A V-LINC Analysis of Agrifood and Tourism Specialisations in West Cork: Analysis, Impressions and Policies for Future Growth

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A V-LINC Analysis of Agrifood and Tourism Specialisations in West Cork: Analysis, Impressions and Policies for Future Growth

This dissertation is submitted for the requirements of the Degree of Masters in Business (Research), Cork Institute of Technology

by

Brigid Walsh
March 2020

Research Supervisor – John Hobbs
Submitted to Cork Institute of Technology, September 2020
**Ethical Declaration**

The author hereby declares that, except where duly acknowledged, this thesis is entirely her own work and has not been submitted for any other degree in any third level institute.

15/09/2020

Brigid Walsh (Student).

Date

15/09/2020

John Hobbs (Supervisor).

Date
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<th>Full Form</th>
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<tbody>
<tr>
<td>AVEA</td>
<td>Association of Visitor Experiences and Attractions</td>
</tr>
<tr>
<td>BERD</td>
<td>Business Expenditure on Research and Development</td>
</tr>
<tr>
<td>B2B</td>
<td>Business to Business</td>
</tr>
<tr>
<td>CCI</td>
<td>Craft Council of Ireland</td>
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<td>CIT</td>
<td>Cork Institute of Technology</td>
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<td>CO-OP</td>
<td>Co-operative</td>
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<tr>
<td>CSO</td>
<td>Central Statistics Office</td>
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<tr>
<td>DAFM</td>
<td>Department of Agriculture, Food and the Marine</td>
</tr>
<tr>
<td>DBEI</td>
<td>Department of Business, Enterprise and Innovation</td>
</tr>
<tr>
<td>DES</td>
<td>Department of Education and Skills</td>
</tr>
<tr>
<td>DETE</td>
<td>Department of Education Trade and Employment</td>
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<tr>
<td>DMO</td>
<td>Destination Management Organisation</td>
</tr>
<tr>
<td>DPER</td>
<td>Department of Public Expenditure and Reform</td>
</tr>
<tr>
<td>DPTC</td>
<td>Dairy Processing Technology Centre</td>
</tr>
<tr>
<td>DJEI</td>
<td>Department of Jobs, Enterprise and Innovation</td>
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<tr>
<td>DTI</td>
<td>Department of Trade and Industry, U.K.</td>
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<td>DTTAS</td>
<td>Department of Tourism Transport and Sport</td>
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<tr>
<td>EC</td>
<td>European Commission</td>
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<td>ECO</td>
<td>European Cluster Observatory</td>
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<td>EIMS</td>
<td>European Innovation Monetary System</td>
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<tr>
<td>EU</td>
<td>European Union</td>
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<tr>
<td>FDI</td>
<td>Foreign Direct Investment</td>
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<td>FHI</td>
<td>Food for Health Ireland</td>
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<td>FSAI</td>
<td>Food Safety Authority of Ireland</td>
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<tr>
<td>GA</td>
<td>Government Agency</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<tr>
<td>HACCP</td>
<td>Hazard Analysis Critical Control Points</td>
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<tr>
<td>HEI</td>
<td>Higher Education Institute</td>
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<tr>
<td>IA</td>
<td>Industry Association</td>
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<tr>
<td>IBEC</td>
<td>Irish Business and Employers Confederation</td>
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<tr>
<td>ICN</td>
<td>International Cleantech Network</td>
</tr>
<tr>
<td>ICT</td>
<td>Information Communication Technology</td>
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<tr>
<td>IFC</td>
<td>Institution for Collaboration</td>
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<tr>
<td>IHF</td>
<td>Irish Hotel Federation</td>
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<td>IHI</td>
<td>Irish Hospitality Institute</td>
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<tr>
<td>IKED</td>
<td>International Organisation for Knowledge Economy &amp; Enterprise Development</td>
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<tr>
<td>IMF</td>
<td>International Monetary Fund</td>
</tr>
<tr>
<td>IoT</td>
<td>Internet of Things</td>
</tr>
<tr>
<td>IN</td>
<td>Input</td>
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<tr>
<td>I/O</td>
<td>Input-Output</td>
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<tr>
<td>IP</td>
<td>Industry Peer</td>
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<tr>
<td>ITIC</td>
<td>Irish Tourism Industry Confederation</td>
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<tr>
<td>LEO</td>
<td>Local Enterprise Office</td>
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<tr>
<td>LPO</td>
<td>Local Partner Organisation</td>
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<tr>
<td>LQ</td>
<td>Location Quotients</td>
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<tr>
<td>MNC</td>
<td>Multinational Corporation</td>
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<tr>
<td>MNE</td>
<td>Multinational Enterprise</td>
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<tr>
<td>NUTS</td>
<td>Nomenclature</td>
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<td>Acronym</td>
<td>Full Form</td>
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<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
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<td>OU</td>
<td>Output</td>
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<tr>
<td>RAI</td>
<td>Restaurants Association of Ireland</td>
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<tr>
<td>RDI</td>
<td>Research Development and Innovation</td>
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<tr>
<td>RFG</td>
<td>Respondent Firm Group</td>
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<td>RD</td>
<td>Research and Development</td>
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<tr>
<td>SDAS</td>
<td>Sustainable Dairy Assurance Scheme</td>
</tr>
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<td>SEAI</td>
<td>Sustainable Energy Authority Ireland</td>
</tr>
<tr>
<td>SIC</td>
<td>Standard Industrial Classification</td>
</tr>
<tr>
<td>SME</td>
<td>Small to Medium Sized Enterprise</td>
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<tr>
<td>SS</td>
<td>Specialist Service</td>
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<tr>
<td>S&amp;T</td>
<td>Science and Technology</td>
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<tr>
<td>SWRA</td>
<td>South West Regional Authority</td>
</tr>
<tr>
<td>UCC</td>
<td>University College Cork</td>
</tr>
<tr>
<td>UCD</td>
<td>University College Dublin</td>
</tr>
<tr>
<td>UK</td>
<td>United Kingdom</td>
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<tr>
<td>UNIDO</td>
<td>United Nations Industrial Development Organisation</td>
</tr>
<tr>
<td>USA</td>
<td>United States of America</td>
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<tr>
<td>VFI</td>
<td>Vintners Federation of Ireland</td>
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<tr>
<td>V-LINC</td>
<td>Visualisation of Linkages in Networks and Clusters</td>
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<tr>
<td>WCDP</td>
<td>West Cork Development Partnership</td>
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</table>
Abstract

In recent years industry clusters have become recognised as a common feature of economies across the globe (Pouder and St. John, 1996; Porter, 1998a, 1998b; DTI, 2004; Sölvell, 2008; Ketels and Memedovic, 2008). Advantages associated with clusters include regional economic growth, new firm formation, employment growth, increased innovation and increased prosperity. The advantages associated with clusters are so great that cluster initiatives have become a widely accepted policy tool for regional economic development. As a small open economy, reliant on exports for economic growth, clusters appear to represent an opportunity for Irish industry to increase competitiveness. Theory argues that clusters cannot be created (Porter, 1998a, 2003) but must be based on capabilities which exist. This research explores the potential of adopting a cluster approach for the development of two of Ireland’s strong indigenous industries; the agri-food sector and the tourism industry. Using the V-LINC methodology, an analysis of business linkages is conducted to examine the industry ecosystems for these sectors in west Cork. Based on the findings of the analysis and application of Porter’s Diamond of Competitive advantage, the suitability of a cluster approach for the development of Agri-food and Tourism in Ireland is discussed and recommendations for future studies are presented.

Key words: Industry clusters, Cluster Analysis, V-LINC, Cluster.

This research was partially supported by Cork County Council (formerly the South West Regional Authority (SWRA)), through the project ATClusters1. An objective within this project was to ‘improve the capacity of regional authorities in the identification and promotion of clusters,’ (European Cluster Policy Group, 2010, p.1). Partners in Cork County Council, commissioned the analysis of a competitive industry sector within west Cork, (it was focused on west Cork, because originally the report was commissioned by the South West Regional Authority, before this agency was absorbed back into Cork County Council).

1 ATClusters is a European project funded under the Atlantic Area INTERREG IVB Programme 2007-2013, aimed at exploring the potential for transnational cooperation among clusters in the Atlantic area (www.atcluster.org).
1 Introduction to the Research Study

1.1 Introduction

In a global market where advances in information communications technology and transport have made the world more accessible, Michael Porter (1990) argues that location is still important for establishing competitive advantage. This research is underpinned by Porter’s (1990; 1998a; 1998b; 2003) theory of competitive advantage and applies it to two of Ireland’s strong indigenous industries. This chapter will introduce the research beginning with a background to the study and a rationale for why the research was undertaken. The aim and objectives of this research will be presented and an overview of the industry sectors to which the research is applied will be provided.

1.2 Background to the Study

In today’s global market, advancements in technology and communications have levelled the playing field for industries and economies across the world (Friedman, 2005). The role of location in establishing competitive advantage has changed. Firms can easily access inputs and services from across the globe, knowledge transfer can occur across any geographic scale, and businesses can serve distant markets with great efficiency. However, location is still important. Porter (2000, p.15) argues that despite the impact that globalisation has on industry, ‘clusters or geographic concentrations of interconnected companies, are a striking feature of virtually every national’ economy and their prevalence ‘reveals important insights about the microeconomics of competition and the role of location in competitive advantage’. He suggests that these clusters arise as a result of a number of determinants of competitive advantage which he explains in his Diamond of Competitive Advantage model (1990; 1998a; 1998b). Clusters emerge where conditions of competitive advantage exist and firms actively seek to advance.

Much research has been conducted on industry clusters and a number of clear advantages to supporting clusters have been identified including increased
productivity, increased level of innovation and due to knowledge spill-over increased firm formation. Porter (2000, p.15) suggests that by examining economies through a cluster framework ‘represents a new way of thinking about, national, state and local economies, and they necessitate new roles for companies, government and other institutions in enhancing competitiveness’.

Porter’s theory became widely accepted by politicians and academics as a new way to approach regional economic development (Cortright, 2006; Van Egeraat and Doyle, 2018). The popularity of the clustering approach to developing regions led to the widespread adoption of cluster policies across Europe and the United States of America (U.S.A) (Roelandt and den Hertog, 1999; Ketels et al, 2012; Delgado et al, 2014; Wolman and Hincapie, 2015). This new approach to policy was perceived by some, to be a panacea (Vom Hofe and Chen, 2006) allowing policy-makers to encourage the growth of industry through specific supports. Porter’s (2000, p.16) theory implies that clusters are driven by industry and based on the competitive advantages gained in their location. He argues that traditionally governments provided regional economic development supports through macroeconomic national programmes. A cluster approach however requires policy makers to change their focus to more influential factors at the microeconomic level to gain a greater understanding of the operating environment for firms so that they can developing more appropriate policies aimed at supporting growth. Clusters in an Irish policy context will be discussed in the next section.

1.3 Rationale for study

As a small open economy, Ireland relies on the ability to export its produce for growth. Clusters provide a framework to increase competitiveness in industry on a global scale, as such, it is a valuable proposition for the Irish economy. Since the 1990’s clusters have begun to appear more often in Irish policy documents. On reviewing these however, Van Egeraat and Doyle (2018) point out that there is little agreement as to what constitutes a cluster, and how to identify them. They suggest that the Irish political approach to clusters is to treat them ‘as a potential mechanism for delivering on complex grand goals rather than a goal worth delivering in itself.’ Meanwhile policy-makers across Europe and North American have adopted cluster analysis of their economies as a tool to deliver ‘informed, evidence-based policy.’ (2018, p.111).
Despite the lack of an established cluster policy, clusters are emerging across the island of Ireland. Examples include CyberIreland, a cyber security cluster; Energy Cork, the energy industry cluster; the national sports cluster; The Greenway cleantech cluster; Financial Mathematics and Computation Cluster focusing on financial services research; Emerald Aero Group a cluster for the aviation sector and the Atlantic MedTech Cluster for the medical devices to name a few.

The most popular attribute of the cluster approach to regional economic development, is its focus on improving competitiveness based on pre-existing regional strengths and resources, as opposed to traditional industry targeting policies. This implies that policy-makers should focus on those industry sectors with an existing base rather than seeking to develop what Estévez (2015, p.2) describes as ‘sexy clusters,’ specialisations of emerging or fast-growing industries for which the economy does not have existing sufficient infrastructure or expertise. In his book on Irish Economic Development, O’Leary (2015) identifies Ireland’s five key competitive industry sectors which include pharmaceuticals, information communication technology (ICT), finance, food processing and tourism. According to O’Leary (2015) the three former industries would have benefited from Ireland’s attraction of foreign direct investment (FDI) and as such, are dominated by strong levels of foreign ownership. The food processing sector and tourism sector on the other hand, have emerged as important competitive industries with relatively little support by comparison. These industries are characterised by a greater proportion of smaller sized businesses typically with lower productivity levels, who serve both the domestic and export markets. These indigenous industries are more deeply embedded into the Irish economy (O’Leary, 2015) and therefore any supports aimed at their development would have a wide economic impact. For this reason, they are worthy of further study.

The V-LINC methodology chosen for this study has previously been applied to manufacturing sectors including both the ICT and pharmaceutical industries, however it has not yet been applied to a service sector. This study will apply this new methodology to a service sector for the first time.
1.4 Research Aim & Objectives

Considering the advantages to be gained from a cluster approach to economic development, this raises the question that if the food processing sector and the tourism sector are two of Ireland’s strong indigenous industries, is there evidence to warrant a cluster approach to supporting development in these sectors? The aim of this research therefore is:

To examine the suitability of a cluster approach for the development of the food processing and tourism sectors in Ireland.

To achieve this aim, a number of objectives have been identified:

1. To conduct a review of the cluster literature and identify the benefits of a cluster approach to regional economic development.
2. To examine the existing linkages amongst firms within the food processing and tourism specialisations.
3. Using the linkage data, to discover whether or not Porter’s (1990) determinants exist for the food processing and tourism sectors.
4. To identify strengths and weaknesses of the sectoral eco-systems and develop policy recommendations aimed at their further development.
5. To assess whether or not the analysis provides any evidence of clustering activity amongst the firms in both sectors and identify the implications of a cluster initiative for each sector.

The next section will provide an overview of each of the industries under study.

1.5 Research context

O’Leary (2015, p.133) suggested that Ireland’s historic approach to economic development focused on Foreign Direct Investment and Industry targeting. While Ireland does have a substantial base of competitive industries, he argues that ‘Ireland’s productivity record is distorted by the practice of transfer pricing’ of foreign assisted
businesses. This means that in order to take advantage of Ireland relatively low corporation tax, foreign owned firms began the practice of diverting profits to Ireland which inflated Ireland's productivity record. O’Leary (2015) suggests that when you discount this practice, the productivity of these industries with a greater proportion of multinational corporations, is less than food processing and tourism. The food processing and tourism industries are indigenous competitive industries dominated by small to medium sized enterprises (SME’s), they rely more heavily on the local economy for inputs and they are credited with wide regional spread. It is for these reasons that the food processing sector and the tourism sector have been chosen for this study. An overview of the recent performance of both the food processing sector and the tourism sector will now be provided.

1.5.1 Agri food sector

According to Food Drink Ireland (2019) the food manufacturing industry is Ireland’s most important indigenous industry with a turnover of €27.5 billion in 2017. It is deeply embedded in the wider economy, purchasing 71% of all materials and 50% of all services domestically and spending €2.1 billion on employment. The industry is highly internationalised and exports to 180 countries. The largest markets include United Kingdom (UK) (37%), the rest of Europe (34%) while the remaining 29% goes to other nations.

‘Food and Drink manufacturing accounts for half of direct expenditure by the entire manufacturing sector in the Irish economy. As a result, the sector has a high employment multiplier, which means it supports employment in other parts of the economy in a way that other sectors don’t.' (FDI, 2019, p4).

The Irish government introduced an ambitious strategy for developing the food processing industry in Ireland known as ‘Food Wise 2015-2025.’ The strategy aims to achieve an 80% increase in the value of exports with the creation of an additional 23,000 jobs across the sector. In order to achieve these ambitious goals, government support is essential.
Due to constraints within this study, a decision was taken to focus on one subsector of the food processing industry. As mentioned previously this research was part funded through Cork County Council under the AT Clusters project, it was agreed, that the focus would be on a competitive industry in west Cork. The food processing sector includes a wide range of industries including; prepared consumer foods, the meat industries, dairy industry, functional foods, seafood, horticulture and speciality foods. Following careful consideration, the dairy sector was chosen as the focus for this study, as County Cork has a strong dairy industry.

Dairy is one of Ireland’s most competitive agrifood sectors, exporting 80% of its output. According to FDI (2019), Ireland is the largest net exporter of dairy ingredients and the largest exporter of powdered infant formula in Europe. The Southern region of Ireland (according to the NUTS 2 regions) has a relatively high level of milk production when compared to other European counterparts, second only to Bretagne in France (Eurostat, 2019).

According to the Department of Agriculture, Food and the Marine (DAFM, 2014, p.68) the dairy sector in Ireland is:

‘renowned for its relatively high productivity and for being an early adopter of new technologies at producer level. A major feature of production in Ireland is the seasonality of milk supply, caused by farmers adjusting the date of calving to maximise the use of grazed grass in the cows’ diet in an attempt to produce milk at as low a cost as possible.’

As a result of the production processes, Ireland is recognised ‘as the lowest carbon-emitting dairy sector in the Northern Hemisphere’ (Irish Examiner, 2019b, p.2).

Despite its successes, in recent years the dairy industry has faced a number of challenges including the abolition of milk quotas under the EU Common Agricultural Policy (CAP), which increased competition amongst producers. While international demand for dairy products has grown the dairy industry still faces a number of challenges including the uncertain impact of BREXIT, changes in consumer demands and an increase in demand for more sustainable food choices (Deloitte, 2017; Cleary 2018). In order to continue to compete internationally and to work towards the policy goals set out in Food Wise 2015-2025, the Irish Dairy sector will require support. As a sector deeply embedded within the Irish economy, and with wide regional spread,
any benefit gained within the sector would have a positive economic impact, and is therefore worthy of consideration. If the Irish government were to adopt a cluster approach to economic development, it would require a greater understanding of the operating environment for the firms involved. This research aims to understand the current eco-system for the dairy firms in west Cork.

1.5.2 Tourism Sector

The tourism sector is credited as being one of Ireland’s strong indigenous industries dominated by SME’s (O’Leary, 2015; ITIC, 2019). According to Tourism Ireland (2019) in 2018, the island of Ireland attracted the highest number of overseas visitors on record, a total of 11.2 million visitors. From those visitors the tourism industry earned a record-breaking overseas revenue of €5.9 billion. The total tourism revenue generated in 2018 was €9.4 billion, which includes domestic tourism revenue and receipts paid to Irish carriers by overseas travellers (Fáilte Ireland, 2019). The main overseas markets for Irish tourism include United Kingdom (42%), Mainland Europe (33%) and North America (18%) while 6% come from the rest of the world. Ireland attracts a high proportion of white collar, managerial and professional holiday-makers (88%). Similarly, to the dairy sector the tourism industry in Ireland has a low important content, as it is a service industry and it is also credited with having a wide regional distributive impact. According to Fáilte Ireland (2019) total employment in the Irish tourism sector reached 260,000 jobs in 2018.

Ireland has the advantage of key features demanded by international tourists including beautiful scenery, unique culture and heritage and friendly people (Tourism Ireland, 2019). The tourism sector is highly fragmented with subsectors including the hospitality industries such as accommodation providers and food and beverage outlets, the transport industry, visitor attractions, natural attractions, leisure activities, entertainment, events, and retail. Due to the fragmented nature of the industry and the nature of consumption (i.e. overseas visitors consume tourism products at the same time as local consumption occurs), access to data for the sector is often limited. An example of the complexity of tourism data relates to difficulties associated with the accurate calculation of the sectors employment figures, the fragmented nature of the
industry results in many overlaps between sectors and therefore many tourism agencies utilise differing methods when calculating the employment statistics. Clancy (2009) explains that in their reporting, Fáilte Ireland (the National Tourism Agency), uses the summation of total employment figures from all sub-sectors, even those which overlap, and therefore it must be acknowledged that these employment figures are inflated. Issues around the availability of data, the granularity of data and time lag make analysis of the performance of this sector and measurement of its impact more difficult. For example, the most recent travel and tourism statistics made available by Fáilte Ireland are already two years old.

Two main public bodies support the industry. The first is Fáilte Ireland, which takes responsibility for the development of the tourism product, providing training supports for the industry, operating a network of tourist information offices and marketing Ireland to the domestic market. Tourism Ireland is the second body, focused predominantly on marketing the island of Ireland abroad. Once international tourists arrive however, it is up to individual destinations to attract them to their locations. The industry in Ireland is intensely competitive within many organisations vying for the same visitors. In efforts to increase demand from overseas visitors four new marketing propositions for the island of Ireland have been developed, aimed at creating unique product offerings based on different locations within Ireland. These include; ‘The Wild Atlantic Way’ – running along the west coast of the country, ‘Ireland’s Hidden Heartlands’ – encompassing the midlands, ‘Ireland’s Ancient East’ – which covers the south east of the Island, and ‘Dublin: Surprising by Nature’ – covers the capital and its surrounds. These tourism propositions are displayed on the map in Figure 1.1
Fáilte Ireland are also currently operating schemes to develop Food Tourism in Ireland. While the development of these brands was welcomed by the tourism industry, more and more businesses are taking a proactive approach to developing destinations around the country, some of the more well-known destinations include Dublin, The Ring of Kerry, Killarney, Kinsale, and Westport to name a few demonstrating a cooperative approach to developing place-based tourism at local level.

Despite this positive development, the tourism industry in Ireland is facing a number of challenges. These include rising operating costs and a shortage of key industry related skills\(^2\). There is also some criticism of the governments approach to tourism development including the increase in the VAT rate for services from 9% to 13.5% in Budget 2019, the inefficiency of using two separate agencies to develop and promote

\(^2\) In 2015 the Expert Group on Future Skills Needs reported that the hospitality sector was facing a deficit of about 5,000 chef trainees annually. While these skill requirements are the most urgent other skills shortages include marketing, revenue management, pricing and general management for SMEs, customer service skills, specialised skills. For more information see the report at http://www.skillsireland.ie/expert-group-on-future-skill-group/all-publications/2015/
the industry, the failure to restore financial investment in the marketing activities to pre-economic crisis levels (Clancy, 2009; ITIC, 2018). The advances in technology developed the industry but consequently had a strong impact on the tourism sector; disrupting distribution channels and resulting in the introduction of substitute products which have increased competition. An example would be the emergence of aggressive online travel agents such as booking.com and Expedia who not only have placed increasing pressure on traditional travel agencies to compete, but also increased pressure on hotels and other tourism service providers to carefully manage their distribution as they cannot compete with technological capabilities. The emergence of new business models such as Airbnb have also increased competition for hospitality services. Since the referendum for BREXIT was passed the tourism industry has recorded falling numbers of British visitors to Ireland, as the United Kingdom are the largest source market for overseas tourists, this will have a significant impact on SME’s, unless source markets are diversified.

