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Clusters in Ireland

THE IRISH DAIRY PROCESSING INDUSTRY:
AN APPLICATION OF PORTER'S CLUSTER ANALYSIS

by

Larry O'Connell, Chris van Egeraat, Pat Enright

National Economic and Social Council

nesc

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(f) Introduction

In recent years, much discussion of Irish industrial policy has focused on the fact that successful economic and employment performance seems to require the development of competitive advantage in a range of interlinked industries or sectors. This discussion reflects the insights produced by international researchers, particularly Porter (1990). It has also influenced the Culliton review of industrial policy which concluded that “the explicit identification of a limited number of promising niches and segments in which to build industrial clusters should be an important element guiding direct intervention by government agencies” (Industrial Policy Review Group, 1992, p.74).

In order to explore the implications of this issue for Ireland, the National Economic and Social Council commissioned a study to examine the importance of industrial clusters for industrial development, and the suitability of Porter’s clustering model, in the Irish context. The study involved analysing the experience of three Irish sectors and considered the extent to which the presence of clusters of related or connected industries have been important in accounting for the degree of competitive success attained in each case. This paper presents the findings on one of the sectors concerned.

In the overall study, three relatively successful Irish sectors were selected for examination, each one chosen because it characterised an important aspect of the architecture of the Irish industrial landscape. The sectors were one in indigenous manufacturing, the *dairy industry*; one which is influenced to an appreciable degree by some form of contact or interaction with foreign companies in Ireland, the indigenous *software industry*; and one internationally traded service, the *music industry*. The case studies of each of the three industries were primarily intended to examine the extent of the influence of industry clusters and the applicability of Porter’s approach, rather than to focus on the industry itself. Each case study adopts a similar approach, first profiling and assessing the performance of the industry and then using the Diamond Model¹, developed by Porter (1990), as a framework for analysing the

1. The research methodology is outlined in Appendix 1.

determinants of competitive advantage and the significance of clustering in each industry.

(ii) Porter’s Diamond Model

Porter’s model is discussed in detail in Porter (1990) and it will be only briefly summarised here. His thesis is that to understand why nations gain competitive advantage the focus should be on particular competitive industries within the nation arguing that it is certain characteristics of the nation that leads to industry competitiveness. For national competitive advantage to occur, however, it is not sufficient to have a number of unconnected successful industries, but instead it is necessary to develop clusters of competitive industries which are linked together through having in common a range of supporting conditions. Porter maintains that all of this is much more likely to occur if the clusters are located in the same geographical space because such proximity facilitates the flow of information from which the capability to innovate and to upgrade competitiveness develops. Porter states that this claim can be empirically supported. His study found that “the phenomenon of industry clustering is so pervasive that it appears to be a central feature of advanced national economies” (p149).

According to Porter the competitive advantage of an industry is seen as arising from four different determinants, which are created within the home base of the nation state: factor conditions, demand conditions, related and supporting industries, and firm strategy, structure and rivalry. He also identifies two residual influences: government and chance events.

Factor Conditions

The quantity and quality of factors of production, such as labour, capital and infrastructure, are clearly one determinant of competitive advantage. However, in Porter’s view the factors of greatest significance to sustainable competitive advantage are those which are *advanced* and tailored to the needs of specific industries, i.e. *specialised*. For example, an advanced factor is a university research institute, and a specialised factor is an institute with specific expertise. These key inputs are not inherited but are *created* within a nation. It is the rate at which factors are created, upgraded and made more specialised to particular industries that is most

important for competitive advantage. The creation of factors varies widely across nations and among industries.

Demand Conditions

Domestic demand conditions can play an important role in shaping the rate and character of improvement and innovation by firms. Porter considers three broad attributes of home demand to be important:

- *composition* of home demand: especially sophisticated, demanding and anticipatory buyers.
- *size and pattern of growth*: e.g. early home demand which anticipates international trends.
- *internationalisation* of demand: transmission of a nation's domestic preferences to foreign markets.

Related and Supporting Industries

The third broad determinant of advantage in an industry is the presence of related and supporting or supplier industries which are also internationally competitive. The geographic proximity of internationally competitive supplier industries facilitates the process of innovation and upgrading in downstream industries in several ways;

- efficient, early and rapid access to the most cost-effective inputs
- facilitation of ongoing co-ordination of firms and their suppliers
- access to valuable sources of information and insights, harvested by supplier companies from their international positions.

Competitive advantage in related industries – i.e. those that can share technology or skills or which involve products that are complementary, can provide opportunities for information flow and technological inter-change and often leads to new competitive industries. In addition, small entrepreneurial firms are frequently spun-off from larger companies. As with home-based suppliers, proximity and cultural similarity make such interchange easier than is the case with foreign firms.

Firm Strategy, Structure and Rivalry

The fourth broad determinant of national competitive advantage in an industry is the context in which firms are created, organised and managed, as well as the nature of domestic rivalry. Porter argues that goals and strategies of firms, and the way they organise, vary widely among nations, in ways that are influenced by their national environments and that, in turn, influence their competitive advantage.

Porter's model accords particular importance to the presence of strong local rivals as a key to the development of successful industries in all nations. Even where substantial economies of scale are necessary, a number of rival local firms are important. The domestic nature of the rivalry is important, because of the beneficial effects of visibility, ensuring that rivalry will be particularly intense because of personal pride. Domestic rivalry is also important in stimulating pressure to innovate because of the inability of each individual enterprise to rely on shared advantages which stem from the nation, such as factor costs or a local supplier base.

Government and Chance

Two other elements of the Porter diamond model are the role of government and the role of chance. While acknowledging the influence of both these elements, Porter argues that the way in which they affect competitive advantage is mediated through each of the four major determinants of competitive advantage and can have either a positive or negative effect.

Determinants as a System

A key feature of the model is that the determinants operate as a system. One determinant is almost never sufficient on its own to ensure competitive success. Furthermore each determinant affects the others, although some interactions between the four determinants are stronger and more important than others. For example:

- the effect of home demand on the development of related and supporting industries may be dependent on its overall size and rate of growth.
- domestic rivalry is shaped by rapidly increasing and sophisticated demand which attracts new entry into an industry

as well as factor creating mechanisms which provide entrepreneurs who enter the industry.

Clusters, clustering and competitive success

The conditions which bring about industry clustering grow directly out of the determinants of competitive advantage and are a manifestation of their systemic character. One competitive industry helps to develop and to support another in a mutually reinforcing process. For example, one competitive industry may be a sophisticated buyer of the products and services of its supplier industries. In this situation, the purchasing industry helps to create the domestic demand conditions which support the competitive advantage of the supplier industries, while the suppliers, if they are competitive, help to sustain the competitive advantage of the purchasing industry through their role as supporting industries. As another example, two or more "related" industries may require similar sets of specialised labour skills. Each of the industries, in such a situation, can help to develop the pool of labour skills through training and experience gained on-the-job, and each can benefit from the enhanced factor conditions (skilled labour) resulting in part from the presence of the other related industries. This process of clustering, i.e. the development of vertical and horizontal linkages between industries, is promoted by the interactions between the four determinants of competitive advantage. Porter's central contention is that competitive advantage arises from the overall configuration of the Diamond. Sectors achieve optimal competitive advantage when they have strengths in each corner of the diamond, which reinforce each other.

(iii) Critiques of Porter

There is now a well-developed body of international literature which critically reviews Porter's model and which is summarised below.

1. Lack of Theoretical Specification

At a general or conceptual level it has been argued that Porter's theory is irrefutable (Davies *et al.*, 1995) and also that it lacks precision, determinacy and strong predictive ability (Grant, 1991; Beije & Nuys, 1995).

2. Geographic proximity

The importance of geographic proximity may be partial and industry specific. Competitive advantage of firms and industries may depend as much on transnational linkages as on local interaction. (Capello, 1996; Penttinen, 1994). There also appears in many industries to be some tendency towards dispersal as the industry develops (Dalum *et al.*, 1991).

3. Cooperation and Competition

For Porter a key outcome of geographic clustering is the way in which it promotes interaction among competing companies. His primary emphasis is on competitive rivalry, but he does make reference to the beneficial role of non-direct forms of collaborative arrangements. However, Porter (1990) does not provide any description of networks in relation to his cluster concept and pays little attention to the manner in which relationships actually operate (Nuys, 1995, p.28). Neither does he actually address the major principles of interaction between enterprises – such as trust, dependency, status, power and economic motive – so that it remains unclear as to why and how interaction between firms is set up. (Boekema & Van Houtum, 1995).

4. Small Open Economies (SOEs)

It has been argued that the model does not work very well for smaller open economies such as Canada, Finland, Austria, New Zealand and Ireland (Rugman and D'Cruz, 1993; Bellak and Weiss, 1993; O'Donnellan, 1994 and O'Donnell, 1997). One of the issues about the relevance of Porter's Diamond model specifically to small open countries refers to the important role of domestic demand. In order to attain a minimum efficient size, industries from SOEs, especially those focused on niche markets, commonly have to export a substantial proportion of their output, from the early stages of their development. This suggests that domestic demand often cannot be a major determinant of competitive advantage for industries in small countries.

A second issue is that of the importance attached to rivalry between domestic firms in his model. Small countries may not be able to support a number of domestic rival firms in an

industry. But firms from small countries commonly have to export significantly to attain a competitive scale of production, and thus will encounter sufficiently intense competitive rivalry from foreign firms in international markets.

5. *Role of Multinational Enterprises*

Porter's (1990) procedure is one which, by and large, excludes foreign owned firms from the study of national competitive advantage. In his view, foreign-owned subsidiaries are generally not sources of competitive advantage for the host country. Some of the critique of Porter's theory deals with his treatment of inbound foreign investment (Rugman and D'Cruz, 1993; Rugman and Verbeke, 1993; Bellak and Weiss, 1993; Dunning, (1992a). This issue has been most comprehensively addressed by Dunning (1992b), who suggests that more explicit attention should be given to the ways in which the transnationalisation of business activity could have either a positive or negative impact on the competitive advantage of the host country.

6. *Resource-based industries*

Porter avoided including in his research industries that were highly dependent on natural resources, arguing that such industries do not provide the basis for competitive advantage in advanced economies. Studies of two relatively small economies dependent on resource-based industries, Canada and New Zealand (Yetton et al., 1992; Cartwright, 1993), concluded that Porter's model was inadequate for resource intensive industries, questioned the implicit assumption that a causal relationship exists between the home-based Diamond and competitive success and found that the model worked poorly in predicting or prescribing the characteristics of internationally competitive resource-based industries. The studies found that successful resource-based industries often have substantial overseas investment and suggest that there is a need to incorporate a broader range of off-shore variables in the analysis of competitive advantage of these industries.

(iv) **Porter's Model in this Paper**

This paper presents an analysis of competitive advantage and the

significance of industry clustering in the case of the Irish Dairy processing industry. It profiles and assesses the performance of the industry, and then uses Porter's model simply as a framework for analysing the determinants of competitive advantage and the role of clustering. But it does so in a way which is informed by an awareness of the critiques of Porter's model, as outlined above.

1 INTRODUCTION

The Irish dairy industry has grown rapidly since the 1980s against a backdrop of restricted supply of milk, the main raw material. The value of output increased over 100 per cent between 1980 and 1990. On a world-wide basis Irish companies have been the fourth most active amongst European companies in acquiring dairy related international business interests. The Irish industry achieved this success through a strong focus on traditional commodity products especially butter and skim milk powder. The five big dairy companies and the export marketing company that have emerged in Ireland remain small compared to some of their European counterparts. However, both in terms of size and profitability, a number of Irish companies are ranked in the top twenty dairy companies in Europe.

The milk processing industry serves a basic nutritional requirement of consumers and provides the raw material for the wider food industry and other industries, such as pharmaceuticals. Figure 1 shows the main product lines of the dairy processing industry and illustrates the complex inter-relationships that exist between the various product options. This research examines Irish companies involved in the primary processing of milk, without confining the analysis to any product or group of products. The are 90 independent companies in the industry and this research focused on 15 of the larger companies, including the Irish Dairy Board (IDB).

In section two of this paper the evolution and performance of the industry is described. Sections 3 to 7 assess and explain the causes of success which the industry has attained in terms of growth and international performance. Thus, sections 3 to 6 consider, in turn the role of Irish factor conditions, domestic demand conditions, related and supporting industries and firm strategy, structure and rivalry.

An important characteristic of the dairy industry is its strongly regulated, protected and supported environment. For this reason, in section 7, the Common Agricultural Policy has been posited as a potential exogenous variable influencing the competitiveness of the Irish dairy industry. This characteristic of the dairy industry also complicates the assessment of the suitability of Porter's theoretical framework for analysing competitive advantage in the industry, since Porter's model was meant to explain competitiveness of industries in an internationally competitive environment. With this

provision in mind, Section 8 draws together the conclusions and considers the extent to which Porter's concepts of clustering and the "diamond" are relevant for the Irish dairy industry.

2 EVOLUTION AND STRUCTURE OF THE DAIRY INDUSTRY

(i) History of the Dairy Industry

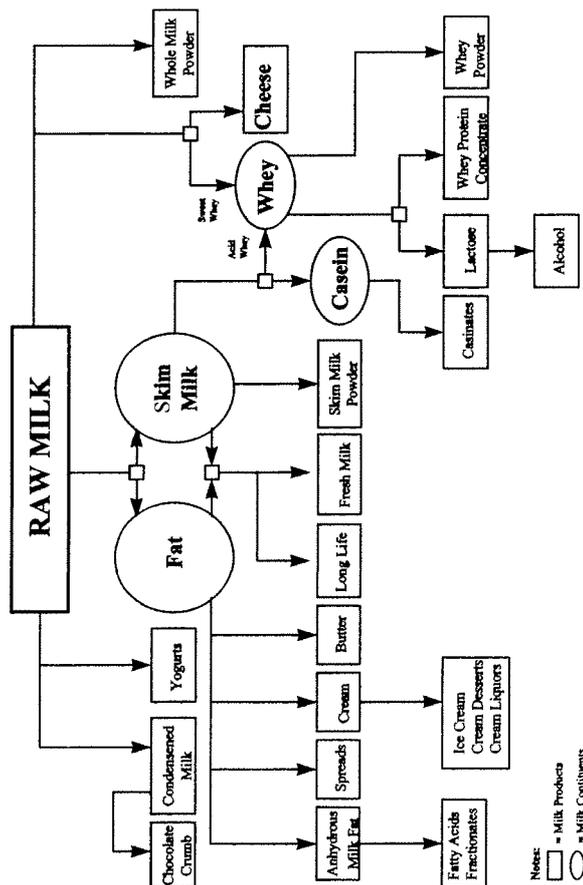
The development of the Irish dairy industry can be considered in four phases². First, a development phase, in which the industry grew rapidly in a very competitive environment. Second, a phase of stagnation from the 1930s to the 1950s attributable to an international depression, domestic protectionist economic policies and a conservative dairy processing industry. Third, a period of renewed growth and reorganisation as Ireland transformed its economic policy and prepared for and joined the EEC. The fourth phase began around the mid-1980s. It was characterised by the introduction of quotas which restricted the supply of raw materials while the larger Irish processors further reorganised and have become international in scope, with four of the five changing to a co-op/PLC structure. Throughout the period since the 1950s foreign investment by UK and US companies in cheese, chocolate crumb and powder manufacture played an important, though diminishing role, in upgrading technological and managerial skills in the industry.

(ii) Performance of the Industry

The Irish industry performed strongly during the eighties and up to mid 1990s. Trade statistics demonstrate that Ireland has a comparative advantage in dairy products (United Nations, *International Trade Statistics Yearbook*). In this section the research seeks to understand whether this represents an international competitive advantage over the main European competitors. A number of measures are employed to assess the competitiveness of the sector. However there are a number of problems in using traditional measures of competitiveness in the dairy sector as growth in output is restricted by the quota regime and the market is heavily dominated and distorted by the presence of various support mechanisms. Further comparisons on profitability indicators are distorted by variations in ownership structure. Notwithstanding these difficulties, a "basket" of cross country measures provides us

2. For a more detailed description of each of these phases see Appendix II.

FIGURE 1
MILK PRODUCTS



with evidence of relative international competitive performance in the sector.

The Irish dairy sector has concentrated on increasing the level of output through a focus on cost-effective production of commodities. Table 1 compares the Irish dairy food industry to two other "small" EU competitors, Denmark and the Netherlands and three large competitors, the UK, France and Germany. In summary Irish growth rates have been among the highest in Europe, as has productivity and the level of investment. Profitability has, also, improved strongly. At the same time employment has decreased but this is broadly in line with that seen elsewhere. In terms of value added, Ireland remains somewhat below that of competitors. In the following sections the individual measures are discussed in more detail.

Table 1 outlines the relative international performance of the Irish sector. The Irish industry achieved the greatest growth, in value terms, between 1980 and 1990 with 111 percent growth.³ In absolute terms, the increase in output is fourth highest, behind France and Germany but noticeably not far behind the UK, with 500 m ECU extra achieved in the UK. The Irish companies have also been the third most active amongst European countries in international acquisitions (Perez et al., 1994, p.170).

The productivity, between 1977 and 1990, of all the countries examined has at least doubled (Clarke, 1995, p.29). The productivity of the Irish dairy sector has "caught-up" and is now second, behind Denmark and considerably ahead of the UK and Germany. In terms of value-added⁴ per employee Ireland has achieved second place in terms of growth behind the Netherlands, over the same period. The level of value-added, measured in terms of gross value added at market prices (GVAm) as a percentage of output, shows that Ireland is behind the UK and France but ahead of Denmark and Germany with Denmark's position improving when the comparison is made on GVAm per employee. Clarke (1995) is critical of the sector because investment, while amongst the highest in Europe, has not been employed as effectively as elsewhere,

3. The growth is somewhat lower, 87% growth over the period, if Eurostat figures are used for the Irish output in 1980 and 1990.

4. Measured by gross value added at market prices - Eurostat GVAm is used. This includes net VAT and is defined as production value less intermediate consumption.

TABLE 1
INTERNATIONAL COMPARATIVE PERFORMANCE
OF THE IRISH DAIRY INDUSTRY

	Ireland		Denmark	Nethrl	UK	France	Germany
	1990	1980					
Output m ecu	2710	1284	2834	5004	7692	18976	12931
			1531	5296	5709	9704	8372
% change	+111		+85	-6	+35	+96	+54
Employment '000s	1990		8	18.3	38.8	60	39.7
Net change as % of 1980							
Employment		-21	-16	-19	-20	-25	-20
Productivity							
Output per Employee		285					
(00 ecu — 1990)			356	n/a	131	226	179
% Growth in GVAm /							
Employee over the period		710	180	820	310	300	240
77 to 90							
Value Added							
GVAm as % output - 1990	12.3		11.6		19.4	16.8	9.6
GVAm m per employee	35		41.2		38.6	52.4	31.5
Profitability							
1990	6.2		2.8		9.9	2.6	3.8
1980	Negative		5.8		10.6	2.4	10.2
Investment							
% of Output - 1990	3.8		2.3		2.9	2.8	3.2

Source: Based on Eurostat data and derived from Clarke, 1995.

namely UK, France and Denmark, to increase the proportion of "value-added".

The industry has improved in terms of profitability over the period 1980 to 1990. Clarke (1995) calculates a measure for profitability⁵ which indicates that prior to 1987 the Irish dairy sector recorded losses but subsequently margins steadily improved from 2.2 per cent in 1987 to 6.2 per cent in 1990, a level significantly ahead of competitors except for the UK. This represents a significant improvement and indicates that the industry has taken serious steps to rationalise and reorganise.

5. Difference between output and intermediate consumption of goods and services (including labour) divided by output.

Data on employment shows that job losses have been a feature of the food industry in Europe over the last decade. The percentage reductions by the Irish industry have been about average with all competitors experiencing significant employment losses in dairying. Ireland and France recorded the highest cumulative percentage losses over the period 1980 to 1990. However only Denmark performed significantly better than Ireland. Further Ireland recovered some of the jobs lost from 1990 to 1992. However since then, the trend continues downwards with Clarke (1995, pp.25-26) estimating 1994 employment to be 7,400, down from 10,202 in 1989 and 12,000 in 1980.⁶

In conclusion, while there may be some debate about individual measures, collectively the measures suggest that the sector has performed very well and the picture is that of a successful industrial sector. The sector has concentrated on increasing the level of output through a focus on the cost effective production of commodities with some sacrifice in the levels of employment. However, the rate of growth in the value of output has been among the highest in Europe, as has the rate of growth in productivity and the level of investment. Finally, profitability has also improved strongly.

(iii) Industry Structure

A database of food companies in The National Food Centre (NFC) was analysed and on this basis we identified 89 indigenous companies involved in the processing of milk. The industry is dominated by co-operatives and related forms of ownership. The industry can be divided into four categories on the basis of numbers employed, see Table 2.

The first tier consists of five major companies, four of whom are quoted on the Irish stock exchange, and which control over 75 per cent of the milk pool. The combined turnover, including turnover of subsidiaries and non-dairy activities such as meat, of these companies in 1994 was IR£3.9 billion of which two thirds was derived from international markets. Dairy accounted for an estimated 67 per cent or IR£2.5bn. A second tier, comprises nine companies, employing between 80 and 500 people. The third tier comprises fifteen companies employing between 21 and 79 people.

6. Figures are derived from CSO estimates and these are supplemented with an industry survey which included enterprises with less than 20 employees.

