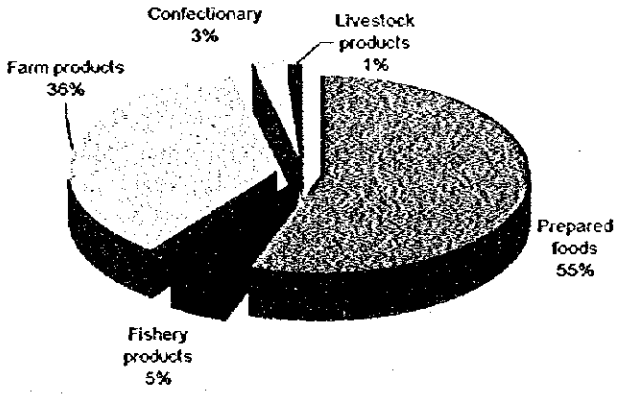


Chart 6.8: Japan Consumption Volume by Categories 1998



Source: Statistics on Various Aspects of the Japanese Frozen Food Industry 1998; Japan Frozen Food Association

The above charts indicate that the local production of farm products is not able to fulfil the demand.

According to a study by USDA's Foreign Agriculture Service (USDA/FAS), the rapid growth in the Japanese frozen food industry can be attributed to its increased price competitiveness and quality. Societal changes have also played a large role. As the numbers of working women increase along with growth in the elderly and single person households, Japanese consumers continue to look for ways to reduce cooking time. Housewives are also turning to frozen food to reduce their cooking burden. There is even a growing trend for frozen food to be consumed as main meals and not just as side dishes.

In the food service sector, frozen food is also gaining in importance as restaurants try to reduce their operational costs by purchasing processed ingredients in frozen form, which can be quickly heated and served to patrons. The trend toward reducing cost in the food service sector provides many opportunities for suppliers of ingredient (e.g. processed frozen meat, seafood, potatoes, and green soy-beans) to sell to restaurant chains and independent restaurants.

Influenced by the boom of "Home Meal Replacement" (HMR) in the United States, HMR has become a new marketing strategy for Japanese frozen food industry. Japan has long had a concept similar to HMR, such as *souzai* (delicatessen) and *obento* (lunch box). However, some supermarkets, for example JUSCO, have recently adopted an HMR concept similar to the US by setting up "real meal corners" in their stores, offering foods which are ready to heat. Convenience stores have also picked up on the idea and are now offering a wide variety of ready-to-heat dishes such as croquettes, fried shrimp, fried vegetables, and rice-based dishes.

Key factors behind the growth in this sector include a growing preference among consumers to spend less time cooking and to eat their meals alone. One of the USDA/FAS report indicated that the most important reason Japanese consumer purchase frozen food was convenience (about 90 percent), with variety and cost ranked second and third. In a similar survey, Americans also ranked convenience as prime reason for purchases (80 percent), but taste and variety ranked second and third (source: USDAS/FAS, JA5028, 1995). A different study by Sanwa Bank on general food preferences showed that Japanese's most important selection criteria for food was freshness (88 percent), and followed by price and taste (source: USDA/FAS, JA9762V, 1997).

The top five frozen food product categories in 1998 in terms of value were croquette, rice products, cutlet (beef and pork), *udon* noodles and hamburger (meat loaf). Chinese cuisine, pasta and Japanese noodles are showing substantial growth potential while gratin and frozen snacks are slumping (source: USDA/FAS).

With the diffusion rate of microwave ovens over 92 percent, these products should continue to be big sellers in the future.

b) China

Total population in China is over 1.2 billion and about 10 to 15 percent of the population consume processed food. According to John Trigg, export director of Aplin & Barret Ltd (part of the Cultor Food Science organisation), consumers in China are still very price sensitive, sometimes at the expense of product quality. Over the last five years, however, the consumption pattern of the Chinese has changed. They are now more aware of new food products, appreciate good quality, and value for money food.

c) Taiwan

Frozen food production, exports, imports and domestic consumption in Taiwan all grew at a feverish pace in 1994, according to Chinese Frozen Food Institute (CFFI). Where per capita consumption reached 14.25 kg.

Domestic consumption was 287,762 tons, up 28 percent from the 224, 840 reported in year 1993. Other highlights of the CFFI's report are that exports increased 17.6 percent in volume, to 592,439 tons; and 17.4 percent in value to USD2.033 billion. Imports grew even faster, i.e., 45.6 percent to 167,485 tons in volume and 36.3 percent to US$416.5 million in value. Production for domestic consumption was up 32.3 percent to 120,277 tons in volume to NT$8.670 billion. Dumplings accounted for nearly 40 percent of domestic output in 1994, at 31,556 tons, with volume up 13.4 percent from 1993 (see Table 6.17).