The Department of Transport, Tourism and Sport (2015) has set out an ambitious strategy for the tourism sector in Ireland called ‘People, Place and Policy – Growing Tourism to 2025.’ This strategy aims to achieve overseas visitor numbers of 10 million and generate an overseas tourism revenue of €5 billion (excluding carrier receipts by 2025 (DTTAS, 2025, p.6). In order to deliver on these targets, the tourism sector requires more support and further development. In recent months the national tourism development agency has made funding available for the development of destination towns, while these supports are welcome, the allocation of funding is to local authorities who successfully apply. It might be possible that the development of a tourism cluster would provide a mechanism through which initiatives such as these are targeted and other supports tailored towards business needs could be delivered.

When considering the tourism industry in relation to a cluster approach it is very easy to associate this with the development of destinations. A destination is defined by Machiavelli (2001, p.7) as ‘a locality that offers the tourist the opportunity of exploiting a variety of attractions and services.’ Destinations are developed as a result

of a collaborative effort by both the tourism and non-tourism related businesses in a location. Usually destinations establish a strategic aim and agree on a shared identity for their location. Businesses within the destination must commit to the delivery of a basic standard of service if the destination is to be a success. Usually these joint activities are coordinated by a Destination Management Organisation (DMO). While each business delivers their products and services separately, the ability to coordinate the activities of the group of businesses will dictate the success of the destination. Tourists will judge the experience not of each individual business but rather of the destination overall, for this reason ‘much of an individual tourism business potential to achieve growth lies outside the power and the influence of the company’, the businesses are mutually dependent and rely on the success of others to achieve success (Nordin, 2003, p.16).

As tourism destinations are closely associated to clusters, it was decided that this study would focus attention on an established Irish tourism destination. Kinsale is a tourist town located just outside Cork city, with a focus on its culinary appeal. This destination has a wide tourism offering and it is successful in its appeal (Irish Examiner, 2019a). There is evidence of tourism business operators in Kinsale working collaboratively to build the destination since the 1970’s. Due to its success and history of cooperation it was chosen as the subject for this research.

1.5.3 BREXIT

It is important to note that this research began prior to the UK referendum on BREXIT. While the impact of BREXIT is a significant concern for firms in both of these sectors, the data in this study was collected prior to BREXIT becoming a reality and therefore the respondent firms for both the dairy sector and the tourism sector did not voice concern over the potential impacts. This data will show however the reliance of Ireland’s indigenous industry on UK connections and the need for supports to assist Irish firms in limiting the negative impact of Britain’s exit from the European Union.
1.5.4 Covid-19

It is important to note that the research was concluded in early February 2020, therefore it does not consider the impact of the coronavirus on either the tourism industry or the food processing sector in Ireland. The full implications of the pandemic have yet to be realised. It is certain however, that the pandemic will have a lasting impact on both industries, with restrictions to travel impacting visitor numbers to Ireland and the economic repercussions of the response to the pandemic. Small indigenous industry will rely heavily on supports to sustain business and ensure the protection of jobs, and further research should consider the full impact of the pandemic on Irish indigenous industry.

1.6 Structure of the Report

This chapter has outlined the aims and objectives of the research. The next chapter presents an overview of the current literature in relation to clusters and cluster theory. Chapter three provides a detailed description of the methodology for the study. The following chapter presents the data gathered in the study, while the final Chapter provides a discussion of the findings of the research with some recommendations for future studies.
2 Literature Review

2.1 Introduction

In recent years policy-makers have adopted the process of clustering across the globe as a framework for regional economic development. The term ‘industry clusters’ was first popularised by Michael Porter (1998b) in his work on the competitive advantage of nations, detailing his extensive research on how particular nations achieved great industrial success. Due to the popularity and accessibility of his work, policy-makers and governments across the globe have placed great emphasis on cluster development within their programmes as a means to improving regional economic performance and growth. Many argue that clusters are a common feature of economies all over the globe (Pouder and St. John, 1996; Porter, 1998a, 1998b; DTI, 2004; Sölvell, 2008; Ketels and Memedovic, 2008)

Geographic concentrations of firms have long been observed by economic geographers, however clusters are a much more complex phenomenon. While the literature on clusters is vast, there is still much ambiguity surrounding the concept itself, its definitions and how such phenomena ought to be appropriately identified, studied and measured. This chapter will present a review of the existing literature. This will begin with an overview of Michael Porter’s (1990; 1998a; 1998b; 2000; 2003; 2009) work explaining his diamond of competitive advantage and his theory of clusters. The foundations of cluster theory will be outlined followed by criticisms of Porter’s work. The economic benefits of clusters will be discussed along with cluster definitions and characteristics. The rationale for cluster policy will be examined and following this an evaluation of cluster analysis tools and methodologies will be presented.

2.2 Porter’s Diamond of National Competitive Advantage

Cluster theory emerged from Porter’s (1990; 1998a; 1998b) research on patterns of industrial success and competitive advantage in a number of leading industrial nations
(including the United States of America (USA), Germany, China, and Japan.) His aim was to determine the key ingredients to competitive success, by analysing the economic performance of the world’s leading industrial nations over time. In his research, Porter (1990) hypothesised that contrary to classical economic theories, gaining competitive advantage was not as dependent upon those so-called factors of production (e.g. labour and land, economies of scale and varying government policies i.e. favourable interest rates and exchange rates) as commonly thought. His research observations concluded that, while such factors are certainly beneficial to firms ‘there was a much broader and more complex set of forces’ (Porter, 1990, p.74) to be considered on how to gain competitive advantage.

Porter (1990) believes that productivity and productivity growth are the most important measures of competitiveness because they determine a region’s overall standard of living, and the scope for which this can be improved. Porter (1990, p.74) argues that to achieve continuous productivity growth an economy must constantly ‘upgrade itself,’ this requires a good understanding of the determinants of productivity. Rather than focusing on national economies however, Porter (1990; 1998b) argues that attention should be paid to specific industries and industry segments, as a nation cannot and will not be successfully competitive in all sectors.

When assessing the success of companies in international markets, Porter (1990; 1998b) observed that although firms follow their individual strategies, the character of successful companies is that they pursue competitive advantage through innovation, looking for new ways to compete, be it through process or product improvements or efficiencies, identification of new market opportunities or pursuing technological improvements. Innovation requires considerable investment from firms in terms of both finance and effort. Porter (1990; 1998a; 1998b) asserts that information is a key ingredient for continuous improvement and innovation to occur, but also to be successful there needs to be some pressure to drive firms to innovate. Competitors can easily replicate any competitive advantage once established, so sustaining advantage requires firms to continuously innovate, upgrade and improve.

Porter (1990, p.78) proposed the hypothesis that a firm’s ‘home base’ is where the competitive advantage is created and sustained, due to the pressures which firms face in their locations. He explains that firms who have ‘strong domestic rivals’ are pushed
to improve, and seek creative ways to compete, access to ‘aggressive home-based 
suppliers’ and serving ‘demanding local customers’ also force firms to upgrade and 
innovate. Porter (1990, p.78) argues, ‘competitive advantage is created and sustained 
through a highly localised process.’ To elaborate his theory further Porter (1990, p.78) 
developed a model called the ‘The Diamond of National Competitive Advantage’ 
(Figure 2.1), within this framework he identified four pillars upon which a nation can 
build competitive advantage on a global scale. These are key determinants of a 
nation’s environment into which its firms are established and within which they learn 
to compete. The determinants include; ‘factor conditions’, ‘demand conditions’, 
‘related and supported industries’ and finally ‘firm strategy, structure and rivalry’ 
(Porter, 1990, p.87). These four pillars constitute the diamond of competitive 
advantage and while each pillar has some influence over the competitiveness of 
nations individually, the diamond itself operates as a ‘self-reinforcing system’ (Porter, 
1990, p.86), with the effect of one pillar dependent upon and affecting the status of the 
others. Each of these determinants will be explained in more detail.

Figure 2.1: Porter’s Diamond of National Competitive Advantage

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4 Adapted from Porter (1998, p127)
‘Factor conditions’ are the first determinant identified by Porter (1990, 1998b) these relate to a firm’s inputs. While conventional economic thinking was that the factors of production (including land, labour and capital) dictate the flow of trade, Porter (1998b) suggests that in advanced economies, the factors of production such as skilled workforce and research capabilities are created by nations. Rather than focusing on access to, or quantities of input factors available, the emphasis should be on how quickly and efficiently these can be created and developed in certain industries and how effectively they can be utilised. Porter (1998b, p.77) distinguishes between two types of factors; 1) ‘Basic’ factors which include things like natural resources, location, climate and unskilled labour and 2) ‘Advanced’ factors including digital data communications infrastructure, highly educated workforce and specialist university research institutes. He explains that basic factors are typically inherited or require little social investment to develop, and while they are important input factors for industries such as agricultural or extractive industries, they generally do not provide sustainable advantage for nations. Advanced input factors on the other hand are less common and require much greater investment in terms of ‘human and physical capital’ (Porter, 1998b, p.77). Advanced factors are highly specialised, thus providing the greatest advantage to a nations firms because they are not easily emulated and more difficult to source within the global market. According to Porter (1998b, p.78-80) ‘nations succeed in industries where they are particularly good at creating and most importantly upgrading the needed factors.’ The USA for example, have established a significant pool of skilled labour and scientific knowledge in computer hardware and software. Having access to talent of this nature has provided a considerable advantage for firms within the USA, not solely within these industries but in many others such as medical devices, electronics and financial services (Porter, 1998b).

Porter (1998b) suggests that disadvantages in terms of the necessary factor conditions can provide the impetus for innovation among firms, who must become more creative and innovative to find ways to overcome the disadvantage, sometimes leading to new business opportunities. Porter (1990, p.82) asserts that within the diamond model however this will only take place if favourable conditions are found elsewhere within the system, e.g. if there is sufficient local demand to justify the innovation and intense rivalry pushing firms to innovate. Porter (1998b, p.84) discusses the Dutch cut flower industry as an example of this. The fresh flower industry in Holland faced huge
disadvantages in terms of their cold climate, to overcome this, industry began to innovate in various areas including ‘glass house growing techniques, new strains of flowers, energy conservation, and other techniques,’ these developments created sustainable competitive advantages for the sector. According to Porter (1998b, p.84) the Dutch firms’ ability to innovate, upgrade and create advantage in this way were highly dependent on other determinants of the competitive diamond; for example, the related and supporting industry: Holland has a number of highly specialised research institutions who focused on elements such as flower cultivation, packaging and shipping. The country has also invested heavily in developing an efficient infrastructure essential for flower handling and air freight. Strong local demand for fresh flowers year-round made investment more attractive, while intense domestic rivalry between growers, auction houses and marketers motivated firms to proactively seek advantage. This provides an example of how all four determinants within Porter’s (1990) Diamond impact upon one another and contribute to achieving competitive advantage.

‘Demand conditions’ are the second determinant of Porter’s (1990) diamond of national advantage. Despite the increased focus on international trading, Porter (1990; 1998b) argues that domestic demand for products is becoming much more important, not in terms of volume but rather the nature of a firm’s domestic market will impact their ability to understand and serve customers. According to Porter (1998b, p.98) when ‘sophisticated and demanding buyers’ exist within a firm’s ‘home base,’ this type of market, challenges local firms to achieve much higher standards through innovation and upgrading of products. He goes on to suggest that the spatial and cultural proximity to demanding markets enables regular contact with sophisticated customers and thus provides valuable insight into emerging consumer needs and new opportunities much earlier than competitors in other markets. Close contact with local customers throughout the development phase is highlighted as another key benefit for firms. Porter (1998b) suggests that distribution channels can also represent sophisticated and demanding buyers, in the instance where a number of powerful chains and intense rivalry exists, these channels can force manufacturers to reduce costs, develop new forms of customer service and introduce new products continuously.
The structure of the domestic market is also important if an industry’s national market becomes saturated early on, this again provides an impetus for local firms to innovate and upgrade continually, as saturated market intensifies firm rivalry, forces firms to reduce prices, introduce product modifications, and improve product performance and seek opportunities elsewhere (Porter, 1998b.) Should local customer needs be early indicators of widespread trends, significant advantage can also be gained, as this gives firms a first mover advantage. Porter (1998b) describes the advantages gained by Japanese firms who began to invest in improving the energy efficiency of products. Public concerns around energy costs arose in Japan following publication of a number of government reports, firms in Japan had to focus on energy efficiency to respond to growing concerns of local buyers. This was not a concern for global competitors until much later thus providing those Japanese firms with significant advantage. What must follow this is the fact that should domestic market needs be solely representative of the home market, and offer no indication of future widespread trends; the domestic firms would be at a great disadvantage. It is also possible for firms within a nation to anticipate international trends if the tastes and needs of that nation are being exported along with its products. The U.S.A. has become the leader of many trends which have filtered across the globe representing the ‘American desire for convenience’ (Porter, 1998b, p.92). Examples include fast food companies, consumer packaged goods and credit which showcase how American firms such as McDonalds, American Express, VISA and MasterCard have become global industry leaders.

The third determinant of the diamond is comprised of ‘related and supporting industries,’ as Porter (1998b) explains having home-based suppliers who are internationally competitive provides a wide range of advantages for firms. Not solely relating to the efficient delivery of required inputs but also knowledge transfer, which aids the innovation process. These advantages happen because of propinquity, in which the firms and their related and supporting industries operate. According to Porter (1998b, p.103):

‘Competitive advantage emerges from close working relationships between world-class suppliers and the industry. Suppliers help firms perceive new methods and opportunities to apply new technology.'
Firms gain quick access to information, to new ideas and insights, and to supplier innovations. They have the opportunity to influence supplier’s technical efforts as well as serve as test sites for development work.’

Shorter lines of communication lead to a faster flow of information, continuous exchange of knowledge and generation of ideas. Porter’s (1998b, p.103) description of the Italian leather footwear industry is a good example of the interaction between supporting and related industries. The Italian footwear industry works closely with leather manufacturers regarding the creation of new styles and emerging trends in manufacturing. While the footwear manufacturers gain insight into new textures and colours, the leather manufacturers become knowledgeable about future fashion trends giving them an advantage when planning new products. The maximum benefit is gained when suppliers are competing on the global stage, as firms who work with ‘captive’ suppliers (those dependent upon the firm or local industry alone), will not be driven to innovate and upgrade. Porter (1998b) warns that these advantages are not automatic, while proximity facilitates information flow and increases speed of communication, this is something which co-located firms and actors must continually work at.

Porter (1998b, p.105) also discusses the importance of related industries, which refer to organisations with which firms ‘can coordinate or share activities in the value chain, or’ those who ‘provide products that are complementary.’ Activities that can be shared often include marketing, distribution, manufacturing or service activities. The presence of strong supporting and related industry in a region provide further opportunities through information flows and knowledge spill-overs. The benefits that can be gained from access to competitive home-based suppliers, and supporting industries are again dependent upon the strength of other factors within the diamond. For example, consider a situation where firms in a region cannot access the necessary advanced factor inputs, where strong domestic demand conditions are not indicative of future trends, and there are low levels of competitive rivalry. In this context, there is no immediate pressure for firms to innovate and there are very few sustainable advantages to be gained from having globally competitive suppliers and strong related industries.
The fourth and final determinant within Porter’s (1990, p.78) diamond model relates to the ‘firms’ structure, strategy and rivalry’, all of which are heavily influenced by national circumstances and context. According to Porter (1998b) competitive advantage stems from national tendencies for particular management practices and organisational models, coupled with the individual goals as set out by firms. These are often reflective of the characteristics of the nation’s capital markets. Porter (1990, p.84) also notes ‘a nation’s success largely depends on the types of education its talented people choose, where they choose to work and their commitment and effort.’ The flow of capital and labour is influenced by the prestige assigned to certain industries, through goals set by institutions and values set for individuals and firms. This directly affects the competitive performance of certain industries. Porter (1990, p.85) suggests ‘the presence of strong local rivals is a final and powerful stimulus to the creation and persistence of competitive advantage.’ He argues that domestic rivalry is perhaps the most important determinant within the diamond due to the powerful impact, which it has on the other determinants, and when intense domestic rivalry exists within a geographic concentration, the strength of this determinant’s influence is magnified. Porter (1998b) believes that domestic rivalry forces firms to innovate and improve; when firms operate within the same environment they cannot attribute local rivals’ success to unfair advantages. Therefore, they are forced to become more creative in order to differentiate, innovate and upgrade their products. Intense domestic competition also pushes firms to focus their efforts on international markets, and drives them to succeed.

In his theory of national competitive advantage Porter (1990; 1998a; 1998b) refers to two external forces which influence the diamond, these are ‘chance’ and ‘government’. Chance relates to events and developments outside the control of firms and a nation’s government such as war, advancements in technology, exogenous political events. According to Porter (1998, p.124) ‘chance events are important because they create discontinuities that allow shifts in competitive position.’ They can often nullify or create advantages for established competitors and so they provide an impetus for a change in competitive position or focus of an industry.
The second external force, government, also has significant impact upon a nation’s competitive advantage. Porter (1998b, p.127) suggests that government can influence and is influenced by, each determinant of the diamond:

‘Factor conditions are affected through subsidies, policies toward the capital markets, policies toward education, and the like. Government’s role in shaping local demand conditions is often more subtle. Government bodies establish local product standards or regulations that mandate or influence buyer needs. Government can shape the circumstances of related and supporting industries.’

Government and its policies can also affect firm strategy, structure and rivalry through policies relating to taxation, capital market regulations, and competition law. Effects can be either positive or negative, but Porter (1998a; 1998b) argues successful government policies must be based upon and reinforce the underlying determinants of national advantage rather than trying to create advantage itself. Porter (1990, p.103) believes that government’s role should be one of ‘catalyst and challenger’ encouraging firms to be forward looking, with a focus on increasing productivity and performance. Governments cannot create competitive industries but to assist firms, policy must create business environments in which firms can gain advantages without direct government involvement. Porter (1998b) believes policy-makers must focus on three key things, encouraging change, promoting domestic rivalry and stimulating innovation. The pursuit of competitiveness is a long-term strategy, and policy-makers must be mindful of a focus on short-term benefits, which can lead to ineffective policies inhibiting regional innovation over the medium and long term.

Porter (1990, p.86) suggests that the diamond does not merely support one competitive industry, but rather it ‘creates an environment that promotes clusters of competitive industries. Competitive industries are not scattered throughout the economy but are usually linked together through vertical and or horizontal relationships.’ Clusters are a term, which Porter (1998b, p.3) uses to describe ‘critical masses of unusual competitive success in particular business areas.’ Porter (1998a; 1998b) suggests that these phenomena have become a feature of almost every economy (national, regional and local). In the context of national competitive advantage, he argues that the four
determinants not only promote industry clusters, but clusters are at the very heart of the diamond, as they constitute the related and supporting industries. Porter (1998b, p.199) suggests, ‘one competitive industry helps to create another in a mutually reinforcing process.’ He explains (1990, p.86) that once a cluster forms, ‘the entire group of industries become mutually supporting. Benefits flow forward, backward and horizontally,’ which encourages innovation, diversification and upgrading.

This Diamond of Competitive Advantage as described by Porter (1990; 1998a; 1998b) demonstrates that firms within industry clusters have the ability to gain significant competitive advantage over global rivals due to their local context. A dynamic and successful cluster has the potential to provide its firms with an optimal business environment, which provides them with the opportunity to compete and be successful at an international level. While Porter’s diamond theory is a comprehensive framework on how competitive advantage can be gained, much of this theory builds on existing work (Harrison and Glasmeier, 1997; Martin and Sunley, 2003; Vom Hofe and Chen, 2006; Torre, 2008) and it is important here to acknowledge the foundations of cluster theory.

2.3 Foundations of Cluster Theory

While Porter (1990; 1998a; 1998b) is credited with popularising the cluster concept, it is argued that he presents ‘old wine in new bottles’ and rather than offering something new, his cluster theory is more a synthesis of existing work (Harrison and Glasmeier, 1997, p.30.) Here a brief review of some of the contributing research will be made, in order to understand the complex nature of the cluster concept.

Economic geographers have long studied the importance of location for business. Alfred Marshall (1920) first addressed the phenomenon of industry agglomerations within economic literature. Marshall (1920) observed concentrations of specialised industry in certain locations, which he attributed to the occurrence of agglomeration externalities. He was the first to recognise the correlation between the economic productivity of an area, and the proximity of businesses and economic agents to each other within the location. He focused on concentrations of specialised industry in the U.K. in Lancashire and Sheffield, which he referred to as ‘industrial districts.’ While
he did not discuss in great detail how the process of industrial localisation began, he believed that these concentrations of industry occur, largely due to external advantages which could be gained by firms through co-location.

In his work, Marshall (1920) identified three main sources of external advantages which included: 1) a skilled labour pool, 2) the growth of specialised suppliers and 3) knowledge spill-overs occurring between the firms within the industrial district. Marshall (1920, p.271) believed that ‘the mysteries of the trade’ become shared knowledge as they are ‘in the air,’ with residents within the region often learning them unconsciously. Marshall (1920) also suggests that such advantages have a ripple effect on subsidiary trades which develop within the neighbourhood, supplying the industry with necessary inputs and materials. He believed that these advantages, referred to as ‘agglomeration economies,’ were responsible for fostering groupings of firms in a particular location and were also highly likely to influence the firms’ decision to stay within the district over the long-term. The assumption was a group of individual firms operating in proximity would experience superior performance when compared to individual units who were more widely scattered. The superior performance of the industry within the region would then attract operators within the sector. They would have a much greater opportunity to build knowledge and in doing so, nurture new opportunities for growth. For these reasons Marshall (1920) held that these industrial districts, and this form of industrial organisation, not only increased the wealth of regions but contributed to the accumulation of communal assets such as increased access to capital and investment, social capital, externalities and increasing returns.

Years later Schumpeter (1954) studied the concept of innovation and the role of technological change, he argued that economic growth requires innovation, because radical innovations provide the basis through which productivity can be improved, facilitating increased production, at higher standards of quality for lower unit costs. Perroux (1950) focused his attention on the notion of regional growth, with the development of his concept of growth poles. This theory focuses on the fact that economic growth is not equally distributed across a region, but rather tends to develop around a specific growth pole (a firm/sets of firms). He posited that these growth poles tend to have a propulsive effect on other sectors due to their having strong input-output
linkages to other industries (Perroux, 1950). For example, if an industry such as the steel industry, has a number of backward linkages to other sectors and the steel industry experiences growth in demand, that in turn translates to growth for supporting sectors such as iron ore mining, coal, transport industries (Darwent, 1969). Arrow (1962) discussed the role of competitors in stimulating innovation, noting that competitive environments provide greater incentives to innovate than monopolistic environments. Given the importance of knowledge transfer for innovation, Polanyi (1962) differentiated between tacit knowledge and codified knowledge and outlined the difficulties arising around the transfer of tacit knowledge. This contributes to the importance of proximity, trust and cultural similarities in knowledge transfer. Romer (1986) discovered the links between increasing returns and endogenous accumulation of knowledge.

