Pursuing added value in the Irish agri-food sector:
An application of the Global Value Chain methodology

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Abstract

This paper examines the Irish agri-food sector from a value chain perspective and identifies some key areas of relevance to industry stakeholders and policy makers interested in understanding how economic gains from the sector can be created and strengthened. The research employs the Global Value Chain (GVC) methodology championed by Duke University’s GVC Initiative and focuses on the two most important pillars of the sector – the dairy and beef industries. The dairy and beef industries are analysed primarily from the Irish perspective and value chain maps for each industry are presented. The findings from this research emphasise the importance of investment in innovation to develop more value-added products within in the agri-food sector, the need for continued consolidation and increased efficiency, particularly among processors, and the potential benefits from promoting more collaboration and coordination within value chains and the sector in general.
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Declaration

I declare that the contents of this thesis are entirely my own work. Any work of others has been cited and acknowledged within the text of the thesis.

Signed:

_______________________________________
Declan Heery
**Introduction**

The recent publication of Food Wise 2025 (FW2025), the latest in a series of rolling ten-year strategies for the agri-food sector, has increased the spotlight on the country’s oldest and largest indigenous commercial activity. According to FW2025, the agri-food sector ranges from primary agriculture and fisheries to food production and forestry outputs. Given the strategic importance of the agri-food sector to the Irish economy, its roots in local communities and its expanding reach in a globalised economy (net foreign earnings generated from agri-food exports are greater than non-agri-food sectors of the economy), the need to understand how the sector operates and how best to take advantage of opportunities in the global marketplace is perhaps greater than ever (DAFM, 2015).

The leading industry stakeholders who authored FW2025 set out a number of growth projections, which they believe are achievable by 2025:

- Increasing the value of annual agri-food exports by 85 percent to €19 billion, driven largely by expansion in dairy, beef, seafood and consumer food and drinks exports
- Increasing value added in the agri-food, fisheries and wood products sector by 70 percent to in excess of €13 billion.
- Increasing the value of primary production by 65 percent to almost €10 billion
- Creation of an additional 23,000 direct jobs in the agri-food sector all along the supply chain from primary production to high valued-added product development (DAFM, 2015).

Ambitious projections such as these raise a number of important research questions: Given all the references to ‘increasing value’ above, what activities should the Irish agri-food sector focus on to provide the greatest return? Where is the value created? How should the sector be structured to facilitate optimal operation and integration in the global economy? How can policy makers ensure that jobs that are created stay in Ireland instead of moving activities overseas? Indeed, what can be done to provide an enabling policy and regulatory environment to help achieve the projections above?

Although FW2025 sets out a strategy and a range of high-level recommendations for the development of the agri-food sector over the next decade, actually delivering on the potential will require more detailed plans to be developed by producers, processors, government
agencies and related organisations. Such plans will need to take into account the questions raised above and will therefore need to be grounded in a clear and comprehensive understanding of the individual components that comprise the sector, how they interact, how and where value is created, and the ways in which the sector operates in the global economy. The majority of economic analyses related to the agri-food sector in Ireland have focused on one or two economic issues or actors – such as the co-operative structure, industry competitiveness, or the policy and regulation environment (e.g. Briscoe & Ward, 2006; Donnellan et al., 2011; O’Donoghue & Hennessy, 2015). However, little research has been conducted in the Irish context to develop an overall economic understanding of the range of activities involved in bringing an agri-food product from conception through to delivery to final consumers. This thesis attempts to fill this research gap and aid in the understanding of how economic gains can be generated from agri-food by analysing the sector from a multi-dimensional value chain perspective.

The analytical framework
Traditional economic concepts, such as comparative advantage, have been used to examine the kinds of issues affecting the global economy noted above. However, such concepts fail to fully account for the increasing fragmentation of processes involving production and supply of goods, both within and across countries. A body of research relating to “global value chains” (GVCs) has emerged in recent years to address this shortcoming. Value chains, according to a recurring description in the literature, refer to the array of activities that are carried out in order to bring a product or service to the market, from initial conception all the way through to the commercialisation process (De Backer & Miroudot, 2013). Value chain analysis can therefore provide a holistic perspective of a country’s engagement in a global industry by focusing on the sequences and overlaps of tangible and intangible value-adding activities, thereby offering economic insights on issues such as industry structure, governance, value creation, and the key actors and institutions that make up the industry (Gereffi & Fernandez-Stark, 2011). Research on GVCs has picked up pace in recent years, particularly thanks to the work of a diverse interdisciplinary and international network of researchers, activists and policymakers linked to Duke University’s Global Value Chains Initiative. In this paper, the GVC methodology arising from the work of the GVC Initiative will be employed to analyse and develop a greater understanding of the two most important pillars of the Irish agri-food sector, the dairy and beef industries, in order to offer insights to
industry stakeholders and policy makers considering the types of research questions highlighted earlier.

This paper will continue as follows: Chapter 1 explores how the concept of global value chains came about, and outlines some of the developments related to the globalisation of production processes that a value chain perspective could help explain. Chapter 2 describes the GVC methodology espoused by the GVC Initiative that will serve as the analytical framework for the research to follow. Chapter 3 applies the GVC methodology in detail to a case study on the Irish dairy value chain, and develops a value chain map – the first of its kind for the Irish dairy industry – to help explain the products, processes and activities that capture added value. Chapter 4 conducts a less in-depth GVC analysis of the beef industry and highlights some contrasting features between the Irish dairy and beef value chains. Finally, the paper concludes with some high-level observations that may inform policy recommendations for the Irish agri-food sector.
1. The Theory of Global Value Chains

Increasing globalisation and the related development of world production, investment and distribution systems have stimulated the creation of conceptual frameworks to help explain the ways that firms and nations engage in the global market (Neilson *et al.*, 2014). This is partly due to the fact that earlier efforts to describe patterns of global integration, for example the concept of comparative advantage, do not adequately account for the increasing separation of processes across the production and supply chain. The concept of “global value chains” (GVCs) has attempted to address this issue and provides the primary analytical framework for this paper. To begin, the next section will provide a brief overview of the origins of global value chains as described in the literature in order to gain a better understanding of the concept and its applicability.

1.1 Global Value Chain History & Definition

According to the World Trade Organisation (WTO), use of the term “value chains” first appeared as far back as the 1960s in the context of development paths for mineral-exporting economies. It was in the 1980s, however, that the term was popularised by Michael Porter in the business literature. Porter introduced the term “value chain”, which was based on the idea that an organisation as a system was made up of sub-systems, each with inputs, transformation processes and outputs. The concept denoted that products pass through the activities of a chain in a certain order, and at each stage the product increases in value. Of note, the concept was also deemed to include not only processes involving physical transformation but also the related support functions such as research and development or procurement.

Gereffi & Lee (2012) also trace the emergence of global value chains to the 1960s when globalisation elevated competition between firms from the local to the international stage, leading to a change in production methods. At that time US companies, in particular, looked for ways to reduce production costs by outsourcing different segments of the production process, for example by outsourcing the assembly of US car parts to Mexican workers to take advantage of cheap Mexican labour costs.