Western tastes are evidently catching on. Domestic production and consumption of fried chicken nuggets was up 68.2 percent to 7,858 tons. Battered products, presumably seafood-based, shot up 230.2 percent to 4,817 tons. And while frozen pizza remains a tiny category, it was up 78.8 percent. Tonnage for Chinese buns, by contrast, was off 0.5 percent to 13,498 tons.

On the import side, the fastest growing category was vegetables, with tonnage leaping more than five fold from 4,521 to 26,086. With domestic production for 1994 nearly double that for 1993, frozen vegetables consumption in Taiwan tripled over the year (see Table 6.17).

Table 6.17 Taiwan: Frozen Food Consumption 1994

Category	Productions*	Imports	Consumption
	ton	ton	ton
Fish and seafood	1,940	68,677	70,617
Meat & poultry	23,991	72,255	96,246
Vegetables and Fruits	14,191	26,553	40,744
Prepared foods	79,008	-	-
Dough products	1,147	-	-
TOTAL	**120,277**	**167,485**	**287,762**

*Production for domestic consumption
Source: Quick Frozen Foods International, April 1996

6.1.6 Southeast Asian Market

The demand for food is highly related to a nation's population. The total population of Thailand, Philippines, Singapore, Malaysia and Indonesia is over 370 million. With the exception of Singapore, average per capita income is pegged at between USD3,200 to USD11,100. The purchasing power is growing as well as the spending on processed foods.

The region's native abundance of fresh produces, especially meat and seafood, has often been seen as a major obstacle in the development of the frozen foods market. With fresh and chilled products readily available at relatively low prices in both traditional marketplaces and modern supermarkets, frozen food tend to be viewed in a somewhat negative light. They are not "fresh" from the farm or ocean, hence, the quality is deemed suspect. Moreover, their sealed packaging forms a barrier preventing consumers from assessing the food quality and taste.

Frozen foods also suffer from an image problem. Most Asians harbour negative notions about frozen foods as being not fresh, and since fresh products are so easily available, it is difficult to change this mindset.

Reasons for buyer scepticism may also lie partly in poor handling practices on the part of suppliers. Well-publicised outbreaks of food poisoning in Europe and Japan may have contributed to such misgivings over frozen foods. In 1998, for example, CP Retailing & Marketing Co. of Thailand had to counter allegations broadcast over a Thai radio network that claimed the company injected formalin into its frozen dim-sum as a preservative. Such news tarnishes the reputation of frozen food.

Education is required to change consumers' perception of the quality of chilled and frozen food. They need to be informed that the quality and taste of chilled and frozen food is comparable to the fresh alternative if the chilling, freezing and handling procedures are properly carried out.

Most of the production of seafood from Southeast Asian countries are exported to foreign countries due to the strength of US dollar, hence, the eventual foreign exchange gains. In addition, exporters also cited that there is substantial demand for frozen foods in countries such as the US and Japan, because buyers are less concerned about freshness and price accustomed as they are to the convenience of frozen foods.

Issues such as negative consumer perception and the ready availability of fresh food have made it more difficult for frozen food manufacturers to market their production in Southeast Asian countries. Greater effort and expenses are also needed to build consumers' confidence compared to the established markets. It would, therefore, be more beneficial for these food producers to concentrate their marketing resources in overseas markets.

There is a gradual and steady trend in a shift from simple processing or packing towards producing value-added seafood or meat products, such as fish or meatballs, finger food items, *surimi* and convenient ready-to-eat foods. This is in response to the increasing demand from more developed countries that source food products from this region.

The current growth of chilled and frozen food industry in Southeast Asia is contributed by the food service sector's growth. Since the 1980s, more Western restaurants and fast food chains have appeared and through them, more varieties of western cuisine and snacks have been introduced to the market. This has spurred demand for food such as frozen pizzas, meat patties, nuggets and French fries in supermarkets. Local producers have recently introduced local favourites like frozen spring rolls, curry puffs, *roti canai*, Chinese *pau*, *samosa* and *dim sum*. Major retailers feel that once people are used to consuming such foods they will continue to do so, although if the quality was acceptable, they might switch to cheaper brands.

The demand for frozen food is highly related to demographics changes, such as rising urban population, greater disposable income, and lesser time for tedious home meal preparation. With more women entering the workforce, frozen food, especially ready-to-cook meal components, is becoming a well accepted alternative.