In the 1980’s industrial districts were in the spotlight again as a result of work carried out by Becattini (1978) and Brusco (1982) among others, regarding the success of thriving industry in what became known as the ‘Third Italy’. Becattini (1978) documented his observations on Italy’s industrial districts and emphasised the importance of place-centred economic development and the value of social relationships. He also highlighted the observed passive embeddedness of the firms within the ‘Third Italy’ and discussed their active sense of belonging to a place which shared a common vision and the advantages which this had for the regional economy in comparison to other areas within the country.

This is a very brief overview of research and theories which have laid the foundation for cluster theory. For a more detailed discussion of the foundations of the cluster concept see Porter (1998b), Belussi (2004), Vom Hofe and Chen (2004), and Brosnan et al. (2016). Porter’s (1990; 1998a; 1998b) cluster theory builds these ideas into one proposition, the notion that competitive advantage is fostered and maintained at the local level, and his concept for regional development has been widely accepted amongst academics and policy-makers alike. Despite its popularity however, critics argue that the notion is ‘fuzzy and vague’ (Martin and Sunley, 2003) lacking essential detail for a clear definition of a cluster. Before a discussion of definitions takes place, it is important to identify and understand the criticisms of Porter’s (1990) theory.
2.4 Criticisms of Cluster Theory

Despite the popularity of the cluster approach in economic development, a great deal of confusion exists around the cluster concept. Porter’s (1990; 1998a; 1998b) theory offers a new accessible approach for policy-makers hoping to develop their regions, however it has also been described by some as a ‘chaotic concept’ (Martin and Sunley, 2003; Malmberg and Power, 2005). Martin and Sunley (2003) are the most cited in their critique of Porter’s work, they explain that a lack of detail and specificity ultimately result in a vague and fuzzy concept leading to what Belussi (2004) describes as ‘semantic ambiguity.’ A number of key concerns of Porter’s theory have been raised and each will be discussed here.

The first criticism of Porter’s (1990; 1998a; 1998b) cluster theory relates to concerns regarding the notion of national and regional competitiveness. Many writers (Krugman, 1994; Martin and Sunley, 2003; Kitson et al., 2004; Motoyama, 2008) take issue with what they argue is a false concept, that nations compete with each other on a global stage as posited by Porter. Krugman (1994) explains that nations cannot compete with each other in the same way as private enterprise, international trade is not a zero-sum game. Countries rely on each other for inputs and exports, so competition between nations cannot be equated with business rivalry. Kitson et al. (2004) argue that while national competitiveness proves problematic, the notion of regional competitiveness is even more so. One of the key concerns is how regional competitiveness should be measured, and many authors are not satisfied with Porters (1998b) suggestion that productivity is the key to competitiveness. Kitson et al. (2004, p.993) argue that:

‘although regional productivity is certainly a useful indicator of what might be termed ‘revealed regional competitiveness’ (Gardiner et al., 2004), there are empirical problems in measuring it accurately (Kitson, 2004) as well as conceptual issues about how to interpret what is actually meant by regional productivity.’

They argue that eager to adopt the cluster concept, policy-makers ran ahead with the idea before common consensus could be reached in relation to what regional
competitiveness means or how it is to be analysed. There is also disagreement
surrounding the notion of specialisation and whether or not this is a suitable strategy
to begin with leaving regions exposed to economic shocks (O’Malley and Van
Egeraat, 2000; Martin and Sunley, 2003; Motoyama, 2008). The popularity and
widespread acceptance of the cluster concept is widely attributed to its accessibility,
Porter (1990; 1992; 1998b) in particular uses business language which is easy to
understand for academicians, politicians and citizens on all levels (Krugman, 1994;
Held, 1996; Feser and Luger, 2002; Martin and Sunley, 2003; Cortright, 2006). A
situation has developed whereby a substantial amount of literature on clusters now
exists, however it would appear that authors are not always discussing the same things
(Belussi, 2004; Martin and Sunley, 2003; Kitson et al., 2004; Malmberg and Power,
2005). This is attributed for the most part to the lack of any absolute definitions within
the cluster theory, both in terms of spatial and industrial definitions. If one considers
Porter’s (1998b, p.197) own definition of clusters he suggests that they are:

‘Geographic concentrations of interconnected companies, specialised
suppliers, service providers, firms in related industries and associated
institutions (for example, universities, standards agencies, and trade
associations) in particular fields that compete but also cooperate.’

Within this definition two criteria for clusters are set-out, the first is that firms must
be geographically concentrated, or located within close proximity, and the second that
they be interlinked or related in some way, however his theory fails to provide any
specificity on both of these criteria. In relation to the geographic boundaries of clusters
Porter (1998b, p.4) posits that:

‘a cluster’s boundaries are defined by the linkages and complementarities
across industries and institutions that are most important to competition.
Although clusters often fit within political boundaries, they may cross state
or even national borders.’

Porter (1990; 1998a; 1998b) gives no indication as to how boundaries should be
drawn, except to suggest that boundaries should be determined by the linkages which
are important. This in turn raises more questions about how to identify important
linkages? What constitutes a weak linkage, how should they be measured and what
the cut-off point should be? There is no guidance offered as to how to delimit clusters.
Martin and Sunley (2003, p.11) argue that Porter’s (1998b) failure to provide specific detail on these issues have left it open to interpretation, ‘the existence of clusters, appears … to be in the eye of the beholder – or … creator.’ They are also alarmed at the contradictory nature of emphasising great importance of geographic concentration of firms within a cluster, while also suggesting that clusters can be spread across nations. They argue that if clusters can be found at any level of spatial aggregation, it renders the cluster concept ‘ridiculously elastic’ (Martin and Sunley, 2003, p.11). How can Porter (1998b) on the one hand argue that geographic proximity is vital to knowledge transfer, spill-overs and innovation, but on the other hand suggest that clusters of related and supporting industry can gain advantages when they span across countries?

There is also concern regarding the lack of specificity around industrial definitions. Porter (1998b) does not offer any indication of what range of industries and related activities should be included within a cluster. His explanation of the existence of strong linkages being used to determine the cluster boundaries, does not provide a suitable framework on which researchers can base their decisions and reasoning. Using published statistical data to identify cross-sectoral clusters, can only be done by identifying sectoral concentrations and then attempting to find evidence of cross-industry linkages through the input output tables (Martin and Sunley, 2003). These measures however do not suffice, and do not consider non-trade linkages which are equally important within the development of a cluster (universities, research institutes, financial institutions, government agencies) (Motoyama, 2008). Porter (1998b) merely points to the fact that should a cluster encompass too wide an array of industries, it will consist of actors connected through weak linkages which are not effective for knowledge transfer while a single sectoral approach to clusters will ignore the value of cross-industry connections important for increasing productivity and innovation.

It would appear then that policy-makers and researchers alike have poetic license when determining who and what is included within their clusters. There is a real fear amongst economists, that cluster theory provides a new disguise for the old tradition of industry targeting, or ‘picking winners’ as opposed to a more balanced approach to regional economic development (Held, 1996; Hefner, 2009; Martin and Sunley, 2003; Cortright, 2006). This lack of detail, has resulted in numerous accounts of very
differing entities, all under the umbrella term of clusters (Martin and Sunley, 2003; Belussi, 2004; Kitson et al., 2004; Malmberg and Power, 2005; Motoyama, 2008).

Another criticism of cluster theory is the assumption that the cluster approach is ‘one size fits all’, and there is no consideration of specific needs within differing industries or varying locations. This is described by some as ‘universalism’ (Kitson et al., 2004; Motoyama, 2008). Motoyama (2008, p.7) puts this into context with an example: if one considers the different roles played by a university for the biochemical and pharmaceutical industries versus an industry such as apparel, it is understandable that these would be two very different roles. He explains that nowhere does cluster theory discuss or consider variations for differing development paths or needs of various industries. Nor does it consider the history of a region’s development or its geography, but rather it assumes that the same strategies can easily be applied regardless of the industries located there. Kitson et al. (2004, p.996) suggest that in terms of devising policies to improve regional competitiveness, there is an assumption that:

‘The same drivers are equally important everywhere, and hence the same basic policy model is applicable, the idea being that in principle, the process of regional economic growth is governed by a series of universal economic rules ... thus, if you pull the right levers the drivers will respond in similar ways with similar outcomes.’

Kitson et al. (2004) also ask the question, if policy-makers focus their resources on chosen localities or clusters within a region, how can they ensure that benefits and improvements will spread out to the other areas of the region? Social cohesion, they point out is a major concern for policy-makers, and should be given equal attention within any attempts to improve regional competitive advantage, along with productivity and employment.

Motoyama (2008) argues that other limitations of the cluster framework include the static nature of the theory. He suggests that cluster theory focuses on the existence of a cluster within a particular region, and how clusters are organised and structured. However, cluster theory fails to provide any insight into how regions develop differently, and why one particular cluster in a specific region, may outgrow others located elsewhere. Cluster theory also fails to account for how clusters emerge and develop, but rather it examines clusters in the present. Motoyama (2008) suggests that
more pertinent questions for policy-makers should be asked, such as what types of policies have been applied in previous similar situations, and which have been more successful, or had deeper impacts? What activities have taken place previously, what actions have been unsuccessful? What particular catalysts were responsible for, or contributed to the development of similar clusters elsewhere? Questions such as these would allow for a much deeper understanding of clusters, and provide a more substantial foundation upon which policy decisions can be based. However, Porter’s (1998b) theory of clusters provides no historical analysis of the development of clusters, it provides a static description of successful clusters, to be more relevant it should be more dynamic and longitudinal (Motoyama, 2008).

Motoyama (2008, p.8) also questions how practical the theory is and how reasonable it is to expect the government to ‘fill in the missing components of the cluster.’ He suggests that it may not always be feasible for the government to participate in supply-side initiatives, as businesses are environmentally aware and will seek opportunity where it exists. However, where gaps do exist, should governments try to address these shortfalls and should they be directly involved? There are also many challenges to address when attempting to advocate ‘interconnectedness’ within a cluster. How should governments increase or improve spill-over effects and knowledge transfer? Motoyama (2008, p.8) argues that while cluster theory suggests governments should act, it does not explain or discuss how. He suggests that there should be some consideration of network-related studies within economic development literature, which address the issues surrounding connections between firms and knowledge transfer. Malmberg and Power (2005, p.59) offer a fitting synopsis when they state that:

’we are at the stage then when there is a lot of confusion about what the concept actually involves, with the effect that research (and policy) has become far too based on a number of ideal types and criteria that may not offer us the most solid conceptual basis for scholarly conversations and real-world interventions.’

These criticisms of cluster theory relate to its lack of specifics and detail, and challenges that it presents to researchers, academics and policy-makers alike. Despite
these however, the phenomenon of clusters does exist and the concept is widely accepted as an effective framework through which to achieve regional economic development. Cortright (2006) argues that despite its flaws, a large portion of the literature surrounding clusters supports the benefits of the concept for examining and considering economic activity and a means to organise regional economic development strategies (Held 1996; Fulton, 1997; Bergman and Feser 1999; Waits, 2002; Motoyama, 2008). The economic benefits and the benefits to the firms within clusters will now be presented.

2.5 The Benefits of Clusters

Clusters offer a wide range of benefits for the individual firms who participate in clusters, and thereby the overall economic growth of the region in which a cluster is located. It is useful to identify the potential benefits to constituent firms in order to understand the benefits to the region overall. There are four basic benefits to firms which participate in clusters, and they relate back to the Marshallian5 agglomeration economies of; access to skilled labour, access to specialist suppliers, knowledge spillovers and two additional benefits of new firm formation and market aggregation (Parr, 2002). Wolman and Hincapie (2015) describe agglomeration economies as those external benefits to firms which arise in the form of productivity gains or cost reductions, resulting from a concentration of both industry (localisation economies) and people (urbanisation economies) within a region or area. They cite Phelps (2004, p.972-973) explanation that these agglomeration economies in clusters lead to economic growth through two possible processes: 1) pecuniary economies which lower input costs or 2) technological economies which increase productivity. The advantages of clusters will be discussed under these four themes.

1. Access to Skilled Labour Pool:

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5 Those advantages identified by Marshall (1920) in his work on geographic concentrations of industry.
As clusters are comprised of interconnected firms of similar and related industries, one of the key advantages for members is access to skilled labour (Porter, 1998b, p.13). A concentration of similar and related firms in one area will provide broad opportunities for experienced and trained employees and as such make it much easier for firms to attract the required skills to the area should they not already exist. This in turn reduces recruitment costs for all firms (Porter, 1998b; Cortright, 2006; Wolman and Hincapie, 2015). This provides pecuniary economies in that access to a large pool of skilled employees suggests that wages will be lower than would otherwise be expected, and also productivity economies in that firms will be better able to replace mediocre employees with more productive staff who are readily available locally.

2. Access to Specialised Suppliers

Similarly, the concentration of related industries requiring similar inputs, also provides opportunities for suppliers to establish themselves within the cluster and to further specialise. The presence of local specialised suppliers reduces transaction costs, risks of delays, and the need for inventory, which constitute those pecuniary economies. The ease of communication between suppliers and firms increases due to proximity, allowing for greater collaboration, improved service for firms— which can positively affect the overall efficiency of production processes, providing firms with productivity economies (Wolman and Hincapie, 2015). Should inputs not be available locally, securing suppliers located outside the cluster is easier as the concentration of firms within the cluster, represent an attractive potential market for suppliers external to the cluster (Porter, 1998b). The relationships and the ease of communication developed between firms and suppliers in a cluster often results in suppliers building capacity and innovating to ensure that they meet the requirements of firms. Should new or varied inputs be required for innovations, there is much greater flexibility and capacity to quickly source the necessary components (Porter, 1998b). Such efficiencies mean that firms are able to experiment and test new processes or products at much lower costs relative to competing firms outside the cluster, and more responsive to challenges such as technological issues or changes in demand (Cortright, 2006; Ketels, 2009). Boasson and MacPherson (2001) and Greenstone et al. (2010) found evidence that
clumped firms achieve higher levels of productivity than firms located outside clusters due to increased access to specialised inputs and innovative suppliers.

These are not the only localisation economies which occur for firms within a cluster, but access to finance improves due to financial institutions familiarity with the industry. Infrastructure investments targeted at industry needs also provide advantages for the cluster participants (Porter, 1998b; Barkley and Henry, 2001). These localisation economies then lower the barriers to entry for new firms entering or establishing themselves in the cluster, and make it an attractive location for entrepreneurs.

3. Knowledge Spill-overs:

A firm’s participation within a cluster also offers increased ‘access to information’ when compared to firms who operate outside the cluster. According to Porter (1998b, p.14) ‘extensive market, technical and other specialised information accumulates within a cluster in firms and local institutions.’ Belussi (2004) explains that firms in clusters can reduce transaction costs by establishing networks. The reduction in transaction costs, distinct from production costs is then likely to increase the frequency of exchanges between cluster actors, thereby leading to opportunities for collaboration, increased efficiencies and product improvements. The accumulation of knowledge within the cluster, represents a valuable common resource which is impossible to replicate outside a cluster due to the development of social capital6 (Anderson et al., 2004; Fallah and Ibrahim, 2004). Participating firms can access knowledge with much greater ease than an isolated firm outside the cluster boundaries.

Case study research has shown evidence of knowledge transfers within clusters (Saxenian, 1994; Dahl and Pederson, 2004). Belussi (2004, p.9) explains that:

‘Personal contacts and interpersonal relationships enhance the diffusion of tacit knowledge among people sharing the same culture, traditions and

The notion of social capital is based on the idea that social life-networks and connections, and shared values foster trust amongst people, and these better enable communities to work together to pursue shared objectives. Arising from these connections are ‘norms of reciprocity’, meaning that people are more likely to do things for each other (Putnam, 1995; Anderson et al, 2004). Social capital is discussed further in section 2.6.2

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Network relationships are indispensable to transfer knowledge, but in particular that part of knowledge which is tacit and difficult to codify.’

The accumulation of human and social capital, coupled with an increase in network exchanges and knowledge spill-overs lead to an increase in innovation activity (Rosenfeld, 1997; Porter 1998b; Belussi, 2004; DTI, 2004; Wolman and Hincapie, 2015). Belussi (2004, p.7) argues that new knowledge is created through interactions between local agents. He describes the innovation process as a circular one, which should involve feedback mechanisms and information ties to link ‘market needs, design, production and search processes.’ The networks developed within a cluster then facilitate exchanges through which firms’ absorptive capacity expands and through which new knowledge can be created. These networks of trust and reciprocity also support innovation by facilitating the iterative processes and as a result of increased exchanges often firms located in these concentrations are not only innovation leaders but early adopters. Research conducted by Audretsch and Feldman, (2004), Fornahl et al., (2010) and Delgado et al., (2014) found empirical evidence to support the notion that clustered firms have higher levels of innovative activity.

A local example of this is the development of INFINITE7, which is a new platform being developed by members of Cork’s ICT Cluster it@cork – it includes EMC, Vodafone, Cork Institute of Technology and Internet eXchange. This initiative will create an online innovation platform to drive the growth of industrial internet products and services - a testbed for operators on which to develop Internet of Things (I.o.T.) products (Industrial Internet Consortium, 2017). Such initiatives and joint projects within clusters, increase the resources and infrastructure of the cluster, allowing member firms to experiment at much lower costs than firms outside the cluster. Ease of access to the necessary skills and inputs, and the ease with which new products can be tested, can result in much shorter launch times for new products and services.

7 for more information see www.siliconrepublic.com & www.iiconsortium.org
Porter (1998b) warns however that innovation can also be inhibited by a firm’s membership of a cluster. In situations where firms within a cluster share common approaches to competition, group think is a potential risk, as it supresses new and innovative ideas and can lead to recurring patterns of competitive behaviour which are difficult to change. In some cases, radical innovations and the associated change can pose a threat to existing advantages and circumstances within a cluster. If this is the case and radical innovation may render a clusters competitive advantages obsolete, the cluster actors may be opposed to such change, which is in direct conflict with market forces (Porter, 1998b).

4. New Business Formation

As a result of the benefits listed above Porter (1998b) believes that clusters act as a magnet for new businesses – to both start-ups and existing firms wishing to relocate. Barriers to entry are significantly lower due to access to inputs, raw materials, and skills whilst investment is easier to secure within a cluster, as financial institutions are involved and familiar with the industry and therefore the perceived risk is lower. Belussi (2004, p.3) states that local networks which provide proximity advantages and access to shared assets become attractive to Foreign Direct Investment inflows and as ‘locations for the strategic development of subsidiaries.’ Increases in new firm formation directly impact the rate of innovation within a cluster. Porter (1998b, p.19) suggests that:

‘Large companies often face constraints or impediments of various sorts to innovating. Spin-off companies often pick up the slack, sometimes with the blessing of the original company. Larger companies in a cluster develop close relationships with innovative smaller ones, helping in their establishment, and acquiring them if they become successful.’

Porter (1998b) suggests that a high rate of new firm formation within a cluster results in continued growth and as the cluster mass increases the cluster advantages are amplified. Studies have found that not only do clusters promote entrepreneurship but
firm growth and survival rates are higher in clusters (Audretsch and Dohse, 2007; Delagado et al., 2010; Wennberg and Lindqvist, 2010)

5. Market Aggregation

According to Wolman and Hincapie (2015, p.81) firms located in clusters experience reduced costs in terms of distribution and sales of goods and services. Having a significant market available within a location will attract suppliers and providers of goods to locate there, this in turn can increase regional economic growth through ‘import substitution’, and the regional economy will also benefit from multiplier effects when employees spend their wages within the local economy.

Cluster theory suggests that each of these benefits leads to growth and improved economic performance of regions. Ffowcs-Williams (2012, p.161) identifies a number of advantages of the cluster approach for a region’s economy, he states that there is ‘a positive relationship between strong clusters in a region and Gross Domestic Product (GDP) per capita, business growth and new job formation.’ Regarding economic development, regional policy-makers focus on increasing prosperity for citizens, due to the growth potential of traded economies as opposed to local economies, Porter’s cluster theory focuses on traded industries with export potential. These traded industries also tend to have higher wages, which generate more for the economy in local taxes. Ffowcs-Williams (2012) argues that evidence suggests that the stronger a cluster is, the greater the number of high value jobs generated within the constituent firms. This is supported by research which found that industries located in clusters are associated with higher employment growth and wages (Drennan et al., 2002; Spencer et al., 2010; Delgado et al., 2014).

It is evident that the positive links between cluster developments, productivity, innovation and new business development increases a regions competitiveness on the global stage (Porter, 1990; 1998a; 1998b; Anderson et al., 2004; Cortright, 2006; Ketels, 2006; Ffowcs-Williams, 2012; Wolman and Hincapie, 2015). This can lead to increased job creation, greater wealth generation within a region which impacts income tax generation. Other economic advantages of strong clusters are: the growth
and formation of new business start-ups with improved survival rates for new firms, the attraction of FDI, new skills and expertise via migrant workers and increasing export development to the region. Policy-makers across the globe are focusing efforts on fostering innovation through industry clusters to further develop and complement the strengths present within that region. Clusters also allow regions to compete and make a name for themselves and their brand, which connects their members with others across the global economy.

The benefits to be gained from industry clusters make it an appealing approach for regional development, improving the attractiveness of regions, and increasing employment and prosperity for citizens. There has been much debate about how to define clusters. The definition of such a concept will allow researchers to pin down key points essential to guide both the analysis and any policy initiatives which are devised. It is therefore pertinent to discuss the definition of clusters.

2.6 What is a Cluster?

Porter (1998b, p.3) describes a cluster as ‘a system of interconnected firms and institutions, the whole of which is greater than the sum of its parts’ and argues that they should not be considered in isolation but rather as a factor in a much wider theory of competition. As outlined previously Porter’s (1990; 1998b) definition of clusters was found lacking. Academics have long debated the need for a more comprehensive definition for clusters, arguing that without more specificity the notion is too elastic. There have been many attempts to define clusters and yet, to this day, there is no one accepted definition. The lack of an agreed definition has resulted in the identification of certain characteristics or features of clusters, in order to assist in the discussion. Following an overview of the debate surrounding a cluster definition, the characteristics of clusters will be explained.
2.6.1 Definition of Clusters

The cluster approach to economic development has been adopted worldwide, with numerous international agencies (Organisation for Economic Co-operation and Development (OECD); the World Bank; the International Monetary Fund (IMF); United Nations Industrial Development Organisation (UNIDO)), national and local governments eagerly promoting industry clusters (Hefner, 2009). Despite the numerous cluster studies and initiatives there is no one accepted definition of clusters, resulting in many academics and agencies devising their own definitions to suit their specific needs. This has led to much confusion within the field of clusters as the lack of specificity has resulted in many different phenomena being discussed under one term, thus compounding the confusion and limiting the efficacy of debate. Porter (1998a, p.197) defines clusters as ‘Geographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries and associated institutions (for example, universities, standards agencies, and trade associations) in particular fields that compete but also cooperate.’