De Backer & Miroudot (2013) describe a slightly different path to the creation of the GVC concept, citing Bair (2005) in tracing it back to the idea of “commodity chains” that appeared
towards the end of the 1970s. The basic approach was to identify all the various inputs and transformations necessary to develop a final product and to map the chain of processes involved. The idea of a “global commodity chain” was later introduced in the work of a pioneer in value chain analysis, Gary Gereffi, where he mapped the apparel commodity chain across countries: from the raw materials, such as cotton, wool or synthetic fibres, to the final products in the form of garments. De Backer & Miroudot (2013) note that in the 2000s, there was a shift in terminology to the “global value chain” arising from the analysis of trade and industrial organisation as a value-added chain, for example in the work of Porter noted above.

Regardless of the path to get there, the definition of value chains is broadly consistent across most of the key literature published in the past decade: in it, the value chain is defined as the full range of activities and processes that are needed to bring a product from conception through the intermediary stage of production to delivery to final consumers. Leading on from this definition, a global value chain can be simply explained as “the sequence of all functional activities required in the process of value creation involving more than one country” (Banga, 2013, p.6).

1.2 Insights from the Study of Global Value Chains

The GVC concept encompasses a number of characteristics of the world economy today. The Organisation for Economic Co-operation and Development (OECD) suggests a number of important developments related to the globalisation of production processes that GVCs could help explain or manage (2013):

- **Economies are becoming more interconnected.** Through GVCs, economic activities in a single industry are often split out across countries in the interest of sourcing the most efficient inputs as well as gaining access to final producers and consumers in other countries. Exported products are more likely to include a measure of value added imported from another country with a productivity advantage, with over half of the world’s manufacturing imports comprised of intermediate goods (primary goods, parts and components, and semi-finished goods).

- **Firms and countries are increasingly specialising in particular tasks and business functions rather than in specific products.** Economic policies tend to be based on the assumption that goods and services are produced from start to finish domestically in order to compete with products from other countries. However, through GVCs
economic actors are more likely to compete for a particular role within the value chain, suggesting that an understanding of GVCs is critical to align policy closer to the needs and reality of business.

- **Global buyers and suppliers are key players.** The study of global value chains offers insights into governance structures, by identifying which actors control and coordinate activities in production networks. Gaining an understanding of governance structures helps policymakers in assessing how policies affect firms and the global positioning of their activities.

From the perspective of GVCs, these developments in the global economy raise a number of questions with respect to industrial policy. For example:

- What activities or roles should a country specialise in?
- What is the best environment for enabling firms and industries to successfully take part in the global economy?
- How can policy makers support the creation of employment, wealth and innovation amid increasing global competition?
- How can policy makers ensure that the benefits of investment in new industries, such as jobs, added value and innovation accrue to the domestic economy?

Questions such as these are not easily answered but, by developing a better understanding of how global value chains operate, individual countries can gain some insights into how to achieve economic gains amid the evolving changes in the world economy (Sturgeon *et al.*, 2013). By using global value chains to their advantage and by playing to their strengths, countries – large and small, developed and developing – can set themselves up to improve income, employment, and productivity (OECD, 2014). This is an area which will be examined later in the paper in the context of the Irish dairy and beef industries. Although dairy and beef commodities and value-added products are traded globally, and the dairy and beef value chains are truly global in nature, this paper will focus on the value chain activities as they pertain to Ireland in order to home in on the issues of most concern to Irish industry stakeholders and policymakers. But first, the chapter that follows will describe in detail the GVC methodology that will serve as the main analytical framework for this research.
2. Global Value Chain Methodology

The past decade or so has seen a flurry of research activity on GVCs by a diverse interdisciplinary and international network of researchers, activists and policymakers under the banner of the Global Value Chains Initiative, housed at the Center on Globalization, Governance & Competitiveness (CGGC) at Duke University. GVC Initiative members have tracked the global spread of industries and studied the implications for both firms and countries as part of efforts to formalise a framework for GVC analysis. According to Gereffi & Fernandez-Stark (2011), the GVC framework offers insights into the way global industries are organised through the study of the structure and dynamics of different players involved in a given industry. The GVC methodology helps in identifying changing production patterns, connecting activities across multiple countries and actors within a single industry, and clarifying roles across both developed and developing countries.

Of particular relevance to this paper is that the GVC methodology is increasingly being adopted by a range of institutions and governments as part of efforts to understand the different layers of global industries. In such cases, the relevant actors are seeking to identify a country’s or firm’s best position in the GVC as well as the most competitive supply of tasks or business functions, with the goal of informing the development of programmes and policies to add value and, ultimately, to promote economic development.

In order to consider how the GVC framework might be applied to Ireland and more specifically the dairy and beef industries – as I will do later in the paper – it is important to first highlight the key dimensions of the methodology championed by the GVC Initiative. There are four basic elements that the GVC methodology investigates:

1) an input-output structure, which describes the process of transforming raw materials into final products;
2) a geographical consideration;
3) a governance structure, which explains how the value chain is controlled; and
4) an institutional context in which the industry value chain is embedded.

An additional element of analysis often included as part of the GVC methodology is referred to as *upgrading*, which describes the dynamic movement within the value chain by examining how producers shift to higher value stages of the chain. As these five elements
provide the basis for an analysis of the Irish dairy value chain later on in the paper, it is important to first describe them in more detail:

2.1 Input-Output Structure

- Identify the main activities in a global value chain.

The aim of this step of the analysis is to gain general knowledge about the industry in question and then map the entire input-output process involved in bringing a product or service to the market, from conception to end use by final consumers. The input-output structure is typically represented as a set of value chain “boxes” demonstrating the flow of goods and services including, for example, research and development, inputs, processing, marketing, distribution and sales (see Figure 1 below for an example of the core components seen in most value chains).

Figure 1. Generic Industry Value Chain Segments

![Generic Industry Value Chain Segments](image)

Source: adapted from Gereffi & Fernandez-Stark (2011); Le Heron et al. (2010); Sturgeon et al., (2013); USAID (2007)

- Identify the dynamic and structure of firms under each segment of the value chain.

It is also important to develop a contextual understanding of the type of firms involved in the industry in question, including their global reach, size, and ownership. By identifying the firms in the chain it is also possible in this step of the analysis to develop insights into the prevailing governance structure within the chain.

2.2 Geographic Scope

The idea behind geographical analysis stems from the fact that in today’s globalised economy, supply chains are often fragmented around the world as different countries or regions specialise in areas of competitive advantage. The typical scenario is that developing countries offer low labour costs and raw materials, while wealthier nations leverage their

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1 Based largely on the work of Gereffi & Fernandez-Stark (2011).
highly educated workforce to specialise in research and development or marketing. Although GVCs can be found at different geographic scales – such as local, national, regional and global – what is remarkable today is the extent of the global fragmentation and how improvements in technology and transportation have facilitated the dispersion of production that was not possible before. Within the GVC methodology, geographic scope can be assessed by identifying the lead firms in each part of the value chain for a given industry and the presence of these leading firms within particular countries or regions.