This trend is more visible in urban centres like Singapore, and the larger cities in Malaysia and Thailand, where most busy, affluent young families have lesser time to spend purchasing food from traditional wet markets and preparing complete meals. Most urban households have microwave ovens and refrigerators; hence, frozen food especially minimally-processed and meal components are becoming popular.

As for the food service providers, the prolonged shelf life of frozen food enables them to stabilise their supply of raw materials. This can assist them to reduce their production costs, reduce wastage, and enjoy higher profits in the long run.

The chilled and frozen food market in Southeast Asia will expand further as these countries become more developed. There is a large potential market for food players with 34 percent of the population in Southeast Asia below 14 of age.

If the experience of markets such as Australia and Japan fore states the future of this region, then the projected growth of frozen food in Southeast Asia might prove to be far larger than estimated.

The chilled and frozen food markets in various Southeast Asia countries are explained below:

a) Thailand

In Thailand, the frozen food market grew from USD20 million in 1991 to USD31.8 million in 1996. Sales of frozen TV dinners in Thailand were reported to have risen 60 percent in 1996 from USD4.8 million in 1995.

The economic downturn, however, has led consumers to turn to cheaper sources of protein other than frozen seafood. A spokesman from seafood producer, Wales & Co. Universe Ltd, said there was little growth potential for the domestic market, especially in frozen shrimp, given the current state of the economy. Demand for frozen seafood would take time to catch up with fresh items, and only when the economy improves. Frozen meat was noted to have become more popular than fresh versions.

Thailand, the world's largest shrimp exporter, saw its frozen shrimp exports growing by 14.2 percent, registering USD357 million in the first four months in 1999 (source: May Ao Company Ltd of Thailand ("May Ao")). For example, May Ao and Compatriot I.C.C. Cosmos exports at least 95 percent of their yearly frozen seafood production, approximately 6,000 tons and 10,800 tons respectively. Most of the exports are for foreign restaurants and supermarkets. It has also been estimated that there are about 20-30 Thai companies exporting 160,000 tons of frozen seafood annually, worth about USD1.71 billion (source: Dr Marut Masayavanich of Thai Fisheries Public Co. Ltd).

Thai frozen food producers expect strong gains in 1999 and 2000. One of the largest frozen food exporter, Surapon Foods Plc ["Surapon"](with USD160 million of revenues in 1998) expects rising sales from high-value exports. Surapon produces frozen shrimp and cuttlefish, sashimi, frozen breaded shrimp, frozen ready-to-eat prawn dumplings, seafood brochettes, and seafood balls and about 70 percent of the company's exports are to Japan.

Similarly, Thailand's largest frozen seafood exporter, Thai Union Frozen (TUF) has also expressed confidence in 1999's performance, forecasting a 40 percent profit growth to USD45 million from USD32 million in 1998. More than half of its exports are to Japan and the US markets.

b) Singapore

Singapore enjoyed significant growth in the frozen ready-to-serve meals market. The market size has doubled from USD260,000 to USD632,000 from 1991 to 1996. Fish nuggets was the acclaimed rising star in finger foods (source: FairPrice) in which Fish Eye and Pasar being the two leading brands. Fish fingers is believed to be on the decline due to their relatively higher price compared to nuggets. Chicken-based products are also becoming more popular lately.

In Singapore, 'wet markets' that traditionally cater to consumers are still popular for its better-priced fresh meats and seafood. Up to 80 percent of chicken parts sold to buyers are through these markets.

However, Daniel Loy, managing director of Global Fisheries, points out that the number of 'wet markets' is falling as most young and working families prefer to shop in modern, more accessible supermarkets. Frozen food will be the better solution for families as these foods fulfil their growing demand for hassle-free and ready-to-cook meals.

In general, frozen food producers in Southeast Asia tend to export their products, and Singapore is not an exception. For example, Global Fisheries Pte Ltd, a major frozen food producer in Singapore, exports 95 percent of its 8,000 tons output yearly.

c) Other South East Asia Markets

The following lists a general overview of other Southeast Asian markets:

- Indonesia - PT Dharma Samudera Fishing Industries ships about 90 percent of its 10,000-ton annual output to markets in Japan, Europe and the US.
- Vietnam - the frozen food industry in Vietnam is currently depressed. Traditionally, Vietnam exports an average of 10,000 tons of frozen pineapple a year to former USSR and East Europe. These markets were lost after the fall of the Iron Curtain in 1991. Presently, only small quantities of frozen fruits and vegetables are exported to Japan and Europe.