It is clear that this definition lacks detail regarding spatial scales and is considered by many to be ‘vague’ (Rosenfeld, 2002; Martin and Sunley, 2003; Feser and Luger, 2003; Cortright, 2006). A more useful definition should include meaningful parameters for the identification and study of clusters. There have been a number of attempts by many authors to define clusters, a very small sample of which are provided in Figure 2.2.
• ‘An industrial cluster is a set of industries related through buyer-supplier and supplier-buyer relationships, or by common technologies, common buyers, or distribution channels, or common labour pools. A regional cluster is an industrial cluster in which member firms are in close geographic proximity to each other,’ (Enright, 1996, p.191).

• ‘An industry cluster is a loose, geographically bounded collection of similar and/or related firms that together create competitive advantages for member firms and the regional economy,’ (Barkley and Henry, 2001, p.2).

• ‘A cluster is a loose, geographically bounded agglomeration of similar, related firms that together are able to achieve synergy. Firms “self-select” into clusters based on their mutual interdependencies in order to increase economic activity and facilitate business transactions,’ (Rosenfeld, 1995, p.12).

• ‘A group of firms, related economic actors, and institutions that are located near each other and have reached a sufficient scale to develop specialised expertise, services, resources, suppliers and skills,’ (Commission of the European Communities, 2008 p.9).

• ‘A cluster is a system of interconnection between private and public sector entities. It usually comprises a group of companies, suppliers, service providers, and associated institutions in a particular field, linked by externalities and complementarities,’ (World Bank 2009, vii).

• ‘Clusters are defined as “geographical concentrations of inter-connected enterprises and associated institutions that face common challenges and opportunities”. This definition highlights two essential features of clusters: they consist of a critical mass of enterprises located in geographical proximity to each other and enterprises within them share many common features,’ (UNIDO 2003, p.9).

Figure 2.2: Cluster Definitions from various authors

Cortright (2006, p.4) observed that many definitions are ‘conceptual and descriptive rather than analytic and precise.’ While there is a general consensus among authors,  

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8 See Belussi (2004) for more examples of cluster definitions
in terms of the overall concept of clusters, there remains much disagreement regarding its applications and what constitutes a cluster.

As set-out in the previous section from Porter’s definition there are two conditions required for a cluster. The first condition is that of proximity. Porter (1998b, p.4) explains that ‘the geographic scope of a cluster can range from a single city or state to a country or even a network of neighbouring countries.’ Furthermore, clusters span across political boundaries and often do not conform to Standard Industrial Classification (SIC) systems. Clusters will assume various forms and this will depend upon their ‘depth and sophistication’ (Porter, 1998b, p.4). The second condition relates to interconnections or linkages between participants of a cluster. Porter (1998, p.4) illustrates this point and suggests that quite often clusters will:

‘Include firms in downstream industries (channels/customers) producers of complementary products; specialised infrastructure providers, government and other institutions providing specialised training, education, information, research and technical support (such as universities, think tanks, vocational training providers), and standard-setting agencies. Many clusters include trade associations and other collective private sector bodies that support cluster members.’

Krugman (1991, p.68) points out that ‘clusters are not seen as fixed flows of goods and services, but rather as dynamic arrangements based on knowledge creation, increasing returns and innovation in a broad sense.’ In other words, it is not appropriate to establish a rigid definition within which clusters must fit, or else be disregarded, as by their very nature they should be dynamic, and continue to evolve. Due to the importance of the local context within which clusters develop, there is a wide acceptance of the fact that clusters are individualistic in nature and vary widely across the globe. To overcome this, researchers in the field have sought to identify specific characteristics identifiable in clusters in order to aid in the discourse. A universal definition of clusters does not exist however any cluster analysis must begin with a definition, as this will ultimately determine how the cluster should be analysed. Bergman and Feser (1999, p.244) explain that:

‘A cluster definition that emphasises informal, ‘untraded’ ties between businesses probably dictates a qualitative study of visible cluster members’
(Rosenfeld, 1997; Gollub et al., 1997), while a definition focused on buyer-supplier relationships implies a detailed quantitative analysis of I/O matrices that trace documented trade flows among many and occasionally unexpected industries (Roelandt et al., 1999; Enright, 1996; Feser and Bergman, 2000).

The lack of a comprehensive definition makes it very difficult to determine what is or is not a cluster from empirical analysis. A number of characteristics of clusters have been identified, which add to the discussion and these are explained next.

2.6.2 Characteristics of Clusters

There is huge diversity among clusters, some clusters are comprised of networks of small to medium sized enterprises (SME’s), some have developed around universities, while others are organised around large anchor firms (European Commission, 2007). This diversity complicates the discourse on clusters, because of their dynamic nature it becomes very difficult to determine what constitutes a cluster, and how does one recognise a cluster when they see it? To overcome this a number of common characteristics and features of clusters have been identified (Rosenfeld, 1997; Anderson et al., 2004; Cortright, 2006; Ketels, 2006; INNO, 2010; Boja, 2011; Ffowcs-Williams, 2012). Anderson et al. (2004), identified seven key characteristics or elements of clusters which include, geographical concentration, specialisation, cluster actors, cluster dynamics and linkages, critical mass, the cluster lifecycle and innovation. They argue that although these are commonly cited amongst authors in the field there is nothing to suggest that all seven must be present before a cluster can exist, but rather clusters tend to possess differing combinations of these characteristics (Anderson et al., 2004). To gain a deeper insight into clusters and how they are identified it is important to consider these features.

The first characteristic common amongst all the cluster definitions relates to **geographic concentration** which is fundamental to the cluster concept (Porter, 1998b; Anderson et al., 2004; Ketels and Memedovic, 2008; Boja, 2011; Ffowcs-
Close proximity is a fundamental requirement for the agglomeration economies which have already been outlined (reduced transport costs, reduction in transaction costs, economies of scale, ease of knowledge transfer, and knowledge spill-overs) thus aiding firms to increase efficiency, productivity and innovation. The ‘soft aspects’ of proximity according to Anderson et al. (2004) relate to localised social capital, and the notion that social networks create a culture of reciprocity amongst members, where actors do things for each other (Baptista and Swann, 1998; Belussi, 2004; Murphy et al., 2016). As discussed social capital is vital for the transfer of tacit knowledge (Saxenian, 1994; Poud and St. John, 1996), which is an important requirement for innovation.

It is clear from the difficulty in defining clusters that the identification of cluster boundaries is a challenging task, and they do not always conform to geographic boundaries. Sometimes successful clusters have been known to cross national boundaries, for example there is an automotive cluster between Portugal and Spain, a plastics cluster operating between Holland and Germany (Anderson et al., 2004, p.21) and a bio-sector cluster operating across the national borders of Switzerland, Germany and France called the Biovalley in Basel (EC, 2008a, p.27). There have been a number of varying methods used in trying to delimit cluster boundaries one method involved examining distances and times that people were willing to travel to work (Rosenfeld, 2002). According to Porter (1998b, p.6-7):

‘Drawing cluster boundaries is often a matter of degree and involves creative process informed by understanding the most important linkages and complementarities across industries and institutions to competition. The strengths of these ‘spill-overs’ and their importance to productivity and innovation determine the ultimate boundaries.’

Debates regarding the relevance of geographic proximity in the current information age continue (Rosenfeld, 1997; EC, 2002; Wolman and Hincapie, 2015), and research has shown that information communication technology (ICT) has altered the role of proximity not just in terms of geographic proximity but relational proximity (Vas, 2009). Despite this however tacit knowledge, vital for sustaining competitive advantage is best transferred through regular face-to-face encounters (Torre, 2008). According to Malmberg and Maskell (1997, p.29) ‘to communicate tacit knowledge
normally requires a high degree of mutual trust and understanding which in turn is related not only to language but also to shared values and culture.’

The second common characteristic relates to the **specialisation** within the cluster, this represents the common denominator amongst the members of a cluster, the activities which link them and motivate them towards common goals (Anderson et al., 2004; Ketels and Memedovic, 2008; Boja, 2011). Ketels and Memedovic (2008, p.378) describe clusters to ‘include companies in different industries that are related to each other in the production of goods and services valued by customers.’ According to Anderson et al. (2004, p.22) much evidence suggests that clusters have limited buyer-supplier transactions between firms within, but rather the focus on linkages within the cluster has shifted to those links facilitating knowledge transfer, knowledge spill-overs and collaborative aspects. Due to their involvement within similar or supporting industries actors within clusters tend to share experience, either through formal relationships or more informal and casual connections. Linkages to other sectors and cluster participants lead to a greater incidence and likelihood of ‘mutual learning, experimentation and innovation’ (Anderson et al., 2004, p.22). Although Porter (1990) originally coined the term ‘industry cluster’ it is important to note that clusters often cross sectoral and industry boundaries, in many of these cases, they have great success, for instance clusters within the Spanish region of Catalonia are market focused. One example of this is the ‘kids cluster’ whose members cross many different sectors, including the food industry, furniture industry, travel and tourism industry (Estévez, 2015). This cross-sectoral approach to clusters can often lead to greater opportunities for innovation, however competitiveness of a cluster is strengthened by the existence of specialised suppliers and sophisticated customers (Anderson et al., 2004).

Porter (1998b) argues that when clusters encompass a wide range of industries they are too broadly conceived, and will most likely develop very weak linkages amongst the sectors, while on the other hand treating single sectors as clusters in their own right, ignores important and valuable cross-industry connections which directly impact competitiveness. This must be considered when drawing cluster boundaries.
Cluster actors or constituent firms are another essential feature of clusters (Anderson et al., 2004). When identifying cluster actors, focus should not rest solely on input-output relationships, but also consider the various institutions such as universities, public authorities (both regional agencies, national agencies and local community), research institutes (also including science parks), financial institutions (both banks, and private equity sources) and institutions for collaboration (IFCs), all of whom are integral to the success of the cluster. Media also plays a part in generating interest and awareness surrounding emerging clusters and regional or local brands (Sölvell, 2008; Ffowcs-Williams, 2012). IFC’s are defined by Anderson et al. (2004, p.24) as ‘formal or informal actors which promote interest in the cluster initiative’ among the actors involved.’

The range of capabilities and roles of actors within a cluster is said to vary at different stages of development, for instance, the public sector may have a greater involvement in the early stages of a cluster initiative. The more mature and dynamic a cluster becomes, the greater the potential for spin-offs, and the more attractive it becomes for new firms. In terms of the public authorities’ involvement, the tendency is for direct involvement of regional public authorities within cluster initiatives. That is not to say that national agencies are unimportant to cluster initiatives, but rather the focus for national agencies surrounds the needs for cluster policies and the linking of these to national policies ‘ensuring appropriate broader framework conditions’ for clusters (Anderson et al., 2004, p.24). It is important that a holistic approach is taken to the actors within a cluster, as success of a cluster will rely heavily upon the motivations of actors within, and how responsive and adaptive they may be to challenges and opportunities which arise for their cluster.

Another feature of clusters relates to the dynamics within a cluster and to the linkages occurring, in terms of both cooperation and competition between actors (Anderson et

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9 A cluster initiative is “an organised effort to increase the growth and competitiveness of a cluster within a region, involving cluster firms, government and/or the research community” (Sölvell et al., 2003, p. 31).
The nature of competition within clusters has a significant impact on the firms within. The more intense the rivalry which exists between firms the greater the pressure for continuous improvement and upgrading. While the competitive dynamics within a cluster are vital to challenge the status quo amongst the constituent firms, collaborative and cooperative linkages between actors are also a common and essential feature of clusters, with actors cooperating and pooling resources to achieve common goals or objectives (Rosenfeld, 1997; 2002). This allows firms to achieve competitive advantage over other clusters as they can achieve much greater economies of scale and scope or gain access to resources which may have proven difficult for individual firms. This element is especially crucial for tourism clusters, as destination marketing becomes a core activity for the cluster, while actors are also competing internally for visitors who do arrive to the destination.

The most fundamental requirement of linkages between actors, is the willingness of those involved to exchange and transfer knowledge and information. The transfer of tacit knowledge is much more complex than that information which can be easily codified (von Hippel, 1994; Szulanski, 2000; Howells, 2002). The transfer of tacit or sticky knowledge is heavily dependent upon trust between parties. According to Szyani et al. (2010, p.91) ‘the concept of dynamic clusters emphasizes innovative cooperation among partners rather than one-way transfers of knowledge.’ A large part of fostering trust amongst actors within a cluster initiative involves the understanding that mutual benefits will arise from collaboration projects and cooperative efforts, and that these benefits will outweigh the costs for firms involved, this is a particularly difficult task. As Porter (1998a) highlights, while clusters have the potential to provide a wide range of advantages to constituent firms, these do not occur automatically, but rather as the result of a process in which firms must be actively involved. While strong linkages amongst cluster actors are very important for clusters, research in network analysis shows that it is also vital to consider weak ties. According to Granovetter (1973) weak ties play a very important role within social networks and often times act as local bridges, creating more, and shorter links or paths between nodes or members of a social network. His research determined that weak ties often provide the means through which information or whatever else needs to be diffused, can reach much
larger number of people and cross greater social distance, as strong ties are usually fewer and often only developed between similar people (Granovetter, 1973, p.1366).

It is not merely local knowledge transfer within a cluster which is important, linkages to the global market also represent great value for the cluster and its actors (Gordon and McCann, 2000; Bathelt et al., 2004; Wolfe and Gertler, 2004; Ketels and Memedovic, 2008; Szanyi et al., 2010; O’Leary, 2015). Many authors have discussed the importance of international linkages for firms within clusters, be they supply-side or collaborative linkages. Bathelt et al. (2004) make a clear distinction between the local buzz in a cluster and global pipelines. While local buzz is the term used to describe the information and communication created within the cluster due to proximity, global pipelines describes the channel through which more distant interactions take place. These global pipelines play an important role, as they expose clusters to knowledge creation and best practice happening elsewhere, they aid in avoiding cognitive lock-in, they enhance the quality of the local buzz within the cluster. While the local buzz happens automatically as a result of agglomerations, and requires little investment except in terms of engagement and effort, global pipelines are more complex. These international links can be established by the cluster actors through contacts on a global stage or they can be derived from the presence of multinational enterprises (MNE’s) within clusters, who introduce their internationally competitive processes to the locality of the cluster (Larsson 1998; EC, 2002; Sölvell et al., 2003; Anderson et al., 2004). It is important to note that global pipelines require much more investment to establish and maintain and as a result they are often built systematically and consciously (Bathelt et al., 2004). According to Bathelt et al. (2004) local buzz and global pipelines play very important roles in knowledge creation and innovation, they are mutually reinforcing and therefore it is essential to consider both in the study of clusters. The European Commission (2007, p.4) state that successful clusters will significantly increase ‘their global reach – attracting people, technology and investments, serving global markets, and connecting with other regional clusters that provide complementary activities in global value chains.’

Another key feature of industry clusters’ is critical mass, in order to derive benefit from internal cluster dynamics, it is essential that a cluster can engage numerous
members and reach a substantial population to sustain that benefit (Rosenfeld, 1997; Fornahl and Menzel, 2003; Anderson et al., 2004; INNO, 2010; Szanyi et al., 2010). It is not only critical mass in terms of the number of firms involved and the numbers employed but the resources available within a cluster such as access to supporting services or public research institutions. When a cluster reaches critical mass, it has the necessary base for ‘intensive cooperation,’ and better exploitation of ‘innovative potential.’ (INNO, 2010, p.29) Therefore it is assumed that the cluster will continue to grow in a process of self-augmentation (Brenner and Fornahl (2002 cited in INNO (2010)). Critical mass also increases a clusters resistance to external shocks, or internal losses of embedded actors who are considered important within a cluster (Anderson et al., 2004).

Critical mass directly impacts the dynamics and evolution of clusters, determining what level of critical mass ought to be reached is a challenge, and one that must be addressed for each individual cluster. There is no pre-determined level upon which critical mass is achieved, nor is there a defined means for the measurement of critical mass, whether it be measured in terms of firm membership or in terms of the resources or capabilities of the cluster as a whole. Some argue that a minimum of 50 firms are required for critical mass based on mathematical modelling, others have identified an upper limit of 200 firms for effective cluster dynamics (INNO, 2010, p.30). Clusters of all shapes and sizes exist in the world today, an example of the range can be seen when analysing ICT clusters in Europe. Seven ICT clusters recently participated in a joint European research project called Be-Wiser, of those seven clusters the largest was Cyberforum e.V., based in the Karlsruhe technology region of Germany, it has a membership of over 1,000 cluster actors, compared to the smallest, ICT Technology Network in Slovenia, which has a total membership of 50 (Byrne, 2016). Despite the wide scale range of clusters involved in the Be Wiser project, interestingly none of the clusters involved in the project were concerned with critical mass, but more the services that the cluster organisations provide for member firms. Industry structure will impact on the required critical mass, and many argue that mass is not the issue, but rather the quality of the interactions within a cluster (INNO, 2010). There are known cases of ‘underachieving’ clusters who have what is considered to be critical
mass, however they lack in terms of social capital, trust and shared vision (Rosenfeld, 1997, p.9).

Clusters are considered to be a long-term strategic organisational approach to economic development within a region. Many authors state that clusters follow a lifecycle, similarly to industry and product lifecycles (Rosenfeld 1997; Swann, 1998; Tichy, 1998; Enright 2003; Anderson et al., 2004; DTI, 2004; Cortright, 2006; Belussi and Sedita, 2009; Menzel and Fornahl, 2007; INNO, 2010). The cluster lifecycle has four key stages, which include: emerging or embryonic stage, growth stage, maturity and decline. Progression through the lifecycle is typically measured through firm births and deaths, employment numbers, new product developments (DTI, 2004; Cortright, 2006). Menzel and Fornahl (2007) argue these are not the only possible criteria to determine stages, but the level of heterogeneity of knowledge and competencies present within the cluster should also be considered, although these are more difficult to quantify.

Progression through such a cycle will vary widely from cluster to cluster. The emergence of a cluster is very difficult to detect (Pouder and St. John, 1996). A number of researchers within the field have tried to identify factors which may contribute to the emergence of clusters however there are no conclusive answers. According to Ffowcs-Williams (2012, p.159) ‘clusters by and large evolve serendipitously’ and while no one cause is responsible he provides a number of examples of factors which contribute to the emergence of clusters. These include factors such as; ‘proximity to natural resources, proximity to physical features, specific local demand, external shocks, cultural traditions, access to transport routes, intervention by government agencies, and chance.’ Each stage of the cluster lifecycle will require very different supports in terms of policy, and this is a key consideration for policy-makers and practitioners who wish to support or facilitate cluster development.

Innovation is the final feature of clusters as listed by Anderson et al. (2004). Nelson and Rosenberg (1993, p.4) define innovation as ‘the processes by which firms master and turn into practice product design and manufacturing processes that are new to
them, whether or not they are new to the universe.’ Anderson et al. (2004) note that innovation has become closely associated to clusters due to the knowledge transfer, knowledge spill-overs, cross fertilisation of ideas, and close linkages between cluster actors through which tacit knowledge is readily shared. Innovation can occur in a number of forms, and in some cases can stem from imitation, which spreads quickly but does not offer sustainable competitive advantage. Anderson et al. (2004) explain the arbitrary nature of measuring innovation, while some choose to examine innovation inputs such as research and development (R&D) expenditure or activity and patents, others look to measure innovation through outputs such as new products or rapidly growing firms. Anderson et al. (2004, p.34) also note the problematic nature of measurement of innovation within the service sector where no physical product exists. According to the EC (2007, p.5) ‘clusters may embody the characteristics of the modern innovation process: they can be considered as reduced scale innovation systems.’ Evidence relating to the link between clusters and increased innovative activity have already been outlined. This is an important consideration for the tourism industry in particular. Research on innovation in tourism is limited (Hjagler, 1997; Nordin, 2003; Camisón and Monfort-Mir, 2012) and compared to manufacturing innovation in tourism happens in a very different way. According to Camisón and Monfort-Mir (2012) due to the nature of innovation in tourism much of the incremental low-technological innovations which occur are under reported in official statistics.

The infrastructure within the cluster will directly impact upon the levels of innovation within constituent firms. Challenges such as openness and willingness to accept change, of customers, suppliers and employees, issues surrounding intellectual property and intangible assets, and the challenge of securing investment will all stem from the infrastructure of the cluster. It is within the cluster infrastructure that policy can provide the greatest supports for cluster development, but what role should policy-makers play in cluster development? Considering that this economic phenomenon is theorised to be market driven, it is important to fully understand the level of involvement appropriate for governments and how best they can support clusters (Boekholt and Thuriaux, 1999; DTI, 2004; Cortright, 2006).
2.7 Cluster Policy

Over the past decade cluster initiatives have been at the forefront of regional economic development policy (Wolman and Hincapie, 2015), with cluster-based policies being adopted by governments all over the globe at varying degrees of aggregation (national, regional and even city level). Policy-makers were eager to identify potential clusters and support their development as a means to advancing regional economies, attracting investment and improving prosperity. The extant literature indicates however that clusters emerge as a result of economies of agglomeration, and they expand largely as a result of market forces, which raises questions about the involvement of government in such a market lead process. Porter (1990; 1998a; 1998b; 2000) argues that governments should not create clusters, but rather act as ‘catalyst’ designing policies to facilitate and support the emergence and development of clusters, it is important to consider the rationale for cluster policy as well as the various approaches and instruments which can be utilised. There is no one cluster policy approach which can be adopted across the board, but rather a range of supportive instruments which can be used within a cluster framework, these will be briefly discussed.

2.7.1 Rationale for Cluster Policy

Indirectly and without targeted policies, governments have a significant role to play in terms of cluster development. Governments determine the macroeconomic policies relating to the general business environment, taxation, employment and competition law as well as micro environment policies including education infrastructure. The cluster framework for policy is considered useful because it requires a reorganisation and refocus of traditional thinking. Cluster policies are described to be ‘situated at the boundaries of industrial policy (including SME policy), regional development policy, and science and technology (S&T) policy’ (Boekholt and Thuriaux, 1999, p.384). Rather than clusters representing a new area for policy, it entails a new approach to existing policy structures, allowing governments a framework not only to improve existing policies, but to coordinate them more efficiently for maximum impact.
Researchers in the past have decried clusters as a validation for modern industrial targeting however cluster policy is very different (Woodward and Guimaraes, 2009; Hefner, 2009; Pessoa, 2010). Traditional industrial policy focused on targeting and supporting those industries who were deemed to have the most growth potential for an economy. Usually this approach involved subsidising national industries to protect employment. However, this type of policy approach not only required direct intervention, but it usually involved sustained investment and as a result it distorted competition in favour of national industry (Boekholt and Thuriaux, 1999; Porter, 2000; Ketels and Memedovic, 2008). In contrast to the defensive measures adopted within traditional industry targeting the cluster policy approach adopts a broader view of competition among firms and focuses on leveraging regional strengths. It advocates that all existing and emerging clusters are worthy of support and should be upgraded (Porter, 2000), governments should not engage in ‘picking winners’ or creating clusters from scratch. The cluster framework is a useful policy tool through which to view national or regional economies and devise the most suitable course of action in facilitating business development (Cortright, 2006). Rather than distorting competition clusters focus on ‘removing obstacles, relaxing constraints and eliminating inefficiencies to productivity and productivity growth’ (Porter, 2000, p.3). European Commission (2007, p.19) suggest that:

‘Clusters can increase collective productivity by developing interdependencies and complementarities which are not always well exploited in a competitive market environment; cluster initiatives help to build up trust and engage in cooperation by enhancing mutual learning and common strategies. Therefore, there is a role for governments to support these initiatives and to complement their strategies with an appropriate policy mix to improve the productivity of clustered resources.’