2.3 Governance

Analysing the governance structure looks at the global economy from the top down to develop an understanding of how a value chain is controlled and coordinated, usually informed by an uneven distribution of power between different firms. In the early years of analysing global value chains, governance was described broadly in terms of “producer-driven” and subsequently “buyer-driven” chains. Producer-driven chains are typically vertically integrated along all segments of the supply chain and associated with high-tech sectors, including the automotive, pharmaceutical, or even infant milk formula industries. Because technology and research and development are such critical parts of such industries, lead firms are most likely to be situated high up the chain and control the design of products as well as most of the assembly which may be split across different countries. Production in buyer-driven chains, on the other hand, can be completely outsourced and is controlled by retailers and branded marketers – such as Nike, Inc., or McDonald’s restaurants – which are focused on the marketing and sales parts of the chain (De Backer & Miroudot, 2013).

2.4 Institutional Context

According to Gereffi & Fernandez-Stark (2011), the institutional framework identifies how local, national and international conditions and policies impact on the globalisation in each stage of the value chain. Within this framework, the ability for a firm to enter into the global value chain depends to a large extent on three separate dynamics at the local level: economic (for example, labour costs and access to finance); social (such as availability of labour and relevant skills); and institutional (such as the tax structure, subsidies or policies that may promote or hinder industry development). Analysing the local dynamics in which a value chain is embedded can be achieved by mapping all the relevant industry actors in the value chain and their main role in the chain.
As noted earlier, some GVC studies discuss the idea of upgrading, which refers to the strategies used by firms and countries to move to higher value activities within GVCs in order to preserve or increase their competitiveness in the global economy. Upgrading can be considered a self-development process by which firms enhance their knowledge and capabilities – such as acquiring the expertise to produce milk-derived ingredients for the sports nutrition market – thereby facilitating innovations or improvements that increase the value of their goods or services (Frederick, 2014).

Now that the key dimensions of the GVC methodology have been outlined, the next chapter will apply this framework to the main case study in this paper: the value chain mapping and analysis of the Irish dairy value chain.
3. GVC Analysis of the Irish Dairy Industry

Among the FW2025 recommendations for the dairy industry was the following: “Industry will continue to focus on the development of value-added products whilst ensuring, insofar as possible, that the maximum value possible is retained indigenously” (DAFM, 2015).

Developing plans to make progress on this recommendation and others requires a clear understanding how the industry is organised, how and where the value is added, and the key players involved in capturing the value generated. This chapter of the paper attempts to aid this understanding by mapping and analysing the Irish dairy value chain, using the GVC methodology proposed by Gereffi & Fernandez-Stark outlined in Chapter 2. This approach involves identifying the key products, activities, actors and locations involved in taking a good or service from raw material to production and finally on to the consumer, and presenting the information in the form of a value chain map (see Figure 2 on page 13 for an illustration of the proposed Irish dairy value chain map). In order to begin, however, the GVC methodology first proposes outlining the evolution of the industry in question and the trends that have shaped it.

3.1 Background to the Irish Dairy Industry

Over a number of decades, Ireland has built up a strong track record of producing and exporting high quality and nutritious dairy products, due in large part to its sustainable grass-based system. The farmer-owned co-operative model has been the dominant organisational structure within the dairy industry, created as far back as the 19th century to assist small farmers in accessing markets and earning a fair milk price. Focusing on more recent times, the evolution of the dairy industry in Ireland over the past 30 years has been inextricably linked to the era of milk quotas under the Common Agricultural Policy (CAP) of the European Union. Up until the introduction of milk quotas in 1984, the dairy industry had expanded by continuously increasing milk supply, facilitated by CAP measures that would intervene to ensure that even surplus production would be rewarded. The introduction of quotas, intended to rein in rising milk production, led to a reduction in dairy cow numbers. The number of dairy producers also dropped significantly over time, from around 68,000 in 1984 to around 17,500 in 2014, associated with a trend towards farm consolidation and associated growth in average farm size (NDC, 2008; Teagasc, 2015).
The limits placed on milk production also impacted opportunities for growth by dairy processors in Ireland, resulting in three significant outcomes: gradual consolidation among co-operatives; a push by processors to expand overseas through the acquisition of existing facilities, most notably in the US and UK; and, perhaps most importantly, a marked effort by processors to shift production onto higher value-added products and ingredients. Today, the dairy industry is one of Ireland’s most important indigenous industries and a vital component of the growing agri-food sector. The export market forms the basis for the strength of the dairy industry where as much as 85 percent of production is sold. In 2014, exports of dairy products and ingredients – not including dairy-based enriched powders of €700 million – were valued at over €3 billion. Traditionally the largest market for Irish dairy exports, the United Kingdom remains a vitally important player accounting for almost one third (€1 billion) of the total. The EU is also a significant destination for Irish dairy exports, with over 28 percent (€800 million) of total trade going to other countries in the EU outside of the UK, most notably Germany, France and Italy and the Netherlands. Perhaps of most interest to policy makers in the dairy industry, international markets now account for as much as 40 percent of dairy exports following rapid growth in demand in recent times. Demand from Asia, in particular, has been very strong, growing 30 percent over the period 2013-2014 to reach 17 percent of exports, while shipments to the Middle East and North Africa (MENA) region, North America, and Russia have all increased (Bord Bia, 2015).

On the next page the proposed Irish dairy value chain map is presented. The value chain map serves as an introduction to the following sections which go on to explain in detail the key products, actors, institutional structures and interactions that relate to each segment of the value chain.
Figure 2. The Irish Dairy Value Chain Map

Source: author’s own research, with conceptual ideas from Gereffi & Fernandez-Stark (2011); Le Heron et al. (2010); Sturgeon et al., (2013); USAID (2007)
3.2 Inputs to Dairy Farming

Identifying the inputs required in dairy farming is the first step in mapping the Irish dairy value chain. Dairy farming requires a range of different inputs which can be divided in terms of animal inputs, such as stock, feed and veterinary services, and pasture inputs, such as land, infrastructure and fertilisers (Le Heron et al., 2010). However, in terms of assessing the costs of production on dairy farms, costs of inputs are more commonly allocated to two categories: direct costs which apply to a specific farm business and vary with farm output; and overhead costs which relate to the farm as a whole and are incurred irrespective of the level of output. Direct costs include expenditure on feed, fertiliser, contractor fees, veterinary services and casual labour. Overhead costs may include land rental, hired labour costs, depreciation of buildings and machinery, interest on loans and land maintenance costs (Teagasc, 2015).

Table 1 below provides averages for the key costs incurred and profit margins experienced by dairy farmers in 2014.