TABLE 2
CATEGORISATION OF DAIRY PROCESSORS IN IRELAND BY NUMBER OF EMPLOYEES IN 1994

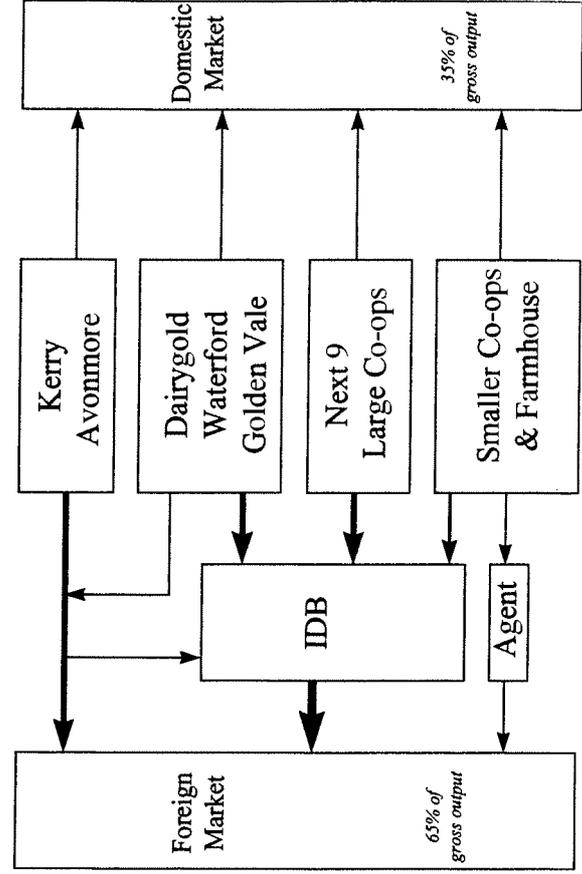
Size (Number of Employees)	Total Number of Companies
< 20	60
21 - 79	15
80 - 499	9
500 +	6 (includes IDB)
Total	90

Source: NFC Database, 1995 and company accounts, 1994.

The fourth tier consists of smaller companies many of which are single owner/operator enterprises.

Foreign owned companies accounted for under two per cent of the milk pool in 1994 down from fifteen per cent in 1980 (Forbairt, 1995). The foreign companies are involved in the preparation of branded products, in the main baby food, and had exports of IR£190 million in 1994. The prevailing view is that baby-food industry represents an excellent customer for the Irish dairy processing industry. On this basis such companies did not form part of the direct focus of the primary research.

FIGURE 2
STRUCTURE OF THE IRISH DAIRY PROCESSING INDUSTRY



The industry is characterised by the presence of a large commercial international marketing board, namely the IDB which is a commercial co-operative. Its function is to market products on behalf of its member companies. Figure 2 presents an overview of the structure of the industry and outlines the general relationship between the processors and IDB. The extent to which companies avail of IDB is dependent on their size and the price offered. In the main the IDB exports the products of the smaller co-ops and that of Dairygold and, to lesser extent, produce of Golden Vale and Waterford. Kerry and Avonmore use the IDB on a more sporadic basis.

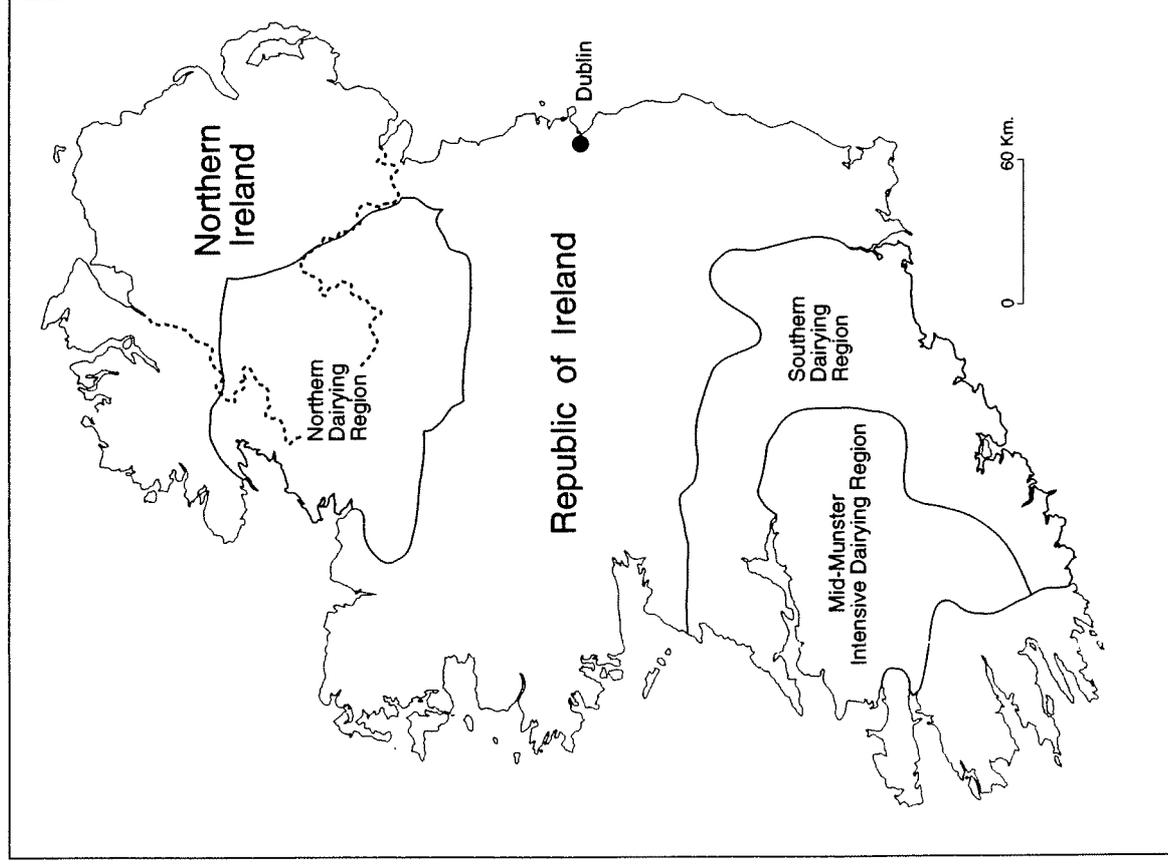
The IDB markets both Irish and foreign produce in international markets. The IDB has an extensive world-wide distribution network, as well as packaging and manufacturing facilities in the UK and Belgium. The IDB does not have government authority to purchase milk supplies from the co-ops, unlike the New Zealand Dairy Board. Therefore the IDB can only influence the strategic choices of co-ops through the commercial returns offered, in competition with traders which cater for the smaller co-ops.

(iv) Location of Dairy Processors⁷

The location of dairy processing companies is closely related to the production of milk at the farm level. Proximity to a perishable and bulk raw material such as milk is a very important locational determinant. The early growth in the dairy processing industry resulted in the establishment of a creamery in almost every town and village in the dairying regions of the country. Improvements in processing and transport technology facilitated greater economies of scale. As a result of rationalisation and amalgamation, especially in the 1970s, the industry gradually concentrated into a tiered structure. Geographically, the result is an industry dominated by five large processors located adjacent to each other in a band running through mid-Munster and south Leinster which is the heartland of dairy farming in Ireland (Figure 3). Many of the larger processors have more than one processing site in this region, with liquid milk plants also located in the main urban centres outside the region. The second tier of processing companies is divided between the North-East (the second dairying region in Ireland), the West (a

7. This section draws on Gillmor (1977, pp.149-151).

FIGURE 3
IRELAND: DAIRYING REGIONS



Source: after Haughton & Gillmor (1979), Fig. 9 and Gillmor (1984), Fig. 4

Source: After Haughton & Gillmor (1979), Fig. 9 and Gillmor (1984), Fig. 4

region relatively new to dairy farming) and the South. Foreign-owned processors have also located in these dairy regions close to their source of raw material. For example, foreign owned milk powder plants specialising in infant food are located in counties Limerick, Cavan, Wexford and Cork. In one case, two foreign owned processors; a chocolate crumb and a milk powder manufacturer are located on the same site as a Dairygold plant. Also in Wexford a foreign owned food plant, a co-op/private jointly owned cheese plant and a co-op plant occupy the same site.

Employment data reflect this pattern (see Figure 4). Table 3 shows that 71 per cent of employment in the dairy products sector is located in the South-east, South-west and Mid-west regions. The East region accounts for eleven per cent of employment while the North-east accounts for seven per cent of employment.

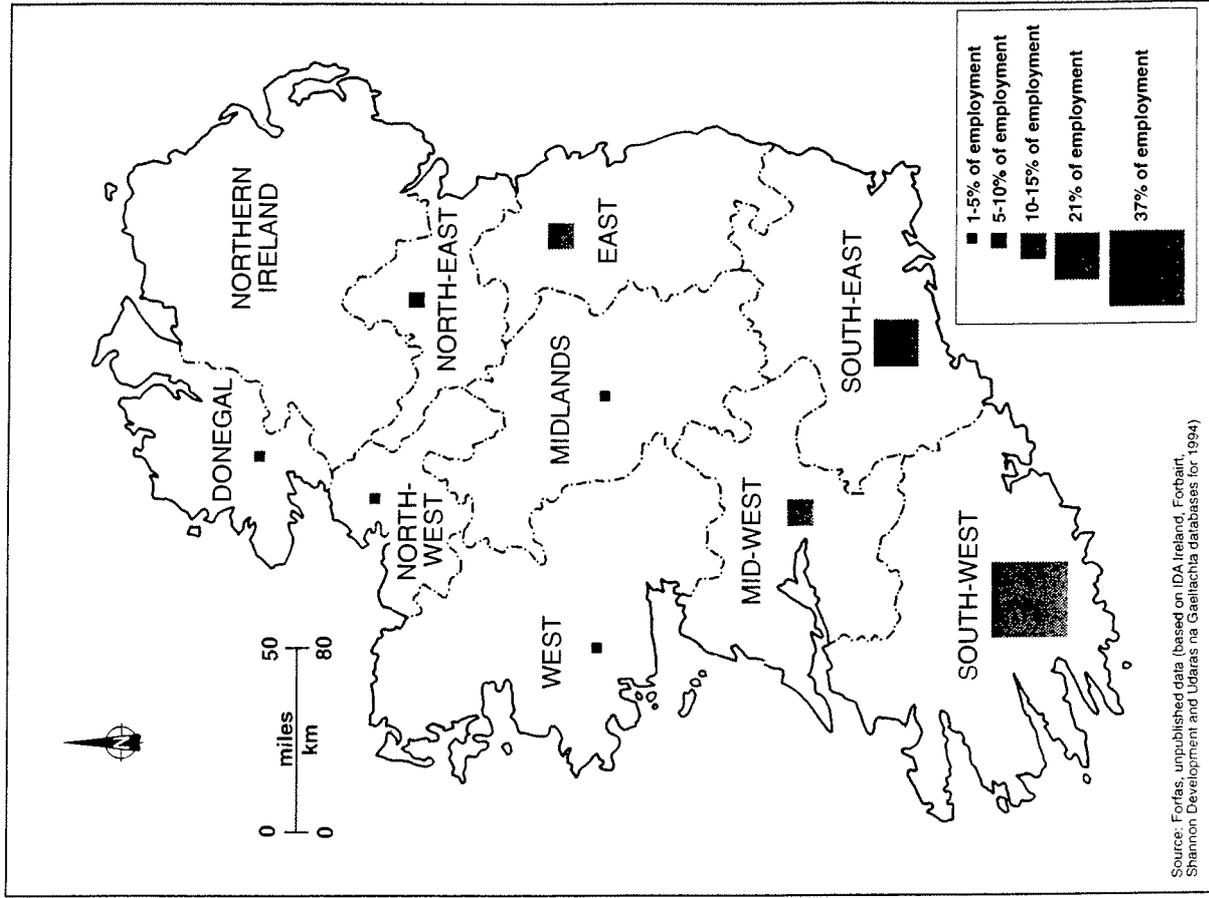
TABLE 3
DAIRY PRODUCTS SECTOR EMPLOYMENT 1994

Region	% of Employment
Donegal	1
East	11
Midlands	2
North East	7
North West	4
South East	21
South West	37
Mid-West	13
West	3
Total	100 ^a

^aOwing to rounding total does not add to 100%

Source: Forfas, unpublished data.

FIGURE 4
REGIONAL DISTRIBUTION OF EMPLOYMENT IN THE DAIRYING PROCESSING INDUSTRY, 1994



Source: Forfas, unpublished data (based on IDA Ireland, Forbairt, Shannon Development and udaras na Gaeltachta databases for 1994).

3 FACTOR CONDITIONS

(i) Introduction

The principal factors which are used by the dairy processing industry and which might have a significant influence on its competitiveness are human, physical, knowledge and capital resources and infrastructure. Porter (1990, p.77) distinguishes between *advanced* and *basic* factors and between *generalised* and *specialised* factors (see preface for a description). The most significant and sustainable competitive advantage results from possession of factors for competing in an industry which are both advanced and specialised. This typology is applied to the factors identified for the Irish dairy processing industry. The factors are also classified as to their effect on competitiveness, on a continuum between positive and negative impacts. Figure 5 classifies the factors of production used in the Irish dairy processing industry and can be used as guide to findings arising from this section.

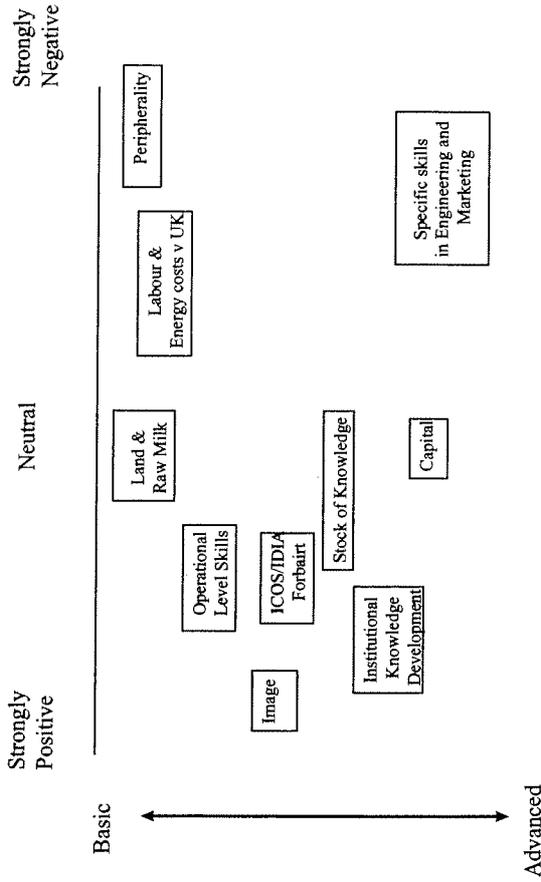
(ii) Physical Resources

The most basic and general factors of production in dairying are the land and climate upon which dairy farming is dependent. Land of high quality, in tandem with suitable climatic conditions, allows the production of quality low cost milk which suggests that "raw milk" is a general basic advantage for the processing industry, with a positive impact on competitiveness. However, there is an extra cost in the sense that the milk contains low levels of protein and fat and is produced in a pronounced seasonal manner. This suggests that land and climate are better considered as a basic resource of the industry and the impact on competitiveness has been neutral to mildly positive⁸.

A second issue is whether Ireland's location has been a significant factor in the development of the Irish dairy industry. There is a cost disadvantage in serving export markets from Ireland which might be expected to create extra pressure to develop an efficient logistical systems. However, a recent benchmarking study of eight European countries (DMBI, 1996) showed that while Ireland has a low cost level measured by total warehousing, distribution and capital costs,

8. The impact of milk supplies on competitive advantage of processors will be discussed in more detail in the section on related and supported industries.

FIGURE 5
IMPACT OF FACTOR CONDITIONS AND FACTOR CREATING MECHANISMS ON THE DAIRY PROCESSING INDUSTRY



an overall logistics index⁹ places Ireland fifth in the sample of eight countries (Table 4).

TABLE 4
EUROPEAN LOGISTIC INDEX FOR FOODSTUFFS

	Costs	Lead-Time	Safety-Stock	Overall Logistics Index
Ireland	54	145	133	108
UK	162	115	108	133
Sweden	79	97	200	100
Germany	82	109	57	93
Belgium	124	115	154	123
France	142	79	29	99
Denmark	83	79	67	79
Holland	78	61	51	67

Source: European Logistic Survey, March 1996, Danish Ministry of Business and Industry, Survey performed by the Logistics Consulting Group.

9. Main elements of the index are lead time (50%), total costs in connection with warehousing, distribution and capital investments (40%) and safety stock levels (10%) (DMBI, 1996, p.16).

The study concludes that this suggests that the “money saved on direct costs is lost through reduced efficiency” (ibid., p.29). This poor performance is attributed to the long lead times (time from order receipt to delivery) in the industry and to high levels of stock, in part due to seasonality, carried in the industry (DMBI, 1996, pp.30-31). Thus peripherality as a basic factor disadvantage has not materialised¹⁰ to the extent one might have expected as a force for competitive innovation and improvement in the industry. Further, Cuddy and Keane (1990) suggest that peripherality may have caused firms to lag behind in technological dynamism and innovation, and concentrate on production at the mature end of the product cycle. We conclude, therefore that peripherality has a mildly to strong negative impact on competitiveness.

A third aspect of physical resources is the image of Ireland as “green and healthy”. This is a natural “marketing” resource which is very important to all food producing companies. In a Porterian sense the image is a positive factor available only to Irish companies. It may be considered as a more important factor in consumer markets than in food ingredients markets where it is reported (PA Consulting Group, 1996) that nationality is the least important purchasing criterion. The impact on competitiveness has certainly not been negative and in the successful development of the Kerrygold brand in Germany, it has been positive. Overall we conclude that it is mildly to strongly positive and in the sense that any identity is the function of various forms of communication, Ireland’s image can be considered a created and reasonably advanced resource.

(iii) Human Resources

An important factor in the dairy industry is the quality, availability and cost of human resources available to companies in the industry. It is also important to consider the “factor creating mechanisms” available to the industry in developing the labour pool.

This research found that the skill levels at operational level are excellent and that the companies have no difficulty in obtaining sufficient numbers of technical staff, with one company

¹⁰ There are some examples, such as the use of ‘ambient temperature’ techniques for the export of butter but the overall index suggest that the impact of such innovations has been minimal.

highlighting the availability of excellently trained operational level personnel as a key competitive advantage. University College Cork (UCC) is the principal third level institute which traditionally had and continues to have a strong orientation towards the dairy industry. Table 5 shows the output of food science graduates in UCC over the last five years, with 117 graduating in 1995. This suggests a healthy position considering that in 1993, 195 people (full time equivalents) worked in “In-house R&D” (Forfas, unpublished data).

TABLE 5
UCC FOOD SCIENCE GRADUATES: 1990-1996

	90	91	92	93	94	95	96
B.Sc. Science, Technology and Business	40	51	78	85	72	91	136
M.Sc. Food Science and Technology	4	5	12	10	17	20	N/A
PhD	4	1	7	4	2	6	N/A

Source: UCC data

There is a trend upwards in the number of graduates. There are also many courses offered in various technical colleges which the research suggests provide ample supply of technical personnel. In one research institute it was suggested that our competitors had higher skilled staff, “more PhDs”. However the industry interviewees were not in agreement, on this point, and, further, believed that the supply of graduates for all relevant positions was at least as good as abroad.

A number of specific deficiencies were mentioned including engineers with specific dairy skills, experienced marketing people, especially international marketers with special knowledge of international channels of distribution and more commercially aware, rounded and broad minded scientific people.

It is interesting in this context to consider the reservations expressed by a Danish manager concerning skill/knowledge levels in the Irish dairy processing industry (Hitchins and Birnie, 1993, pp.84-86). This manager suggested that the available skills are more suited to a heavier commodity orientation and less at increasing the level of higher margin products.

IBEC (1995, p.18) estimate that labour costs (payroll and PSRI) represent 5.4 per cent of processing costs. Thus labour costs, while important, are not a major aspect of overall processing costs relative to raw material. Further, although Ireland has a small labour cost disadvantage with the UK, it is not disadvantaged relative to competitors from other European countries (Hitchins and Birnie, 1993, p.87).

In conclusion, despite the critique expressed by the Danish manager, respondents in this survey considered the human resource factor at an operational level mildly positive. Further, the supply and quality of more advanced graduate resources is posited as at least mildly positive.

(iv) Capital

The industry possesses good cash flow and has access to institutional funds and many have adopted innovative practices in their capital structure (Forbairt, 1995, p.65). Many dairy companies in Ireland and elsewhere are producer co-operatives and in some countries, although recently withdrawn in Ireland, retained earnings of co-operatives, have a tax exempt status. In other countries, such as Germany and the Netherlands, these earnings in co-operatives tend to be minimal due to the taxes levied on such earnings. Dairy co-operatives in these countries initially pay a high milk price while retaining little earnings. Capital is obtained from farmer members through various loan and revolving-fund type mechanisms, in contrast with Ireland where substantial earnings are retained by the processing co-operatives (Keane, 1995).

While it is difficult to discern the impact of capital availability, on competitiveness, it is clear that the availability of capital was improved by the co-op/plc structure and the tax exemption on retained earnings. Therefore, this may be an enabling factor in the international expansion by Irish dairy companies. However, a number of interviewees suggested that a large co-operative, such as Dairygold, has equal access to capital. In conclusion we classified capital as an advanced factor which is not negative in its impact on competitiveness.

(v) Knowledge

This section examines the proposition that Ireland is endowed with

a knowledge base and knowledge "creating mechanisms" which facilitated the development of a successful Irish dairy industry. Technology is an advanced specialised factor which a recent report (Perez et al., 1994, p.49) suggests is important in creating new product opportunities and allows companies to gain competitive advantage in the dairy industry.

A recent survey of European ingredient buyers found that Irish companies are perceived to be at least as technically competent as their foreign competitors (PA Consulting Group, 1996). Varley (1991, p.172) and Forbairt (1995, p.65) outline support for this finding. However, it is important to note that Irish companies are not perceived to have a unique leading edge in any particular area (ibid., 1996). Further Gill (1995) argues that the technological base will soon need a major overhaul.

Forfas (unpublished data) report that expenditure on R&D outside of their own company (non-internal) is small (IR£1.2m) compared to the total R&D spend (IR£15.2m) and further that this expenditure on "non-internal" research is largely confined to the Irish market except in the area of technical consultancy.

In this research, we asked companies to indicate the knowledge factor creating mechanisms they utilised for research and development and other technologically related services¹¹. In *basic*¹² product R&D, UCC and Moorepark were considered very important and to a lesser extent internal R&D¹³ and NFC. TCD (nutrition department) and UCD were also mentioned in this context. These are also the most important sources for basic process research. However, in basic process research, foreign expertise plays an important role. In particular, equipment manufacturers such as APV, foreign dairy companies such as Valio in Finland and also research institutes in Denmark, France and Holland were utilised. The use of foreign sources was in general attributed to the availability of expertise and / or of equipment in a specific area, which is not available in Ireland. In applied R&D, UCC, Moorepark and, to a

11. Interviewees were provided with a list of options, which included National Food Centre (NFC), Moorepark Technologies Limited (MTL), UCC, UCD, TCD, Internal R&D, co-operation with local companies, co-operation with overseas companies and research institutes.