The rationale for cluster policy goes beyond seeking the benefits to be gained but rather should address market failures which impede the development of clusters,
allowing firms to overcome obstacles to productivity growth (Boekholt and Thuriaux, 1999; Anderson et al., 2004; OECD, 2010; Ketels et al., 2012). Ketels et al. (2012, p.40) suggest that policy intervention is justified when ‘specific conditions restrict the ability of the normal market process to lead to optimal outcomes from an overall welfare perspective.’ They identified three types of market failures which impact the development of clusters. The first is ‘coordination failures’ whereby firms may be unaware of the cluster, and how their performance impacts other actors. The second type of market failure relates to ‘information asymmetries’, when actors don’t take advantage of expertise knowledge of suppliers, or do not take opportunities for collaboration. The third type of market failure is based around the concept of path dependency\(^{10}\), whereby the cluster may lack crucial elements or participating firms cannot access strategic knowledge. In each of these cases the development of the cluster is hindered and so policy intervention should be justified, however Ketels et al. (2012) stress that to avoid distortion of natural market forces, policy interventions should be targeted directly at addressing the source of market failures.

2.7.2 Cluster Policy Instruments

It is important at this stage to clearly distinguish between the terms cluster, cluster policy, cluster initiative and cluster organisation. A cluster is defined as a ‘geographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries and associated institutions in particular fields that compete but also cooperate’ (Porter, 1998a, p.197). Sometimes referred to as ‘wild clusters’ these are economic phenomenon which emerge (Estévez, 2015). Cluster policy refers to efforts by government to influence cluster development at some level, (local, regional or national). Cluster initiatives (CI’s) on the other hand, are organized efforts to increase the growth and competitiveness of clusters within a region, involving cluster firms, government and/or the research community’ (Sölvell et al., 2003, p.15). The key difference here being that a cluster initiative is not necessarily driven by

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\(^{10}\) Path dependency is related to the notion that decisions made today will impact on future economic trajectories, and likewise decisions made today are impacted by what has happened historically. It is often associated with another negative concept called ‘lock in’. See Liebowitz and Margolis (1998).
government, although government agencies often have some involvement (commonly in terms of funding), CI’s are often instigated and driven by industry. A cluster organisation is the administrative arm of a cluster initiative, taking responsibility for coordinating activities acting in cluster members interests and facilitating knowledge sharing (ECO, 2014). Cluster organisations can be established from the bottom up or the top down and they work towards facilitating collaboration within the cluster. If a cluster organisation is established the funding\textsuperscript{11} models used must be carefully considered.

The dynamic nature of the cluster phenomena coupled with the significant importance of the cluster context, mean that there is not one prescribed policy intervention which can be rolled out across the board. Cluster policy can occur at varying levels of aggregation, national cluster policy (e.g. Pôles de Compétitivité in France, the Centres of Expertise in Finland or Japan’s Industrial Clusters and Knowledge Clusters programmes) regional cluster policy (e.g. Catalonia, Spain; Baden-Wurttemberg, Germany; Upper-Austria) and some at city level (e.g. 22@barcelona, mediacityuk – Manchester, Phoenix West – Dortmund). Cluster policy can be aimed at impacting the general business environment conditions, or they can be cluster-specific. Cluster specific policies aim to build on existing cluster capabilities and facilitate further development, policies such as this may not by explicitly referred to as cluster policy but they fall within the remit of ‘regional policy, research and innovation policy, industrial policy and SME Policy’ (EC, 2007, p.15)

Ketels and Memedovic (2008, p.385) suggest that there are three main aims of cluster policy. The first is to ‘leverage clusters to improve the efficiency of economic policy’ developing infrastructure and skills around clusters to increase attractiveness for foreign direct investment and thus improving regional economic development. The

\textsuperscript{11} See InTra-Net Project Note as part of REG X – Financing Models of Cluster Organisations – where they address the strengths and weaknesses of each possible funding model, private, public and public-private funding. Available online at -\url{http://www.regx.dk/fileadmin/user_upload/InTra-Net/News_and_Events/130625_UK_Financing_Models_of_Cluster_Organisations_FINAL-regx-wtsh.pdf}
second aim of policy is to strengthen clusters by improving the competitiveness of clusters, often by supporting cluster initiatives to increase awareness and encourage participation and collaboration. The third aim is ‘creating clusters’, whereby policy is aimed at attracting industry to a particular location and stimulating investment in specialised infrastructure. This third strategy is not recommended, and previous cases has shown to fail (Ketels and Memedovic, 2008, p.385). They suggest that a more suitable approach rather than creating clusters is to improve the general business environment, build on skills, infrastructure, and easing access to finance in order to better enable potential clusters to emerge.

Cluster policies tend to support the development of clusters in three key ways; increasing the engagement of actors, establishing or facilitating the development of business linkages and encouraging or incentivising collaborative R&D efforts. ‘The purpose of the different policy instruments will vary depending on the type of cluster and regional needs’ (OECD, 2010, p.2). The OECD (2010, p.3) compiled a list of commonly used instruments in cluster policy, these instruments are listed in Figure 2.3. Depending on the cluster context a wide range of instruments are available to policy-makers to support the development of clusters. It is important that regional policy-makers have a sufficient level of autonomy in order to adopt the most appropriate supports for their regional clusters.
Similarly, to the cluster concept itself, there is no one definition of cluster policy or a standard approach to cluster development. The benefit of a flexible approach to cluster development is that the most appropriate tools and instruments can be adopted to develop clusters, depending on their local context and stage of development. Raines (2001, p.14) conducted a study of cluster policies across several different regions in Europe. His research showed that cluster analysis was deemed by most to be a crucial stage in the design of cluster policy. Raines (2014) determined that cluster analysis

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**Figure 2.3: Common Policy Instruments used in Clusters. Source: OECD, 2010, p.3**
provided a number of key benefits to policy-makers, such as an overview of existing clusters within the economy and the identification of strengths and weaknesses of those clusters. This information allows policy-makers to tailor their efforts to specific cluster needs ensuring that policy initiatives have maximum impact. It is this analysis which enables cluster policy to be fact driven. Cluster analysis should be the first stage in any cluster strategy to identify the potential clusters within a region. The next section reviews different methods used when identifying and analysing clusters.

2.8 Cluster Analysis

Clusters are a complex phenomenon. Vague and varied definitions of clusters in terms of spatial and industrial scales has resulted in the adoption of numerous techniques to identify and evaluate them. In his theory, Porter (1990; 1998a; 1998b) offered no methodology for analysing clusters. Rather he suggested that to identify the constituent parts of a cluster a number of steps should be taken: 1) begin with an agglomeration of firms, or one large firm and examine upstream and downstream links in the vertical chain of firms and institutions to identify suppliers and customers. 2) Consider horizontal links to identify industries passing through common channels or using similar specialised inputs and technology. 3) Identify the institutions providing specialised skills, technology, information, capital or infrastructure to cluster participants and 4) Determine those government or regulatory bodies that have significant influence on actors in the cluster (Porter, 1998a, p.200) This process does not offer any indication of how these economic features should or can be identified, or how they perform.

Researchers began to adopt a wide range of analysis tools and techniques ranging from mathematical models based on published regional and national statistics, to interviews and case studies in the pursuit of clusters. Many studies focused on observed cluster effects, including employment growth, while others attempted to determine the levels of innovation by examining patents within a region. Almost thirty years on from Porter’s (1990) seminal paper there is still no one agreed or accepted methodology for the identification of clusters (Roelandt and Den Hertog, 1999; Feser and Luger, 2003;
Martin and Sunley, 2003; Cortright, 2006; Wolman and Hincapie, 2015). Vom Hofe and Chen (2006, p.3) believe that:

‘Despite the increasing popularity of industrial cluster theory for economic development policy analyses there probably has never been more chaos diffusion and misinterpretation among economic developers, practitioners and academicians alike on proper cluster definitions, appropriate cluster identification methodologies and their translation into cluster based economic development policies. There exists no single contractual and analytical framework that when correctly applied, will help identifying regional industrial clusters....’

Bergman and Feser (1999, p.13) suggest that there are three general motivations to conduct regional cluster analysis: 1) To gain greater understanding of how to develop and strengthen linkages among firms gain competitive advantage in leading industries; 2) To uncover complementarities or potential for collaborations amongst leading and developing industries within a region; 3) To investigate the regional strengths and potential of industry in a region. Depending on the purpose of the analysis and its context the most suitable level of analysis can be identified.

In this section the differing approaches to cluster analysis will be outlined, however to provide some context to these methods it is important to recognise that cluster analysis takes place on different levels and is conducted from two different perspectives (Byrne, 2016). Understanding these allows greater insight to the aims of the studies.

2.8.1 Levels of Cluster Analysis

Roelandt and den Hertog (1999) suggests that there are three different levels of regional disaggregation upon which cluster analysis can occur (Figure 2.4). The first is micro level analysis which focuses on participating firms. Usually the analysis seeks to determine the networks surrounding a particular firm, why firms co-locate, how actors co-operate, and examine their use of shared resources, common technologies and markets. Analysis at this level can be used to identify potential strategic partners
for collaborative projects, to strengthen ties between actors, or identify missing connections essential for further development. Byrne (2016) explains that micro analyses depend on primary data as no secondary sources exist (Hoen, 2002; Mazzarol et al., 2005). This can be expensive and time consuming however it also provides rich data, enabling a deeper understanding of how the cluster participants operate within their local context (Mazzarol et al., 2005). Micro level analysis is suitable when seeking evidence of clustering behaviour within a specific industry (Mazzarol et al., 2005, p.50). Studies such as these are context specific and will not be representative for other regions (Bergman and Feser, 1999; Hoen, 2002; Mazzarol et al., 2005)

The second level of analysis is the meso or industry level (Roelandt and Den Hertog, 1999), which ‘typically applies at the regional level, above the level of the firm but below examining an entire nation across all industries’ (Byrne, 2016, p.67). Analysis at this level examines the linkages between industry sectors in a value chain and is often used to define clusters (Byrne, 2016). Meso-level analyses are useful to determine the strengths and weaknesses within a particular sectoral network, to identify opportunities for further development and innovation. Meso-level analysis ‘provides a more complete picture of entire industries,’ (Mazzarol et al., 2005, p.50) and it is this level of analysis which was adopted in most of the Porter studies ‘carried out for various countries’ (Roelandt and den Hertog, 1999, p.14). Analyses at this level tend to use secondary sources of statistical data such as employment data and industry concentrations (Mazzarol et al., 2005).

The third and final level of analysis is the macro level, which focuses on industry groups across the economy as a whole. These analyses seek to identify areas and patterns of specialisation across industries and examine how industry groups constitute the broader economic structure (OECD, 1999). As such macro analysis can contribute to national economic and innovation policy (Roelandt et al., 1998). Studies of this type use secondary data sources such as regional indicators relating to employment and industry concentrations.
Each of these levels of analysis has a different focus as seen from Figure 2.4 and as such require very different techniques. It is important that the most appropriate level of analysis is chosen in line with research objectives as this will impact the possible outcomes of the study and each approach has its limitations (Byrne, 2016).

Two general perspectives exist in cluster analysis: 1) a top-down approach, predominantly relies on quantitative analysis to deduce the industrial structure of a regional or national economy, and 2) a bottom-up approach adopts more qualitative methods to focus on inter-firm linkages within a cluster or local industry eco-system (Cortright, 2006, p.28). These perspectives require differing levels of analysis, tend toward a variety of research tools and techniques, and focus on different objectives, see the differing characteristics summarised in Figure 2.5.
Each perspective will be outlined here and an overview of some of the research techniques will be discussed.

2.8.2 Top-Down Approach

Bergman and Feser (1999, p.15), note that the top-down approach is used to ‘identify clusters through various reduction techniques.’ This approach typically occurs across the macro and meso levels of analysis. It involves ‘quantitative techniques which rely on more sophisticated economic modelling and are based on statistical methods that aim to identify clusters indirectly by measuring the revealed effects assumed to be observable when a cluster is present’ (Commission of the European Communities, 2008, p14). Cortright (2006, p.28) suggests that top-down approach to cluster analysis aims to answer questions such as ‘How much does a region’s economy depend on a particular industry? Or how much does industry specialisation affect the growth of a region?’ The tools adopted within this type of analysis will vary from country to country according to the availability and depth of published statistics. Top-down analysis employs analytical tools and techniques to identify concentrations of industry based on specific indicators. The most frequently cited within the cluster literature include location quotients and input-output analysis. Each of these will be briefly described.
1. Location Quotients:

Location quotients (LQ) are used to identify patterns of regional specialisation by highlighting regional concentrations of economic activity, and determine whether or not these are over or under represented within a region relative to that of the larger population (i.e. the nation). The location quotient is typically used with employment data to determine whether a cluster or region has a significantly higher share of employment within a particular industry than that of the nation. In its simplest form the LQ formula is a ratio which implies that an LQ higher than 1, shows that a degree of specialisation exists. There is an underlying assumption that if a particular region supports greater employment in a sector than the national average, the greater production within that region implies that the produce is exported. Location Quotients are one of the most commonly used economic models in the identification of clusters, and is favoured by Porter (2000) among others (Isaksen, 1996; Miller et al., 2001). Its popularity is due to the fact that it is easy to calculate, easy to understand, and the relative ease with which the necessary data (employment data both regional and national) can be obtained.

A number of limitations exist when using the LQ. The first is that there is no agreed value as to what level of specialisation indicates the existence of a cluster. According to O’Donoghue and Gleave (2004), Miller et al. (2001) used an LQ cut-off point of 1.25, whereas Isaksen (1996) chose a cut off LQ of 3 to represent sufficient specialisation for a cluster. Another issue with the use of the location quotient is that it cannot distinguish between internal and external scale economies. Should a region show a large LQ for a particular industry, this does not illustrate whether this is due to the existence of a number of firms and enterprises or due to the existence of one large company, employing much greater numbers (Vom Hofe and Chen, 2006). LQ’s also assume that local productivity is equal to that at national level, on this basis a high LQ is believed to infer that exporting is occurring, which indicates a strong industry performing well. However, depending on local productivity levels the opposite may be true in that local productivity may be lower than the national average, which infers that it takes a greater number of employees to produce the required output demanded within that region (Shields, 2016). Where LQ’s are calculated on individual industries
the analysis ignores any intra-industry dependence, which is important for clustering (Feser and Luger, 2003). There are a number of other measures which, similar to the location quotient, aim to identify the concentration and dispersion of industry within regions, these include the Gini-coefficient (see Krugman, 1991) and the Ellison-Glaeser measure (see Ellison and Glaeser, 1997).

2. Input-Output Analysis

Another technique utilised in cluster analysis is input-output (I-O) analysis. This method addresses the issue of measuring inter-industry dependence. ‘Input-output tables use data on sales or shipments between firms in different industries to estimate which fraction of the inputs used by one industry are purchased from all other industries’ (Cortright, 2006, p.32). Using factor analysis on input-output tables allows the identification of strong or weak links between industries (Roepke et al., 1974). This method has been used by a number of practitioners within the field (Scott and Bergman, 1997; Hewings et al., 1998; Feser and Bergman, 2000; Roelandt and den Hertog, 1999; vom Hofe and Bhatta, 2007). Feser and Bergman (2000, p.12) argue I-O analysis provides ‘the best uniform means of identifying which firms and industries are most likely to interact through a myriad of formal and informal channels.’ One of the greatest criticisms of the input-output analysis however is that it is a-spatial and does not consider the issue of proximity. Typically, the data required for input-output tables is compiled at a national level and it becomes very difficult to access the relevant information at the most accurate level of geographical aggregation (O’Donoghue and Gleave, 2004). O’hÚllachain (1984) argued that while input-output tables are useful in the identification of complementary relationships they do little to detect vertical value chain links. O’Donoghue and Gleave (2004) also argue that there are no defined cut-off values in relation to what constitutes a strong or weak linkage.

A number of variations for the aforementioned models have also been used, for example O’Donoghue and Gleave (2004) propose what they refer to as the ‘Standardised location quotient.’ Feser and Bergman (2000) developed cluster
templates useful for benchmarking, based on national inter-industry linkages. Other methods for measuring clusters and evaluating cluster performance involve the identification of knowledge focused concentrations using patent data (see Jaffe et al., 1993; Koo, 2005), and mapping innovative activity with innovative interaction matrices (see DeBresson, 1996). Shift share analysis has also been used to determine whether local economic growth is due to national trends in the industry, growth within the economy as a whole, or superior performance within the region due to region specific competitive advantages (see Stimson et al., 2006).

These types of top-down approaches to cluster analysis serve to identify or measure the existence of clusters by measuring observed effects, that is intra-industry linkages through I-O analysis, employment growth through shift share analysis, levels of specialisation through LQ’s, or increased levels of innovation through patent data. A prerequisite for all of these quantitative methods of analysis, is the availability of published statistics, imposing a number of additional challenges. The collection of public data varies widely between nations, and granularity of available data will also vary, this can prove challenging when trying to replicate analysis across nations, methods may have to be adjusted or changed to suit the data available. There is also the issue of time lag, which results in analysis based on past data. As Feser and Luger (2003, p.14) point out ‘in today’s high-tech, high-speed world, several years can be a lifetime.’ How relevant are these measures when they are based upon data collected three or four years ago? They also raise the point that policy-makers often have more interest in new or emerging clusters, which are often too small or too recent to appear in the data available.

Despite this, the top-down approach to cluster analysis is considered effective for cluster evaluation from the meso and macro levels, whereby researchers can analyse a regions employment concentration, and trading patterns in comparison to national performance. Top down analysis cannot facilitate analysis on the micro level however, it is a useful starting point for cluster analyses however it can and should be complemented with additional data to gain a deeper understanding into the regional economy and cluster eco-system, the bottom-up approach is useful in this regard (Roelandt and den Hertog, 1999; Hoen, 2002; Cortright, 2006).
2.8.3 Bottom-Up Approach

Rather than trying to identify clusters within regions from regional or national data, in a bottom-up approach the researcher aims:

‘To identify clusters by beginning with individual sectors and then find linkages with other industries and related non-business institutions. In essence the analyst builds a picture of regional industrial interdependence from the ground up, one sector at a time’ (Bergman and Feser, 1999, p.15).

This approach is suited to analysis at the firm or micro level and it involves the use of qualitative data. According to Cortright (2006, p.34) bottom up cluster analysis is ‘more narrowly focused, examining a subset of industries or a limited set of areas. They often focus on a particular local economy [or] look at a single industry cluster…. they generally try to draw inferences about the mechanics of clustering from their observations.’ He states that there are three common techniques used in the bottom-up approach which include; basic qualitative methods, genealogies and case study analysis. Each of these techniques will be briefly described below:

1. Basic Qualitative Methods

Cluster analysis, using a bottom up approach has a narrow focus and aims to obtain much richer data through the use of qualitative methods including interviews, focus groups and the Delphi survey method (Feser and Bergman, 2000; Cortright, 2006). These methods of analysis have grown in importance due to the challenges faced when adopting quantitative analysis, they provide the means through which ‘contextual information’ can be obtained (Feser and Luger, 2003, p.14). ‘There are no secondary sources of information on cooperative relationships between local companies; input-output data can only provide hints of such relationships’ (Bergman and Feser, 1999, p.14). In cases where the analysis is focused upon a defined set of industries in which policy-makers have interest, qualitative methods can uncover evidence of clustering behaviour and provide researchers a deeper understanding of the experience of participating actors (Mazzarol et al., 2005). Qualitative techniques are employed with
a view to gaining valuable insight from key informants within the industry, where expert opinion is vital to this approach. Bergman and Feser (1999, p.16) explain that ‘regional experts such as industry leaders, public officials and other key decision makers are important sources of information about regional economic trends, characteristics, strengths and weaknesses.’ Stough et al. ((1997) as cited in Feser and Luger (2003, p.2)) argue that regional experts are ‘agents who know the region’s industries in terms of basic practice, supply chains, current investment patterns and potential opportunities for new products.’ It is important to note that secondary sources of information e.g. industry reports and newspaper articles are also considered expert opinion.

A number of shortcomings of these qualitative methods exist. Feser and Luger (2003, p.14) describe a ‘know it when you see it’ logic, which can sometimes be applied in qualitative studies where definitions bend as data is gathered so compromising the ‘objectivity of the findings’. Qualitative methods can also be impacted by response bias where opinions and experiences are asked of individuals involved. The sampling methods used will also impact the representativeness of the findings, in cluster analysis convenience sampling is often adopted based on what experts can be accessed, and response rates can also create a challenge in achieving sufficient sample sizes (Feser and Luger, 2003).

2. Genealogies:

Genealogical charts are considered useful in the bottom up approach, to document the emergence and growth of a cluster, and therefore identify the path dependent nature of a cluster’s development (Cortright, 2006). Due to the nature of clusters lifecycles (Roelandt and Den Hertog, 1999) it has been documented that spillovers and spin-offs are a common feature throughout the growth stage. According to Hulsink et al. (2007, p.5) genealogy maps ‘provide relational information on founders of companies and the previous company affiliation of the founders’, allowing analysts to consider and document a cluster. Genealogical charts have been used to document the Silicon Valley cluster an example can be seen below in Figure 2.6. Genealogies are a valuable tool in the emergence and evolution of new industries (Hulsink et al., 2007). While this tool is particularly useful in understanding how a cluster has developed over time,
the costs associated are high as it is a time consuming and labour-intensive process. Genealogies are also specific to the cluster being analysed leaving little room for comparison with other clusters (Cortright, 2006).
Figure 2.6: SEMI Semiconductor Industry Genealogical Chart (Laws, 2016)
3. Case Study Analysis:

Case study analysis allows the ‘investigation of a contemporary phenomenon, in its real-world context, especially when boundaries between phenomenon and context may not be clearly evident’ (Yin, 2003, p.2). The case study approach is perhaps the most common approach to the analysis of clusters with many influential and commonly cited cluster analyses in the USA (such as Porter, 1990; 2003; Saxenian, 1994; Rosenfeld, 2000; Waits 2002; Scott, 2004) and across Europe (Sölvell et al., 2003; Ketels, 2006). Typically, case studies provide in-depth qualitative analysis of the emergence and development of a cluster, along with the identification of the individual cluster components (Wolman and Hincapie, 2015), strengths and weaknesses. Case studies provide ‘richly detailed accounts of uniquely successful industrial groupings [which] are instantly familiar and compelling, particularly to politicians and policy-makers seeking solutions to regional economic problems’ (Cortright, 2006, p.36). The case study approach to cluster analysis generally uses a number of techniques and methods to gather data. For example, Saxenian’s (1994, p.209) work on the technology clusters in Silicon Valley and Route 128, Boston, Massachusetts, was based upon:

‘Empirical material accumulated over the course of nearly a decade living in and observing the two regional economies. The core of the argument is built from more than 160 in-depth interviews with entrepreneurs, industry leaders, corporate executives and representatives of local business associations, governmental organisations and universities in Silicon Valley and Route 128.’