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentrate Costs</td>
<td>5.49</td>
</tr>
<tr>
<td>Pasture and Forage Costs</td>
<td>4.94</td>
</tr>
<tr>
<td>Other Direct Costs</td>
<td>4.31</td>
</tr>
<tr>
<td><strong>Total Direct Costs</strong></td>
<td><strong>14.74</strong></td>
</tr>
<tr>
<td>Energy and Fuel</td>
<td>2.39</td>
</tr>
<tr>
<td>Hired Labour</td>
<td>0.46</td>
</tr>
<tr>
<td>Other Fixed Costs</td>
<td>8.31</td>
</tr>
<tr>
<td><strong>Total Fixed Costs</strong></td>
<td><strong>11.16</strong></td>
</tr>
<tr>
<td><strong>Total Costs</strong></td>
<td><strong>25.90</strong></td>
</tr>
<tr>
<td><strong>Total Gross Output</strong></td>
<td><strong>38.86</strong></td>
</tr>
<tr>
<td><strong>Net Margin</strong></td>
<td><strong>12.97</strong></td>
</tr>
</tbody>
</table>

Source: Teagasc National Farm Survey 2014

Animal feed and fertiliser are generally the main inputs which affect the cost of milk production. In Ireland’s case, the overwhelming majority of dairy herds eat fresh grass for up to 300 days per year, with conserved grass the main food source during the winter months. The low-input, grass-based production system used in Ireland is seen as advantageous when animal feed prices are high, due to the relatively low input content of feed compared with high-intensity confinement systems seen in many other countries. Given the importance of Ireland’s grass-based production system, grassland management – in terms of utilising correct stocking density, applying the correct quantity of fertiliser and operating a controlled grazing
system – is an important focus for dairy farmers in managing input costs as well as ensuring productivity. The downside to the reliance on such a low-input production system is that output per cow is typically also significantly lower compared to more intensive production systems that utilise concentrates over grass. An additional shortcoming is that production is also more seasonal under the pasture-based system seen in Ireland, leading to higher costs at the processing level as processing facilities built to accommodate peak period milk production can only operate at such levels for a limited period of the year (Donnellan et al., 2011).

3.3 Milk Production

There are approximately 17,500 dairy farms in Ireland which produce over 91 percent of all milk processed in Ireland, with the remainder being imported from farms in Northern Ireland (Agri Aware, 2014). Figure 3 shows the total milk supplies sent for processing by creameries and pasteurisers in Ireland between 2011 and 2014. Since 2012, milk intake has increased year on year, likely reflecting producers’ efforts to begin ramping up production in anticipation of the lifting of milk quotas in 2015. Although the 2014 figure of 5.6 billion litres produced domestically represents an improvement over previous years, that volume would appear small compared to approximately 21 billion litres produced in New Zealand in the same period (DCANZ Statistics, 2015).

Figure 3. Intake of Cows Milk by Creameries and Pasteurisers (million litres)

Source: CSO
Income from milk production in Ireland has for some time been the most profitable conventional agricultural activity when measured both on a per-farm and per-hectare basis (Teagasc, 2015). With the abolition of the milk quota regime as of April 2015, the dairy industry in Ireland is once again engaging in rapid expansion in order to tap into the export potential offered by increasing demand for dairy products worldwide – due in large part to changing dietary preferences among an expanding middle class in many developing countries. The Irish Government and industry experts have targeted an ambitious 50 percent growth in milk production by the year 2020, amounting to an additional 2.7 billion litres over baseline production figures.

3.4 Dairy Processing – Primary and Secondary

Liquid milk is composed of water (~87%), lactose (~4.8%), fat (~3.8%), protein (~3.4%) and minerals (~1% or less) (Dairy Ireland, 2013). In simplest terms, dairy processing involves the processing of liquid milk for human consumption and the separation and concentration of its different constituents to manufacture commodity dairy products. Around 480 million litres of liquid milk was processed for human consumption in 2014 (see Table 2), accounting for only eight percent of total milk processed in 2014 in that year.

Table 2. Milk Sales for Human Consumption by Type of Milk (million litres)

<table>
<thead>
<tr>
<th>Type of Milk</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole milk</td>
<td>282.0</td>
</tr>
<tr>
<td>Skimmed milk</td>
<td>21.1</td>
</tr>
<tr>
<td>Semi-skimmed milk</td>
<td>176.6</td>
</tr>
<tr>
<td>All milk</td>
<td>479.7</td>
</tr>
</tbody>
</table>

Source: CSO

The remaining 92 percent of the milk pool underwent primary processing into dairy commodities and products, including butter, cheese, milk powders, casein and whey powder, with some of these products continuing on to undergo secondary processing, for example to be made into higher value products such as premium cheeses, infant milk formula or sports

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2 Primary processing of food is generally done to make it safer to consume, easier to transport, more appealing to consumers or more convenient to use: for example, pasteurising, drying, and manufacturing of basic dairy commodities, or cutting and boning of beef and manufacture of beef-based products such as hamburgers. Secondary processing of food occurs after primary processing to create food products that are significantly different from the original raw ingredients that form the product: according to the Irish Dairy Industries Association, secondary processing includes the manufacture of infant milk products, nutrition products and ingredients, and dairy-based liqueur and confectionary products (IDIA, 2007).
nutrition products and ingredients. Table 3 provides an indication of the volume of core dairy products undergoing primary processing in 2014.

Table 3. The Utilisation of Milk in Ireland – Primary Processing

<table>
<thead>
<tr>
<th>Product</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid milk</td>
<td>480 million litres</td>
</tr>
<tr>
<td>Butter</td>
<td>166,400 tons</td>
</tr>
<tr>
<td>Cheese (mostly cheddar)</td>
<td>188,400 tons</td>
</tr>
<tr>
<td>Whole milk powder</td>
<td>38,000 tons (2011)</td>
</tr>
<tr>
<td>Skimmed milk powder</td>
<td>70,600 tons**</td>
</tr>
<tr>
<td>Casein</td>
<td>48,400 tons</td>
</tr>
<tr>
<td>Whey powder</td>
<td>100,000 tons (2011)</td>
</tr>
</tbody>
</table>

Source: CSO, IFA

**Partial due to confidentiality issues

3.4.1 Overview of the Dairy Processing Industry

The mainstream processing industry is made up of 16 processors ranging from smaller co-operative creameries such as Centenary/Thurles or North Cork, to large, globally operating co-operatives such as Dairygold or Carbery, and also some public limited companies (PLCs) such as Glanbia and Kerry Group, which have their shares listed on the Irish Stock Exchange. The farmer-owned co-operative model has been the dominant organisational structure within the dairy industry since its inception, helping to provide producers with a voice in decision making in their industry, and a large degree of consistency with respect to market access and milk prices. Importantly, the co-operative model has also facilitated relatively orderly coordination along the value chain.