12. Research in the area of chemistry, biology etc. It refers to more fundamental scientific research.

13. We return to internal R&D under firm strategy, structure and rivalry.

lesser extent, NFC and UCD were indicated to be of importance by some respondents. A number of companies co-operate with local companies and with international research institutes and dairy companies, but is less significant. However for most companies the main source for applied research is internal R&D. Pilot scale R&D is not a major form of research and when it is carried out it is mainly internal. Some pilot scale R&D is carried out at Moorepark and foreign expertise is also utilised.

The interviewees were also asked to indicate the importance of the various sources of research for the industry, in a general sense. Moorepark is thought to be the most important though some reservations were expressed concerning their contribution on a "day to day" basis. The universities are important though they need to become more "pro-active" and, further, it was suggested that the industry needs to encourage them to be more active.

In conclusion the industry is perceived as technically competent, sourcing much of its requirements for technology in Ireland. The industry has not been a major investor in R&D and has focused on internal sources. The external sources tend to be Irish with a number of exceptions. The Irish sources are perceived to be competent in basic product research and some count foreign companies among their clients. Therefore the level of technical knowledge available within companies had a positive impact on the competitiveness of the industry.

(vi) Role of Agencies

The state clearly plays a significant role in supporting the competitiveness of the dairy industry through its provision of a relatively strong education system, (section iii, above) and research support (section v, above). The interviewees, while critical of some aspects of government policy, such as strategic planning for the industry, and duplication amongst state agencies, acknowledge the important role played by state agencies and support institutions in the development of the industry.

The interviewees indicated that Teagasc has played a positive role, especially in assisting in process and product development. However, some respondents felt that advice given to the farming sector was encouraging increased seasonality of milk production, thereby making it more difficult for the industry to adopt a more

value added orientation. Although only recently established, Bord Bia, is important for companies which export independently as it provides market information and financial support. The Irish Dairying Industries Association (IDIA) represents the industry at European level through its affiliations with various European associations. The IDIA along with the Irish Co-operative Organisation Society (ICOS) fulfil the important role of providing information and lobbying at policy level in Ireland and in Brussels. Many criticised what they perceived as an overlap in function between these two organisations. ICOS was also criticised (by one respondent) for not providing leadership to bring about the rationalisation that was considered necessary. The positive function of the Department of Agriculture, Food and Forestry in co-ordinating, policing, administering and lobbying is recognised throughout the industry. Forbairt was also considered to play an important role in the industry. In particular, a number of companies cited the Food Ingredients working group as an example of good support.

Overall the support was provided in the form of technical advice and assistance as well as in the form of various state grants. Agencies are partly involved in factor creation and partly in support to the industry. The impact on the industry is unlikely to be negative. Individual companies offered different opinions, but the support of agencies is considered at least as good as that available in other European countries.

(vii) Importance of Factor Conditions for Competitiveness

Figure 5 (page 13) summarises the impact of the various factors of production used in the Irish dairy processing industry. Overall, the factor conditions are important for the competitiveness of the Irish dairy processing industry, particularly the level of technological knowledge, the operational skills, the supply of graduates and the national image. Factor creating mechanisms, such as the universities and the state support agencies and institutes play an important role insofar as they help companies to maintain and update their expertise. Land and raw material production are relatively basic factors and have a neutral to mildly positive impact. Peripherality is a basic factor disadvantage which has had a rather negative impact on the competitiveness of the sector. The lack of

experience in international markets and specific skills in engineering were also cited as weaknesses.

4. DEMAND CONDITIONS

The market for dairy products can be broadly divided into a market for consumer products and a market for industrial products. Most of the consumer products are sold through retailers (see Figure 6). Technological development has facilitated a greater use of milk constituents like fat, protein and lactose, in a range of industries. Important applications of industrial dairy products are found in animal feed, bakery, chocolate and confectionery, ice-cream, baby and diet food industries and the dairy industry itself. Finally the fast-food chains and other forms of catering are becoming increasingly important customers of the dairy industry.

Table 6 shows the relative importance of different markets for Irish dairy products. In 1990, a large part (65%) of output was exported¹⁴. Half of the sales to the Irish market are consumer products, mainly

TABLE 6
OUTPUT FLOWS OF THE IRISH MILK AND DAIRY PRODUCTS INDUSTRY, 1990

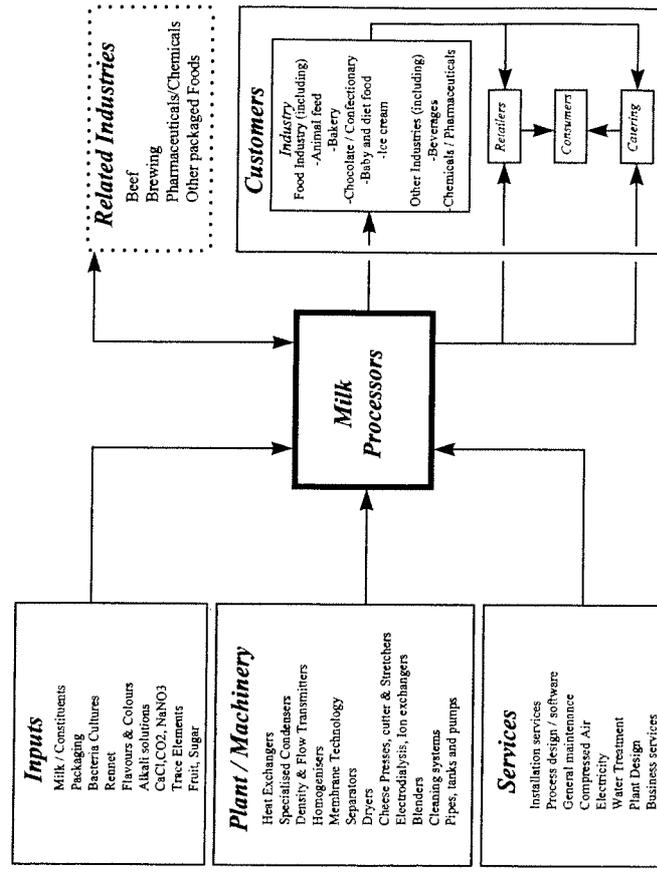
Customers for Dairy Products	Output Flows in - IR		Share of Total Output %	Share of Total Sales in Ireland %
	£ million			
Agriculture/Forestry/Fishing	53		3	7
Milk and Dairy Products	254		12	36
Other Food Products	38		2	5
Beverages	13		1	2
Personal	349		17	49
Services	7		0	1
Total Sales in Ireland	714		35	100
Merchandise Exports	921		45	
Invisible Exports	13		1	
Changes in Stocks	420		20	
Total Output	2068		100*	

* Owing to rounding, items do not add to total

Source: ESRI unpublished data.

14. The large increase in stocks during 1990 represents product sold into intervention. Most of these stocks were eventually exported.

FIGURE 6
EXTENDED LINKAGES CHART OF THE DAIRY PROCESSING INDUSTRY



sold through retailers. The local market for industrial dairy products is relatively small and the most important customer (36% of local sales) is the dairy industry itself, involving milk-deals and the intra-industry sales of dairy by-products and ingredients for the production of yoghurt and processed cheese. Only 7% of the local output was sold to other industries, mainly beverages, confectionery, baby food, ice cream, bakery, meat processing, and ready meals industries. Many of these local industrial customers are subsidiaries of multinational companies.

Porter (1990) argues that proximity to the right type of buyers is decisive for national competitive advantage. Below we will examine the importance of local demand conditions for the competitiveness of the Irish dairy processing industry. Demand is examined, first, in terms of the individual dairy products and

second, through an analysis of important customers in the Irish market.

(i) Home Demand for Individual Dairy Products

The structure of home demand is seen as shaping the attention and priorities of a nation's firms which in turn influences competitive advantage in the production of certain products. Is it possible to identify segments that represent a large or highly visible share of home demand but account for a less significant share in other nations? Table 7 shows the per capita consumption for selected dairy products in 1993. The figures indicate that Irish people are by far the biggest milk drinkers in Europe. The per capita consumption of butter is below the EU-average and consumption of cheese and yoghurt is amongst the lowest in the EU. Most other dairy products (smp, wmp, whey powder, casein/caseinate, whey protein concentrate and lactose) are mainly sold as ingredients for the food industry¹⁵. Per capita consumption is therefore a less relevant measure. Instead, Table 8 shows the absolute consumption of selected dairy ingredients in the European Union.

TABLE 7
HOME DEMAND (KG/CAPITA) FOR SELECTED DAIRY PRODUCTS
IN THE EU, 1993^a

COUNTRY	Liquid Milk	Cream	Yoghurt	Condensed milk		Cheese	Butter	Ice Cream
				Milk	Cream			
Germany	70.3	1.8	11.3	5.2	18.5	6.8	2.9	
France	76.7	1.0	17.3	0.7	22.8	6.8	5.4	
Italy	75.0	0.3	5.0	0.1	20.1	1.8	0.5	
Netherlands	84.1	0.8	20.7	7.4	15.8	3.3	n.a	
Belgium	65.4	1.5	5.7	1.1	19.8	6.9	3.3	
Luxembourg	81.5	2.6	7.0	1.4	16.5	5.8	6.3	
United Kingdom	114.9	1.1	4.6	2.6	8.3	3.5	0.3	
Irish Republic	186.3	0.8	3.7	n.a.	5.7	3.9	n.a.	
Denmark	114.7	2.9	8.3	0.0	15.4	4.1	4.9	
Total Nine	84.4	1.2	10.2	2.7	17.4	4.9	n.a	

^a Data for 1993 or the last year available

Source: Milk Marketing Board, 1994

15. However, smp and whey powder are extensively used in the animal feed industry.

TABLE 8
EU CONSUMPTION OF SELECTED DAIRY INGREDIENTS ('000 TONNES),
1993

COUNTRY	Whole milk powder	Skimmed and buttermilk powder	Whey powder	Casein/caseinate
Germany	54	51	5	21
France	45	375	241	17
Italy	27	146	47	16
Netherlands	10	251	615	36
Bel./Lux.	17	5	n.a	4
United Kingdom	19	74	2	8
Irish Republic	15 ^b	18	13	6
Denmark	9	11	23	1
Greece	6	8	3	2
Total 10^a	202	939	949	108
Irish Republic / Total 10	7%	2%	1%	5%

^a Owing to rounding items do not always add to total.

^b Cunningham and Pitts, 1995, p.36.

Source: Milk Marketing Board, 1994

Does the segmentation of Irish home demand for dairy products provide us with a possible explanation for the competitiveness of certain sectors in the Irish dairy industry? It is tempting to test this hypothesis with a simple statistical exercise relating the home demand for individual dairy products to Ireland's position in export markets. Table 9 shows Ireland's export position vis-à-vis other European countries. Ireland's share in total EU10 exports could indicate that Ireland has a competitive advantage in the production of butter (13.9%), skimmed milk powder (13.7%) and casein (26.3%). This does not seem to correspond with the structure of home demand. Irish per capita consumption of butter is far below the EU average. Irish consumption of skimmed milk powder is very low and casein is also not a very important segment. Ireland has a weak position in the export markets for yoghurt (0.6%) and cream (0.3%). This corresponds to low per capita home demand for both products.

Based on these figures one could conclude that the lack of home demand for yoghurt and cream led to a "neglect" of these segments and was therefore detrimental for the competitiveness of Irish producers. However, the findings regarding butter, skimmed milk powder and casein seem to contradict Porter's theory. This apparent conflict can be explained by a number of industry characteristics.

Until now we have disregarded a very important "customer" for dairy products. The product mix and export portfolio of Irish companies are strongly related to the CAP support system of the European Union. Based on export figures one might argue that Ireland has a competitive advantage in the production of butter, skimmed milk powder and casein. However, these markets are very much support/subsidy driven¹⁶. If intervention was not limited to butter and skimmed milk powder, and there had not been an export subsidy for casein, the export portfolio might have looked completely different. The resulting export portfolio is therefore not a reflection of "real" demand conditions. Strong export segments cannot automatically be regarded as competitive. Therefore, one should not derive direct conclusions from export figures as to the importance of home demand conditions for competitive advantage. This does not mean that the structure of home demand does not provide Irish companies with a competitive advantage for the production of certain products. It only means that export figures can not be used to assess the relation.

However, there are reasons to believe that the competitiveness of some dairy products is not much affected by the present structure of home demand. This holds for most of the commodity-type products at the end of the product-life-cycle (e.g. butter, skimmed milk powder, whole milk powder, etc.). There have been no substantial product or process innovations in these segments for some time. The "state-of-the-art" technologies, required to produce these products, are readily available everywhere. Production decisions and sales are more dependent on fluctuations in the price that a product makes on the (spot) market than on the technological base and marketing capability of individual firms¹⁷. Demand for these products in one nation is unlikely to give a firm competitive advantage over its competitors abroad.

16. The amount of skimmed milk powder and butter sold into intervention has been small since 1995. This does not mean that the importance of the intervention system in determining the product portfolio has decreased. The intervention system is still in place. So, the production of intervention products bears less risk compared to other products. Furthermore, the intervention system has resulted in huge investments in skimmed milk powder and butter plants which has a continuing influence on the pattern of production.

17. For example, this is illustrated by the 1995 shift in production from cheddar cheese to butter as a result of a better return for butter in third countries.

TABLE 9
EXPORTS ('000 TONNES) OF SELECTED DAIRY PRODUCTS BY EU MEMBER STATES, 1993

COUNTRY	Including butter equivalent of butteroil. ^a										
	Germany	France	Italy	Netherlands	Belgium/Luxemb.	United Kingdom	Irish Republic	Denmark	Greece	Total 10	Irish Republic/Total 10
Liquid milk	1657	770	7	81	800	94	57	22	0	3489	1.6
Cream	113	63	1	45	22	71	1	13	0	329	0.3
Yoghurt	126	69	0	17	93	2	2	5	5	319	0.6
Condensed milk	293	56	1	308	45	52	3	0	1	759	0.4
Cheese	349	414	109	463	100	57	76	259	13	1840	4.1
Butter	98	231	21	258	153	52	114	47	0	816	13.9
Whole and semi-SMP	98	231	0	236	106	57	41	95	0	863	4.8
Skimmed milk powder	426	69	0	95	106	57	122	13	0	888	13.7
Why powder	277	284	9	128	94	52	46	11	0	901	5.1
Casein	30	30	0	8	2	1	31	15	0	118	26.3
Ice Cream	18	35	4	7	45	3	1	28	5	146	19.2

^a Revised CSO data. Source: Milk Marketing Board, 1994 and ZMP, 1995 (for yoghurt only).

This does not mean that demand conditions have never been important for these products. However, the initial product development took place long ago and one has to go far back to trace a possible positive relationship between home demand conditions and competitiveness. The advantages of home demand have long been neutralised. Below we examine Foley's (1993) historical analysis of the Irish dairy industry and find little support for the idea that home demand contributed to the competitive advantage for the production of these products.

High butter consumption in Ireland might have contributed to a strong export position although from an early stage the production figures were strongly influenced by UK demand¹⁸. The first skimmed milk drying facilities were in place before the First World War and some of the skimmed milk powder was sold to industrial users. However, most of the by-product of butter manufacturing, skimmed milk, was returned back to the farmer for animal feed. The surge in skimmed milk powder production in the 1960s was partly instigated by the fact that farmers were no longer willing to have the skimmed milk returned to their farms. The strong market position of casein exporters does not seem to be a result of a strong home demand either. Although casein production started as early as 1932, the real development of the industry was instigated by strong North American demand in the 1970s.

The influence of home demand for individual dairy products on competitive advantage was further investigated by asking the managers whether experience in the Irish market regarding certain products was important for the companies' performance in international markets. The only obvious case is that of the "dairy spreads". Mixed fat spreads, a blend of dairy fat and vegetable oil, were first launched in 1969 in Sweden, as a response to the increasing market share of margarine. Ireland and the UK developed as one of the first new markets for spreads. When spreads were first launched in the Irish market they quickly gained considerable market share. Spreads constitute 42% of the Irish market for spreadable fats (butter, margarine and spreads) which makes the spreads segment in Ireland one of the strongest in the EU. Per capita consumption of spreads is among the highest in Europe (Pitts, forthcoming).

18. Before the introduction of dairy spreads in 1984 the per capita consumption of butter in Ireland was among the highest in Europe. (Pitts, forthcoming).

All the managers that were exporting spreads were of the opinion that the early demand in the Irish market contributed to their competitiveness in international markets. One manager stated that they were able to offer the foreign buyers any number of variations, something that had only come about because of what they had to do in the Irish market.

This is, however, the only example of a positive impact of home demand for a dairy product. Managers tended to stress the negative aspects of the home market, particularly in relation to yoghurts, chilled deserts and non-cheddar cheese. The per capita consumption of yoghurt, deserts and non-cheddar cheese in Ireland is among the lowest in Europe. Compared to the more mature markets of France and the Netherlands, Irish demand for these products developed relatively late. Processors in some other countries, for example in France, experienced more favourable home demand conditions that might have led to an early competitive advantage.

The early development of strong competitors abroad probably contributed to the weak position of the Irish producers in these areas. However, most of the managers stressed the small size of the Irish market as a more important factor. Branding is very important for success in products like yoghurts and deserts and it is notable that most of the companies did not even consider getting into these products. Establishing a brand requires substantial economies of scale because of the costs involved. Preferential access (as a result of transport cost and perishability of these products) to a large home market can therefore be an important advantage. This view was supported by some managers stating that they would have developed these segments if the home market was bigger.

(ii) Characteristics of Customers in the Irish Market.

According to Porter (1990), a nation's firms gain competitive advantage if domestic buyers are, or are among, the world's most sophisticated and demanding buyers for the product, especially if their demand anticipates demand in other nations. Such buyers provide a window into the most advanced buyer needs.

The European consumer food market is affected by a range of social, economic and demographic trends which have resulted in a rising demand for convenience products. A greater concern for health and environmental issues is responsible for a declining

demand for full-fat products, while quality, hygiene and environment-friendly production processes have become important product attributes. Most of these changes reflect greater affluence and are occurring in all European countries, including Ireland.

In relation to low fat products, one could argue that the Irish customer is a late mover. Table 10 shows that there has been a shift from whole milk to semi-skimmed and skimmed milk consumption in the EU. The Irish consumer has definitely not acted as an "anticipatory buyer" in this regard. In 1993, half of the total liquid milk consumption in the European Union was consumed as whole milk, down from 60% in 1988. The figure for Ireland was 92% in 1988 and hardly came down since. This negative example of anticipatory buyer needs will probably not have a big impact on the competitiveness of processors in Ireland, since the production of low fat milk and full fat milk requires basically the same technology.

TABLE 10
LIQUID MILK SALES BY TYPE (%) IN THE EU, 1988 AND 1993

Country	Whole Milk		Semi-Skimmed Milk		Skimmed and Buttermilk	
	1988	1993	1988	1993	1988	1993
Total Nine ^a	60%	50%	32%	46%	8%	7%
Irish Republic	92%	91%	0%	0%	8%	9%

^a Germany, France, Italy, Netherlands, Belgium, Luxembourg, UK, Irish Republic, Denmark.

Source: MMB, 1994

In relation to the aspects of service, quality and hygiene we hypothesised that the sophistication of two local customer groups contributed to the competitiveness of the Irish dairy industry. First we deal with the retailers. The role of retailers, and retail chains in particular, is shifting from a mere distribution channel for the dairy industry towards a customer for both branded and own-label products. Second, the role of multinational food and beverage companies located in Ireland is analysed because they are perceived as sophisticated customers for industrial dairy products.

Retailers

According to Porter, Irish milk processors could gain competitive advantage if domestic retail chains were among the world's most

demanding buyers. Due to changes in consumer demand and technology the retail environment is changing with major repercussions for the retailer-manufacturer relationship. In many countries the superstore has become an important retail format both as a result of price competition and changing consumer tastes creating a demand for wider product ranges (Collins, 1996). The introduction of information technology has proved important for reducing operating costs and facilitating the centralisation of decision making, which increased the buying power of the retailers. The buying power of the multiples has been further enhanced by the proliferation of private label.

Table 11 shows the concentration of the retail market in Europe. The retail market is most concentrated in Scandinavia where the top three retailers in each country control more than three quarters of the market. Outside Scandinavia the market is most concentrated in Ireland, Belgium, Austria, The Netherlands, Germany, and the UK. With 65% of the retail market controlled by the top three players (Power Supermarkets, Dunnes Stores and Musgrave-controlled retailers) the Irish retail sector is among the most concentrated in Europe.

TABLE 11
EUROPEAN FOOD RETAIL STRUCTURE 1994

Country	Market share of top 3 retailers %	Penetration of private label (% of all sales)
Austria	56	21
Belgium	58	20
Denmark	77	15
Finland	80	5
France	38	21
Germany	46	25
Greece	17	9
Ireland	65 ^a	27
Italy	11	8
Netherlands	47	16
Norway	86	7
Portugal	41	7
Spain	20	8
Sweden	95	10
UK	43	35

Source: ABN.AMRO, 1996 and Goodbody, 1995

Note: (a) This figure for Ireland (January 1995), presented by Goodbody, is considerably higher than that presented by ABN.AMRO because all the Power Supermarkets store chains are counted as one entity as are the Musgrave controlled retailers.

its higher level of concentration, helped by the fragmented nature of the Irish processing sector, has increased the buying power of the Irish retailers. Kamann and Strijker (1995) suggest that the relatively high producer concentration in Belgium and the Netherlands off-sets the power of retailers, resulting in a relatively lower share of own-label products. Using the same logic one could argue that the high penetration of own-label products in Ireland (27%) and the UK (35%) could be a reflection of the strong bargaining power of the retail sector in these countries.

There are two aspects to the possible effects of these developments for the processing industry: cost efficiency and standards. Porter believes that large powerful chains can be a major force in pressurising manufacturers to constantly reduce prices and thus costs, which leads to a more competitive position in international markets. He also argues that demanding buyers pressure local firms to meet high standards in terms of product quality, features and service.