Cortright (2006, p.36) states that case studies ‘address many different dimensions of industry simultaneously,’ and as such ‘they provide a more balanced view of the various factors that produce clusters.’

Case studies also have limitations. Case study analysis is almost always conducted on already successful clusters, and therefore there is a real danger of readers assuming that strategies and tactics identified for successful clusters are copied to others to produce similar results (Cortright, 2006; Wolman and Hincapie, 2015). Due to the qualitative nature of the research, ‘evidence is always case-specific,’ which raises issues for comparison or generalisations. Furthermore, the collection of data can be
very time-consuming, and as dynamic clusters change over time, studies can very quickly become outdated (Commission of the European Communities, 2008, p.15). Expert opinion is often used as a data collection method for the creation of case studies and therefore the limitations of bias will be an important consideration here too.

2.8.4 Effective Cluster Analysis

As discussed previously, none of the cluster analysis tools described here are without limitations. While the top down approach relies heavily on published statistics it provides evidence of observed cluster effects or a lack of those effects at the macro and meso level. These methods can be useful evaluation measures of cluster performance in the event of any policy interventions or supports. The bottom up approach is useful in cases where published statistics are not yet available due to time lag or issues with granularity. This approach focuses on analysis at firm level, identifying the linkages and interdependencies which occur for firms. It can also prove useful in the evaluation of ‘key supporting agencies and institutions for which there is often very little high-quality secondary information’ (Feser and Luger, 2003, p.14).

It is argued that the most effective and comprehensive cluster analysis adopt a combination of qualitative and quantitative methods in order to provide a true and honest representation of a regions economic eco-system (Roelandt and den Hertog, 1999; Feser and Bergman, 2000; Mazzarol et al., 2005; Cortright, 2006). Mazzarol et al. (2005, p.4) suggest that:

‘The use of location quotients identifying employment and industry concentrations or similar concentrations of human capital provides only a partial picture explaining the dynamics of clusters. Also required are micro-level analysis techniques designed to drill down to the firm level and explore the value chain relationships and strategic networks that provide the basis for understanding the full dynamics of industry cluster behaviour.’

Hybrid cluster analyses combining both approaches are better placed to identify strengths and capabilities, and acknowledge weaknesses, determining the situation for
industry clusters within an economy and identifying the potential for further development and supports necessary to facilitate this transition (Austrian, 2000; Feser and Luger, 2003; Cortright, 2006; Ffowcs-Williams, 2012; Wolman and Hincapie, 2015).

Cluster analysis therefore should be considered as a flexible mode of inquiry, whereby finding the most appropriate approach to cluster analysis will depend on local context and the policy concerns within that context (Feser and Luger, 2003; Cortright, 2006). Feser and Luger (2003, p.12) argue that:

‘Any findings from such analyses cannot be divorced from those policy issues and the preferences and values that brought them to the fore. When the link between the methodology as technique and the policy context is explicitly recognised applied, cluster analysis has much to offer.’

Such a flexible approach to analyses, while it can produce highly accurate and detailed accounts of the regional economic realities, it may also be used to produce some justification for industrial targeting by policy-makers. Evidence of this exists if one considers the number of cluster initiatives aimed at developing what are referred to as ‘sexy clusters’ of ICT and biotechnology, not because any solid foundation for these clusters exist, but because they are believed to offer the greatest development potential and returns for the regional economy (Estévez, 2015). Therefore, in cluster analysis it is important that the limitations and scope of each method and technique are fully understood, and by combining techniques analysts can overcome these.

Cluster mapping is an important consideration in the analysis of clusters. Developments in cluster mapping efforts both in Europe and the USA, add depth to the cluster debate and provide tools for more accurate representation of industry clusters. Some cluster mapping tools are discussed in the next section.

2.8.5 Cluster Mapping

In response to the lack of clarity surrounding cluster definitions, cluster mapping has evolved as another dimension of cluster analysis. Cluster mapping involves establishing cluster definitions by linking together industry sectors, allowing for the
identification of industrial agglomerations across regions and developing performance measures to evaluate ‘the competitiveness and dynamism of clusters,’ (Ketels and Protsiv, 2014, p.4). A second element of cluster mapping involves the visual representation of clusters which can be presented as schematic diagrams of links between industry sectors (Austrian, 2000; Mazzarol et al., 2005), or as representations of clusters on geographic maps to identify what types of clusters exist and where they are located (US Cluster Mapping, 2017; EU, 2017). This new approach is considered a crucial element of assessing clusters particularly for policy-makers ‘as it provides rich fact-based analysis of local competitiveness and concentration of economic activities’ (Ketels and Protsiv, 2016, p.2). To better understand cluster mapping tools both elements will be outlined here, and a brief overview of two key cluster mapping tools will be provided.

1. Establishing Cluster Definitions and Evaluation Methods

Ketels and Protsiv (2014, p.2) explain that:

‘Clusters are a reflection of cross-industry linkages, not just of economies of scales through narrow specialisation. Cluster definitions group narrow industries into cluster categories to systematically track and measure the presence of clusters across locations in a comparable way. Cluster mapping is the process of generating such definitions and applying them to a specific economy. The result of cluster mapping is a data set of cluster-specific indicators like employment, establishments, and wages across locations.’

In other words, cluster mapping involves the identification of benchmark cluster definitions that is groupings of industry sectors and subsectors into cluster categories
using standard industry classification codes (NAICS\textsuperscript{12}, ISIC\textsuperscript{13}, and NACE\textsuperscript{14}). Once these categories have been identified, it is possible to examine economies (regional or national) to determine whether or not these clusters exist and where. For example, consider that the U.S. Cluster Mapping initiative have identified a food processing and manufacturing cluster which involves a total of 47 different industry sectors. They have also defined a hospitality and tourism cluster as one of their cluster configurations or groups, and within that they have identified a total of 31 sub-clusters or industries (US Cluster Mapping Project, 2017). Due to the nature of the analysis employed, and the comparability of the data within the cluster definitions, cluster mapping provides a means to gain a much deeper understanding of the composition of an economy through determining not only what clusters exist, but their profile, structure and economic performance within that economy (Ketels and Sölvell, 2006). Access to information such as the aforementioned, is invaluable for policy-makers trying to identify where their limited resources should be focused, and what activities they can and should be involved in, to support clusters, and develop their region’s economy.

There are a variety of ways in which cluster mapping occurs, and typically mapping projects differ based on their approach to grouping industries into cluster definitions (Ketels and Sölvell, 2006). A number of differing mapping projects exist, the largest of these being the US Cluster Mapping project and the European Cluster Observatory which take place at macro-level. Much smaller mapping exercises have also been conducted, and often times these can be carried out for specific regions such as the North East Ohio Cluster project (Austrian, 2000), Western Australia (Mazzarol et al., 2005), Italy (Lazzeretti and Capone, 2006), or nations for example the Sweden, (Sölvell et al., 2003), UK (DTI, 2001) and Denmark (Napier and Bjerregaard, 2013).

2. Visual Representations of Clusters

\textsuperscript{12} NAICS – North American Industry Classification System, used to identify firms’ primary business activity among North American countries of Canada, Mexico and the United States.

\textsuperscript{13} International Standard Industrial Classification (ISIC) of all economic activities is used by United Nations for classifying economic data

\textsuperscript{14} NACE – The Statistical Classification of Economic Activities in the European Community – refers to the system used by the European Union to designate statistical classifications of economic activities.
Cluster mapping can often use visual renderings via the use of schematics to outline the interdependencies and relationships between industries within a cluster (micro-level), typically with arrows to represent linkages between actors. These visualisations are referred to as cluster maps (Austrian, 2000; Rosenfeld, 2002). While they provide valuable insight into clusters through their interindustry linkages, they fail to account for geography, and often focuses solely on buyer-supplier relationships with no consideration of support networks within clusters (Austrian, 2000). In more simplistic cluster maps there is often very little indication of the strength or weakness of linkages between actors within the cluster, with some maps using darker arrows to indicate stronger links, this is not always the case however (Austrian, 2000). Examples of cluster maps using schematics can be seen in Figure 2.7 and Figure 2.8.

![Cluster Map of the Boston Biopharmaceuticals Cluster](image-url)

**Figure 2.7: Cluster Map of the Boston Biopharmaceuticals Cluster (Source - US Cluster Mapping Portal, 2017)**
Austrian (2000, p.109) suggests that cluster maps are important tools allowing researchers to illustrate the structure of clusters and provides a graphic representation of the constituent parts of clusters and the linkages between them. Wolman and Hincapie, (2015, p.105) posit that ‘cluster maps with arrows, as they are usually represented are a summary tool rather than an analytical one; they show that there is a relationship of various parts of the cluster to each other, but provide little or no information on the extent, importance or nature of the relationship.’

Cluster visualisations can also be represented on geographic maps to display statistical data across a macro level, these are used by cluster mapping projects in both US and Europe. Cluster visualisations on the macro level do not provide any detail on the inner workings of the clusters in terms of the actors or institutions involved or the linkages which exist, but rather they are used to clearly identify areas of specialisation and concentration based on statistical analysis. Figure 2.9 provides an example of a macro-level cluster map from the European Cluster Observatory, this is a visual representation of the levels of specialisation of Hospitality and Tourism sectors across all regions in Europe (based on LQ).
While schematic visualisations of clusters display the actors and interindustry linkages, there is a tendency to ignore the supporting networks and non-trade linkages that are vital within a cluster, such as links to research and development, education, and other supporting institutions. Schematics also ignore the spatial scale of clusters and give no indication of cluster boundaries. Macro level maps however can display statistical data across geographies, however they do not illustrate actors within areas of concentrations, nor do they reflect linkages between them.

2.8.5.1  Macro Cluster Mapping

Cluster mapping at macro-level ‘aims to deliver a better understanding of the presence, profile and economic performance of clusters’ (Byrne, 2016, p.105). Two cluster mapping projects have been undertaken by the US (US Cluster Mapping Project, 2014) and the European Union (European Cluster Observatory) with the aim to
improve the identification and analysis of clusters through comparable and meaningful ways, but providing rich data which can be easily understood. Both of these projects provide public tools available online to share information on clusters at regional level.

The US Cluster Mapping Initiative

The US cluster mapping initiative was established in 1990’s by Michael Porter along with his colleagues within the Institute for Strategy and Competitiveness in the Harvard Business School. This tool has since been revised and financially supported by the U.S. Department of Commerce and the Economic Development Administration. Through this initiative a public tool is provided with a vast body of data on clusters and regional business environments in the North America. The U.S. cluster mapping initiative is the most robust mapping project in existence, and for every cluster definition which is identified, further testing of this is carried out in order to ensure that this is representative of industries on the ground (Delgado et al., 2014).

Based on the information gathered, the methodology enables Porter and his colleagues to develop a number of inter-industry linkage measures which reflect those outlined within the literature such as; ‘Input-Output linkages, occupational linkages, the co-location patterns of industries, and combinations among them,’ these measures allow for more accurate analysis of cluster performance (Delgado et al., 2014, p.4). The project has identified a total of 51 traded clusters and 16 local cluster categories. The analysis information regarding cluster definitions, the sub-clusters which they are comprised of and statistical data surrounding the cluster performance by region and by cluster, is all made available through the US website.

The website provides an important tool for economists, policy-makers, academics and industry practitioners alike. Figure 2.10 is an example of the visualisations which are

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15 Porter (1990; 1998a; 1998b) distinguishes between traded and local clusters. Traded clusters are those who serve markets beyond their locality and therefore experience competition on a broader scale. These traded clusters tend to have higher wages, higher levels of innovation activity and therefore greater conduits of economic prosperity.

16 Local clusters include those industries that tend to focus locally, they are dispersed across all regions. Local clusters tend to account for a great proportion of employment, but typically lower wages due to lower skill requirements examples of industries considered to be local are retail and restaurants, as they focus on serving local needs. See Porter 1998b for further discussion.

17 www.usclustermapping.us.
provided and the level of information available through the US Cluster Mapping Portal. This particular map represents the levels of specialisation in the Hospitality and Tourism Cluster across the United States of America, regarding employment.

Figure 2.10: Cluster Map from the US Cluster Mapping Initiative Source: US Cluster Mapping Project, 2017

The EU Cluster Observatory

The European Commission operate a similar cluster mapping portal to that of the US although it is not as robust and accurate as the U.S. equivalent. The US cluster definition data was adapted to suit the European context. As the European mapping project takes places across national boundaries there were issues surrounding the availability of data across borders, and the levels of granularity within the data available. This meant that the most appropriate measures used within the European Cluster Observatory are based on NUTS 2\textsuperscript{18} Level data (Ketels and Protsiv, 2014). To put this in context, for the Republic of Ireland’s NUTS2 level data is available for two

\textsuperscript{18} NUTS classification (Nomenclature of territorial units for statistics) is the hierarchical system for dividing up the economic territory of the European Union for the collection and harmonisation of regional statistics, socio economic analyses and policy development. NUTS 2 Level data consists of ‘basic regions for the application of regional policies’ (Eurostat, 2017). The population thresholds for NUTS 2 level regions are $\geq800,000 \leq3,000,000$. There are a total of 327 such regions included in the EU Mapping project, (Ketels and Protsiv, 2016)
regions; the Border, Midlands and Western Region and the Southern and Eastern Region. It is important to note, that large regions in such a small country will impact on the discovery of clusters in Ireland, and can result in some significant concentrations of industry not being recognised for their growth potential within the larger regions (Ketels and Sölvell, 2006). Similarly, to the US Mapping project the EU mapping tool combines data on a number of different indicators of linkages, co-location, skill-use and I-O relationships to determine cluster definitions. It too has identified 51 traded cluster categories and treats the remainder of the economy as local.

Despite the difficulties surrounding the availability of data, cluster mapping can accurately identify concentrations of industries and areas of specialisation. These macro cluster mapping initiatives provide very rich data, which can easily be compared across regions. This is a valuable starting point for policy-makers and cluster analysts alike. However, mapping tools such as these do not imply that there is an active cluster initiative in operation, or that actors within the identified clusters are aware that they are part of a cluster. Cluster mapping tools still fall victim to the limitations of relying on strict industrial codes, and political boundaries despite the fact that ‘real life’ clusters do not adhere to these (Woodward, 2005). Cluster mapping projects also do not consider differing lifecycle stages of clusters.

The cluster mapping tools do offer a macro analysis of the cluster potential for regions. Deeper understanding of a cluster and its structure, will allow for more appropriate policy and planning decisions based on facts. Mazzarol et al. (2005, p.17) suggest that these types of analyses identify what already exists within regions. They argue that policy decisions without this level of knowledge are at risk of being inappropriate and unsuitable for regional economies. They state that:

‘It is important that industry concentrations, industry supply-chains and inter-firm local production networks are mapped and understood prior to the development of regional economic development or industry support programs. Such information offers enhanced targeting and the prospect of more accurate monitoring and measurement of the impact of such programs.’
Cluster mapping will also be positioned to statistically identify the growth and decline of clusters over time, therefore providing an opportunity to develop ‘cluster policies based on the industrial strengths and weaknesses in a region’ (EC, 2007, p.12).

The value of cluster mapping in terms of providing understanding of a clusters economic indicators is clear. However, the dynamic nature of clusters, rapid changes in technology and data availability also imply that cluster mapping techniques need to be continuously developed and refined to ensuring that results can be verified to ensure that they reflect the reality on the ground (EC, 2007).

‘Statistical cluster mapping is an important tool for identifying clusters, but it is not sufficient. Qualitative information from the ground is also necessary to validate the statistical findings and provide complement information that cannot be captured from statistical data, such as the framework policy conditions.’ (EC, 2007, p.15)

Despite the variety of analytical approaches and wide range of methodologies adopted in cluster analyses, there is common consensus that each approach imposes limits on cluster analysis. Therefore, a hybrid approach to analysis is useful in overcoming such limitations, especially in the case of informing policy and other decision makers, as it is vital to ensure that a true and honest representation of the cluster reality is presented. Where policy interventions are expected at a regional level, it is clear that analysis of the cluster or sector within its context is vital if appropriate supports are to be identified. A new methodology aimed at analysis across the micro and meso levels has been developed. The V-LINC methodology (Visualisation of Linkages in Networks and Clusters) is a new mapping technique which goes some way toward combining detail on geographic scales and inter-firm linkages. This is the methodology which has been chosen for this research and it is outlined next.

2.8.6 V-LINC (Visualisation of Linkages in Networks and Clusters)

The V-LINC methodology (Byrne 2016), is a new method of cluster analysis, which maps, visualises and analyses spatial concentrations of industry. This methodology developed in Cork Institute of Technology was originally conceived by Dr. John
Hobbs (2010). He believed that a greater framework was required to examine the strength and business significance of linkages which firms within clusters engage in. He developed the ‘Four ‘i’ Linkage Scale’ as a means to enumerate inter-firm linkages, thus providing data, through which researchers could more accurately determine the type of industry agglomeration within a region. This method followed the assertion that the economic potential of clusters cannot be realised without the ‘social glue’, close linkages and interactions between actors within and beyond the cluster boundaries (Porter, 1990; 1998a; 1998b; 2003; Enright, 2003; Ketels, 2004; Mazzarol et al., 2005; Bathelt et al., 2004; Cortright, 2006; Wolman and Hincapie, 2015).

The V-LINC methodology is a hybrid approach to cluster study, which focuses on gathering rich linkage data at a micro level and aggregating this up to meso level within a region. The methodology not only examines the types of linkages that firms engage in but it also addresses the spatial dimension across which firms must engage in order to ensure success of their business. This methodology combines the basic qualitative approach of interviews with firms with a software application that is used to aggregate firm level data to the industry sample within a region. The software can then generate visualisations of the industry’s geographic footprint to enable analysts to identify strengths and weaknesses within the region for that particular industry and make suggestions for further supports in order to develop the industry. A sample of the maps can be seen in Figure 7 which displays the linkage data for the Cork ICT sector by geographic scope (local, national, European and international).
The V-LINC methodology addresses the measurement of the linkages and interactions between actors within a cluster, while also examining those business relationships which have been developed beyond the cluster boundaries or ‘global pipelines’ (Bathelt et al, 2004). This type of analysis can determine what strengths and capabilities are present within a region, it can identify weaknesses or important issues facing firms, and examines how actors develop meaningful links beyond the cluster. The V-LINC methodology also records firm data such as firm size in terms of employment and date of establishment, which are useful for longitudinal studies for measurements of growth. Analysis of the linkage data is then be used to determine how policy can best support further development of the sector, and identify targeted policy initiatives to do so.

2.9 Conclusion

A review of the extant literature reveals the complexity of clusters, a phenomenon which is difficult to define, detect and measure yet empirical evidence demonstrates
the potential benefits of adopting this approach to regional economic development. The lack of any systematic process through which clusters emerge and develop imply that there is no magic formula but rather the local context must be fully understood if policy is expected to support and facilitate cluster development. The approaches used in analysis and evaluation of local ecosystems are vital to ensure that policy is fully informed so that the most appropriate supports can be determined and any analysis will have to provide a justification for policy intervention. Analysis methodologies which can assess the cluster eco-system to identify strengths, weaknesses and potential for opportunities for collaboration will provide the most value to both cluster actors and policy-makers in their efforts for cluster development.

This research is focused on cluster development in the Irish context, specifically in relation to the agri-food and tourism sectors, as two of Ireland’s strongest indigenous industries. There is no official cluster policy in Ireland to date, however clusters are mentioned in a number of policy programmes such as the Action Plan for Jobs 2017 (DJEI, 2017). While the food-processing sector and tourism sector are not considered to be ‘sexy’ industries, they have performed very well in the Irish economy over the last number of years. The next chapter will consider the performance of these indigenous industries for the Irish economy, as well as discuss the current status of Irish cluster policy. It will also examine international examples of agri-food and tourism clusters.
3 Methodology

3.1 Introduction

The previous chapter presented a review of the existing literature on cluster theory and the benefits that a cluster approach to economic development could have for a small open economy, such as Ireland. The characteristics of clusters were outlined, with the three most common features being spatial concentration of industry, specialisation of industry and a critical mass of firms who are linked and interact with each other. The analysis of clusters was also discussed, outlining important considerations for how cluster analysis should be conducted and the suitability of both top-down and bottom-up approaches. There is no formal cluster policy in Ireland however, as previously discussed, clusters are often referred to in policy documents as a mechanism by which to achieve policy goals. The dairy industry as a subsector within food processing sector and the tourism sector in Ireland were identified as strong indigenous industries deeply embedded in the Irish economy and so they are the subject of this research.

This chapter will set out the aims and objectives of this research, with an in-depth discussion of the research design and methodological approach. The sampling methods will be detailed as will the data collection process. This chapter acknowledges some of the limitations of the study and describes the measures taken to ensure reliability and validity of the results.

3.2 Aim of the Research

The cluster approach to regional economic development is an attractive proposition for Irish policy-makers, as it is associated with many benefits including: increasing employment, increasing productivity, increasing innovation activity while also increasing the attractiveness of the region to new investments. Gaining a deep understanding of the challenges and opportunities facing firms is inherent to the clustering process. It is this understanding of the industry’s specific needs that
facilitates the development of targeted policy initiatives to support and facilitate growth.

As discussed previously the Food Processing and Tourism industries are two of Ireland’s competitive indigenous industries (O’Leary, 2015). Both are deeply embedded in the Irish economy, relying heavily on local inputs, catering to both export and local demand, consist of a highly proportion of small indigenous businesses, with a wide regional spread. For that reason, this research is focused on determining the potential of a cluster approach for the further development of two of Ireland’s strongest traditional indigenous industries, the dairy industry as a subsector of food processing industry and the tourism sector.