In addition to the types of processors noted above, there are also a number of important multinational corporations (MNCs) with operations in Ireland that do additional processing of dairy products, such as Abbott Nutrition (infant formula), Danone (infant formula), Nestlé’s Wyeth Nutrition (infant formula) and Mondelēz (chocolate crumb). In common with most if not all entities involved in dairy processing is the export-oriented focus of their operations. Given Ireland’s small domestic market relative to the volume of milk output, as much as 85 percent of dairy products produced in Ireland are exported each year. According to the Irish Co-operative Organisation Society, there are 22 manufacturing milk plant locations in Ireland. In terms of products, 12 of the plants process milk powder; nine of them process butter; eight are cheese-making plants; and four large plants manufacture infant milk formula or ingredients for same (2015).
In the early 2000s, the Department of Agriculture & Food and Enterprise Ireland, in conjunction with the Irish dairy processing industry, commissioned Prospectus and Promar International to carry out a strategic study (the “Prospectus Report”) of the Irish dairy processing industry. Their report concluded that although the number of processing co-operatives and plants had dropped during the 1990s and into the 2000s, the Irish dairy processing industry remained relatively fragmented compared to other dairy-producing countries. The Prospectus Report suggested that in order for the Irish dairy industry to improve its competitive position, the tradition of small scale of dairy processing would need to make way for plant rationalisation and consolidation in order to achieve economies of scale comparable to larger operators in rival countries. Some industry consolidation has taken place in recent years, with the three largest processors – Glanbia, Dairygold and Kerry Group – processing approximately 70 percent of the total milk pool in 2014, compared to 2001 when a similar market share was held by the four largest processors (Prospectus and Promar International, 2003; Teagasc, 2015). However, this level of consolidation falls far short of Ireland’s major competing dairy export countries such as Denmark or New Zealand, where only one company processes as much as 70 or 80 percent of the milk pool (Prospectus and Promar International, 2003).

3.4.2 From Commodity to Value Added Products

Historically, Ireland’s dairy product mix has been weighted towards undifferentiated products or commodity output, such as liquid milk, milk powders, bulk butter and cheese, and casein. In more recent times, industry players and policy makers have emphasised developing more differentiated products that can command higher prices due to their relative scarcity, brand appeal, or ability to meet the specific needs of consumers. Such value-added, and usually more highly processed, products include infant formula products and ingredients, nutrition products and ingredients, and premium cheeses like Kerrygold’s Kildery cheese (a specialist Maasdam-type cheese being marketed and sold in Germany). As recently as 2008, close to two thirds of Irish dairy exports were priced at world base commodity price level, with the remaining one third making up value-added or branded products (Enterprise Ireland, 2009). One of the challenges of relying so heavily on commodity-based exports is that commodity prices can fluctuate considerably from year to year, although that effect was neutralised somewhat over the past decades thanks to a number of market supports under CAP, such as export subsidies and intervention buying for butter and skimmed milk powder. However, the
removal or phasing out of CAP market supports over the past few years has further encouraged the dairy industry and policy makers to focus more on developing value-added products and ingredients that can command a price premium and are generally more stable in prices compared to commodity products (Ryan, 2014).

Perhaps the most frequently-cited example of a value-added product in the dairy industry is infant milk formula. The processing of milk constituents and other ingredients into infant milk formula is not the most milk-intensive activity in the dairy industry, but the share of value added to Irish exports is significant indeed – in 2012, infant milk formula sales overseas was around €700 million, equating to close to 30 percent of the value of Irish dairy exports in value terms (see Figure 4 below). According to a Teagasc report on the dairy industry, the MNCs involved in producing infant milk formula are able to mark up their product by as much as 20 to 30 percent, far more than the low single digit percentage mark-up applied to standard dairy commodities (Teagasc, 2015).

**Figure 4. Irish Dairy Exports in Value Terms (2012)**

![Bar chart showing Irish dairy exports in value terms (2012)]

Source: Eurostat, Teagasc (2015)

In addition to the large MNCs, the larger Irish dairy processors have also invested heavily to upgrade their activities in the value chain in order to realise the potential for higher and more stable returns of value-added products. Section 3.5.3 below provides a more detailed example of one such added-value activity – processing of whey powder for sports nutrition products – and the returns that can be made from innovative processing methods.
3.4.3 Adding Value through Secondary Processing: Whey Protein Isolate

Liquid whey is an interesting example of how value can be added through additional processing. Whey, a by-product of cheese and casein production, was until relatively recently considered to be of very little value. However, thanks to investments in processing technology, and advances in the science of human nutrition, Whey Protein Isolate (WPI) containing 90 percent protein is now considered a valuable ingredient for the sports nutrition industry. This industry was estimated to be worth $10.1 billion globally in 2014 and growing at 11 percent each year (DAFM, 2015). Table 4 below profiles the greater value that can be extracted by varying degrees of processing raw whey, to be used as ingredients in products as diverse as ice cream, infant milk formula and sports nutrition products.

Table 4. Value Added from Processing Liquid Whey

<table>
<thead>
<tr>
<th>Product</th>
<th>~ Kg per Ton Raw Whey</th>
<th>Production Process</th>
<th>~ Price per Ton of Powder*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whey powder</td>
<td>71</td>
<td>13% protein – raw whey (6% solids) is dried to powder form (97% solids)</td>
<td>$1,000</td>
</tr>
<tr>
<td>Whey protein concentrate (WPC35)</td>
<td>18</td>
<td>35% protein – further value added by extracting lactose to increase the protein %</td>
<td>$2,200</td>
</tr>
<tr>
<td>Whey protein concentrate (WPC 80)</td>
<td>7</td>
<td>80% protein – further lactose extracted</td>
<td>$5,500</td>
</tr>
<tr>
<td>Whey Protein Isolate (WPI)</td>
<td>4</td>
<td>90% protein – nearly all the fat and lactose is extracted</td>
<td>$6,000</td>
</tr>
</tbody>
</table>

*Figures reflect average prices as of end-2014

Ireland-based global performance nutrition and ingredients group, Glanbia, has leveraged this value-added potential to develop into the world’s leading provider of whey-derived nutritional solutions. Glanbia now owns the largest Business to Consumer global sports nutrition brand family and controls as much as 12 percent of the global sports nutrition market (DAFM, 2015).

The example of one of Glanbia’s added-value activities above also provides an interesting opportunity to test the validity of the proposed Irish dairy value chain map presented in Figure 2. As shown in Figure 5 below, the relevant segments of the dairy value chain map can be juxtaposed with Glanbia’s own value chain as drawn directly from the company’s annual report – the simple graphic demonstrates the strong alignment between the proposed value chain map for the dairy industry and the individual company’s core business activities.
3.5 Branding, Marketing and Distribution

In the relatively small domestic market, accounting for no more than 15 percent of milk production and processing, most dairy co-operatives and PLCs market and sell their products, whether at the local level or on a national scale. The National Dairy Council, a non-profit organisation funded by a voluntary dairy farmer levy, supports growth in the consumption of dairy products in Ireland through education, marketing and communications programmes. Bord Bia, an Irish state-funded agency, also helps to promote sales of Irish food and horticulture, including dairy, in the domestic market in addition to its role in linking Irish producers and their customers worldwide.

A considerable amount of the sales and marketing activities for the extensive export market for dairy products is led by the three largest processors – Glanbia, Dairygold and Kerry Group – in addition to Orana (formally known as the Irish Dairy Board Cooperative Limited), an agri-food commercial co-operative that packages, markets and sells dairy products to overseas markets on behalf of its members and the Irish dairy farmer. These
large, globally-operating co-operatives/PLCs maintain a high degree of vertical integration within the value chain, often controlling everything from milk collection and primary processing to secondary processing and on to branding and distribution. Ornua accounts for the majority of dairy exports from Ireland, using packing and distribution subsidiaries in a number of countries to export a range of branded products such as Kerrygold, Dubliner, Pilgrims Choice and MU. Ornua has been particularly helpful in providing a platform for the smaller and medium-sized co-operatives to access export markets (Briscoe & Ward, 2006). However, due to their wide reach and, in some cases, similar product lines, Ornua and the larger co-operatives and PLCs have ended up being in direct competition with one another in a number of markets worldwide, leading to inefficiencies and a situation where Ireland is at a disadvantage compared to its main international rivals who have more integrated marketing and distribution systems (Prospectus and Promar International, 2003).