Collins (1996) finds support for this in the UK. To minimise product failure, retailers demand stringent product specifications and access to the production facilities of the dairies. Plants are vetted, production runs are monitored and quality measured. Retailers are becoming more demanding in terms of product quality and innovation, logistics and relationship management. The relationship in its own right could lead to competitiveness. One of the direct implications of the involvement of retailers in private label production in the UK has been an increase in boundary personnel contact, e.g. between retail technologists and production managers or between retail buyers and key account managers. The exchange in and constant interplay between personnel assist the reduction in inter-firm conflict while promoting joint problem solving (ibid.).

In their annual reports Irish dairy companies stress the importance of customer relationships, but in the interviews the responses of the managers diverged. Managers of the three big companies all stated that they attach great value to the development of interaction with retailers, a finding supported by another survey of the Irish dairy processing industry (Varley, 1991). Companies have formed long term relationships with local retailers, with key relationships evolving between the key accounts person and the customer. The relationship has developed beyond price negotiation and involves sharing of information and monitoring of service and delivery

performance. Some retailers share information from barcode analysis. They communicate their ideas and work closely together with the processors in product development (tweaking of products). However, all three companies stressed the central importance of costs. The relationship is important "but if somebody comes up with a better price the relationship is finished".

The views of the managers of the smaller companies were less positive. None of them attach great value to the development of interaction with the retailers. Three of the smaller companies do not supply the Irish retail market. Another small company uses agents for the distribution of its products on the Irish market. Although the remaining three small companies deal directly with local retailers and multiples, the interaction concerns the negotiation of prices only. In that, local retailers were considered as ruthless. The negotiations are "cut-throat" involving no other specification than price. The companies experience no loyalty from the retailers or multiples. One manager found more loyalty with the UK multiples which gave him more opportunity to develop. The Irish situation is similar to that in the Dutch dairy industry where the demands of powerful retailers mainly relate to packaging and price rather than products (Jacobs et al., 1990).

The question remains whether or not the Irish dairy processors gain competitive advantage from their interaction with retailers/multiples in Ireland. There is some evidence of an effect on standards among the bigger companies. As described earlier, these companies all foster beneficial relations with the local retailers. Supplying local retailers had been a "useful experience" when entering the UK retail market. One manager even stated that they were able to transfer some of the Irish experience into the UK. There seems to be more evidence of an effect on cost-efficiency. Almost all interviewees stated that the relations are principally cost based - "The lowest price wins". There was however no support for the idea that this is helpful in establishing a position abroad. On the other hand, one does not expect individual managers to be positive about the effects of an uncomfortable price-squeeze. In some cases it is probably contributing to a competitive advantage in international markets.

Foreign Multinational Enterprises

In spite of the modest local market for food ingredients we

hypothesised that the presence of multinational enterprises in Ireland contributes to the competitiveness of the Irish processing industry. Large industrial buyers in Europe are becoming more and more demanding on issues of hygiene and process control (Kamann and Strijker, 1995). The findings of a study of the European dairy ingredients industry point to greater supplier participation in the drive towards innovation (PA Consulting Group, 1996). Suppliers are subjected to a rigorous screening process for inclusion on the approved supplier list and are assessed on quality, price, delivery and the capacity to live up to product specifications. Multinationals try to bind suppliers into long term relationships. A strong trend towards centralised purchasing and global sourcing leads to an added advantage of supplying several production facilities of the same multinational enterprise.

Foreign multinational enterprises always made up an important part of the local market for food ingredients and a historical perspective of the Irish dairy industry provides some evidence of their contribution to innovation (Foley, 1993). From the early 1940s until the early 1970s foreign multinationals like Rowntree Mackintosh were major local customers buying chocolate crumb from indigenous processors. The early 1970s saw the development of a strong infant food manufacturing sector dominated by subsidiaries of large multinational enterprises like Abbott, Wyeth, and Cow and Gate (later acquired by Nutricia). Initially, these companies used partly de-mineralised fluid ingredients, including skim milk and whey, but the trend has been towards the use of customised dry ingredients. The Borden Company, which started production in 1961, has always been a major customer for whole milk powder. Their requirement for powder with the same physical properties that they had been accustomed to in the USA led to the installation of new dryers in Irish processing plants. Finally, foreign multinationals have also invested in the Irish beverage industry (e.g. The Gilbey Group) buying cream and alcohol from Irish dairy processors.

Presently, foreign multinationals in Ireland are responsible for only a small part of the turnover of the processors interviewed. Two processors had no contact with foreign multinationals in Ireland, and five others sold only a modest amount to these companies. This does not mean that the presence of MNEs was perceived as having no impact. Only one of the managers supplying to MNEs in Ireland did not support the view that supplying local MNEs had an impact

on competitiveness and three managers believed that it had a significant impact. Most managers perceived a learning effect from dealing with the MNEs in Ireland. They learned about auditing standards, a codified approach to quality standards and purchasing systems. Multinationals were considered to be a step ahead in this respect. "They were always critical of something which helped us internally". In some cases the relationship resulted in process developments such as system improvements and improvements in plant lay-out which led to more consistency in product.

These findings seem to be in conflict with Porter's theory. According to Porter (1990) firms are better able to perceive, understand, and act on buyer needs in their home market. Understanding needs requires access to buyers, open communication between them and a firm's top technical and managerial personnel, and an intuitive grasp of buyers circumstances. Although he admits that subsidiaries of foreign MNEs can play the role of sophisticated and demanding buyers, open communication is extremely difficult to achieve with foreign buyers because of the distance from headquarters.

The MNEs located in Ireland seem to have played a positive role. However, not all managers were of the opinion that this was an effect of easy access and open communication between processors and local MNEs. In the first place, some companies had benefited from selling to the local MNEs without developing a substantial relationship with them. Apart from that it is debatable whether the relationships that have developed are a result of the Irish location of these MNEs. Only one manager, of a smaller dairy company, stated that proximity was important. "Proximity of a few customers in Ireland lends itself to working in a special way with them. We obviously also have long-term relations with customers abroad, but we are doing things with them (the MNEs located in Ireland) that you could not do abroad. You need to be on the same island".

However the other companies had been able to foster the same relations with customers abroad. Most of the companies, including the smaller ones, meet their customers "face to face" on a regular basis, either in Ireland or abroad. "We send people out there, travel is no impediment anymore". In the case of the smaller processors the relationship with foreign customers is often facilitated by the Irish Dairy Board. The Irish Dairy Board brings in the customers from abroad for factory visits and to discuss product changes. They

also facilitate visits by Irish processors to customers abroad. There is no evidence of variation in customer feedback due to geographical distance. One manager of a larger processor even stated that he had probably been more successful in developing advanced relations, and probably developed more sustainable value added products, with customers outside Ireland.

(iii) The Importance of Home Demand Conditions

Porter's concept of segmentation proved to have some relevance in the analysis of competitiveness, although less so for commodity-type products at the end of the product-life-cycle. Like research carried out in the Netherlands (Kamann and Strijker, 1995) and New Zealand (Crocombe et al., 1991) we found little evidence for Irish home demand for *individual dairy products* having a positive influence on competitiveness. A single case is that of dairy spreads. We found more support for the idea that home demand for individual dairy products like yoghurt, desserts and non-cheddar cheese has a *negative* influence on the competitiveness of the Irish dairy industry. However, in these cases, the small absolute size of the home market seems to be of greater relevance than the concept of segmentation *per se*. Managers stated that they would be producing these products if the Irish home market had been bigger.

The competitiveness of the Irish dairy processing industry seems to be more positively influenced by the *characteristics of customers* located in the Irish market, in particular the retailers and the multinational food and beverage companies. The retail sector in Ireland is one of the most concentrated in Europe and can be regarded as a sophisticated and demanding buyer. Their requirements in terms of product quality, features and service have upgraded the standards of the larger Irish dairy processors to some extent. However, a more important implication of the increased bargaining power of the retailers has been the constant pressure on the processors to reduce prices, and the consequent effects on cost efficiency.

The overseas MNEs located in Ireland constitute a second group of demanding and sophisticated buyers for the Irish dairy processing industry. In spite of the fact that the MNEs are responsible for only a small part of the turnover of most processors, they appear to have contributed to the competitiveness of the dairy industry. Most

processors learn from the standards and systems employed by the MNEs in Ireland, an experience that helps them in international markets. It is, however, important to recognise that these positive effects are not necessarily a result of the geographical proximity of the MNEs. In some cases the relationship does not involve substantial interaction between processor and customer and it is therefore possible to argue that proximity is not a requirement for learning to take place. Apart from that, many processors have been able to foster an intensive and beneficial interface with MNEs located abroad.

5. RELATED AND SUPPORTING INDUSTRIES

In this section we analyse the importance of the third broad determinant of national advantage, the presence of supplier industries or related industries which are internationally competitive. The most important inputs of the dairy processing industry are outlined in Figure 6. Milk and milk constituents are by far the most strategically important inputs. The only other input of some strategic importance is packaging. Plant and machinery include both very sophisticated systems, such as ion exchangers and specialised condensers, and more basic equipment such as tanks, pipes and pumps. Finally, installation work and process design/software are the most strategically important services¹⁹.

Related industries are, in principle, country specific. Therefore, Figure 6 does not show all the industries that could possibly be related to the dairy processing industry. Instead we present the industries that, based on interviews with key informants and information from secondary literature, were hypothesised to be related to the Irish dairy industry. Below we will examine the actual importance of these potentially related industries for the competitiveness of the Irish dairy industry.

(i) Dairy Farming

The main input required by the dairy processing industry is the milk supplied by the farmers. Crocombe et al. (1991) report on the positive impact of the well educated and innovative farming

19. Although electricity constitutes an important cost factor for the dairy processing industry it is not considered 'strategic'.

community on milk quality and production efficiencies in New Zealand. Likewise, entrepreneurial and managerial skills of dairy farmers in the Netherlands secured a world leading position of the Dutch dairy farming sector (Kamann and Strijker, 1995)²⁰.

In order to determine the impact on competitiveness we need to understand that the farmer-processor relationship is complicated by the fact, that in most cases, the farmer is both supplier to, and the main shareholder in, the processors. This link between the shareholder and the supplier is an important issue for the competitiveness of the Irish dairy processing industry and we will return to this issue in the next section on firm strategy, structure and rivalry. Here, we will concentrate on the issue of milk as an input to the processing industry. The quality of the milk, the milk price paid to the farmer and the farmer-processor relationship received considerable attention in many previous Irish studies. However, it proved a difficult task to determine the exact influence of these issues on the competitiveness of the dairy processing industry, partly because of the complex relationship between the issues.

In 1994, the average milk producer price in Ireland and Spain was the lowest of all European member states (ABN.AMRO, 1996). *Prima facie*, a relatively low milk price would suggest a competitive advantage for processors in Ireland. However, when comparing milk prices between countries it is necessary to control for differences in bonus systems, seasonal payments, VAT and currency translations. Furthermore, in assessing the advantage of a low milk price one must account for differences in milk composition, collection costs and seasonality of supply.

In comparison to the milk processed by Ireland's main European competitors, Irish milk has a low fat and protein content (ZMP, 1994). Irish processors are also confronted with higher milk assembly costs than competing European countries (Boston Consulting Group, 1993). The low milk producer price is mainly a reflection of the low fat content of Irish milk (ABN.AMRO, 1996). However, Table 12 shows that, even when we control for these

20. The authors of the Dutch study acknowledge the contribution of the competitive dairy farming segment. However, the farmer-(co-operative) processor relationship is seen as negatively influencing the competitiveness of the processing segment. This issue will be further discussed in the sections 6 and 7 of this paper.

variables, the milk price paid by Irish processors is still low compared to their main European competitors.

TABLE 12
MILK PRICES (DELIVERED TO DAIRY) AS A PERCENTAGE OF THE
TARGET PRICE 1989-1995

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Belgium	90.8	90.6	95.5	100.4	91.9	89.4	91.5	92.9	89.0	91.0
Denmark	101.5	98.6	107.2	109.2	108.5	107.8	105.3	101.5	101.0	99.0
France	89.7	91.4	94.0	93.8	93.3	91.5	93.0	94.2	95.5	95.0
Germany	94.5	92.6	98.4	107.3	101.2	99.0	100.1	98.4	96.5	93.0
Ireland	90.8	90.6	95.5	101.1	89.7	86.5	92.9	90.6	90.0	96.0
Netherlands	93.8	94.3	100.8	104.2	96.7	98.9	101.6	100.7	99.0	98.0
UK	89.8	89.8	94.1	95.2	93.2	92.6	90.2	86.7	94.0	98.0

Source: ABN.AMRO, 1996

However, the figures in Table 12 do not take account of an important characteristic of the Irish milk delivery pattern: the highly seasonal nature of milk supply. An even pattern of milk supply is usually considered an advantage for the milk processors but it usually increases the costs to the farmer. Irish milk is produced in a pronounced seasonal manner. Keane (1995) shows that seasonality accounts for many of the scale inefficiencies at cheese processing plant level. A number of respondents in this research indicated that due to seasonality plants are operating below full capacity. Clearly then, the seasonal delivery pattern partly offsets the advantages of a low price.

Thus, the advantage of a relatively low (standardised) price for milk realised in Ireland, is partly counter-balanced by a highly seasonal supply. It has proved difficult to establish the exact extent to which the advantages of a low milk price "outweigh" the disadvantage of seasonality (Keane, 1995). The contribution depends on several factors which are difficult to control for, including the (feasible) product portfolios of the processors and the pending changes in the CAP.

Finally, milk prices do not reflect only the efficiency of the supplier (farmers) but also the efficiency and related profitability of the customer (the processors). Therefore, a low milk price (in Ireland or abroad) could be a result of an inefficient processor unable to pay farmers a competitive milk price. Furthermore, the figures fail to

take account of differences in the above mentioned supplier-shareholder relationship. These differences affect the way farmers are rewarded, i.e. through a maximisation of milk prices or through the optimisation of corporate profits which accrue to (farmer) shareholders.

(ii) Other Supplier Industries

The second most important group of suppliers are the competing dairy processors themselves. Irish dairy processors receive an important part of their raw material inputs from other dairy processors²¹. There is a significant amount of trade in raw milk between mostly neighbouring processors, both in response to market forces and in order to create production efficiency.

Some of this trading involves ad hoc arrangements, depending on the economic conditions of the day, but most trading involves long-term (though rather informal) arrangements. These latter arrangements contribute to the efficiency of the Irish processing industry. A good example is the "winter-working" arrangements involving the transfer of milk to a neighbouring processor for a few weeks while the plant is closed for maintenance. Some milk trading is instigated by changing milk characteristics. Processors buy or sell milk depending on the seasonal milk characteristics most suitable to their production.

There is also substantial trade in milk by-products like skimmed milk, butter milk, whey and casein. The individual processors try to optimise the use of their production capacity by buying the milk components they need for their own production and selling by-products to other processors. This trade between the Irish dairy processors of course leads to greater efficiency, however, it is hardly leading to a competitive advantage for the Irish industry. One could argue that the trade merely compensates for an inefficient industrial structure (many relatively small processors) which leads to trade between companies in search of a sufficient and suitable supply of raw material. The larger Irish dairy processing companies are less dependent on trade for their raw materials since they are able to transfer milk and milk by-products between their own plants.

21. In this section we concentrate on supplier-customer relationships. The relationships between competing processors will be further discussed in the section on competition and co-operation.

Apart from milk and milk by-products, the number of inputs of strategic importance for the dairy processing industry is limited. The most important non-farm supporting industries are packaging, equipment manufacturing, installers (engineering companies), and the software industry. In some countries dairy processing benefits from the presence of competitive supporting industries. In his own study, Porter (1990) presents the example of the Danish dairy industry that is well serviced by local companies producing food processing equipment and refrigerating equipment. Jacobs et al. (1990) point to the importance of the local dairy equipment (e.g. Stork) and installation (e.g. Hovap) industries for the Dutch dairy sector. In New Zealand, the supporting industries appear to provide a more modest source of competitive advantage. Although the farming segment is supported by a number of international successful indigenous suppliers²², most of the technology, particularly equipment, for the dairy processing industry has to be imported (Crocombe et al., 1991).

The supporting industries in Ireland are less developed than in, for example, Denmark or The Netherlands. Nearly all companies source at least part of their packaging requirements from companies located in Ireland. One packaging supplier (Smurfit) is, itself, a global competitor. The impact on competitive advantage appears to be limited. Although one manager stated that the local suppliers are cost efficient, two managers rated them as expensive (one of these two managers described the situation until recently as "a near cartel situation" which had to be broken by imports), and the other managers took a neutral stance. The quality of the packaging materials produced in Ireland is generally perceived as satisfactory. We found some evidence of interaction between processors and packaging suppliers and many dairy co-operatives share ownership of a co-operative packaging company in Limerick. However, in most cases the interaction is limited to the sharing of information concerning market developments. We encountered no situations where interaction led to upgrading or innovation.

Nearly all the required machinery is produced abroad by the major UK, German and Danish companies (Niro, Alfa-Laval, Tuchenhausen, APV), who in many cases are also responsible for the

22. International successful farm supply industries include: electric fences, animal identification systems, bovine genetics and artificial insemination, milking equipment and milk meters.

yearly overhaul. Some Irish companies are involved in the manufacture of basic equipment such as tanks, pipes and pumps (BCD, P.S.V., Blackwater Engineering, Radley Engineering and Kells Stainless). Installation work, process design, and maintenance is carried out by both foreign and local companies. A number of indigenous companies are concentrating on plant design and project management (E.G Pettit and Design & Project Management). The main indigenous installers are BCD, B.A. Flynn, Cross Refrigeration and Food Engineering. Three managers stated that they employ Irish companies. One manager saw Ireland as "well serviced" by price efficient engineering companies.

The market for plant software is again dominated by the large international companies (APV, Alfa-Laval and Niro) but some work is carried out by indigenous companies (CDS, General Controls & Automation, Mentec and Ogenek). Four processors are using the services of local software companies. These companies are mostly hired for the customisation of process control systems that come with the foreign produced equipment and plants. At least one of these local software companies, Ogenek, has been very successful in exporting its dairy software systems. Although two managers stated that the interaction with local engineering and software companies has developed into more than a simple transaction, the interaction did not appear to involve more than some information sharing.

The general impression is that the supporting industries in Ireland do not make a significant contribution towards the competitive advantage of the dairy processing industry. Almost no local suppliers have developed into "global competitors", Smurfit is one of the exceptions. Most can be described as "captive industries" mainly supplying the local market. Furthermore, relationships with local suppliers appear not to be that much different from the relationships with suppliers abroad: - "We have the same level of interaction with suppliers abroad. Abroad is no further than Ireland." (respondent interview). There is no evidence of substantial co-ordination or joint development with local suppliers. In fact, the only examples of joint development and early access to new technologies involve suppliers located abroad. For example, a UK subsidiary of an Irish dairy company gained early and exclusive access to a new heat seal development because of its relationship with a French packaging company.

(iii) Related Industries

Porter (1990) describes related industries as those in which firms can co-ordinate or share activities in the value chain or those which involve products that are complementary. Sharing of activities can occur in technology development, manufacturing, distribution, marketing or servicing. The presence of competitive related industries could enhance the competitiveness of the dairy industry. Porter provides the example of Denmark, where the dairy industry benefited from the presence of strong insulin and enzyme producers, with whom it shared common technologies and skilled workers.

The examples in Ireland are less convincing. The links with other industries do not appear to have a strong impact on the competitive advantage of the dairy processing industry. That it not to say that there are no links or shared activities. First, the Irish dairy industry has links with related industries through diversifications into other food areas. Apart from that managers gave examples of less direct links, notably with the chemicals/ pharmaceutical and brewing industry.

An obvious case is the dairy industry's active manufacturing involvement in related food industries. A number of Irish dairy companies are operating in areas as diverse as meat, mushrooms, orange juice and mineral water. This diversification is not entirely new to the dairy industry. Irish co-operatives have always been involved in the processing and sale of different farm products combined with the manufacture of farm inputs. The different activities are very much inter-linked. Farmers buy inputs from the co-operative and sell their milk to the dairy division of the same co-operative.

However, there was little support among the managers for the idea that the dairy industry benefits from links with the meat industry. It is possible that the dairy industry and the meat industry employ workers with similar training, but the dairy industry is believed to have its own "high" standards. It is possible that the two sectors benefit from each other's knowledge regarding (vacuum) packaging, but most managers claimed that the meat sector gains more from the presence of a strong dairy sector than the other way around.

A more recent development is the diversification into the processing

of non-farm raw materials, such as orange juice, mineral water and soup. These moves are facilitated by production and distribution synergies. The processing and bottling of milk, orange juice and mineral water require similar technologies and the same distribution network can be utilised for the marketing of the products. Soup packaging also builds on the available packaging expertise of the dairy industry. However the number of diversifications in these areas is small and the impact on competitiveness of the dairy division is questionable. According to one manager the main advantage is increased group turnover (and profits) plus adding a product to the "basket" on offer to the multiples.

Apart from their direct involvement in related production the managers also gave examples of other links with related industries. Most cases involved the pharmaceutical and brewing industries. Pharmaceutical, brewing and dairy companies use similar technologies. We encountered some concrete examples of shared technology. One processor "looked at the technology and control system of a local brewing company". Another processor was able to "help one of the pharmaceutical companies with holding quality through the production process". A number of managers stated that they employed technical staff with experience in the pharmaceutical industry.

The full extent of beneficial relations between industries is probably greater than the individual players might perceive. This is because many of the benefits come around through indirect links, for example, through suppliers. This appears to be the case in the dairy industry also. One processor benefited from an Irish engineering company using technical expertise gained in the pharmaceutical industry. The full name of one of the engineering companies mentioned earlier, Brewery, Chemical and Dairy Ltd. (BCD), is illustrative in this regard. Similar transfers possibly occur via the software industry given the fact that a noticeable number of software companies has customers in different processing industries like dairy, drinks, chemicals, pharmaceuticals and food.

This transfer of knowledge through suppliers is enhanced because of new company formation by employees of the different processing industries in Ireland. A noticeable example is the case of Golden Vale's engineering division, wound up in the early 1980s. This led to the formation of a new engineering company, Brewery, Chemical and Dairy Ltd., with the result that some of the engineering

expertise of the dairy industry became accessible to the other processing industries in Ireland. In a similar fashion, some of the processing technology of the brewing industry was "unlocked" when a number of engineers employed by Guinness left the company to set up their own business (FDK) and started servicing the dairy industry.