The aim of this research is as follows:

_To examine the suitability of adopting a cluster approach to the development of the food processing sector and tourism sector in Ireland._

The literature on cluster policy advocates for supportive measures rather than attempting to create new clusters, and the success of any cluster initiative is dependent on active participation of cluster actors. Therefore, in order to achieve the aim, set out above, it is vital to establish whether there is evidence of the determinants of Porter’s (1998) Diamond of Competitive Advantage and clustering behaviour amongst firms in these sectors. The objectives are described in the next section.

### 3.3 Research Objectives

A total of five objectives were identified within this research. The first objective is:

1. To conduct a review of the cluster literature and identify the benefits of a cluster approach to regional economic development.

A review of the literature was presented in chapter two. This has shown that much empirical evidence exists to demonstrate the benefits of a cluster approach to economic development. Improved productivity, increased innovation activity, increasing birth rates of enterprises and greater success rates in industry have all been associated with successful industry clusters. As a small open economy, Ireland relies
heavily on its ability to compete on an international scale, as opportunities within the domestic market are limited. To this end, the clustering approach appears to be an appropriate strategy towards economic development. However, as Doyle and Fanning (2007, p.278) point out ‘it is not the role of policy-makers to impose cluster development on uncooperative businesses.’ In order to be successful, clusters must be driven by industry, even if it requires policy-makers to initiate or encourage the process to begin, without active participation and commitment from firms, the cluster will not be successful in the long-term. In order to determine the suitability of the cluster framework analysis should comprise both a top down and bottom up approach, if it is to fully inform policy-makers.

While some quantitative analysis has been conducted (O’Leary, 2015) there is a lack of qualitative analysis at firm level. If policy intervention is to be considered for the development of these industries, a greater understanding of the current business environment from the firms’ perspective is required.

2. To examine the existing linkages amongst firms within the dairy and tourism specialisations in west Cork.

The literature suggests that while concentrations of industry in geographic locations do exist, what constitutes a cluster is the interaction amongst participants, shared goals and the development of linkages not solely within the location, but beyond the cluster boundaries. An analysis of business linkages will enable analysts to understand the interactions of actors within an eco-system and allow an understanding of the operating environment for firms. Analysis should examine the linkages that these firms engage in; how and where firms source their inputs, what markets the firms are serving, does collaboration with related and supporting industries take place and how intense is the rivalry amongst firms. Access to this data can provide an insight into the challenges faced by the firms and may also enable identification of opportunities for further development.

3. Using the linkage data, to discover whether or not Porter’s (1990) determinants exist within the dairy and tourism ecosystems in west Cork.
Porter’s (1990) diamond provides a useful framework through which to understand the eco-system for firms within the tourism and dairy sectors. The diamond framework looks at factor conditions, firm strategy, structure and rivalry, related and supporting industries and demand conditions. Applying these four pillars to aggregated linkage data analysis will indicate whether or not there is evidence of these forces within the environment for the west Cork firms. It could also provide an opportunity to identify means in which the most appropriate supports could be delivered for the firms.

4. To identify strengths and weaknesses of the sectoral eco-systems in west Cork and develop policy recommendations aimed at their further development.

Important linkages amongst the actors will indicate the strengths and capabilities of each sector in the region. Of equal importance are those linkages that firms do not engage in, as they can provide evidence of the challenges or weaknesses faced by firms within their industry. Granovetter (1973) stresses the importance of weak ties within business networks as they allow for fuller and faster diffusion of information, while Bathelt et al. (2004) suggest that local linkages focus on local buzz, but global pipelines or linkages beyond cluster boundaries enable access to external and valuable knowledge and information. Understanding not only the linkages, which firms have established, but also those which are lacking is very valuable information. This will enable the identification of areas in which firms may need assistance and can allow for the development of targeted supports to develop the industry sectors further. Policy recommendations can then be made based on the strengths and weaknesses, which have been identified.

5. Based on an understanding of the current ecosystem for firms in the dairy sector and tourism sector in west Cork, the implications for adopting a cluster approach to their further development will be identified.
Evidence of Porter’s four determinants will ascertain whether or not the potential for competitive advantage exists, and the linkage data will provide an insight into how firms operate within that context. Using the characteristics of clusters as a framework, the results of the data analysis will be presented. Through this discussion the implications of a cluster approach for sectoral development will be identified and recommendations will be made.

3.4 Research Design

The aim of this research is to determine the suitability of a cluster approach to the development of the dairy specialisation and tourism specialisation in west Cork. As outlined in the research objectives this study aims at gaining an understanding of the current business operating environment for the firms involved. This will require a qualitative approach. Qualitative research is primarily exploratory research, often used to gain an understanding of underlying reasons, opinions, and motivations. Qualitative research provides insights into problems, and can assist in developing ideas or hypotheses for potential quantitative research. Bryman and Bell describe this approach (2007, p.402) as:

‘An epistemological position described as interpretivist, meaning that in contrast to the adoption of a natural scientific model in quantitative research the stress is on the understanding of the social world through an examination of the interpretation of that world by its participants.’

Qualitative research approaches are commonly adopted in the study of clusters (Markusen, 1994; Saxenian, 1994; Scott 2004), as this approach facilitates a bottom up analysis. The bottom up analysis is essential for this study, in order to understand the context in which these firms operate and how the firms with these sectors behave. The purpose of the study is not to generalise about these sectors overall, but to analyse how operators within each sector in west Cork and Kinsale, perceive their respective business environments and to identify the challenges and opportunities which they
face. The aim is to determine the suitability of a cluster approach to develop these industries and to make recommendations for policy-makers. Within the qualitative approach a number of methods were outlined in section 2.7.3 including basic qualitative methods and case studies. Each method was carefully considered. Basic qualitative methods including interviews and focus groups provide a valuable method to gather rich primary data directly from those experts who are involved in the industries. Case Study analysis also provides a very useful framework through which to examine the current business environment for firms operating in both dairy and tourism sectors. The importance of visual representations of clusters was also discussed, especially in the context of portraying a true reflection of the economic footprint of an industry specialisation when making suggestions for policy supports within that context.

The V-LINC methodology follows Porter’s (1998a; 1998b; 2003) hypothesis to examine forward and backward type linkages along the firms’ value chains, and analyse un-traded linkages between firms (horizontal) and other supporting institutions and organisations (such as education and training, industry associations and industry peers). Hobbs (2010) developed the ‘Four ‘i’ Linkage Scale’ to examine business linkages across three dimensions, the nature of the linkage (transactional value chain links, knowledge transfer links or economic/supportive links), the importance of the links and the geographic scale across which the links occur (locally, nationally or internationally). Byrne (2016) further developed Hobbs scale into what is now known as V-LINC. He incorporated elements of social network analysis\(^\text{19}\) to gain deeper understanding of a cluster ecosystem.

Byrne (2016) acknowledges the limitations of cluster mapping projects, regarding reliance on published statistics with rigid industrial classification codes occurring within strict regional boundaries and the difficulty in the identification of emerging or developing clusters. Byrne (2016, p.133) believes that:

\[\text{’A new cluster analysis methodology should be flexible enough to have the ability to analyse an agglomeration, industry specialisation or industry}\]

\(^{19}\) For more information on Social Network Analysis see Wasserman and Faust, 1994; Freeman, 2004; Granovetter, 2005; INNO, 2010
cluster, and produce valuable results which can be used to identify policy
initiatives to support the development of industry sectors and regions.’

He argues that a new methodology should enable analysis of clusters across
administrative boundaries, and results be presented in a manner accessible to all. The
V-LINC methodology is designed with policy-makers in mind; it provides analytical
tools to enhance understanding of regional competitive advantage and identify
clustering behaviour, while also supporting academics in their future research of
clusters. Byrne (2016) designed a data collection tool to ensure that qualitative, micro-
level analysis could be easily replicated across regions and provide systematic analysis
of economic eco-systems. A software application was also developed which facilitates
in-depth analysis of the linkage data and can generate visualisations of linkage data
across geographic maps, it also enables the aggregation of micro-level data to meso-
level or sectoral level results.

The value of the V-LINC methodology is that it is flexible; it focuses on the linkages,
which firms engage in not merely those internal to the agglomeration under study, but
those external linkages, which are deemed vital for new information and avoidance of
‘lock-in’. The mapping function provides a unique tool through which the cluster
ecosystem can be portrayed, presenting rich data regarding the nature, and value of
linkages and their geographic scope, and this is very valuable for policy-makers. Feser
and Luger (2001, p.21) when discussing the visualisation of inter-cluster trade state
‘for many development officials these conceptual insights would be far stronger if
reinforced through visualisation methods.’ They argue that when cluster practitioners
and economists expect decisions from policy-makers who are removed from the
situation and unfamiliar with the analysis, it is increasingly important to ensure that
the communication of data and an overview of the situation is clear and precise. ‘The
information value of any graphic is greatest when regionally relevant data are
embedded within the visual templates’ (Feser and Luger, 2001, p.23). Austrian (2000,
p. 109) also supports this view and states that in using cluster maps researchers can:

‘Provide industry and policy decision makers with a better tool with which
to explain the cluster structure and its connection to the different parts of
the economy. Understanding the cluster’s structure allows firms and
institutions to recognise who else is part of their cluster and whether they can work together on common issues.’

No other methodology has a structured framework through which the subjective firm level data can be recorded consistently for each respondent firm (Byrne, 2016). The V-LINC methodology also allows for the visualisation of results into maps, which can be analysed to identify particular strengths or weaknesses for the sector under study. This method of research will enable consistent measurement of both the dairy and tourism sectors in west-Cork. The methodology will now be described in detail.

3.5 V-LINC Methodology

The V-LINC methodology focuses on the measurement of business linkages developed by firms located in spatial concentrations of industry, it ‘records, visualises and analyses firm linkages to investigate cluster ecosystems’ (Byrne, 2016, p.130). This methodology was first conceptualised by Hobbs (2010), who states that the V-LINC methodology provides a systematic investigation of business linkages amongst actors within a region. It allows researchers to determine how embedded the sector is in the economy by examining the forward and backward type linkages between firms, customers and suppliers. It also allows for identification of collaborative linkages, providing an indication of the levels of information sharing and knowledge spill-overs occurring, which can often lead to innovative activity within firms.

The V-LINC method comprises a six-step framework to conduct the research, a method to collect firm linkage data and a software application used to visualise cluster eco-systems (Byrne, 2016). When studying linkages within a network there are three characteristics, which should be considered: 1) the type of linkage under consideration or linkage category, 2) where the linkage occurs, the geographic scope, and 3) the importance or perceived significance of each link to the firm who engages in it. The V-LINC method not only records the linkages but classifies the data collected under these three characteristics. Each of these will now be discussed.
3.5.1 Linkage Categories

Linkages are defined by Hobbs (2010, p.222), as:

‘relationships that enable exchange of goods, services, personnel, information, ideas, expertise, grants and other supports to business that occur between two or more parties, over a sustained time period. Payment is a feature of some but not all linkages.’

On this basis V-LINC not only records value chain linkages relating to the firms’ inputs and outputs, it includes a number of additional linkage categories, which contribute to the firms’ competitiveness such as knowledge transfer linkages, collaboration linkages, and administrative supports. All firms engage in a diverse range of business linkages at varying frequencies, in order to allow for comparison, the V-LINC methodology characterises business linkages into eight linkage categories which are described in Figure 3.1.
1. **Government Agency linkages (GA):** are comprised of all forms of linkages to government departments and agencies including state support for enterprise. Regional authorities and local agencies such as city or county councils are also included;

2. **Industry Association linkages (IA):** includes all membership and relationships with organisations for collaboration such as industry association groups, chambers of commerce and cluster organisations;

3. **Industry Peer linkages (IP):** are defined as formal and informal relationships with companies: in similar or related industries, who share technologies or target complimentary markets;

4. **Input linkages (IN):** are links with suppliers of raw materials, goods and services which have a critical impact on the end product or service of the surveyed firm;

5. **Output linkages (OU):** relate to customer of a surveyed firm and channel sellers from both a goods and services perspective. Outputs may be with individual customers or broken down by customer segments and regions;

6. **Research and Development linkages (RD):** include research and development relationships between companies and also with academic and research institutes;

7. **Specialist Service linkages (SS):** relationships with vendors who supply other essential services to the surveyed firm, outside of inputs, where the expertise or capacity is not contained in-house e.g. services specific to an industry, distribution, IT, consultancy, marketing, financial and legal services;

8. **Training linkages (TN):** are linkages with third parties who provide specific training or learning for employees, e.g. relationships with academic institutes in regard to inputting on course modules to address future skills needs.

*Figure 3.1: V-LINC Linkage Categories. Source: Byrne (2016, p.131-132).*

These linkage categories consider the inputs and outputs of a firm, as these are the basis for any measurement of productivity. Also included are industry peers, specialist service, research and development and training linkages, which are considered to
support the core production activities within firms and represent knowledge transfer linkages. Hobbs (2010, p. 226) states that:

_Industry peers provide competitive pressure for the firm to be innovative and creative which lead to additional training activities. Specialist services may be out-sourced if specific production expertise or capability is not available in-house. Also, outside expertise may be purchased relating to accountancy, analytical services, automation, engineering, IT, Legal services and/or validation._

The final two linkage categories are government agencies and industry associations. While these types of links do not affect the firm’s final product directly, they have a direct impact upon the operating environment within which firms do business and therefore it is vital to consider these additional support linkages animated in Figure 3.2.

![Figure 3.2: V-LINC Linkage Categories. Source: Byrne (2016, p.132)](image)

3.5.2 Geographic Scope

Porter’s (1990; 1998a; 1998b) original cluster analysis focused on linkages which occurred locally to the firms within a cluster. Many researchers did not consider linkages to organisations which were developed beyond the cluster boundaries. Hobbs (2010, p. 228) argues that ‘all linkages matter’ and it is vital to identify the geographic
scope across which business linkages occur. Recording the significance of linkages to the firms at varying geographical distances allows for a deeper understanding of the overall ecosystem for the respondent firms. For example, if the firms within an agglomeration, have to source essential inputs from beyond the local boundaries, this suggests a weakness in that important factor conditions are not present locally. As Bathelt at al. (2004) suggest while local links are extremely important for internal knowledge spill-over, linkages to firms beyond the cluster boundary exposes firms to new knowledge, experience and technologies and therefore greatly reduces the risk of technological lock-in. The V-LINC method of analysis takes this into consideration and records linkages not only by linkage category but also by geographic scope. The methodology uses four categories the local scale, the national scale, a European scale and an International scale for all other locations outside of the EU.

Defining the local scale for analysis requires some consideration. According to Byrne (2016, p.132):

‘The local region is defined in collaboration with the local partner organisations, where three questions are asked to define the region: 1) what geographic area do firms who participate in the cluster reside? 2) What administrative region(s) does the cluster encompass e.g. (NUTS level 1, 2 or 3)? 3) Does the region allow for regular face-to-face contact between the actors in the cluster (e.g. are the firms within 150 km or two hours driving time of the centre?)’

He suggests that the answers to these questions guide the definition of the local geographic scope for the study. In the case of this research the local geographic scope is defined as within the regional border of County Cork, while the remaining three geographic scopes include the national scale within the Republic of Ireland, European scale and international scale. Once recorded, the linkages can be categorised by geographic scale and displayed on maps generated by the V-LINC software. An example of the V-LINC maps can be seen in Figure 3.3. The visualisation tool is a valuable feature of the V-LINC methodology, as it ‘has the opportunity to shed light on the geographic boundaries of clusters and the geographic reach of clustered firms,’ which provides a valuable resource in presentation of results (Byrne, 2016, p.133).
Figure 3.3: Cork ICT Sector Linkages by Geographic Scope. Source: Byrne (2016, p.180)

3.5.3 Perceived Significance of Linkages

The third characteristic measured by the V-LINC methodology the perceived significance of each individual link recorded by the firms under study. Hobbs (2010, p.229) believes that ‘data on linkages of a sample of individual firms in the same industry sector, will provide a measure of the general perceived significance of each linkage category at different geographic levels.’ This allows for greater understanding and comparison of the importance of linkages both internal and external to the region. The qualitative nature of business relationships presents a challenge in the measurement of their value to the firms involved. V-LINC provides a consistent method to appraise linkages by collecting data through a structured interview process in which Likert scale questions are used.
The V-LINC method evaluates the business impact of each individual linkage under four criteria: intensity, importance, involvement and investment to assess a linkage’s overall importance to the respondent firm. Factors such as the strength and durability of the relationship, how beneficial and mission critical it is for the firm, the level and frequency of contacts engaging in the linkage and the amount of time invested by the firm in maintaining each linkage. Using Likert scales from 1 to 10, each link is analysed under the four criteria, and the individual component scores combined to provide a perceived significance score out of a total possible 40. To interpret these results Hobbs (2010) devised four perceived significance bands within which the scores can be classified and discussed as shown in Figure 3.4. Byrne (2016) suggests that the use of Likert scales translates qualitative information into quantitative data which allows for further comparative analysis. He does warn however that these perceived significance scores are not subject to statistical analysis and therefore no corresponding confidence interval is identified.
‘High’ Band – Score >30 to 40:
Linkages in this range are perceived as highly significant. They are viewed as critical linkages to the respondent firm and its future development. Substantial time is invested in the linkage. These linkages have a high frequency of interaction at multiple levels across the organisation involved and typically involve top-level management. Usually characterised by constant, (even daily) face-to-face meetings, email or telephone communications.

‘Medium’ Band – Score >20 to 30:
Linkages in this range are perceived to have medium significance. While not mission critical they are important and may have a role in the development of the firm. Linkages in this category contain a number of points of contact which are in regular communication. Contacts are typically at multiple levels across the organisation.

‘Low’ Band – Score >10 to 20:
Linkages in this range are perceived to have low significance. Viewed as somewhat beneficial to the firm, they are not mission critical, but may in the future develop into more important relationships. Linkages in this category typically contain few points of contact and there is a moderate frequency of contact between the parties involved at operational and administrative levels. Meetings occur on a more formalised basis.

‘Tenuous’ Band – Score 1 to 10:
Linkages with perceived significance in this range are ‘tenuous’, they are not of value to the firm at present and are not judged to become critical in the future. Typically, linkages in this band have only few points of contact, there is infrequent contact between the parties involved, and meetings are likely to be ad hoc.

*Figure 3.4: Four Perceived Significance Bands. Source: Byrne (2016, p.134)*

Examining the perceived significance of linkages for the firms involved enables a deeper understanding of the impact that business linkages have on the firms within the ecosystem, and how important linkages across the various spatial scales are to the firms who engage in them.
3.5.4 V-LINC Methodology Framework

According to Byrne (2016) the use of the V-LINC methodology requires researchers to follow a methodical process. This framework involves six steps, which are discussed in this section and outlined in Table 3.1 below.

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<tr>
<th>V-LINC Methodology Framework</th>
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<tbody>
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<td>Step 1</td>
<td>Regional Context</td>
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<td>Step 2</td>
<td>Defining the Cluster and the Sample Population</td>
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<td>Step 3</td>
<td>Firm Invitations</td>
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<td>Step 4</td>
<td>Data Collection and Facilitation</td>
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<td>Step 5</td>
<td>Data Validation, Upload and Visualisation</td>
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<td>Step 6</td>
<td>Data Interpretation and V-LINC Reports</td>
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</tbody>
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*Table 3.1: V-LINC Methodology Framework. Source: Byrne (2016, p.135)*

The first step involves secondary research regarding the industry sector within the chosen region, to establish a background and context to the business environment. Here, Byrne (2016) suggests that without a basic review and understanding of the region’s economic and political environment, developing appropriate targeting policy recommendations is impossible. This first step then should include a review of the characteristics of the region under study, relevant economic policy, including information regarding population, area and GDP with a discussion on sector specific statistics such as employment and number of businesses. This review aims at identifying the fabric of the potential cluster, identifying key members involved such as relevant government agencies, industry bodies, academia and how the regional sector is placed in relation to the national economy.

The next step requires the researcher to define the cluster, that is, identify those industry sectors which should be incorporated into the study. Byrne (2016, p.136) suggests that ‘the cluster should be identified through empirical analysis or a predetermined cluster is selected, but the firms under investigation may in reality
simply be an agglomeration or industry specialisation.’ Once the cluster has been defined, the local geographic boundaries must be defined using expert knowledge from a Local Partner Organisation (LPO), and firms within the cluster boundaries are then identified as the sample frame using national, regional databases and local knowledge from the LPO. From this, a sample of firms are chosen to participate in the study using certain characteristics including ‘the size of the firms, the firm origin, the activities of the firm within the cluster, how involved the firm is in the cluster and access to key personnel within the firms identified’ (Byrne 2016, p.137). According to Saunders et al (2012, p. 262) this non-probability approach to sampling means that:

‘The probability of each case being selected from the total population is not known and it is impossible to answer questions which require statistical inferences about the characteristics of the population. The researcher may still be able to generalise from non-probability samples about the population, but not on statistical grounds.’

Byrne (2016, p.137) does acknowledge this limitation of non-probability. However, he argues that this sampling method enables the research to focus on those organisations who are actively involved within an agglomeration and most likely to contribute and participate in initiatives targeted at or developed for a cluster. He states that ‘it allows for policy initiatives to be developed for the sample of firms who are more likely to participate in the initiatives and benefit from them, as opposed to firms that do not engage in the cluster.’

Once the sample has been identified, invitations for participation in the study are issued to all firms. Byrne (2016) created a standard template invitation which was adapted for the purposes of this study and is included in appendices A and B. The invitation not only details the aims of the study, but provides respondents with an overview of the data collection process and outlines the potential benefits to be gained from their participation. All written invitations are then followed up by telephone where any additional questions can be answered and a time for interview suitable to the respondent is confirmed. Byrne (2016) recommends that the most knowledgeable members of staff participate within the interview, those staff who are involved in the linkages on a regular basis and can best judge the perceived significance of these business ties for the firm. The staff members involved in the data collection process
will vary depending on the size of the organisation, in a small owner operated business the owner will be heavily involved in all business linkages, whereas in a larger MNC functional managers or department heads would be best positioned to discuss different linkage categories.

The fourth step within the V-LINC framework is the data collection process. As mentioned previously data is collected through face-to-face structured interviews for consistency. Face-to-face interviews were deemed the most suitable method of data collection to counter any issues that may arise if respondents were left to interpret the process on their own. Face-to-face interviews provide an opportunity for the researcher to answer any questions that respondents may have, to reassure respondents about the confidentiality of the research and to establish rapport and build trust (Hobbs, 2010; Byrne, 2016). Byrne (2016) suggests that interviews should, where possible, be conducted at the firm’s premises to limit the cost of participation for respondents. The use of a structured interview ensures that the interviewees are asked the same question in the same way to ensure consistency across all of the interviews (Campion et al, 1994; Myers, 2013). To facilitate the structured interviews an excel form was created originally by Hobbs (2010) which was then adapted by Byrne (2016). For each respondent firm an excel form is created, where linkages are recorded, each linkage category is recorded on separate worksheets. The form compiles descriptive linkage information (which includes the linked company name and address) identifying the geographic scope at which the link occurs and the perceived significance data. The data collection form is completed during the interview process and provides respondents with instant feedback on the perceived significance score of each linkage. This is then used by respondents as a benchmark to speed up the measurement process and to validate their results through comparison.