The other key players in the marketing segment are the MNC processors which invest heavily in advertising their branded products like Aptamil, Cow & Gate (Danone) and Similac (Abbott Nutrition). These major processors invest a large part of their sales effort in targeting healthcare professionals (rather than retailers) in order to take advantage of their credibility in the eyes of consumers with respect to products such as infant milk formula.

3.6 Sales and Retail

In terms of sales of liquid milk in Ireland, retailers are the main distribution channel accounting for close to 80 percent of all fresh milk, with food services/catering and ‘doorstep’ deliveries making up around 10 percent each. Within the retail sector, the three largest supermarket chains – SuperValu, Tesco and Dunnes Stores – controlled 74 percent of the Irish grocery market in 2014 (NMA, 2014). This significant market share of the big supermarkets provides them with considerable bargaining power over processors and producers, a situation that is compounded by the fact that milk imports from Northern Ireland can often be available more cheaply that milk from Irish producers (Matthews, 2009). According to the National Milk Agency, over 64 percent of liquid milk is sold under the retailers’ own labels, which may sell for up to one quarter less than processors’ brands (NMA, 2014). Although the own label figure is relatively high, the fact that up to 36 percent of the liquid milk pool is sold under the more expensive processors’ brands suggests that the processors still retain a reasonable measure of market power. In Ireland, processor prices for
liquid milk sales to retailers are not published and so it is not possible to give accurate figures for the margin breakdown of a litre of milk. However, an Irish Farmers Journal estimate from 2009 (see Figure 6 below) offers an indication of the relative strength of the retail take from sales of liquid milk.

**Figure 6. Estimated Margin Breakdown for a Litre of Milk in Ireland**

![Diagram showing margin breakdown](image)

**Source:** Irish Farmers Journal, October 2009

The above example shows that much of the value from a commodity product like liquid milk can be captured by the retail sector, but the picture may be quite different for more highly processed, value-added dairy products. A study by Coriolis Research of the New Zealand infant milk formula industry (see Figure 7 below) estimated that the lion’s share of the value of a can of infant milk formula is created by the manufacturer (or secondary processor). This suggests that FW2025 efforts to maximise the value of processed goods retained indigenously should focus on encouraging processors that engage in more complex, higher value processing to locate their factories in Ireland, rather than locating them overseas and shipping lower value ingredients to them from Ireland, such as milk powders.
3.7 Institutional Context

Creating the right institutional and regulatory environment – including activities such as government policy, international trade agreements, research and development, and education and training – is an important enabler of driving value-added activities in the agri-food sector in general. As noted earlier, the CAP has been hugely influential in the dairy industry through the imposition of milk quotas. Their abolition in April 2015 provides Irish dairy farmers with an important opportunity to increase milk production for the first time in 30 years. CAP funding, in the form of direct payments, also plays a vital role in helping farmers to finance expansion plans and expenditure on farm inputs and services, as well as helping to smooth out volatility in milk prices (Agri Aware, 2014). Climate change is a hugely important area that will require a comprehensive institutional response over the coming years, as Irish agriculture grapples with the challenge of increasing food production to meet global demand, while simultaneously trying to reduce greenhouse gas emissions from the sector as part of the DAFM’s forthcoming National Mitigation Plan (DAFM, 2015).

Research into innovative new processes and products that add value is vital to ensure the continued success of the industry. Although the larger processors have their own research and development operations, the public sector in Ireland plays an important role by investing in programmes and initiatives to support the production and commercialisation of value added products. One such initiative is the Dairy Processing Technology Centre (DPTC), hosted by
the University of Limerick. The DPTC is a collaboration of eight companies and 10 research performing organisations working to position Ireland as a world leader in dairy innovation. Food for Health Ireland, a partnership between Enterprise Ireland and the dairy industry, is another important initiative set up to identify novel ingredients coming from milk to develop functional food ingredients with health benefits for consumers.

Continuing on the research and development theme, the establishment of an innovative cheese production facility in Saudi Arabia provides an example of what can be achieved through partnerships between different actors across the value chain framework. In late 2013, Ornua announced a multi-million euro investment to develop a new state-of-the-art manufacturing plant in Riyadh. The investment formed an important component of national efforts to develop new routes to market in light of the additional milk production expected in the aftermath of the abolition of milk quotas. The new facility will use pioneering technology developed by Ornua and Teagasc to produce a range of fresh white cheeses that appeal to local market tastes. The technology allows milk protein ingredients to be recombined in Riyadh for fresh white cheese production, thereby adding significant value to the Irish milk powder concentrate that is shipped from Ireland to Riyadh (Teagasc, 2013). This initiative illustrates the importance of having a favourable institutional environment: the development of new market potential was made possible by a collaborative partnership between Teagasc, a state-funded organisation investing in scientific research and development, and the commercial sector, in this case Ornua.

3 The DPTC consortium includes eight companies: Arrabawn Co-op, Aurivo, Carbery, Dairygold, Glanbia, Kerry, Lakeland Dairies and Tipperary Co-Op and 10 research performing organisations: University of Limerick (Host), Teagasc, UCC, UCD, TCBB at NUIG, DCU, TCD, DIT, ITT & CIT.
4. GVC Analysis of the Beef Industry and Comparison with Dairy

The main case study in this paper – described in Chapter 3 – focused on using the GVC methodology to develop an understanding of the Irish dairy value chain; however, a similar approach can be applied to the beef value chain to reveal some interesting comparisons between the two industries. This chapter will develop a value chain map for the Irish beef industry, describe briefly the key elements that make up the beef value chain in Ireland, and make some high-level comparisons between it and the dairy value chain. Such comparisons may identify areas of strength or weakness within each chain that could provide insights for policy making in regard to the research questions highlighted earlier, for example, what is the optimal industry structure, or what activities should Ireland specialise in to generate and retain value domestically.

The beef industry is the most significant component of the Irish agri-food sector, accounting for over one-third of gross output (34 percent). The overwhelming majority of beef produced in Ireland – amounting to nine out of every 10 cattle produced in Ireland – is targeted for export to the UK, Continental Europe and international markets. This makes Ireland the largest net exporter of beef in the EU and the fifth largest in the world. In 2014, the volume of beef exports exceeded 520,000 tonnes generating over €2.2 billion in revenue, a 50 percent jump in value over 2010 figures (Bord Bia, 2015.)