(iv) The Importance of Related and Supporting Industries

The most important suppliers of the dairy processing industry are the farmers. We examined the contribution of the milk price towards the competitive advantage of the Irish dairy processing industry. For a number of reasons it is difficult to determine the exact contribution. First, although a low milk price could be indicative of efficient farming, it could also be a result of inefficient processors, unable to pay farmers a competitive milk price. Second, milk price comparisons fail to take account of differences in the governance structure of the processing industry. These differences affect the way farmers are "rewarded", i.e. through a maximisation of milk prices or through the optimisation of corporate profits which accrue to (farmer-) shareholders. Although inconclusive, the data suggest that, Irish farmers, compared to farmers in most other European countries, are competitive producers. However, Irish processors have to deal with a highly seasonal supply, which partly offsets the advantage of a low price for the main milk constituents.

Competing dairy processors, supplying milk or milk by-products for further processing, constitute the second most important source of raw materials. Although the trade between the individual processors might lead to greater efficiency in the Irish processing industry, it can be argued that it only represents an attempt to compensate for an inefficient industrial structure.

Finally, the general impression is that other supplier industries located in Ireland do not contribute much towards the competitive advantage of the dairy processing industry. Although some local linkages with indigenous companies have developed in areas like packaging, engineering and software development, almost none of the indigenous suppliers have developed into global competitors. Most of them can be described as "captive industries", mainly supplying the local market. Furthermore, the relationship with local suppliers appears to be not that much different from the relationship

with suppliers abroad. There is no evidence of substantial coordination or joint development with the local suppliers.

Although there are some examples of links with related industries, again, the general impression is that the impact on the competitiveness of the Irish dairy industry is limited. The diversifications into related food industries had little impact on the competitiveness of the dairy divisions. The links with the pharmaceutical and brewing industries appear to be more interesting and suggest potential for further development. Some suppliers appear to have benefited from the presence of competitive processing industries located in Ireland, and we found some cases where this led to an indirect transfer of knowledge between related industries. However, as yet, most links seem to be incidental rather than part of a constructive network of related industries.

6. STRATEGY, STRUCTURE AND RIVALRY

The fourth broad determinant of the competitive advantage of an industry which is discussed by Porter is firm strategy, structure and rivalry. This section describes the structure of the industry and then consecutively examines the product, investment and research strategies as well as managerial motivations of the Irish dairy companies. This is followed by an assessment of the importance of domestic rivalry and co-operation.

(i) Strategy and Structure

Co-operatives have dominated the Irish dairy industry however, over the last ten years four of the five major players have adapted their structures to various forms of a hybrid co-op/plc structure. Harte (1995) argues that, while the expressed objective was to design a new funding mechanism, the solution had a more far reaching affect. It provided a means by which many of the problems associated with vertical ownership and with the co-operative structure could be overcome. It addressed the lack of incentives for staff, the investment portfolio problem and the restriction imposed by the short term horizons of farmer members (ibid., 1995).

TABLE 13
TURNOVER IN DAIRY RELATED ACTIVITIES AS PERCENTAGE OF
GROUP TURNOVER

Company	1994 %
Shannonside	100
Carbery	100
Lakeland ^a	90
Tipperary	90
Waterford ^b	90
GV	88
Mid West ^c	74
Nenagh	67
Dairygold	51
Avonmore	50
NCF	32
Kerry Group ^d	30

^a Estimate

^b Figure includes dairy and consumer products

^c Balance is Trading and Stores

^d Not possible to determine but "guess-estimate" of "dairy derived" sales is 30%.

Source: Derived from company interviews and from Annual reports.

The industry remains highly concentrated in the core business of dairying (Table 13). In particular, the smaller co-ops, together with Waterford and Golden Vale, are highly focused on dairying. The other three larger firms have reduced their dependence on dairy.

Table 14 shows the relative size of the larger Irish companies relative to the top companies in Europe. The companies are ranked, based on litres processed, dairy sales and operating margin. It is clear that Irish companies are still relatively small in size, however the ranking of all the major Irish processing companies is higher when operating margins as opposed to sales data are used as the criterion.

It is possible to discern two broad groupings within the structure of the industry (Table 15). The first group comprises nine companies for whom the driving force is milk price. In this group there are a number of smaller co-ops whose pursuit of a high milk price is strongly facilitated by the IDB. Further, there are a number of larger co-ops who have adopted a slightly longer term and broader

TABLE 14
RANKING OF IRISH DAIRY ENTERPRISES AND A SELECT NUMBER OF FOREIGN COMPANIES ON SIZE AND PROFITABILITY CRITERIA

Companies	Litres Processed 1994	Dairy Sales 1994	Dairy Operating Margin 1994
Number 1	Besnier	Nestle	Nutricia
Waterford	13	21	17
Avonmore	11	20	15
IDB	n/a	9	23
Golden Vale	20	23	n/a
Dairygold	19	25	n/a
Kerry	22	26	13
Foreign Companies			
MD Foods	4	14	10
Dairycrest	8	14	7
Fretsland	14	19	18

Source: Compiled from information presented in ABN-AMRO, 1996 and annual reports of Irish dairy companies.

perspective which is more market-driven. These companies certainly were, and to a large extent continue to be, facilitated by the export opportunities offered by IDB. The extent to which these companies use the IDB varies. This second group is comprised of 3 large companies which are more expansion orientated in order to achieve highest return on investment. Nonetheless, these companies are still heavily influenced by the "milk price factor".

TABLE 15
STRATEGIC GROUPINGS IN THE IRISH DAIRY PROCESSING INDUSTRY (N=12; SAMPLE PROCESSORS PLUS KERRY AND DAIRYGOLD).

Companies	Characterisation
Group A	Primary goal – Milk price Produce commodities at lowest cost Utilisation of regional resources important for some Maintain healthy financial base Adding value in various markets stated as an ambition
Group B	Primary Goal – ROI Expansion orientated Market development and product development Strong international orientation.

Source: Derived from company interviews, industry interviews and from Annual reports.

The following sections will examine the extent to which the particular structure and the broad strategies adopted by the companies, have been influential in improving the competitive position of the Irish industry. It is important to realise that many of the strategies discussed below are related to the a central characteristic of the dairy industry. In the co-operative structure the supplier is often the shareholder in the processing companies. The primary goal of farmers has centred on the development of their core business, namely farming, which in practice means achieving the highest possible price for their output.

Product Strategies

The product portfolio has a heavy emphasis on butter with an allocation of 65 per cent of Irish whole milk, on an output basis, versus only 14 per cent to cheese in 1991, compared with 62 per cent and 17 per cent in 1994 (IDB,1995, p.3). These allocations have not changed significantly since EU membership, while the main dairy competitors all reduced their reliance on butter. Various reasons have been suggested²³ for this commodity orientation. However the figures are generally used as a critique of the industry. They suggest a lack of breadth in the product portfolio and a dependence on commodity type products.

However, Boyle (1992) suggests that there is an economic basis for Ireland's concentration in commodity products and exports in that it possess a comparative advantage at this end of the value. Therefore, he suggests that this commodity orientation is solidly based and not something which should be decried.

However, such a route would leave the Irish producers vulnerable to world market fluctuations. In the case of New Zealand, Crocombe et al. (1991) suggest that a commodity orientation requires a "differentiation" strategy in which commodities are supplemented by the development of new sophisticated products (p.69). However, Boyle (1992) argues that it would be a giant leap to infer any comparative advantage in the production of higher value-added food products.

23. Reasons include remoteness and a lack of home market, risk and financial considerations, management skills and investment decisions, farm production and structural problems, low R&D and marketing investment, (for example, O'Sullivan, 1982; Keane,1984; ICOS,1987).

We believe that the debate on product mix / strategic focus cannot be accommodated by the existing "commodity" versus "value added" dichotomy. For example butter is traditionally referred to as a commodity, but surely butter in a 5g catering pack is value added. Instead, in this report an attempt is made to capture the subtleties that exist in this area. Therefore Nixon's (1995) concept of active and passive value added is applied.

Passive value added is where value is added outside the control of the firm, for example due to relaxation of tariffs or movements in the commodity cycle, (Nixon, 1995, p.4). Active value added, occurs when a firm takes decisions to deliberately add value by differentiating its product from other competing products, through various marketing techniques.

The companies provided a confidential classification of the breakdown, by type of product, of company sales in 1995. Companies were asked to allocate production into categories. Products which were associated with "active" value added included derivatives of skim milk, butter and whey along with some non-cheddar cheeses and customised products.

The results outlined in Table 16 indicate that the companies in the survey have about one quarter of their products in the active value added category. If casein is excluded the proportion falls to about 10 per cent.

A further interesting finding arising from Table 16 is that, in value terms, the product portfolio of the companies is more balanced than the milk allocation figures, presented above, would suggest. In value terms, liquid milk is the main product. Non-cheddar cheese (mainly processed cheese) comprises 7 per cent and cheddar 6.5 per cent. However Irish based production still has a heavy emphasis on butter, 25 per cent of sales value in 1995. Cahill (1992) has explained this discrepancy by pointing to the fact "that value added involves small quantities of milk which are not reflected in the aggregate figures for milk utilisation in the traditional products" (p.221).

The product portfolio appears even more balanced when we examine the foreign production of the three multinational

R&D and marketing investment, (for example, O'Sullivan, 1982; Keane, 1984; ICOS, 1987).

companies in our sample. It is particularly apparent that the reliance on butter is reduced.

TABLE 16
PRODUCT PORTFOLIO, MEASURED IN VALUE TERMS IN 1995,
EXPRESSED AS A PERCENTAGE OF TOTAL IRISH AND FOREIGN
PRODUCTION BY IRISH DAIRY COMPANIES.^a

Product Categories	Product portfolio (Irish based production)		Product Portfolio of Irish Dairy Companies (All regions)	
	%	%	%	%
"Active" Value Added				
SM derivatives (mainly casein)	15	11.1		
WMP derivatives	1	.6		
Butter derivatives	3.0	1.8		
Non-Cheddar	4.7	10.8		
Whey derivatives	.7	.5		
Other	.5	.9		
Sub-total	24.9	25.7		
"Passive" Value added				
Liquid Milk ^b	22.6	31.8		
Basic SMP	15.5	10.5		
WMP	4.3	4.3		
Butter	25.3	15.1		
Cheddar	6.5	11.5		
Whey	.8	1.0		
Sub-total	75	74.2		
Total	99.9	99.9		

^a The IDB is excluded from this analysis to avoid double counting and Kerry and Dairygold are not part of this analysis.

^b Includes fresh products for Waterford.

Source: Derived from research findings from a sample of 10 companies.

Thus, in value terms, Irish dairy companies have had some modest success in adding value to their product portfolios. However, Table 16 suggests that the industry is still strongly oriented to the production of basic commodities.

Yet, an interesting strategy, outlined in many interviews, aims to add value through the formation of better marketing relationships, greater continuity of supply, increased customisation and longer term arrangements. The outcome is often slightly more security and somewhat higher margins. Thus while commodities may remain the

primary outlet, some companies are striving to customise their products. This is not to say that forms of branding are not pursued but it may be secondary in importance to developing closer relationships with other businesses. This would suggest that companies are trying to find a middle ground between commodities and consumer brands.

Relationships have been highlighted in a number of reports (PA Consulting Group, 1996; Varley, 1991) as a key component of the industry's marketing strategy. In this context PA Consulting Group (1996) highlight a number of concerns in relation to Irish dairy companies and their approach to relationships, indicating that there is scope for improvement. In our research it was apparent that a number of companies may be paying "lip-service" to marketing ideas. For example, on relationships, one interviewee indicated that "at the end of the day price is all that matters".

Notwithstanding these reservations, this analysis concludes that a number of companies, while still heavily orientated to commodity type products, are trying finding a middle ground, between basic commodities and higher margin products, by focusing on the development of relationships.

Investment Strategies

A further concern is the nature of, and impact from outward investment, by three Irish dairy companies,²⁴ on the Irish processing industry and whether the companies are carrying out the more "active value added" activities abroad.

An examination of acquisitions in the dairy sector, by the companies based in various European countries, between January 1985 and April 1996, shows that the French and the British were the most active with Irish processors ranked fourth, behind the Dutch (Table 17). Perez et al. (1994) noted that the number of restructuring transactions, per annum, in international dairying had risen from about 60 in the early 1980s to 100 in 1990 and to 140 in 1993. Transactions within the EU rose from 32 in 1985 to 90 in 1991 and declined again to 66 in 1993.

24. Three companies, from the sample, have invested in dairy processing abroad.

The 2 non-participating companies also have activities abroad. Kerry has concentrated its expansion abroad and Dairygold acquired its only foreign dairy processing facility in Somerset when it bought a cheese manufacturer in 1994.

TABLE 17

MAIN ACQUISITION ACTIVITY IN DIFFERENT EU COUNTRIES JAN 1985 TO APRIL 1993

	Location of the Business			Total
	Home Country	Other EU country	Rest of the World	
France	76	81	42	199
UK	98	24	24	146
Netherlands	20	16	32	62
Ireland	21	24	11	52
Italy	20	7	21	48
Germany	18	2	10	30
Spain	25	0	0	25
Denmark	7	8	2	17

Source: Perez et al., 1994, p.168 and ABN AMRO, 1996, p.20.

TABLE 18

NET ACQUISITION A ACTIVITY IN DIFFERENT EU COUNTRIES JAN 1985 TO DEC 1993

	Location of the Business		Total
	EU	Rest of World	
France	70	31	101
Ireland	14	10	24
Denmark	11	26	37
Netherlands	7	1	8
Total	102	68	170

^a Net means acquisitions less sales in each region.

Source: Perez et al., 1994, p.170.

Table 18 shows the net acquisitions²⁵ and on this basis Ireland is ranked third behind France and Denmark, demonstrating clearly that the Irish industry has been very outward oriented in its strategic focus.

Table 19 chronicles the acquisitions by Irish dairy companies since 1987, showing that most of the acquisitions have been of UK and US companies, and to a lesser extent, companies from other European countries.

Table 20 examines the product portfolio of three dairy companies with international production facilities. From Table 20 we can

25. Net acquisitions are: acquisitions in a region less sales in that region.

TABLE 19
FOREIGN DAIRY RELATED ACQUISITIONS BY IRISH COMPANIES

Irish Company	Year	Acquisition Company	Country	Business	Cost
Irish Company	Year	Acquisition Company	Country	Business	Cost
Kerry	1987	Primas Fd Ing.	US	Food Ingredients	n.a.
Kerry	1988	Beatreme	US	Food Ingredients	US\$120m
Avonmore	1988	Roy's Dairies	US	Dairy Processing	US\$9.5m
Avonmore	1988	Glenmills Dairies	UK	Liquid milk	£0.5m
Avonmore	1989	St Falbo Cheese	US	Cheese mfg.	n.a.
Avonmore	1989	Golden Dairies	UK	Mozzarella	n.a.
Waterford	1989	Heald Foods	UK	Milk/Fruit Juice	£43.0
Golden Vale	1989	DPP	UK (NI)	Processing cheese	£5.0m
Golden Vale	1989	Ceredigan	UK	Liquid milk	n.a.
Golden Vale	1989	Golden Cow	UK (NI)	Butter spreads	n.a.
Tipperary	1989	CPL Davoine	France	Cheese	n.a.
Avonmore	1990	Birmingham Dairies	UK	Liquid milk	n.a.
Avonmore	1990	Goodwins	UK	Liquid milk, Cheese	sig£5.7m
Avonmore	1990	Handsworth	UK	Liquid milk	sig£7.7m
Kerry	1990	Milac GmbH	Germany	Food Ingredients	n.a.
Kerry	1990	Semmons Taylor	UK	Food Ingredients	n.a.
Waterford	1990	Galloway West	US	Dairy Products	£44.9
Waterford	1990	Western Cheese	UK	Cheese	n.a.
Golden Vale	1990	Bridgend	UK	Liquid milk	£3.6m
Waterford	1991	U.C. Dairies	UK	Milk	£40.8
Avonmore	1991	Caterpak	UK	Grated cheese	£0.4m
Avonmore	1992	Wards Cheese	US	Cheese mfg.	n.a.
Avonmore	1992	Whitcroft Dairies	UK	Liquid milk	£4.4m
Avonmore	1992	Willshire Dairies	UK	Liquid milk	n.a.
Avonmore	1992	Hampshire Dairies	UK	Liquid milk	n.a.
Avonmore	1992	Golden Foods - joint venture	Belgium	Cheese mfg.	n.a.
Avonmore	1992	Churchfield	UK	Liquid milk	sig£5.7
Avonmore	1992	Parker	UK	Liquid milk	sig£4.9
Avonmore	1992	Paszto Kft	Hungary	Liquid milk	n.a.
Golden Vale	1993	Leckpatrick	UK (NI)	Dairy products	£22.2m
Golden Vale	1993	Vonk Food Holland	Netherlands	Processed Cheese	n.a.
Golden Vale	1993	A/S Vejle	Denmark	Margarine	n.a.
Waterford	1993	Durham Dairies	UK	Liquid milk	£7.7m
Waterford	1993	Express (NI)	UK	Mozzarella	n.a.
Avonmore	1993	Dairycrest	UK	Liquid milk	£21.6m
Waterford	1994	Greencroft Dairies	UK	n.a.	n.a.
Kerry	1994	DCA	US ^a	Cheese	US\$402m
Dairygold	1994	Horticks	UK	Cheese	n.a.
Waterford	1995	T C C	UK	Dairy Foods	£125.0

^aAlso, activities in UK, Canada, Australia and Poland.

Source: Annual Reports.

calculate that 54 per cent of dairy sales by the three multinationals were of dairy products produced abroad. The biggest product category produced is liquid milk. Apart from a higher proportion of non-cheddar cheese and lower proportion of butter in foreign production, there was little evidence among the 3 companies that there is a trend towards locating "active value added activities" or of producing higher margin products abroad.

The central issue of importance in this section is to understand the motivation and consequence of these investments for the Irish dairy processing industry. We asked the interviewees to discuss the reasons for internationalising production and the benefits that had emerged. The companies retain close control of their subsidiaries which improves the chances of benefits flowing back to the home country. But it may diminish the extent to which the subsidiaries will integrate into foreign Diamonds. The companies have acquired production or distribution facilities abroad and the details are contained in Table 19.

TABLE 20

SALES IN EACH PRODUCT CATEGORY OF IRISH AND OVERSEAS FACILITIES WITHIN 3 IRISH DAIRY PROCESSING COMPANIES, 1995

Product Category	Production in Ireland %	Production outside Ireland %
Liquid Milk	32.1	4.4
Basic SMP	14.8	4
SM derivatives (mainly casein)	15.2	6
WMP	3.1	4.4
WMP derivatives	-	-
Butter	21.1	1.7
Butter derivatives	4.4	.3
Cheddar	4.4	18
Non cheddar cheese	3.6	18.9
Whey	1.1	1.2
Whey derivatives	.3	.4
Other	100	100
Total company dairy production (£m sales, in 1995)	868.7	1005.2

Source: Derived from company interviews.

The need to acquire scale and access to raw materials was cited by all the respondents as a reason for investment and greater opportunities for this kind of structural adjustment were available abroad. Further, many of the overseas investments incorporated a distribution/sales network. This is a major consideration as distribution is a critical success factor in international markets. The internationalisation of production was also a response to the need to acquire geographical diversity to decrease or spread risk. Furthermore benefits arose because the investments led to more effective development of relationships, which are now perceived as the basis for future development. The investments also improved access to research and development facilities. All companies felt that the investment allows them to deploy their resources, both capital and human, more effectively. The companies did feel that their physical presence may lead to some extra access to information on customers "the bodies on the ground" effect. Exposure to foreign competition had created extra pressure to innovate, but this was not due to the actual investment in the countries *per se*. Other benefits and links, included knowledge concerning milk suppliers, human resource policies and benchmarking technology in foreign markets. On balance the companies felt that Ireland was a net exporter of knowledge. Finally, it was apparent that many of investments represented an opportunity to use skills in the area of cost reduction.

These findings suggest that there are some learning benefits for the home base from the international investments. However is this learning significant for the competitive advantage of the industry? Dunning (1992a, p.145) suggests that companies can have different forms of investments, namely, resource seeking, efficiency seeking, market seeking, or strategic asset seeking and that each form of investment offers a different learning experience. It would appear that the driving force behind the Irish dairy companies' investments has been the need to acquire scale, not readily achievable in the home market. The emphasis has been on acquiring resources and access to markets. It would not appear that the investments have the specific objective of transferring assets back to the home base, nor is the attainment of efficiencies a dominant goal. Further, the companies expressed the view that while many of the benefits are magnified by the actual international presence, many of the benefits would also have accrued from an international marketing presence.

In conclusion, it is clear that the reasons offered for internationalisation are mainly concerned with acquiring greater access to resources, in turn, driven by the need for scale. In a sense this is line with Porter's hypothesis that companies will invest abroad in order to exploit and upgrade competitive advantage, created in the home base. Finally, while it seems reasonable that companies are "tapping" into foreign Diamonds, learning appears to be limited and is secondary to the primary goal of increasing scale.

R&D Strategies

A further indication of the orientation of Irish dairy companies is provided through an examination of their R&D strategies. This section outlines the levels and nature of R&D among Irish dairy companies.

Forfás (unpublished data²⁶) found that, in 1993, the spending on R&D in the sector was 0.38 per cent of sales, which is an increase relative to 1988 (0.24 per cent). However, this is less than the food sector in general, which spends 0.5 per cent of sales on R&D. In absolute terms the spending by the 13 companies amounted to IR£15.2 million in 1993, an increase of over 100 per cent relative to 1988 (IR£7m). However, in practice 95 per cent of total R&D expenditure in Ireland is by the big five dairy companies and the IDB. For research, the dairy companies, particularly smaller companies, depend on their own funds²⁷.

The structure of and attitude toward R&D among the companies varies considerably. Forfás (1995) find that among "R&D performers" in the dairy industry 8 of 13 R&D performing dairy companies had a "Formal R&D department". Our findings (Table 21) show that most of the smaller companies either conduct R&D in a very informal way or conduct no R&D internally. However, many of the smaller companies claimed that they had a "research culture" the essence of which is captured in the phrase "everyone is conscious of the need for, and importance of, research". The majority of the smaller companies have adopted a follower strategy in terms of R&D.

26. Based on a survey sample of 13 R&D performing dairy companies.

27. Irish dairy companies finance 84 per cent of research internally versus 86 per cent for all manufacturing and 78 per cent for all food companies.

TABLE 21
R&D STRUCTURES IN IRISH DAIRY PROCESSING INDUSTRY

	No. of Small Companies	No. of Large Companies	Total
No R&D dept.	1	0	1
R&D Informal	3	0	3
Head of R&D (No Full Time Staff on R&D)	1	1	2
R&D Department	1	1	2
Integrated R&D Department (Team approach)	1	2	3

Source: Derived from company interviews.

It is also possible to examine the form of R&D expenditure. Forfás provides estimates as outlined in Table 22. The data shows that 44 per cent of research in 1993 was for new products which is lower than the rate found in the industry in general (51 per cent). Furthermore, our research suggests that research into new products in the dairy industry is in areas new to the company rather than new to the market.

TABLE 22
BREAKDOWN R&D EXPENDITURE BY OBJECTIVE OF RESEARCH

	%
Improving existing processes	18
Developing new processes	17
Improving existing products	21
Developing new products	44

Source: Forfás, unpublished data.

In conclusion, Irish dairy companies, in particular the smaller to medium sized companies, have under-invested in R&D relative to other food companies. The limited R&D commitment, of Irish dairy companies, was confirmed by a spokesperson for a research centre, who indicated that Irish companies are not research driven. In conclusion, R&D strategies are identified as a weakness in the Irish dairy industry.

Managerial Motivation

A final consideration is the managerial capability and motivation which underpins the strategies. Many authors (Varley, 1991; Igoe, 1993; and Forbairt, 1995) claim that the calibre of management in

the quoted companies is high. However Clarke (1995) argues that management capabilities are weak in the current environment feeling that a "denominator management" form of governance, associated with a strong production focus, prevails.

An important determinant of individual behaviour and effort is the reward systems under which managers operate (Porter, 1990, p.113). Interviewees were asked to outline the basis for senior management incentives (Table 23).

For two companies there is no explicit incentive and in two other companies incentives are directly tied to the milk price. In six companies the reward system involves some limited incentives based on profitability. Thus, in a number of cases there is a potential for conflict between the price paid for milk and the level of profits achieved.

TABLE 23
BASIS FOR INCENTIVES IN THE IRISH DAIRY PROCESSING INDUSTRY

Basis for Incentives	Number of Companies	
	Small	Large
No Incentives	2	0
Related to Milk Price	1	1
Performance related to profit and goals	1	3
Non financial - related to performance	2	0
Incentive but not specified	1	0

Source: Based on company interviews.

Thus, in most companies, management is motivated and driven by incentives. While the form of these incentives may vary, they all encourage a short term perspective. In conclusion, the impact of managerial motivation on competitiveness has been substantial, as management has successfully responded to the short term pressures by reducing costs as reflected in the increased profitability reported in Table 1.

(ii) Domestic Rivalry and Co-operation

Porter argues that vigorous domestic rivalry between firms, based in the same nation state, may create and sustain international competitive advantage in an industry. Similarly to the situation in

New Zealand (Croccombe et al., 1991) competition in the Irish industry was largely confined to raw material sourcing with less competition in the market place. Consequently, innovative efforts focused on cost reduction rather than market or product development.

Competition in the Irish market place is largely confined to liquid milk and some consumer products. While all companies stated that competition in the Irish market is very intense, it is largely related to price and quite regionalised. Competition from overseas companies in the Irish market is not seen as a major force except in the area of spreads. Competition in the Irish market was not considered a significant factor in the explanation of competitiveness. The only exception may have been in the development of the spreads sector where extensive "copy-cattng" may have led competitive advantage in international markets. Most companies were in agreement that rivalry in the foreign markets is more intense. Finally none of the companies claimed that the rivalry had given rise to major innovations on the product side.

The other aspect to rivalry is competition for supplies. Several studies²⁸ point to the low level of consolidation in the Irish dairy processing industry. However, Keane (interview UCC) suggests that the concomitant rivalry on the supply side may have been the impetus, as it was in New Zealand, for increases in processing efficiencies. In the 1980s companies competed aggressively for milk supplies by paying a higher price for milk. To be able to do this, companies focused reducing production costs by developing cost-effective technically-efficient operations. A number of respondents supported the view that this cost efficiency facilitated the international acquisition strategies of Irish companies. The rivalry also reduced take-over opportunities in Ireland, thereby forcing companies to look beyond Ireland. Many companies believed that it was often not possible and certainly more difficult to achieve sufficient scale in Ireland.

Managers were also asked to comment on the level of co-operation with other dairy companies. We looked into three areas of co-operation: production, marketing and research and development. Apart from the earlier mentioned "milk deals" and some, often short-term, contract work arrangements involving the production

28. For example O'Dwyer, 1970; Keane and Pitts 1981; Igoe 1993; and Gill 1995.

and/or packaging of milk products, we found no evidence of "real" production arrangements (joint-ventures, licensing or franchising) between Irish dairy processors²⁹. The latter kind of production co-operation only takes place with competitors abroad, and is almost exclusively limited to the larger Irish processors.

As regards marketing most of the companies mentioned the co-operation through their stake in the Irish Dairy Board. Apart from this we found no examples of direct marketing co-operation between Irish Dairy processors. Some Irish dairy processors have forged co-operative marketing relations, but always involving foreign dairy processors and almost exclusively for the marketing of Irish products in foreign markets (as opposed to the marketing of foreign products in Ireland). We found some evidence of informal co-operation between Irish companies in export markets. In these markets a number of companies try to prevent "quoting for the same deal", thereby increasing their bargaining power.

Finally, regarding research and development, most managers mentioned collaboration through Moorepark Technology Limited (MTL). Apart from this we found little evidence of direct research and development co-operation between Irish dairy processors. There is, however, informal co-operation, mostly linked to problem solving. Managers regularly consult each other on issues regarding production processes, equipment, engineering and assist each other in times of inventory shortages.

This kind of co-operation is often based on personal relationships, involving a high level of trust and integrity. The Irish dairy processing industry is a small industry where all the players know each other. Managers gave evidence of strong social and commercial interaction between competitors. Meetings at the Irish Co-operative Organisation Society, the Irish Dairy Board, among others, were seen as important for the creation of a valuable social network.

So, although there is a substantial amount of interaction and indirect co-operation between the Irish dairy processors, the amount of

29. The sharing of production facilities by Irish farmer co-operatives is more part of an ongoing process of consolidation in the Irish dairy sector, than evidence of production co-operation between independent processors. The 'joint-venture' companies (e.g. Carbery Milk Products and Shannonside Milk Products) manage the main production facilities of the individual farmer co-operatives.

direct, production related, co-operation is limited. Co-operation is most developed in the area of marketing where the processors have been able to increase their marketing scale and bargaining power through the operation of the Irish Dairy Board. Most managers thought that this co-operation has been beneficial for the competitiveness of the Irish dairy industry. The informal marketing "co-operation" between Irish companies in export markets was also seen as beneficial. Finally, in the area of research and development, managers acknowledged the role of indirect co-operation through MLT. However, the co-operation in technical problem solving, although helpful, is not likely to have a significant impact on innovation.

Thus, in the Irish dairy processing industry we found elements of both competition and co-operation. Elements of both co-operation and competition were found to have a positive impact on competitiveness.

(iii) The Importance of Structure and Strategy and Rivalry

Notwithstanding some reservations, it is reasonable to conclude that, within the present regulatory framework, the structure and strategies of the companies contributed to the competitiveness of the Irish dairy industry. The industry has been dominated by a co-operative ethos and a production orientated philosophy. The emphasis has been on commodities, particularly butter. Rivalry, focused mainly on raw material supplies, in parallel with substantial co-operation among the companies, has had a positive impact on competitiveness. The larger companies have successful international expansion strategies. A number of companies modestly broadened their product portfolios and tried to add value mainly through the development of relationships. However they are still strongly oriented towards commodities. Management has effectively responded to short term pressures. The resulting efficiencies facilitated the drive towards internationalisation. The international investments, driven by a search for scale have concentrated on gaining access to resources and markets. However, R&D strategies and the lack of a developed marketing orientation were identified as a weakness of the industry.

7. THE COMMON AGRICULTURAL POLICY AND THE IRISH DIAMOND

The Common Agricultural Policy (CAP) was introduced in this paper as a characteristic of the dairy industry structure that complicates our assessment of the suitability of Porter's theoretical framework for analysing competitive advantage. However, the CAP is also part of the regulatory regime, treated by Porter as a final variable influencing the four determinants of the Irish "diamond". *Prima facie*, the entire EU market is regulated by the same regime, and therefore impacts all competitors equally. However, we argue that the CAP, in conjunction with national Diamonds, will have different effects in individual member states and may therefore be a significant variable in the explanation of competitiveness of the Irish dairy industry.

(i) The Common Agricultural Policy

In Ireland, as in the rest of the EU, the dairy industry operates in a highly regulated environment. Since 1973, the Common Agricultural Policy (CAP) has been the most influential policy operating on the Irish industry. Through a system of intervention support, prices for dairy products in the EEC were kept well above world prices. The EEC market was protected from imports by import levies and exports were made competitive on the world market through export subsidies. This market support system provided a guaranteed outlet for dairy products at attractive prices. This regulatory regime was a major factor in the growth in the production of dairy products during the 1970s and into the early 1980s.

As production grew throughout the community in the 1970s and 1980s, problems arose with surpluses of dairy products and the cost of the market support measures. As a result, quotas³⁰ or limits on milk production were introduced in 1984. In addition, changes in the intervention system were introduced to make it less attractive as an outlet. Delays in the payment for produce placed in intervention as well as a tendering system, which effectively reduced the intervention price, were introduced. Continuing surplus production

30. Quotas were fixed at 1981 national deliveries plus 1%. However Ireland's quota level was fixed at 1983 deliveries plus 4.6%. Further reductions of 8.5% in the level of milk quotas were made in the late 1980s.

and budgetary problems along with pressure from the Uruguay round of GATT negotiations resulted in further reform of CAP in 1992. The net effect of the reform of the CAP has been to reduce and limit the surplus milk production in the Community. In addition, the sale of butter and skimmed milk powder into intervention has been made less attractive.

(ii) The CAP and The Irish Dairy Industry

The impact of the CAP in the Irish dairy industry was not the same as in other EU member states, partly because of the favourable treatment the industry received in CAP reforms. In 1984, with the introduction of the quota system, quotas were fixed at 1981 national deliveries plus 1%, however, Ireland's quota level was fixed at 1983 deliveries plus 4.6%. This favourable treatment continued in consecutive rounds of negotiations through the 1980s when national quota were cut. Between 1985 and 1995 the Irish quota had been cut by only 6.3%. This compares favourably with cutbacks in Denmark (9.7%), France (9.5%), Netherlands (9.2%), "West" Germany (8.7%) and the UK (8.5%) (ABN.AMRO, 1995, p.38).

The favourable outcome of successive rounds of quota negotiations was that Ireland's share of EU milk production increased³¹. This, combined with a guaranteed market and export subsidies obviously led to a higher share of total EU exports. It has been argued that the outcome also affected other indicators of performance, such as overseas acquisitions and value added. For example, the reduction in the UK quota has turned it from being nearly self-sufficient in milk into a country in net deficit by about 10%. In contrast, Ireland's quota still leaves it with a substantial surplus relative to local consumption. Others have argued that this may have been one of the reasons why Irish dairy companies were able and willing to acquire some UK dairy operations, for further processing of Irish dairy produce (ABN.AMRO, 1995).

Thus, the performance of the Irish dairy industry, as expressed in its share of world exports, has been partly facilitated by a regulatory regime that has discriminated in favour of the Irish dairy industry. However, we argue that it was not the CAP, but the "Irish diamond"

31. Note that the Irish share in EU milk production actually dropped slightly, due to the reunification of Germany and the consequent increase of the total EU12 quota figure.

working in conjunction with the CAP, that created a competitive advantage *within the context of the regulatory regime existing at the time*. Below we start by showing that the Irish dairy industry has been able to influence CAP policies and, furthermore, show that, given the characteristics of the Irish "diamond", the specifics of CAP suited the Irish dairy industry.

Kamann and Strijker (1995) rightly point out that the EU CAP is not something autonomous, something given: – "The outcome and nature of the regulatory regime in any market is politically determined and therefore is subject to influence from lobbies by interested parties" (pp.107). It is our view that the "favourable treatment" of Ireland in consecutive CAP negotiations was not a given, but something won. The Irish (i.e. Department of Agriculture, Food and Forestry and ICOS) have proved to be very effective in negotiating concessions for the Irish dairy industry: – "The small 6.3% cutback in Ireland is perhaps a reflection of the effectiveness of Irish political lobbying in a country where dairy farming is proportionately more important to the Irish economy" (ABN.AMRO, 1996, p.38). This effectiveness, in turn, could be seen as reflecting the continuing importance of agrarian interests in Irish politics relative to other European countries³².

Furthermore, the CAP suited particular characteristics of the Irish dairy industry (i.e. production of commodity type products for export markets and a relatively fragmented industry structure). Commodity-type products have always constituted a large part of the product portfolio of the Irish dairy industry. The combination of seasonality, a small domestic market, peripheral location and being an industrial late-comer, resulted in a commodity oriented production.

Climate and other natural conditions made the seasonal production of milk (and dairy products) economically appealing. Relative to milk production, the domestic market was small, and this created a surplus for exports. Export of commodities was the most feasible option. The requirement of a year-round milk supply, for the manufacture of branded consumer products, together with the country's peripheral location, made the production of storable commodities for export a logical option. Furthermore, being an

32 Mjoset (1992) presents a comprehensive analysis of the reasons for the continuing importance of agricultural interests in Ireland relative to other European countries.

industrial late-comer, the Irish dairy industry lacked international brands which would be difficult to develop by relatively small companies in a fragmented industry. The specifics of the CAP support system suited this situation. The system provided a guaranteed support for storable commodities (butter and skimmed milk powder) which were allowed to be produced in a seasonal pattern.

However, on the downside, the CAP also reinforced some characteristics of the Irish dairy industry. Seasonality was reinforced because of the existence of a guaranteed market, which took away the "risk" of seasonal over-supply. Furthermore, the product portfolio became more orientated towards commodity-type products because the home market for (branded) consumer products was nearly saturated and most of the scope for increasing output was in the area of commodities for exports.

The CAP worked against long term development of export markets for unsupported products. Farmers are a risk averse group and their strategic horizon is shorter than what would be preferable for processors (Harte, 1995). As described in the section on rivalry, the Irish processors, have been under pressure from farmers to pay the best price for milk, a rivalry stronger than in other countries. The CAP reduced the need for "risky" investments in branded products because it offered a guaranteed market for commodities. This, in combination with the rivalry and the relative short-term strategic outlook of the farmers, meant that management of the farmer-controlled processors could count on less support for high risk investments in products and markets.

Finally, the CAP also influenced the structural development of the industry. In this research a number of interviewees argued that the CAP system reduced the need for consolidation in the Irish dairy processing industry which would have been necessary in the context of a less regulated market. Because of the possibility of selling commodities into intervention there was less need to develop new products for unprotected markets, which would require larger companies. This allowed the relatively fragmented production structure in Ireland (as well as in some other EU member states) to survive.

The structure of the industry was further affected by the introduction of quotas. The quotas were an additional barrier to

entry and reduced the pressure for mergers (or amalgamations). Furthermore, quotas have limited the milk available for processing and this allowed some processors to sell part of their milk to the highest bidder, while relying on others to invest in processing and markets. This further reduced the pressure for rationalisation in the industry.

(iii) Sustainability and the CAP

Thus, the Irish "diamond" worked in conjunction with the CAP, to create an industry that could be seen as "competitive" within the context of the existing regulatory regime. However, the context is changing and, the sustainability of present performance in this new context is questionable. As outlined in the preceding section, the CAP has left the industry dependant on (directly or indirectly) supported, storable commodity products. While one could argue that the commodity orientation of the industry is bound up with seasonality, peripherality, and a small domestic market, the fact remains that it was the CAP that allowed for a relatively risk-free increase in production of supported commodity products, thereby increasing the commodity orientation.

With the prospect of a continued move towards agricultural trade liberalisation and declining support for the dairy sector under the CAP regime, the industry is left with a product portfolio which is likely to come under increased competitive pressure. Furthermore, it is questionable whether the surviving structure of the dairy processing industry is sustainable in a less regulated and less supported market. Sustainable performance in the changing context will require "a new set of competitive advantages."

Declining support for EC-export products, like butter and skimmed milk powder, will mean that Irish producers will face strong competition from efficient commodity producers in, for example, New Zealand and The Netherlands. It is not impossible for Irish processors to become very competitive, seasonal, commodity producers, able to face such competition. Indeed, as discussed above, Boyle (1992) argues that there is an economic basis for Ireland's concentration in commodity production and exports in that it possesses a comparative advantage at this end of the value chain. Furthermore he argues that this comparative advantage can not be readily imitated.

However, such a route would leave the Irish producers vulnerable to world market fluctuations. The study of the New Zealand dairy industry, is illustrative in this regard. "Despite our cost advantages, which have been the result of favourable natural conditions and investments in production efficiency, our margins have fallen and our returns have become more volatile. (...) A significant upgrading of New Zealand's sources of competitive advantage will be necessary to obtain more secure and profitable positions. This upgrading will demand sustained investments in building new advantages through developing sophisticated products and consumer brands, and reducing exposure to undifferentiated commodities" (Croccombe et al., 1991, p.69).

Furthermore, in the long run, a basic commodity route is unlikely to "increase the standard of living for the citizens of Ireland" (Porter, 1990, p.6). True, an increased standard of living can be attained via a "low cost" strategy. But this route is not infinite and, in itself, not likely to lead to further "development" of the dairy sector.

A "differentiation strategy" would offer more scope for development in the long term. However, such a strategy is not easy to implement. The option of utilising the available milk for the production of less mature and branded products will be difficult given the lack of developed brands. According to Boyle (1992) it would be a giant leap to infer any comparative advantage in the production of higher value-added food products.

Furthermore, for reasons explained earlier, it is unlikely that the co-operatives will make substantial investments in the development of such products and brands. Although the farmers, with a good deal of control over the processing side of the industry, are very aware of the future changes in the CAP and the possible requirements for sustainable competitiveness, they seem reluctant to support major investments in product and brand development.

This is not an irrational move, but a strategic decision based on their entrepreneurial interest in the farm and its revenue. For the farm, as a business, it simply does not make sense to sacrifice the short term gains of a higher milk price for the (high risk) development of future products and markets that might not be there, precisely because of the changes that make these investments necessary in the first place. The Irish dairy processing industry is trapped in a "CAP-web". The future changes in the CAP regime require actions that are

not likely to be taken before the changes are actually taking place. A similar view is held by Kamann and Strijker (1995) in relation to the Dutch dairy processing industry.

This is not to criticise the co-operative ethos. On the contrary, in the present context the co-operatives are successfully performing their primary task: to sell all the milk of the owner-farmers, in whatever processed form, for the highest price, with low risk. Comparing the actions and performance of co-operatives with the (arguably more sustainable) performance of *private* dairy processors, does not make sense. The co-operatives have to take account of the farmers' interests. The only concern of private processors is to create a good return on invested capital. Therefore, it is debatable whether the farmers' interest would have been better served if the market had been dominated by private processors. And, in the same line of thought, it is not likely that private processors would be performing as well as they do now, if they had to process all the milk of the present number of farmers against the current milk price.

(iv) Influence of CAP on Irish Dairy Processing Industry

The performance of the Irish dairy industry has been facilitated by a regime that has discriminated in favour of the Irish dairy industry. Furthermore, the specifics of the CAP support system suited the particular characteristics of the Irish dairy industry. However, the role of the CAP has been more than just "an outside influence on the four determinants" of the Irish "diamond"³³ (Porter, 1990, p.127). It is our view that the Irish dairy industry has not just been influenced by the CAP. The Irish "diamond" worked in conjunction with the CAP, to create an industry that could be seen as "competitive" within the context of the existing regulatory regime. The Irish dairy industry has used and influenced the CAP regime to its advantage to become an important exporter of dairy products.

However, on the downside, the CAP also *reinforced* some characteristics of the Irish dairy industry. The CAP reinforced seasonality, worked against the long term development of products and allowed for the survival of a relatively fragmented production structure.

33. This statement refers to Porter's view on the role of Government. We have treated the EU CAP as part of the regulatory regime (Government).

In the context of a continued move towards agricultural trade liberalisation and declining support for the dairy sector under the CAP regime, the sustainability of present performance is questionable. The industry is left with a product portfolio which is likely to come under increased competitive pressure. Although, it is not unthinkable that the Irish dairy industry could become a very competitive producer of basic commodities, a strategy focusing on the efficient production of such products is unlikely to create increased wealth for the Irish citizens in the long term.

A “differentiation strategy” would offer more scope for development but will not be easy to implement. Such a strategy would require substantial investments in products and markets. Furthermore, the Irish dairy industry is trapped in a “CAP-web”. The actions, necessary for the sustainable development of the Irish dairy processing industry are not likely to be taken before the changes in the CAP regime are actually taking place. This is explained by the different time horizons of farmers and processors, together with the fact that it is unlikely that the same amount of farmers would enjoy the fruits of present sacrifice.

8. ASSESSMENT AND CONCLUSIONS

Our assessment of the suitability of Porter’s theoretical framework for analysing competitive advantage in the dairy industry is complicated by an important characteristic of the industry: its protected and supported structure. Porter’s model was meant to explain the competitiveness of industries operating in an environment of free trade. Therefore, in applying his model to the dairy industry we should not expect all the elements of the Diamond framework to be fully borne out. In turn, this means that it is not possible to draw robust conclusions as to the applicability of the entire Diamond framework for the dairy industry. However, we do believe that the exercise has provided some insight into the relevance of a number of Porter’s concepts for a future dairy industry, operating in a less supported and protected context.