On the next page the proposed Irish beef value chain map is presented. The value chain map provides an overview to the following paragraphs which explain in brief the key products, actors, institutional structures and interactions that relate to each segment of the value chain.
Figure 8. The Irish Beef Value Chain Map

Source: author’s own research
4.1 Mapping the Beef Value Chain

Beef farming in general requires much of the same inputs as the dairy farming enterprise, such as stock, feed, veterinary services, land, and fertilisers. However, there is a large degree of heterogeneity in the beef industry in terms of specialisation, intensification, breed, production systems, and types of animals – such as suckler cows, calves, heifers, young cattle, bulls and steers – resulting in significant variation in costs across farms. Table 5 below highlights the key costs incurred and net margins experienced by cattle finishers in 2014.

Table 5. Costs of Cattle Finishing and Net Margin (euro per hectare)

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentrate Costs</td>
<td>278</td>
</tr>
<tr>
<td>Pasture and Forage Costs</td>
<td>277</td>
</tr>
<tr>
<td>Other Direct Costs</td>
<td>79</td>
</tr>
<tr>
<td><strong>Total Direct Costs</strong></td>
<td><strong>634</strong></td>
</tr>
<tr>
<td>Energy and Fuel</td>
<td>117</td>
</tr>
<tr>
<td>Other Fixed Costs</td>
<td>367</td>
</tr>
<tr>
<td><strong>Total Fixed Costs</strong></td>
<td><strong>484</strong></td>
</tr>
<tr>
<td><strong>Total Costs</strong></td>
<td><strong>1,118</strong></td>
</tr>
<tr>
<td><strong>Total Gross Output</strong></td>
<td><strong>948</strong></td>
</tr>
<tr>
<td><strong>Net Margin</strong></td>
<td><strong>-170</strong></td>
</tr>
</tbody>
</table>

Source: Teagasc National Farm Survey 2014

Compared to the profits enjoyed by dairy farmers in 2014, cattle finishers endured negative net margins before direct payments were taken into account; the experience for single suckling enterprises did not differ much, with margins also dipping into negative territory in the same period.

Despite the growth in dairy production in the run up to the abolition of milk quotas, beef production remains the leading enterprise on Irish farms. Close to 28,000 mixed farms are involved in some aspect of the beef supply chain and approximately 68,000 farms specialise in beef production (Agri Aware, 2013) – this compares to approximately 17,500 farms specialising in dairy production. According to the Department of Agriculture, Food and the Marine, the beef farming industry in Ireland is divided across the three main roles required at the production stage – suckler producers, fatteners and cattle finishers – serviced by over 70 auction marts around the country (DAFM, 2015; IFA, 2013). In total, around 1.75 million head of cattle were produced for slaughter and processing in Irish slaughterhouses and meat processing plants in 2014. Furthermore, Ireland is also a significant exporter of live animals,
with over 230,000 animals worth over €170 million shipped overseas in 2014. The expansion of the dairy herd in the current post-milk quota environment is also expected to increase beef output by between five and 10 percent in the coming years (DAFM, 2015).

The Irish beef processing industry is made up of around 30 large-scale, DAFM-supervised private processing facilities which are approved to export from Ireland to the UK, Continental Europe and other international markets. Of these, some are focused primarily on slaughtering, cutting and packing the chilled or frozen meat for export – such as Ashbourne Meat Processors, Foyle Food Group, etc. – while a number of larger, added value processors –like ABP, Dawn Meats or Kepak – engage in the above activities in addition to further processing the meat, for example manufacture of burgers, dog food, or ready-meals. In addition, the Local Authority Veterinary Service supervises over 190 low-volume slaughterhouses that may export only within the EU, while there is also a large number of beef boning and beef added value processing businesses that do not have slaughtering facilities (Enterprise Ireland, 2009; Agri Aware, 2013). In 2014, over 570,000 tonnes of beef were processed by Irish facilities, with as much as 90 percent exported. The UK is the largest single market for beef exports, taking in approximately 270,000 tonnes worth over €1 billion (Bord Bia, 2015). In terms of distribution channels (see Figure 9 below), around 47 percent of exported beef from Ireland ends up being sold in the retail sector, with 29 percent going to the food service sector and 24 percent being used in food manufacturing (Agri Aware, 2013).

**Figure 9. Distribution Channels for Irish Beef**

![Distribution Channels for Irish Beef](image-url)

*Source: Agri Aware (2015)*
In recent years the Irish beef processing industry has undergone a noteworthy transformation, switching from being a commodity business with heavy reliance on supports and intervention to a focus on supplying differentiated and premium product such as fresh, chilled beef to more upmarket, quality- and safety-conscious retail and food service customers across the UK and Continental Europe (Agri Aware, 2013). Rather than selling live animals or carcasses of beef to institutional buyers through the intervention system or wholesale markets, as happened in the past, Irish beef is increasingly being sold in multiple and diverse boneless beef cut-portions in many different consumer-ready packaging formats (Dawn Meats, 2015).

On the marketing side, Bord Bia fulfils an important role in promoting Irish farms as environmentally-friendly producers of safe, high-quality beef. Similar to the dairy value chain, a small number of large processors invest in branding their products for export markets, ably assisted by the Bord Bia-led Quality Assurance Schemes. With regard to sales and retail, the large restaurant and retail chains are pivotal players in the beef value chain resulting from their massive purchasing power. For example, as declared on the McDonald’s website, McDonald’s is the largest purchaser of Irish beef by volume each year, buying up over 40,000 tonnes of beef which is then exported to other European markets; likewise, supermarket giant Tesco purchases almost 14 percent of the entire value of Irish beef exports annually (Tesco Ireland, 2012).

The beef industry is influenced by many of the same institutional structures as the dairy industry. Research and development efforts among public and private actors are focused on optimising fresh meat quality, and there is a growing need for training and education to enhance skills in product innovation and marketing. Perhaps more than any other institutional structure, the CAP plays a vitally important role in the beef industry by heavily subsidising farmer income. In 2014, cattle rearing farmers received an average of €15,469 while other cattle farmers (mostly fatteners) received an average of €18,349 in subsidies, accounting for 151 percent and 133 percent of income, respectively (Hennessy & Moran, 2015).

4.2 Comparing and Contrasting the Beef and Dairy Value Chains

Beef production is generally regarded to be a complex enterprise, particularly due to the heterogeneity within the breed and production systems – such as the “cattle rearing” (mostly
suckler cow production), “cattle other” (mostly fattening) and “mixed livestock” classifications used by the National Farm Survey. As a result, the Irish beef value chain tends towards complexity quite early on in the chain when compared with the dairy value chain. There are a wide range of entry and exit points for livestock, including auction marts, exports, rearing, finishing, addition of dairy beef and private sales, making the beef production phase remarkably intricate. The nature of the commodity itself – livestock of very different breeds, size, etc. – adds further complexity when compared with the relative homogeneity of cow milk production within the dairy value chain.

Despite the sizeable contribution of the beef sector to the overall economy, and the fact that the largest proportion of farms are involved in beef production, the system is characterised by low levels of economic viability at farm level, with incomes for beef farmers (before subsidies) much lower than those received by dairy farmers (see Figure 10 below).

![Figure 10. Average Farm Income by System, 2014](image)

Despite the sizeable contribution of the beef sector to the overall economy, and the fact that the largest proportion of farms are involved in beef production, the system is characterised by low levels of economic viability at farm level, with incomes for beef farmers (before subsidies) much lower than those received by dairy farmers (see Figure 10 below).