To conclude, we first summarise the contribution of Porter’s four determinants of competitive advantage to the performance of the Irish dairy processing industry. This is followed by an assessment of the significance of clustering in the creation of competitive advantage in the dairy processing industry. This will enable us to

reflect on the suitability of Porter’s theoretical framework in relation to the dairy processing industry. Finally, we outline the policy implications of our study.

(i) The Role of the Determinants of Competitive Advantage

Ireland has a reasonable endowment of *factor conditions*. The level of technical expertise, operational skills, the supply of graduates and a healthy national image were all identified as relatively strong elements. As regards the cost base, costs of logistics and, to a lesser extent, energy costs have a somewhat negative impact on effective progress in the Irish dairy industry. Finally, marketing skills were identified as a negative factor. As regards the “factor creating mechanisms”, the Irish educational institutes and the supporting agencies / institutes were seen to play an important, positive, role. Overall, factor conditions in Ireland have an important, and positive, impact on the competitiveness of the dairy processing industry.

Home demand conditions have impacted in different ways on the competitiveness of the Irish dairy industry. Irish consumption patterns might have worked against the development of some segments of consumer products, such as yoghurt and desserts. However, while Ireland’s main EU competitors all benefited from a broader range of often more sophisticated demands, the small absolute size of the home market seems to have played a bigger role than the concept of segmentation.

The retailers and foreign multinational enterprises located in Ireland have a positive influence on the competitiveness of the Irish dairy industry. The Irish multiples can be regarded as sophisticated and demanding buyers and they are, to some extent, responsible for upgrading the standards of the larger Irish dairy processors. However, a more important influence of the retailers has been their constant pressure on the processors to reduce prices, and the consequent effects on cost efficiency. The multinational customers located in Ireland have also played a positive role. Most processors learned from the standards and systems employed by these MNEs, an experience that helped them in international markets. It is however important to recognise that many processors are also fostering intensive and beneficial relations with multiples and MNEs located abroad.

Apart from the Irish dairy farmers, *related and supporting industries* in Ireland contribute little to the competitive advantage of the Irish dairy processing industry. The Irish dairy farmer is both a supplier and a shareholder of the Irish dairy processing industry. Because of this, it is difficult to determine the exact contribution of the farmers to the competitiveness of the processing industry. The data suggest that Irish farmers, compared to farmers in most other European countries, are competitive producers, but this advantage is partly offset by a highly seasonal supply.

There is very little evidence that the Irish processors benefit from the local presence of other (non-milk) supplier industries. Most of the strategically important machinery is imported. Although, there are some links with related industries, again the contribution to competitiveness is limited. Some suppliers appear to have benefited from indirect links with other processing industries which suggests potential for further development. Most of the interviewed managers did not perceive the lack of related and supporting industries as a competitive disadvantage. However, one could argue that it is difficult for managers to appreciate the potential benefits of absent related and supporting industries.

As regards the contribution of *Firm Strategy, Structure and Rivalry*, one characteristic is the important role played by the co-operatives. Co-operation through the IDB partly overcame the disadvantage of the relatively small size of the Irish companies in international markets. The Irish dairy processors showed a willingness to adopt innovative governance structures, e.g. the co-op/plc structure. An examination of the strategies suggests that, often, a cost based competitive focus has been pursued. Although, in value terms, Irish dairy companies have had some modest success in adding value to their product portfolios, they are still strongly oriented to the production of basic commodities. Companies are directing efforts towards growth in areas of competitive strength rather than in downstream activities. However, companies attempt to add value, through the formation and maintenance of relationships, either directly or via the IDB. Driven by a search for scale, the companies have become active in international acquisitions.

Porter (1990) believes that the existence of rigorous domestic rivalry facilitates the creation and persistence of competitive advantage in an industry. Certainly, Irish companies have competed for market share, mainly within concentrated geographic regions.

However, the competition focused mainly on the supply side. This competition for raw materials was considered to have a positive impact on competitiveness as processors vigorously tried to reduce costs.

In parallel, co-operation exists at various levels. The companies collaborate and support the IDB, which is now a major international player in the European dairy industry. In a similar vein Moorepark Technology Limited is evidence of joint research. Companies also collaborate informally on international marketing strategies. In most cases, however, the type of co-operation identified is of an indirect nature. The few examples of indirect forms of co-operation have had a limited but positive impact

In conclusion to this section on Firm Strategy, Structure and Rivalry, the industry has organised itself into a structure consisting of processing companies, a group marketing organisation (IDB) and a number of support organisations, e.g. ICOS and IDIA, which have effectively represented the industry at government and supra-governmental level. In parallel the companies have competed internally to produce a leaner industry which facilitated their internationalisation strategy. Notwithstanding some reservations, it is reasonable to conclude that, *within the existing regulatory framework*, the structure, strategies and rivalry of the Irish dairy industry had a positive impact on competitiveness.

Finally, the *Common Agricultural Policy*, was posited as part of the regulatory regime, as an additional variable, an outside influence on the four determinants. However, the Irish dairy industry has not just been influenced by the CAP. The Irish dairy industry was able to use and influenced the CAP regime to its advantage to become an important exporter of dairy products. Thus, the Irish "diamond" worked in conjunction with the CAP to create an industry that could be seen as competitive *within the context of the existing regulatory regime*.

However, on the downside, the CAP reinforced seasonality, worked against the long term development of export markets for unsupported products and allowed for the survival of a relatively fragmented production structure. Sustainable *performance in the context of a continued move towards agricultural trade liberalisation and declining support for the dairy sector* will require a new constellation of competitive advantages.

(ii) Assessment of "Clustering"

Having identified the relative significance of the four determinants of competitive advantage we now need to identify and explain the significance, or non-significance, of clustering in the creation of competitive advantage in the dairy processing industry. We therefore need to consider whether there is evidence of a clustering process, and its contribution to competitive advantage.

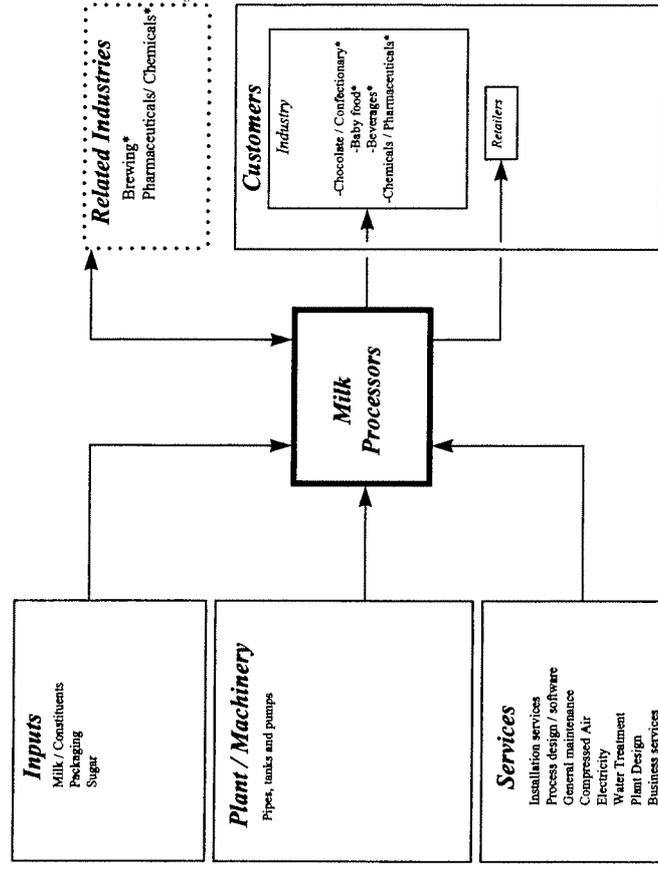
Figure 7 brings together the earlier identified horizontal and vertical linkages of the Irish dairy processing industry, that are characteristic of a "cluster" in the sense used by Porter. The core of the Irish cluster is made up of a relatively large amount of competing indigenous milk processors, some of which have developed into competitive multinational companies with head-quarters in Ireland. We found many vertical linkages and other forms of commercial interaction between the competitors. In the area of marketing, the interaction between the processors has evolved into indirect co-operation. Certainly the smaller co-operatives could be described as a "network of processors supplying one sales organisation". However, all processors are free to sell their produce through other marketing channels, and on balance, there appears to be more competition than co-operation. We also found evidence of social interaction. In this regard, meetings at organisations like the Irish Co-operative Organisation Society, the Irish Dairy Board (AGM) and the IDIA, among others, were seen as important for the creation of a valuable social network.

But is the dairy processing industry part of a larger cluster of competitive industries? We found some forward linkages with competitive customers, most notably with the baby food and confectionery industry. The presence of these industrial customers appears to have contributed to the competitiveness of the dairy industry. Almost all these industrial customers are multinational companies, with their *home base* outside Ireland. We also found that the relationships between processor and multinational do not always involve substantial interaction. Apart from that, some of these down-stream industries involve only a limited number of companies. The second group of customers, the Irish retailers, have not developed into global players. In spite of this they had a positive effect on the standards and cost efficiency of the milk processors.

On the input-side, the processors are "supported" by dairy farmers who are both suppliers to, and (in many cases) shareholders of, the

FIGURE 7

EXTENDED LINKAGE CHART OF THE IRISH DAIRY PROCESSING INDUSTRY



* denotes mainly foreign owned

processing co-operatives/companies. The dairy farmers form an important part of the cluster. For obvious reasons, the competitiveness of the Irish dairy farmers, compared to farmers in other countries, cannot be expressed in terms of world export share. Also, an assessment on the basis of milk prices proved inconclusive, precisely because of the strong link between supplier and processors. However, the data suggest that the Irish dairy processors are supported by competitive milk producers. Furthermore, the "common ownership" structure has resulted in a strong supplier-customer interaction.

Apart from dairy farming, the number of competitive suppliers located in Ireland is extremely limited, and only the packaging industry could be regarded as a competitive industry in the Porter sense. Apart from some "captive" engineering companies, supplying some basic equipment, there are no manufacturers of dairy machinery in Ireland.

With regard to the services provided to the processors the picture is

more positive. Most of the services required by the dairy processing industry are available in Ireland. However, the suppliers that might have contributed somewhat to the competitiveness of the dairy industry are the engineering companies (installers). Again, apart from one or two exceptions in the software and process design sector, none of the service suppliers are active in foreign markets. Furthermore, one could argue that the presence of some of the service industries (e.g. electricity, water treatment, many business services and most installation services) is a result of the fact that these industries are examples of what Porter would call "multi-domestic industries". According to Porter in many such cases there is no issue of national advantage or international competitiveness. Virtually every nation will have such industries and many of the firms that compete in them will tend to be owned locally (Porter, 1990, p.53).

Finally, two industries, brewing and pharmaceuticals have the potential of developing into related industries to dairy processing. The pharmaceuticals/chemicals, brewing and the dairy processing industries use similar technologies and we found some examples of reciprocal direct interaction and information flow between these industries. We also found examples of indirect technology transfer via the suppliers, and the movement of technical staff between these industries. However, although these links might have benefited the three industries to some extent, most links seem to be incidental rather than part of a constructive network of related industries and until now the impact on competitiveness has been limited. Apart from that, both the brewing and chemicals/ pharmaceuticals industry are mainly foreign-owned.

We already saw how the different elements of the Irish "diamond" have influenced the competitive advantage of the dairy industry. But has the Irish dairy "cluster" promoted the interaction between the four elements? In other words, is the Irish "diamond" operating as a system? There is some support for this. First the presence of a number of strong competitors in the dairy processing industry has instigated the establishment of two high- standard factor creating research facilities developing generalised and advanced technology, Moorepark Technology Limited and the research facilities at UCC. Furthermore the strong demand of the dairy processing industry together with the demand of other processing industries for skilled

labour resulted in a wider range of courses in educational institutes and increased the availability and standards of skilled labour.

The cluster of milk processors in Ireland has also affected demand conditions in the Irish market. The availability of (primary processed) milk formed an important attraction for a number of multinational companies to set up production facilities in Ireland. In turn these companies increased the demand for skilled labour, the sophistication of production facilities and the standards of the Irish processing industry in general. Finally, there is some evidence that the presence of the milk processing sector and other "related" processing industries led to the formation of new firms and skills in the supply sectors, although the number of "spin-offs" from the processing industries has been extremely limited.

Although, these points can be interpreted as evidence for a (potential) "diamond as a system", the question remains whether the functioning of the "diamond as a system" and the process of clustering have been facilitated by geographic proximity. Figure 8 shows the location of the biggest Irish dairy processors and some of the most important supporting industries and organisations³⁴. Ireland's dairy "cluster" appears to have a strong geographical dimension. The economic activities of dairy farming, dairy processing, and the few supplier industries (including a packaging supplier, several equipment contractors, specialist process engineering contractors and some small software development companies) are all spatially clustered in the heartland of Irish dairy farming. Furthermore, while many of the institutes identified as important (Department of Agriculture, Food and Forestry, ICOS, IBEC (which includes IDIA)) are located in the Dublin area, the most important dairy related research institutes (UCC and Moorepark Research Centre) are located in the South.

The reasons for this spatial concentration are apparent. Because of favourable climatic conditions, the heartland of Irish dairy farming developed in the southern province of Munster. The perishable and low value/weight ratio of the milk supply acted (and still acts) as an important locational determinant for the processing industry with the result that the processors showed the same regional concentration. Transport costs were again the main locational

34. Information on suppliers and their importance is based on analysis of questionnaires administered at plant level and industry directories.

determinant for some multinationals using the output of the processors, which also located in the same region, and in some cases on the same premises as their suppliers.

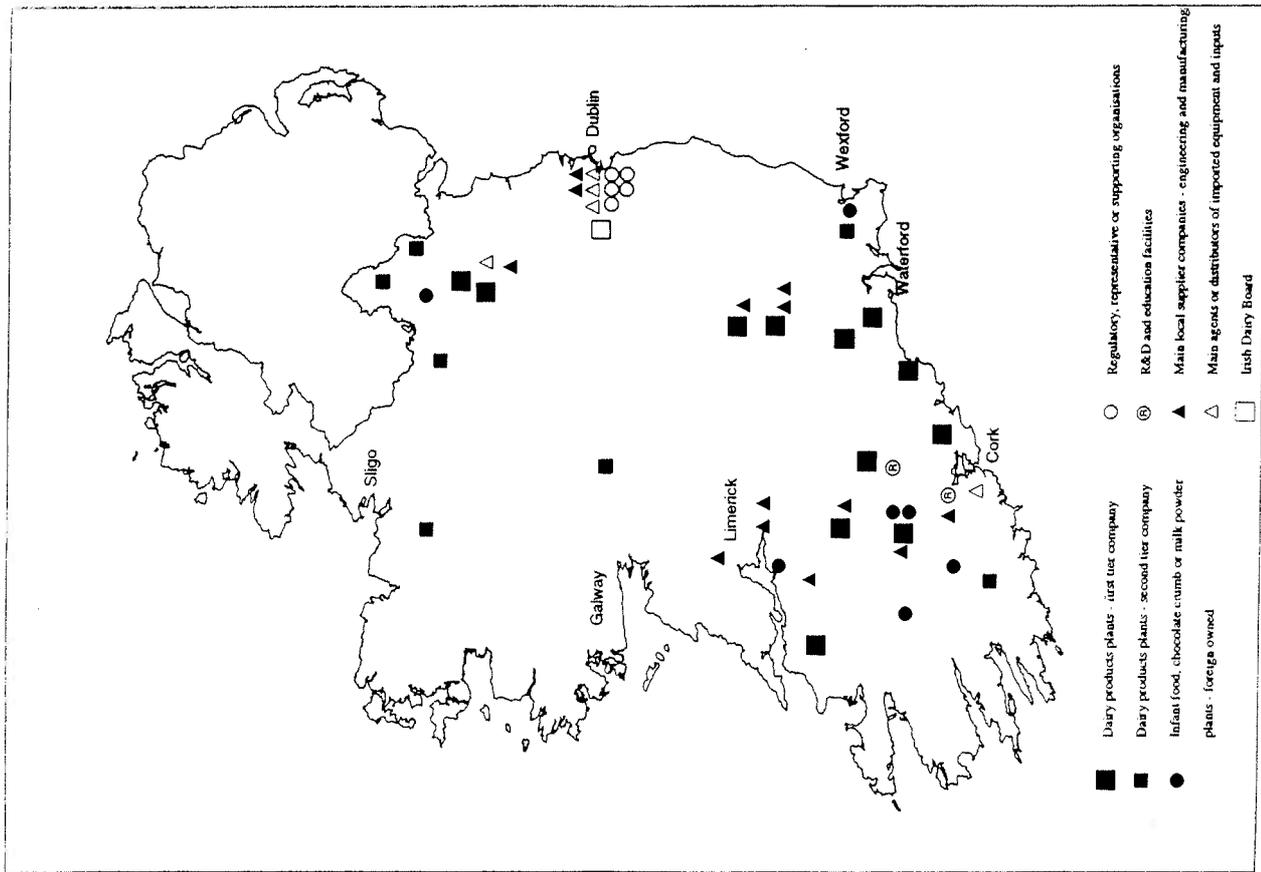
The geographical proximity of the engineering companies seems more likely to be the outcome of a selection process of the processors rather than of the location decisions of the engineering companies themselves. Given the regular need for engineering services, processors employed engineering companies located in the same region, provided they were capable of doing the job. The experience gained by these engineering companies led to the development of "specialised" engineering companies in the region. Finally, the location of the main research institutes is the outcome of planning decisions which were influenced by the location of the processing industry.

Thus, there is evidence of an agglomeration effect where a cluster of processors attracted suppliers, customers and supporting organisations to the same region. This agglomeration is basically a result of considerations regarding transport costs or service/lead times. The resulting geographic proximity has facilitated information flow within the "cluster". There is a substantial amount of commercial and social interaction between the Irish dairy processors which was seen as a valuable factor. The informal co-operation between Irish processors in export markets could be an example of interaction facilitated by geographical proximity. Geographical proximity has also been instrumental in facilitating a small number of direct and indirect horizontal linkages with related processing industries.

However, the findings regarding the relationships with customers and suppliers suggest that, although the contact with competitive customers contributed to competitiveness, this positive contact was not necessarily the result of geographic proximity. Processors have benefited from selling to local customers without developing substantial relations and many processors were able to foster beneficial relations with customers located overseas. On the other hand, information can flow in more ways than just via direct customer supplier interaction (e.g. via media, industry associations, education systems and government support agencies). These kinds of intra-cluster information flows are certainly facilitated by geographic proximity.

Porter identifies domestic rivalry as a second element with

FIGURE 8
THE GEOGRAPHY OF IRELAND'S DAIRY CLUSTER



Source: Company interviews and Co-Op Ireland Directory 1993/1994.

especially great power to transform the Diamond into a system, because it promotes upgrading of the entire national Diamond. Indeed, the Irish processing industry is characterised by substantial rivalry, particularly in the context of raw material sourcing. We failed to find much evidence to confirm Porter's proposition that rivalry for market share would lead to the upgrading of the other elements of the Diamond and have a consequent impact on innovation. The Irish experience in the area of dairy spreads, characterised by several companies trying to gain market share by introducing new product variations, was the only obvious example of a possible systematic impact of such rivalry. However, the competition for raw materials clearly had a positive effect on processing efficiency and internationalisation strategies.

On the other hand, we found examples of co-operation between the processors that could be argued to have had an impact on the other elements of the "diamond". In the area of export, the joint marketing effort in the form of the IDB facilitated the development of innovations such as an international brand name. One could argue that this would have been less likely in a situation of non-co-operation. Furthermore, collaboration through MTL has upgraded the level of knowledge available to the dairy industry. Finally, the collaboration between the different co-operatives also led to the formation of a new packaging co-operative supplying packaging to the dairy industry.

From the above it is clear that, on a number of points, the Irish dairy processing industry falls short of being a cluster in the Porter sense of the term. First, the "cluster" is limited in scale and scope. Although Ireland has a relatively large number of dairy companies, the number of non-milk suppliers, customers and supporting institutions is very small and the scope of their activities is limited. Second, many Irish suppliers and customers are not part of a competitive indigenous industry themselves. Third, most of the important downstream and related industries involve mainly foreign-owned multinational companies with their home base outside Ireland. Fourth, although we found some evidence of beneficial interaction between milk processors and customers increasing the competitiveness of the milk processing industry, the benefits do not seem to be reciprocal. In other words, the interactions are not always part of "a mutually reinforcing process". Finally, although we found evidence of geographical concentration,

a large part of the business within the cluster takes place in the absence of substantial direct interaction (this does not mean in the absence of intra-cluster information flow).

In conclusion, we identified aspects of a "cluster" and a "clustering process" as described by Porter and the few examples appear to contribute to the competitiveness of the Irish dairy processing industry. However, an Irish "dairy cluster" supported by an Irish "diamond" functioning as a system leading to innovation and sustained growth has not developed.

(iv) Suitability of Porter's Theoretical Framework

Several critics argue that Porter's Diamond framework is not suitable for analysing competitive advantage in resource based industries like the dairy industry (see preface). Yetton et al. (1992) point to Porter's own qualification to his model – that one can succeed in resource based industries, with only one of the elements of the Diamond in place.

Others argue that Porter's model is not applicable to resource based industries at all and, again, claim to find support in Porter's writing: "The capacity to compete in industries that are highly dependent on natural resources might be more explicable using classical theory" (Porter, 1990, p.28).

However, Porter does not intend to limit the applicability of his model to non-resource-based industries. Porter acknowledges the fact that firms in a country may sometimes be able to sustain their competitive advantage for a time, based solely on the country's natural resources. However, by this, he does not mean to invalidate his model for resource based industries. In responding to critics, Porter and Armstrong (1992), explain that there is nothing wrong with resource industries being the mainstay of an economy. However they criticise countries that export only unprocessed or semi-processed products with little presence in more sophisticated segments. The challenge that they identify is to increase the sophistication of the way in which countries compete in natural resources industries through more efficient production and through migration into more sophisticated segments. It is in relation to this challenge that Porter defends the relevance of the Diamond model, for (natural) resource based industries.

There is, however, a more fundamental reason why we should not expect all the elements of the Diamond framework to be fully borne out in the case of the dairy processing industry. As discussed above, Porter's model was meant to explain the competitiveness of industries operating in an environment of free trade and one of the most prominent characteristics of the dairy processing industry is its protected and supported structure. This means that it is not possible to draw strong conclusions as to whether our study validates or invalidates the entire Porter framework. However, we do believe that the exercise has provided some insight into the relevance of a number of Porter's concepts for a future dairy industry, operating in a less supported and protected context.

The findings fail to support all of Porter's propositions to the same extent. The relative success of the Irish dairy industry has been achieved in spite of the underdeveloped nature of some elements of the "diamond" and in spite of limited system dynamics. Furthermore, the importance of some influences seems to be underestimated by Porter.

Thus, first, domestic demand conditions have played a smaller role in determining the performance of the Irish dairy processors than Porter's model would suggest. The presence of a number of "sophisticated and demanding buyers" has been helpful but does not appear to have been a crucial influence. Furthermore, contrary to Porter's ideas, the small size of the Irish home market *has* proved a competitive disadvantage for the production of certain consumer products. Second, apart from the modestly positive impact of the dairy farmers, the processing industry has not benefited from the presence of competitive local suppliers. Third, although the "competition" for raw milk supplies had a positive impact on efficiency, the impact of competition for (regional) market share appears to be limited. Finally, although the Irish dairy processing industry has some characteristics that might be indicative of a clustering process in the Porter sense of the term, the industry has been able to compete in the absence of a fully developed "dairy cluster" and its associated system dynamics.

Apart from this, a number of influences that contributed positively to the performance of the Irish dairy processing industry are not accounted for in Porter's model. First, although Porter lays stress upon strong rivalry between individual firms, different forms of limited, *indirect*, co-operation between competing processors seems

to benefit the Irish dairy processing industry. Second, subsidiaries of foreign multinationals in Ireland have played a more positive role than would be expected on the basis of Porter's model, both as key customers and as related companies. Finally, by treating the CAP as an additional variable – "influencing the four determinants from outside" – Porter would not fully capture the influence the Irish dairy industry has on the policy making process and, secondly, the difference in ability of national industries to react to specific policy outcomes.

However, although the Irish dairy processing industry has prospered in the absence of a fully developed "dairy cluster", this does not necessarily invalidate Porter's theoretical framework for the dairy processing industry. Again, Porter's model was meant to apply to industries operating in free markets and the Irish dairy industry is presently performing in a highly protected and supported context. But this context is changing and the move towards agricultural trade liberalisation and declining support provides a new challenge for Irish processors.

As discussed, in this changing context a strategy focusing on the efficient production of basic commodities is unlikely to create increased wealth for the citizens of Ireland in the long term. The challenge will be to increase the sophistication of the way Irish processors compete in a natural resource-based industry, through more efficient production and, more important for the wealth of Ireland's citizens, through migration into more sophisticated segments (which could mean more sophisticated commodities). However, such a strategy would require substantial investments in products and markets.

In this changing context sustainable performance and a growing wealth of Ireland's citizens will require a new set of competitive advantages. It is our view that this new set will, more than at present, contain *aspects* of the determinants as described by Porter. In this study we found examples that fit Porter's notion of clustering and a Diamond, and these examples contributed positively to the performance of the Irish dairy processing industry.

Thus, we found support for the importance of *advanced* and *specialised* factor conditions and factor creating mechanisms, such as technical expertise and dairy research facilities. We also found examples that support Porter's ideas regarding the positive

contribution of *sophisticated* and *demanding* customers in Ireland towards industrial upgrading and innovation. More generally, we found examples of direct and indirect information flow and knowledge transfer within the grouping of processors, customers, supporting organisations and related industries that was seen as a valuable factor. The actual benefits might even be greater than suggested by the interviewees since it might be difficult for individual players in a "cluster" to perceive all the benefits of a clustering process. We also found some support for Porter's concept of *system dynamics* where the grouping of companies promoted the interaction between the four determinants. Finally, Porter's ideas as to the importance of rivalry seem, at least partially, supported by the positive effect of competition for raw materials on processing innovation and international expansion.

In the absence of a fully formed cluster in the dairy industry, it is not possible to recognise its potential benefits. However, a number of aspects of Porter's framework are at work and were seen to contribute towards the competitiveness of the industry and enhancement of these elements would certainly contribute to competitive advantage in the new context.

(iv) Implications for Policy

In summary, agricultural trade liberalisation and declining support will lead to a changed competitive context. It is acknowledged that it is not inconceivable for Irish processors to become competitive producers of basic commodities in this new context, and that a differentiation strategy represents a substantial challenge, partially because of the seasonal nature of raw material production. However, further development of the industry and increased wealth for the Irish citizens requires that the strong position in commodities is supplemented with the development of more sophisticated products.

This will require a new set of competitive advantages. Aspects of Porter's Diamond and clustering concepts, already contributing to competitive advantage to some extent, will become more important in the new context. However, in prescribing policy recommendations we must take into consideration the qualifications identified in the preceding sections.

The capacity to innovate will to a large degree depend on the

availability and quality of labour. The level of operational skills and the supply of graduates are identified as relatively strong elements of the Irish "diamond". It is important that this position is maintained and further developed. According to Porter (1990), education and training constitute perhaps the single greatest long-term leverage point available to government in upgrading industry. But, in certain areas, firms must accept and play their own role in education and training.

As regards knowledge and expertise, it is important that processors invest in expanding the existing base and increase the efforts in product development, particularly in technology-driven market segments, such as ingredients and functional food products. Although, we see a role for the Irish government in stimulating institution-based R&D, again, processors must play their part. Government should continue to finance competitive and basic research. However, it is important that the benefits of these efforts are accessible to the industry as a whole rather than to individual companies. In this respect there will be a greater need for closer integration of research institutes and industry. It is our view that indirect co-operative research can be beneficial provided it takes place in research institutes to which the majority of industry participants have access. The Government should continue in its efforts to facilitate this type of co-operation.

Furthermore, we acknowledge the potential benefits from the presence of a grouping of competitive related and supporting industries and industrial customers. This should be both part of our "strategy" as well as the outcome of policy. We advocate the governments involvement in facilitating a deepening and broadening of the existing dairy industry. However, in this process one should be realistic and appreciate the constraints of such a strategy.

For example, the scope for development of backward linkages might be limited. The machinery sector is dominated by a small number of large international firms. In such a concentrated industry the barriers to entry might well be too strong for new indigenous companies to develop successfully. In some cases, one might conclude that for a small economy it is more practical to attempt to capitalise on expertise of suppliers abroad. Thus, policy should not be aimed at "filling all the gaps in the cluster". However we identified a potential for the further development of service

companies that might benefit a broader “processing cluster” in Ireland.

There are, however, more obvious possibilities for a further development of downstream linkages. This potential could be developed through related diversification by the existing processing companies in Ireland and, also, through the targeted attraction of foreign food companies. According to Porter (1990) a country should seek to attract foreign multinationals that operate in industries within those broad sectors in which the nation's firms might themselves eventually gain competitive advantage. Here, MNEs can seed a cluster. However the focus should be on the development of indigenous companies. Furthermore, policy should aim to facilitate more effective information flow between dairy companies, customer industries and related industries. On an international scale, the IDB must continue to give priority status to establishing direct links between Irish processors and customers abroad.

The future success of the industry is dependent on the ability of the management of the Irish dairy industry to adapt their structures and strategies to suit the changing environment. Managerial behaviour is affected by the process of corporate governance. According to Porter, governance structures, in which the boards represent the interests of investors, and in which investors have a role in management, would normally lead to more emphasis on building long term shareholder value. However, in the case of the Irish dairy processing industry the situation is complicated by the fact that an important group of shareholders are also the suppliers of the most important raw material. We identified the resulting “horizon problem” as an impediment for the long-term development of some of the Irish dairy companies.

Many of the above points have been identified by the different bodies responsible for policy making in Ireland. Forbairt has embraced Porter's cluster concept in its latest Food Development Strategy (Forbairt, 1995). Furthermore, the major players in the dairy industry, expressed a need for action. However, the “horizon problem” in conjunction with the pending changes in the CAP and GATT make it difficult for the industry to take the necessary steps.

APPENDIX I

RESEARCH METHODOLOGY

An integral part of the Irish dairy industry study was an extensive review of relevant articles, documents and reports. In formulating the field research support was received from a number of institutions and we gratefully acknowledge the contribution, as ‘key informants’ from the following:

Industry Evaluation Unit, Ann Clarke
ICOS, John Tyrell and Martin Varley
Riada, Joe Gill
Goodbody, Liam Igoe
IBEC, Ciaran Fitzgerald
UCC, Drs. Keane, Foley and Daly
Teagasc, Eamonn Pitts and Phil Kelly

A total of 89 indigenous companies were identified as processors of dairy products. However it was possible to identify four clear strata. A view was formed based on interviews with key informants that fifteen companies were the most relevant in understanding the sources of competitiveness of the dairy processing industry. The top strata is composed of five large companies that between them process around 75 per cent of the Irish milk. The next group comprises nine companies all of whom employ between 80 and 499 people. The third tier contains fifteen companies, employing between twenty and 79 people. The fourth tier included 60 smaller companies that employ less than twenty. Many of these companies are owner operator type companies, such as farmhouse cheese makers. Companies in the third and fourth tiers were excluded from the analysis on the grounds that their impact on the sources of competitiveness was likely to be small as they are in the main very small enterprises. We also included the IDB.

Therefore fifteen companies were identified as part of the population for research. These included NCF, Mid West, Shannonside, Carbery³⁵, Nenagh, Tipperary, Lakelands, Irish Dairy Board, Golden Vale, Avonmore, Waterford, Kerry, Dairygold, Town

35. Carbery carries out all processing, except butter manufacture, for Bandon, Barryroe, and Drinagh co-ops.

THE DEVELOPMENT OF THE IRISH DAIRY INDUSTRY

1. Introduction

The development of the Irish dairy industry to date can be considered in four phases. First, the development phase, in which the industry grew rapidly in a very competitive environment. Second, a phase of stagnation from the 1930s to the 1950s facilitated by international depression, domestic protectionist economic policies and a conservative dairy processing industry. Third, a period of renewed growth and reorganisation as Ireland transformed its economic policy and prepared for and joined the EEC. Foreign based food companies became involved in the industry, especially in secondary processing. Fourth, from the mid 1980s to date, a phase of further reorganisation as the larger Irish processors became international in scope and several changed from co-operative to PLC status.

2. Early Development

The Irish dairy industry has its origins in farm produced, heavily salted butter which was one of Ireland's main exports until the late 19th century. A commercial network developed around this trade that included farmers, butter merchants and the Cork butter market. Britain was the principal outlet for this product and in the early 1870s (O'Grada, 1977).

The invention and widespread use of the centrifugal separator, in Germany in 1877, was to change butter production from a farm to a creamery or factory based system and led to the development of a dairy processing industry. Ireland's European competitors, most notably Denmark, quickly adapted to the new production system based on the centrifugal separator and gained a large share of the British market with their fresh lightly flavoured butter. Ireland was slower to adapt to the new situation than its competitors, resulting in a loss of market share to creamery butter.

In the early 1880s, the first creameries were established in Ireland; 20 privately owned creameries were in operation by 1884 and the

of Monaghan, Wexford Creameries. In total, eleven were in a position to participate in the study.

In all companies at least one in-depth interview was held, attended by at least two representatives of the research group and at least one company representative. A structured questionnaire was employed with a number of closed and open-ended questions. Only one interview was not recorded. Eleven interviews were completed at senior executive level. We spoke to the CEO in ten companies.

Further a second questionnaire was administered at plant level. On most occasions this was left behind with a specific person to whom we explained the requirements for completion of this questionnaire. The primary purpose was to provide us with more detailed information on customers and related and supporting industries.

We do not claim that our findings can be generalized to the population of all dairy companies, nevertheless the findings should give reasonably good indications about the industry.

first co-operative creamery was established in 1889. The number of creameries grew rapidly to 800 by 1906; less than half were co-operatively owned. This growth was driven by a slump in price of firkin butter as creamery butter became more popular on the British market (O'Grada, 1977).

In the early decades, the creamery system operated in a very competitive environment. Creameries competed with one another for milk supplies at home and with Irish, Danish and other suppliers in the export market (O'Grada, 1977). In Ireland, the issues of ownership and control were important, as private and co-operative creameries vied for milk supplies and markets. In contrast to Scandinavia, private businessmen had a significant role in the early development of the Irish industry. Many of the private creameries set up in Ireland were by families and merchants who were involved in the butter trade. However, co-operatives continued to grow in number; they were vigorously promoted by the Irish Agricultural Organisation Society (IAOS).

3. Post 1920s

Up to 1920, the industry experienced prosperity; during the first world war markets were favourable and turnover in the industry increased. High prices for cheese stimulated its production and export to England and by 1919 200 creameries were involved in its production (Foley, 1993). However, after 1921, prices and production of cheese fell. After the 1920s there was severe milk price competition and the new creameries were established with little regard for existing facilities in the area. Prices declined due to the influx of butter from outside Europe and the poor economic situation in Britain (Bolger, 1983). This situation combined with the war of independence in which many co-operative creameries were burned, drove many farmers out of dairying. As a consequence, there were too many creameries for the available milk, and severe competition for milk ensued with private creameries as well as between co-operative creameries.

In response to the problems of the industry, the Department of Agriculture set up the Dairy Disposal Company (DDC). In its initial decade, the DDC purchased most of the privately owned and some of the co-operative creameries. Many of these creameries were retained by the DDC while others were either closed or transferred

to co-operative ownership. In 1928, the state put in place a licensing system to control the establishment of new creameries. By the 1930s therefore, the dairy industry was firmly in co-operative or public control and a regulatory system controlling production, and entry into the industry was in place. The industry had evolved to a system of branch and central creameries with buttermaking the predominant processing activity, and Britain the principal export market.

From an early stage, the lack of a co-ordinated approach to marketing was a problem; several unsuccessful attempts were made to manage marketing in 1893, 1928 and 1936. The attempts failed because the creameries failed to support the marketing agencies. It was not until the establishment of An Bord Baine in 1961 that the problem was successfully addressed.

The substantial decline in the price of butter in the 1930s caused the government to introduce price support for butter. In addition, the dairy industry was severely affected by the outbreak of the economic war with Britain in 1933; it resulted in heavy duties on Irish exports to Britain. During the second World War, the scarcity of supplies and the introduction of compulsory tillage cultivation resulted in low levels of milk supplies. Supplies remained low until 1949, when a gradual improvement began. The combination of price support for butter and low levels of milk supplies inhibited the diversification of the industry. The provision of Marshall aid resulted in improved soil fertility and drainage. This coupled with better cattle stocks and price supports for milk stimulated increased milk supplies.

Throughout this period, the number of co-operative creameries reduced from 274 in 1929 to 193 in 1951 through a gradual process of attrition and rationalisation (Bolger 1977, p.225).

4. Post 1950s

In the early 1950s, improved market conditions, the resumption of butter exports to the UK and improvements in farming resulted in increased milk yields and supplies. Milk output increased and in 1960, output was 480 million gallons which increased to 740 million gallons by 1973 (Foley, 1993). In response to more favourable markets and increasing milk supplies, a dynamic phase of growth and reorganisation began.

Milk powder became more important and new milk dryers were commissioned in Mitchelstown, Ballyclough and Dungarvan (Foley, 1993). The manufacture of chocolate crumb also became an increased outlet for milk supplies; foreign owned companies such as Rowntree Mackintosh, and Fry Cadbury set up plants in Ireland. In 1959 a co-operative marketing agency for Irish milk powder exports was set up through an arrangement with Unigate. In 1961, the Irish Dairy Board (IDB) was set up. Through advertising and a marketing plan, IDB launched Kerrygold, a branded Irish butter on the British market, it was later extended to middle Eastern, American and European markets. In the early 1960s there were 160 dairy co-operatives (the DDC continued to handle 20% of milk); 80% of milk was manufactured into butter with the skim milk being returned to farmers for animal feed. The butter was destined for the domestic and the British markets. Some cheese was manufactured for a small domestic market and for the processed cheese market (O'Leary, 1983).

The Anglo Irish Free Trade agreement with Britain was signed in 1965. This helped the industry considerably by doubling the existing butter quota. Also, during the 1960s, there was substantial growth in dairying in the west of Ireland; in the province of Connaught, milk production increased from 12.3m gallons in 1960 to 26.1m gallons by 1970. The Government, motivated by growth orientated policies and a desire to prepare the industry for membership of the EEC, stressed the need for rationalisation and amalgamations in the dairy industry to achieve economies of scale and allow diversification as well as the need for orderly marketing (Smith and Quinn, 1974). The late 1960s and the early 1970s saw some of these changes come about in the industry. The changes were facilitated by the take-over of DDC creameries by the co-operatives, the building of new plants in several locations and a change in the rules of co-operatives from which a 51% majority vote for amalgamation was required rather than 75% as heretofore. During the 1970s, the closure of smaller creameries and the centralisation of processing facilities was greatly facilitated by the change from delivery of milk by farmers to the local creamery to bulk collection ex-farm by milk tanker.

Reorganisation, was the result of local negotiation and arrangement. The IAOS was very much the catalyst for this change, however while the IAOS tried to co-ordinate the reorganisation, it did not

have any statutory power to do so. Consequently, a geographical patchwork emerged without a rational allocation of milk supplies. Also, from the amalgamations, boards with large numbers of directors were formed which were not conducive to effective decision. In addition, uneconomic promises to maintain plants, staff levels and facilities were made in some cases (O'Leary, 1983). Out of the reorganisation in the north and west of the country, Lough Egish, North Connaught Farmers and Donegal emerged. In the south, seven major groups emerged including; Avonmore based in County Kilkenny, Ballyclough, Golden Vale, Mitchelstown based in County Cork, Waterford based in Dungarvan, North Kerry based in County Kerry and a group of creameries based in County Tipperary (Bolger, 1977). As well as the seven large dairy groupings, there also emerged a second group of 6 dairy co-operatives, ten at the next level and a further 20 smaller co-operatives (O'Leary, 1983). As well as amalgamating, many of these larger co-operatives maintained a diversified position in farm input manufacture and distribution, meat processing and artificial insemination. The 1960s and 1970s were a period of rapid change as the focus changed from autonomous local creameries to centrally controlled larger diversified businesses.

During the 1960s and early 1970s, there was also some diversification away from butter to cheese manufacture. Production of cheese increased from 5000 tonnes in 1960 to 45,000 tonnes in 1973. British based companies in conjunction with Irish co-operatives were the impetus behind this trend. Unigate in conjunction with local co-operatives were involved in three processing plants and Express Dairies were involved in two plants. A national cheese grading scheme for cheddar cheese was introduced by the Department of Agriculture in 1966.

During this period, there was also a switch from batch to continuous buttermaking technology. The first continuous butter making equipment was installed in Dungarvan co-op in 1964, by 1968 twelve were in operation throughout the country, by the mid 1970s, batch chum buttermaking had almost disappeared.

Also, as the practice of returning skimmed milk to farmers (for use as animal feed) declined, processing facilities for the manufacture of skim milk powder developed. Existing processors increased capacity and new drying facilities were established at Killesandra, Lough Egish, Virginia, Ballaghaderreen, also the Borden company

established a powder packing plant at Mallow. The manufacture of casein also developed with Waterford, Mitchelstown, Avonmore commencing manufacture in 1971 and Kerry in 1972. Infant food also became an outlet for milk powder; factories were established in Cavan and Limerick in 1974, Wexford in 1973. All these facilities were foreign owned by companies such as Unigate, Nutricia, Wyeth and Abbott.

Up to Ireland's entry to the EEC in 1973, IDB had operated as a statutory marketing agency with almost exclusive control over dairy product exports. This situation was not compatible with EEC policy, therefore, the board was changed to a co-operative in which the dairy product manufacturers were shareholders. Through the 1970s and 1980s IDB acquired processing and distribution facilities in the UK, Europe, Middle East and US. The relationship between the processors and the IDB is complex and individual processors have different arrangements which vary over time.

In the 1970s, competition between the main dairy co-operatives increased; milk prices paid to farmers, levels of profitability and development of new products were closely followed in the press with dairy co-operatives trying to outdo each other. There was a large requirement for capital investment, added to by the pronounced seasonality of milk production. The introduction of milk quotas in 1983 marked the end of an era in the dairy industry. Up to this point, the industry had developed by focusing on the continuously increasing milk supply and could rely on intervention as an outlet for products.

5. Post 1983

With the introduction of milk quotas in 1984, a limit was placed on the expansion of milk production and consequently on the scope for expansion for dairy processors. The response of the larger players in the industry was to either expand within Ireland or through overseas acquisition. Overseas expansion through acquisition of existing facilities has been the principle route of expansion.

Most of the acquisitions have been of UK and US companies, and to a lesser extent European based companies. The Kerry Group has concentrated on the US and the acquisition of larger food ingredient companies such as Beatreme in 1988 and DCA in 1994. Cheese companies in the US and dairies in the UK have been the target of

Avonmore. Waterford also have significant acquisitions in the liquid milk business in the UK, and in the UK cheese market especially with the acquisition of The Cheese Company in 1995. Golden Vale has also made acquisitions in processed cheese, and spreads (in Northern Ireland, Netherlands and UK) and to a lesser extent in the liquid milk market in the UK. Dairygold has been the last of the large dairy companies to join the acquisition trail with the purchase of Horlicks in the UK in 1994. Of the smaller processors, Tipperary is the only one to acquire facilities abroad with the purchase of CPL Davoine in 1989.

However, following the introduction of quotas, greater attention was also focused on yields, waste elimination, added value products and manufacture of dairy ingredients for specific end-uses (Foley, 1993). The upgrading of hygiene, quality and environmental standards also became a greater priority. By the mid-1990s, the dairy co-operatives had maintained their dominance (over private companies) of the dairy processing sector in Ireland. However, four of the large dairy co-operatives have changed their status to incorporate various forms of public shareholdings. In 1991, two of the big co-operatives, Ballyclough and Mitchelstown, amalgamated to form Dairygold Co-Op.

Despite the need for diversification in the dairy industry being advocated over a number of decades the industry remains heavily reliant on traditional commodity products especially butter and skim milk powder. Since the mid-70s, production of butter has increased reaching a peak in 1984 at 165,000 tonnes and since stabilising at around 130,000 tonnes. Skim milk powder production has closely followed trends in butter production. In the same period, cheese production has increase from 60,000 tonnes in 1975 to over 90,000 tonnes by the mid 1990s.

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