The much lower incomes from beef farming tend to be associated with lower levels of economic viability at farm level due to a number of factors such as farm size, efficiency and location in marginal areas. However, differences in coordination and producer power within the structure of the beef and dairy production and supply chains may also be contributing to the disparity in incomes. For example, on the dairy side, the long-standing farmer-owned co-operative structure gives farmers a voice in decision making in their industry and facilitates a
relatively integrated chain, from inputs through to the processing stage. However, on the beef side, a measure of coordination occurs through the livestock mart system but no large-scale farmer-owned group, processor or co-operative currently exists. As a result, Irish beef farmers are in a weak position when it comes to price negotiations with a disparate group of private sector processors, and the beef chain is characterised by intra-supply chain competition and mismanagement. This, in turn, risks impairing the overall efficiency of the chain and reducing the opportunities and capacity for creating added value (O’Donoghue & Hennessy, 2015). Another risk associated with limited coordination across the production and supply chain is the potential for significant variations in the quality and consistency of beef products – as highlighted by studies conducted in the U.S. in the 1990s, the lack of coordination and limited information sharing across the beef chain led to large variations in beef quality, which was a major determinant of a 20-year decline in beef consumption (Goldberg, Knoop & Shelman, 2005). Efforts to expand exports of premium cuts of high quality Irish beef could certainly be put at risk unless improved coordination across the beef chain can be achieved.

Another notable difference between the beef and dairy processing industries is the level of processing involved. As highlighted earlier, secondary processing – or the manufacture of food products that are significantly different from the original raw ingredients – is a very important component of the dairy value chain with considerable investment and returns associated with further processing of milk constituents, for example into added value products and ingredients for the nutrition and infant formula industries. Although the manufacture of some beef added-value products such as ready-made meals or dog food could be considered secondary processing within the beef value chain, the scale of such activity is small compared to the dominant activities of cutting, boning and packing chilled and frozen meat, as well as the basic processing of meat for products like hamburgers.

The lack of meaningful secondary processing activities in the beef value chain begs the question of why that is. Should more investment be made into innovative ways of further processing beef? As noted earlier, the efforts of the Irish beef industry to capture more value have been focused the ‘premiumisation’ of beef sales rather than on seeking out opportunities to develop new added value products based on additional processing. Investment in the beef industry is more likely to focus on technologies and systems to reduce costs, ensure higher
quality produce and prolong shelf life rather than on developing additional added-value products derived from beef. Ultimately, it may be the case that beef, as raw material, is simply less versatile, less amenable to further processing to the same extent as milk. In the area of marketing, products from the beef value chain are generally not branded to the same extent as dairy products, and would certainly not have the same level of global recognition as a number of dairy products with household names, such as Kerrygold, nor the marketing might behind them comparable to that of Kerrygold’s owner, Ornua.
Conclusion

The introduction to this paper posed a number of questions concerning the challenge of achieving ambitious projections set out for the Irish agri-food sector in the recently-published Food Wise 2025: For example, what activities or products should the Irish agri-food sector focus on to provide the greatest return? Where is the value created? How should the sector be structured to facilitate optimal operation and integration in the global economy? How can policy makers ensure that the most value added stays in Ireland? What can be done to ensure an enabling institutional environment to help achieve the projections above?

This paper argued that in order to get a handle on these questions, it was important to develop an overall economic understanding of the range of activities and actors involved in bringing an agri-food product from conception through to delivery to final consumers. This was achieved by analysing the two most important pillars of the Irish agri-food sector – the dairy and beef industries – from a multi-dimensional value chain perspective, using the Global Value Chain (GVC) methodology championed by Duke University’s GVC Initiative. Beyond the detailed analysis contained in Chapters 3 and 4, the research yielded some high-level observations which may be of interest to industry stakeholders and policy makers concerned about the types of questions noted above. These observations are presented below.

First of all, it could be argued that Irish production systems are relatively inefficient. On the dairy side, output volumes are hindered somewhat by the seasonality of production and the reliance on a less intensive grass-based system. Farm sizes for both dairy and beef production are small compared to competitor countries; similarly, the processing industry remains relatively fragmented compared to Ireland’s main rivals, and even the biggest processors are small compared to the biggest global food companies. To ensure the continuing competitiveness of the Irish agri-food sector, it is likely that further consolidation will be required at both the farm and processor level to help increase scale and improve cost efficiency, particularly with respect to the large processors. Further consolidation would also enable the sector to become less dependent on commodity products, more likely to invest in new technologies and facilities, and would facilitate taking advantage of existing and emerging product and market opportunities.
A second major challenge relates to the continuing reliance on commodity sales to overseas markets. As noted earlier, as recently as 2008 close to two thirds of Irish dairy exports (not to mention beef exports) were priced at world base commodity price level. Given the lack of scale and cost disadvantages, the Irish agri-food sector is not going to succeed in the long term by relying on commodities. Exports must be oriented towards high-margin, value-added products (Bell & Shelman, 2012). It seems clear that considerable value can be generated by the Irish agri-food sector (and the dairy industry, in particular) by continuing to invest in capacity to move up the value chain. The story of Glanbia becoming a global player in the area of sports or functional food nutrition sets the example of what can be achieved by investment in innovation and diversification into higher value products. There must also be an institutional environment that promotes innovation beyond that which is done by the largest companies – Teagasc’s leading role in the development of pioneering technology to produce a range of fresh white cheeses that appeal to local market tastes in the Middle East provides an example of a publicly-funded agency driving the innovation agenda. In addition, the sector must reduce its reliance on lower value business-to-business exports, such as to the food ingredients industry, and focus more on expanding business-to-consumer sales of branded products, as has been done to considerable success by the likes of Ornua with its Kerrygold brand.

Thirdly, the evidence from the dairy and beef industries highlights a range of related challenges such as a lack of coordination along the production and supply chain, intra-chain competition, and even intra-sector competition that holds the agri-food sector back from competing on the global stage. As noted in Chapter 4, structural deficiencies such as the lack of a co-operative model or a single, dominant firm in the beef chain, can lead to a less integrated chain with associated problems such as inefficiency and products of inconsistent quality. With reference to the lack of coordination in the Irish beef industry, Bell & Shelman highlight the success story of the turnaround in the US beef industry over the past decade or so, wherein two significant members of the supply chain worked together to satisfy the quality needs of a single large customer – McDonald’s – leading to significant improvements in quality, consistency, efficiency and, most importantly, enhanced margins (2012). It’s worth noting that in cases where dominant companies or co-operatives do emerge, policy makers may need to provide an enabling environment whereby the lead companies are incentivised to retain the majority of their high value-adding activities in Ireland to ensure that the value accrues domestically. Finally, with respect to intra-sector competition, Chapter 3 points out
that some of the larger processors often end up being in direct competition with one another in a number of markets worldwide, leading to inefficiencies and a situation where Ireland is at a disadvantage compared to its main international rivals. Efforts to encourage more collaboration and greater trust among the processors could reap a range of benefits in areas such as cost-effectiveness, innovation, logistics, and market access.
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