Once all linkages have been recorded and the perceived significance scores calculated, the interviewee is given time to review the information on the excel form to confirm and approve the overall linkage scores.

The fifth step within the V-LINC methodology framework requires the researcher to validate the data, confirming that all company names and addresses are recorded accurately using Google maps. This is vital to ensure that the visualisations of the cluster’s linkages are precise and accurate. Once the data in the forms has been checked and any errors corrected, the forms are then uploaded to the V-LINC software.
Data is checked again for accuracy ensuring that the total number of linkages in each category and each geographic scope correspond to the data in the original excel forms. Following these checks the visualisation can then be created using the software.

The final stage of the framework refers to the ‘data interpretation and V-LINC Reports’ (Byrne, 2016, p.141). Here the researcher analyses the findings of the interviews using the tabulated data and visualisations from the V-LINC software. These are discussed in relation to the regional context and subsequently, recommendations are made for targeted policy initiatives or supports based on the overall findings. Byrne (2016) suggests that the policy recommendations be developed in consultation with the LPO who are most familiar with the local business environment. He states that ‘this expert judgement adds to the development of policy initiatives and improves the validity of the initiatives ensuring that they are appropriate to the region and cluster, valuable to cluster members, and practical and achievable.’ Each respondent firm is furnished with a V-LINC firm report which gives an overview of the findings for the Respondent Firm Group as a whole, and then an analysis of the firm’s own linkage data by comparison, providing them with linkage visualisation for their individual footprint. The reports follow a standard structure to ensure consistency for all participants.

Byrne (2016) suggests that when using the V-LINC methodology it is vital that the six steps described here are followed precisely, as they have been devised to enrich the credibility and validity of the analysis, which will be discussed in the next section.

3.5.5 Reliability and Validity

Reliability and validity are widely accepted within the positivist paradigm as criteria upon which the rigour and trustworthiness of research can be evaluated (Schensul et al, 1999; Shenton, 2004; Roberts et al, 2006; Bryman and Bell, 2007; Cohen et al, 2011). Reliability relates to the question of whether the results of a study are repeatable and focuses upon the measures used within a study, questioning their consistency. Replication, another important consideration for ensuring rigour of research focuses on the thorough documentation of the research process, thus allowing for replication
in the future. Validity is concerned with the integrity of the conclusions generated from research. There are two considerations within this, internal and external validity. Internal validity focuses on the confidence levels surrounding causal relationships said to be proven within a study. External validity is concerned with whether or not the results of a study can be generalised beyond the research context, both are concerned predominantly with the sampling methods and the representativeness of chosen samples (Bryman and Bell, 2007).

Given the descriptive nature of qualitative research, Lincoln and Guba (1985) proposed alternative terms and means of assessing qualitative research which have been accepted and supported by numerous researchers (Erlandson et al, 1993; Miles and Huberman, 1994, Shenton, 2004; Marshall and Rossman, 2006; Trochim et al, 2015). These alternative criteria are listed in Table 3.2 and described below.

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<tr>
<th>Traditional Criteria for Judging Quantitative Research</th>
<th>Alternative Criteria for Judging Qualitative Research</th>
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<tr>
<td>Internal Validity</td>
<td>Credibility</td>
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<tr>
<td>External Validity</td>
<td>Transferability</td>
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<tr>
<td>Reliability</td>
<td>Dependability</td>
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<tr>
<td>Objectivity</td>
<td>Confirmability</td>
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*Table 3.2: Lincoln & Guba (1985) proposed alternative criteria for judging qualitative research*

**Credibility:** is concerned with whether or not results of the research are credible from the participants’ point of view. Due to the nature of qualitative research, it is the participants experience and social reality that researchers are trying to uncover and therefore they alone can judge the results credibility based on their personal experiences. ‘Respondent Validation’ is one method of ensuring research credibility (Bryman and Bell, 2007, p. 410). This includes providing the findings of a study to the study’s participants, with the aim of seeking their corroboration or disagreement with the account that the researcher has arrived at.
**Transferability:** is concerned with the degree to which qualitative research can be generalised. Qualitative research seeks depth of knowledge, and as such the qualitative research focus is much narrower than that of quantitative studies. In order to work towards the transferability of qualitative research, the researcher must produce what Geertz (1973, p. 6) refers to as a ‘thick description.’ This means providing a rich and detailed account of a culture, which then provides a reference for others upon which they can judge the possible transferability of the findings to other contexts (Bryman and Bell, 2007, p. 411).

**Dependability:** is concerned with the trustworthiness of research. In order to ensure that this is met, Lincoln and Guba (1985) argue that researchers should adopt an auditing approach and ensure that complete records are kept of all phases of the research process in an accessible manner, so that peers can then act as auditors and determine whether or not proper procedures have been followed.

**Confirmability:** the final criterion relates to the level of objectivity within the research. Lincoln and Guba (1985) acknowledge that complete objectivity is impossible, however in business research it is important that the researcher can be shown to have acted in good faith not allowing any personal values or theoretical inclinations to sway the research process or the findings from it (Trochim et al, 2015).

Awareness of the criteria outlined above mean that a number of steps could be taken to increase the credibility and dependability of this research. These include firstly, ensuring to follow the steps outlined in Byrne’s (2016) framework precisely when adopting the V-LINC methodology, and ensuring to record and document additional considerations or issues encountered within the study to verify that findings are dependable and transferable. Secondly, after the data analysis has been conducted, participant firms receive an individual firm report. This provides details and maps of their own firm’s linkages along with a comparative analysis to the cumulative results for the Respondent Firm Group, allowing them to benchmark their firm within the sector. This report provides a means of obtaining respondent validation and will invite any feedback or disagreement from participants within the study, which increases the credibility of the study. With this in mind the cluster definition and sampling methods will be described in detail next.
3.6 Cluster Definitions and Sampling Methods

Details of how the V-LINC methodology has been applied to the food processing sector and tourism sector in Cork will now be discussed.

3.6.1 West Cork Dairy Sector Sample

The food-processing sector was identified as a strong indigenous industry that contributes to Ireland's export base. However, given the broad scope of the food-processing industry, to conduct a bottom-up analysis of the entire industry would be beyond the scope of this research. It was therefore necessary to narrow the focus to a specialisation within food processing. Consultation with partners in Cork County Council resulted in a range of sub sectors being identified (some of which included marine and aquaculture; poultry; beverages) however, the dairy specialisation was chosen for a number of reasons. Firstly, Cork represents a large portion of national dairy production accounting for over 25% of total Irish dairy output (O’Connor and Keane 2014) as it is home to the largest number of dairy cattle (Agriland, 2018). Secondly, the dairy industry across Europe is facing a number of challenges, including the abolition of the milk-quota leading to increased competition, price fluctuations, and changing consumer demands. Considering the performance of Cork dairy and the challenges faced by those within the dairy sector the partners agreed that the dairy specialisation was worthy of consideration, and could benefit from analysis to determine how best policy could support the industry going forward, or whether any support was indeed warranted from a cluster perspective.

Following this decision Cork County Council (formerly the South West Regional Authority) suggested the West Cork Development Partnership (WCDP) as a suitable local partner organisation to facilitate the analysis. Contact was made with the WCDP and a meeting arranged with representatives from WCDP and Cork County Council. It was decided that as a subsector of the food-processing sector, the analysis would focus on dairy processing, and a sample frame was drawn up from a number of sources including the Food Producers Directory of Cork, and a list of approved producers
under the hygiene regulations from DAFM\(^20\), as well as a number of cooperatives from the national directory of cooperatives. Due to the initial focus on the development of west Cork, the sample consisted of firms located to the west and south of Cork city boundaries. A total of sixty-two firms were identified as possible candidates by the WCDP. While only firms in west Cork would be considered for interview, it was determined that the most appropriate local scale for these firms would be the county of Cork, as they rely heavily on the surrounding areas for inputs and services.

It was agreed that to legitimise the research on the County Councils behalf, a representative from the WCDP would make the initial contact to each of these firms, providing a general introduction to the research study and requesting permission to put forward their firm for participation. Those firms who consented, were informed that they would receive further information regarding the study from the researcher directly. The assistance of the rural development officer was essential in gaining commitment from firms. Of the sixty-two firms who were contacted, twenty-six agreed to be involved in the study.

The researcher contacted all twenty-six firms by telephone to make an introduction. Following this brief phone conversation, an explanatory e-mail was issued outlining the overall aim of the study and providing information regarding the V-LINC methodology and the interview process. Managers within the respondent firms were invited to participate in the interviews. It was necessary to contact all firms again, following these invitations in order to confirm participation and arrange a suitable time and location for interview. Of the sixty-two potential firms, a total of eleven firms participated, which is a response rate of 17.7%. This response rate is very low, the main reason being that the interview process is time consuming, and the respondents required for the process, include time poor managers involved within the firms. This is a limitation of the V-LINC methodology, however as Byrne suggests those firms who participate in the analysis are also much more likely to become involved in any cluster initiatives that may be launched, and therefore the analysis reflects their reality.

The sample selection for the tourism sector is discussed next.

\(^{20}\) (www.agriculture.gov.ie)
3.6.2 Kinsale Tourism Sector Sample

The County of Cork is Ireland’s second highest performing county in tourism outside of Dublin. With the recent development and launch of Fáilte Ireland’s west coast initiative the ‘Wild Atlantic Way,’ a focus on the tourism sector in this region was deemed worthwhile, the route for the Wild Atlantic Way begins west of Cork city so potential respondents, those tourism businesses located along the coastal route would be selected from west Cork. The research on clusters in tourism focuses predominantly on destinations. Tourism businesses rely on the performance of other services and firms within the destination to perform for positive tourist experiences, however they also compete directly for business. Therefore, in order to understand the behaviour of tourism firms a narrow focus on a particular destination would be required, as the dynamics would not be visible at a higher level of aggregation. A number of destinations in west Cork were considered (Clonakilty, Skibbereen, Schull, Bantry) Kinsale was chosen as the most suitable focus for the V-LINC analysis. Kinsale is located just outside Cork City, many businesses there are committed to the development of a competitive tourism destination, having established a Chamber of Tourism and Business and a reputation as the Gourmet capital of Cork (Cork Chamber of Commerce, 2014). Kinsale has also been designated as the starting point for ‘The Wild Atlantic Way,’ which provides it with considerable advantage over other destinations in the county.

The Kinsale Chamber of Tourism and Business was identified as a potential local partner organisation, and contact was made with the organisation to describe the intended analysis, and garner their support. Thankfully they agreed to assist throughout the process and a meeting was arranged to discuss the analysis. The initial consultation with the LPO aimed at achieving two main goals, the first to delineate the cluster that is, to identify what subsectors should and should not be included in the analysis. The second goal was to determine the local scale for the tourism firms in Kinsale. Defining the tourism cluster was a challenge. The tourism industry is highly fragmented consisting of a number of different subsectors and industries, which combine to provide a tourism experience (accommodation, transport, restaurants, bars, entertainment organisations, leisure activities, business activities, heritage and cultural sites and attractions etc...) Porter (1998a; 2003) suggests that those firms who are
focused on trading locally should not be included, he considers retail outlets and restaurants to be local industries rather than traded and therefore they are not included in the tourism definition of the US mapping project, nor are they included in the cluster definitions of Ketels and Protsiv (2016).

Following a discussion with partners in the Kinsale Chamber of Tourism it was determined that the analysis for Kinsale should include both restaurants and specialist retail outlets, as locally these firms were committed and heavily involved in the future development of destination Kinsale. Porter (2000, p.3) argued that ‘understanding the linkages and complementarities across industries and institutions that are most important to competition in a particular field,’ informs the process of drawing cluster boundaries. Therefore, it was determined, based on the expert opinion of the LPO along with Porter’s (2000) own argument that the strength of linkages would facilitate the delineation of clusters, that restaurants and retail would be included in the sample, however these subsectors would require additional consideration in the analysis. It was also decided that the County of Cork would be the most suitable local scale for the tourism sector analysis, while only firms within Kinsale would be interviewed, the success of the tourism sector in Kinsale relies heavily on inputs and services from across the county and therefore county Cork will constitute the local scale in this analysis.

The Chamber of Tourism in Kinsale identified a sample of firms in Kinsale based upon firm size, activities and involvement. The Chamber’s member services team identified a potential sample of seventy-nine tourism businesses based in Kinsale. These businesses included hotels, guesthouses, bed and breakfast operators, restaurants, bars, nightclubs, retailers and leisure activity providers such as sailing clubs, art galleries, equestrian activities and walking tour guides. A representative from the Chamber facilitated introductions between the researcher and the potential respondent firms, introducing the study and requesting consent for participation. A total of thirty-four firms consented to participate.

Following this each firm was contacted directly by telephone, a follow-up e-mail invitation was issued to the managers within the potential respondent firms, outlining the overall aim of the study and providing information regarding the V-LINC
methodology and interview process. Additional follow up calls were conducted to confirm participation and arrange a suitable time and location for interview. A total of sixteen tourism firms agreed to participate within the study from the seventy-nine potential respondent firms, indicating a response rate of 20%.

Once the sample populations and respondents had been identified it was necessary to arrange the data collection. This is discussed in detail in the next section.

3.7 Data Collection

In line with Hobbs (2010) recommendations for face-to-face structured interviews when using V-LINC, a schedule of interviews was created for each industry sector. Byrne (2016) suggested that personnel with knowledge of the linkages possess the expert opinion required to identify and evaluate the firm linkages. Interviews were, therefore scheduled with managers of the respondent firms. In smaller firms with fewer employees a manager typically had knowledge of all relevant linkages, however in larger firms a number of interviews were required where specialised departments were present, for example some firms required additional interviews with a human resources manager and a head of research and development. Interviews were conducted within each firms’ premises to reduce costs of participation for respondents.

Prior to interviews being conducted, the researcher observed the methodology being used in a number of face-to-face interviews conducted by Dr. Hobbs, to become familiar with the interview process and methodology. This helped to clarify questions used in the methodology, ensure consistency in the interview technique and ensure the smooth flow of interviews for the respondents. Each interview consists of six stages, the first stage involves an explanation of the study and the data collection method, the second stage involves going over the definitions of key terms within the data collection form, that is defining a linkage, defining the linkage categories, geographic scope and perceived significance are all explained to the respondent. The third stage of the interview is a collection of firm characteristic data such as primary products produced, market segmentation, size in terms of employment and the date of establishment. In the next stage the interviewee is asked their opinion on the firm’s involvement in a
cluster. Linkage data is then collected under each linkage category using a data collection form.

<table>
<thead>
<tr>
<th>Intensity</th>
<th>Strength</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>10 10 6 10 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duality</td>
<td></td>
<td>10 10 5 5 10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Importance</td>
<td>Mission Critical</td>
<td>6 6 2 5 10</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beneficial</td>
<td></td>
<td>8 8 4 4 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Involvement</td>
<td>No of Contact Points</td>
<td>7 5 2 2 8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of Contacts</td>
<td></td>
<td>8 6 8 8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investment</td>
<td>Frequency of Contact</td>
<td>7 6 6 4 10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time Commitment</td>
<td></td>
<td>7 5 3 5 10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Linkage Value (out of 40)</td>
<td>32.0</td>
<td>28.0</td>
<td>16.0</td>
<td>19.0</td>
<td>37.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 3.5: Data Collection Form Source: Byrne (2016, p.138)**

To collect the linkage data a Microsoft Excel form was created (Figure 3.5). Within this form, a separate worksheet for each linkage category is created so each company linkage form consists of eight worksheets. Each individual linkage is recorded on the appropriate sheet, as well as geographic data, (the company name and address). The link is classified by geographic scope into four bands (L for local; N for national; EU for European and INT for international). Once the linkages have been documented the perceived significance is recorded for each individual linkage, by asking the eight perceived significance questions. For each question asked a score is entered out of a maximum ten, the excel form calculates the cumulative score of each linkage based on the eight recorded scores. When scores have been calculated for all linkages within a particular category the respondent is given an opportunity to reflect and compare the overall scores to ensure that they accurately reflect their opinion. Byrne (2016) stresses the importance of the face-to-face interview to allow interviewees to ask any questions that they have, to build rapport and establish trust between interviewer and interviewee as linkage data is often confidential, and not something which may be obtained through questionnaires. Details of the interview schedules are now provided.
3.7.1 Dairy Sector Interviews

A total of thirteen face-to-face interviews were conducted with experts from the eleven respondent firms. Interviews for the agri-food sector were carried out over a period of two months from October 2014 to January 2015. A list of the respondent firms for the west Cork dairy sector can be seen in Table 3.3.

<table>
<thead>
<tr>
<th>Firm Name</th>
<th>Specialisation</th>
<th>Size by No. of Employees</th>
<th>Respondent Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm 1</td>
<td>Production &amp; Processing</td>
<td>Medium</td>
<td>Assistant General Manager</td>
</tr>
<tr>
<td>Firm 2</td>
<td>Processing</td>
<td>Medium</td>
<td>Operations Manager</td>
</tr>
<tr>
<td>Firm 3</td>
<td>Production &amp; Processing</td>
<td>Large</td>
<td>CFO, HR Manager &amp; Head of R&amp;D</td>
</tr>
<tr>
<td>Firm 4</td>
<td>Production</td>
<td>Micro</td>
<td>Owner/Operator</td>
</tr>
<tr>
<td>Firm 5</td>
<td>Production</td>
<td>Medium</td>
<td>General Manager</td>
</tr>
<tr>
<td>Firm 6</td>
<td>Production</td>
<td>Micro</td>
<td>Owner/Operator</td>
</tr>
<tr>
<td>Firm 7</td>
<td>Production</td>
<td>Small</td>
<td>Owner/Operator</td>
</tr>
<tr>
<td>Firm 8</td>
<td>Production</td>
<td>Micro</td>
<td>Owner/Operator</td>
</tr>
<tr>
<td>Firm 9</td>
<td>Production</td>
<td>Micro</td>
<td>Owner/Operator</td>
</tr>
<tr>
<td>Firm 10</td>
<td>Production</td>
<td>Micro</td>
<td>Owner/Operator</td>
</tr>
<tr>
<td>Firm 11</td>
<td>Production</td>
<td>Micro</td>
<td>Owner/Operator</td>
</tr>
</tbody>
</table>

*Table 3.3: West Cork Dairy firms. Collectively these firms will hereafter be referred to as the RFG (Respondent Firm Group) for the Dairy sector in West Cork.*

3.7.2 Tourism Sector Interviews

A total of nineteen interviews were conducted with managers from the tourism sector in Kinsale. These interviews were conducted over the course of a four-month period from February 2015 to the end of May 2015. A list of the respondent firms for the Kinsale tourism sector can be seen in Table 3.4. Collectively these firms are referred to as the RFG for the tourism sector in Kinsale.
<table>
<thead>
<tr>
<th>Firm Name</th>
<th>Specialisation</th>
<th>Size by No. of Employees</th>
<th>Respondent Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm 1</td>
<td>Accommodation</td>
<td>Medium</td>
<td>General Manager</td>
</tr>
<tr>
<td>Firm 2</td>
<td>Food &amp; Beverage</td>
<td>Micro</td>
<td>Sales &amp; Marketing Manager</td>
</tr>
<tr>
<td>Firm 3</td>
<td>Private Event Venue</td>
<td>Micro</td>
<td>Owner/Manager</td>
</tr>
<tr>
<td>Firm 4</td>
<td>Accommodation</td>
<td>Small</td>
<td>Owner/Manager</td>
</tr>
<tr>
<td>Firm 5</td>
<td>Retailer</td>
<td>Micro</td>
<td>General Manager</td>
</tr>
<tr>
<td>Firm 6</td>
<td>Food &amp; Beverage</td>
<td>Small</td>
<td>Owner/Manager</td>
</tr>
<tr>
<td>Firm 7</td>
<td>Food &amp; Beverage</td>
<td>Small</td>
<td>Owner/Manager</td>
</tr>
<tr>
<td>Firm 8</td>
<td>Gallery &amp; Retail</td>
<td>Micro</td>
<td>Owner/Manager</td>
</tr>
<tr>
<td>Firm 9</td>
<td>Food &amp; Beverage</td>
<td>Micro</td>
<td>Sales &amp; Marketing Manager</td>
</tr>
<tr>
<td>Firm 10</td>
<td>Leisure Activity</td>
<td>Micro</td>
<td>Owner/Manager</td>
</tr>
<tr>
<td>Firm 11</td>
<td>Accommodation</td>
<td>Micro</td>
<td>Owner/Manager</td>
</tr>
<tr>
<td>Firm 12</td>
<td>Leisure Activity</td>
<td>Micro</td>
<td>Owner/Manager</td>
</tr>
<tr>
<td>Firm 13</td>
<td>Accommodation</td>
<td>Micro</td>
<td>General Manager</td>
</tr>
<tr>
<td>Firm 14</td>
<td>Leisure Activity</td>
<td>Micro</td>
<td>Owner/Manager</td>
</tr>
<tr>
<td>Firm 15</td>
<td>Accommodation</td>
<td>Medium</td>
<td>Finance, HR, Sales &amp; Marketing &amp; MD</td>
</tr>
<tr>
<td>Firm 16</td>
<td>Accommodation</td>
<td>Small</td>
<td>Owner/Manager</td>
</tr>
</tbody>
</table>

Table 3.4: Kinsale Tourism Respondent Firms (RFG for Tourism Sector in Kinsale)

3.8 Data Validation, Upload and Visualisation

Following the interviews, the linkage data for each firm is checked and validated. This involves verifying that spellings, and address details are accurate to ensure that the mapping function can precisely pinpoint the location and scale of each linkage. ‘V-LINC software uses Google Maps and a built in ‘find’ function added to the excel sheet,’ to assist in this process (Byrne, 2016, p.141). Any errors detected are corrected prior to uploading the files into the V-LINC software. A master excel document is created for each sector to calculate the total overall linkages (by category, geographic scope and perceived significance) for the respondent firm group, and this is used as a checking reference. Following the checks and validation, individual firm linkage forms are uploaded to the software. Once this is complete it is necessary to check the data once again, to ensure that the overall linkage data corresponds with the data recorded, that linkages appear in the correct categories, at the correct geographic scale.

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and appear at the correct location on the maps. The V-LINC software collates the data and presents it both visually on geographic maps and in tabular form. This data can then be analysed.

### 3.9 Data Interpretation and V-LINC Reports

The V-LINC software provides the analyst with a number of tables and maps through which to analyse the linkage data. This data is considered carefully in terms of the regional and sectoral context. Based on the findings and the cluster policy instruments detailed in section 2.7.2, the most suitable policy recommendations are put forward. Recommendations are formulated in consultation with the local partner organisation to ensure that their knowledge and experience of the sector are utilised. This ensures that policy initiatives ‘are appropriate to the region and cluster, valuable to cluster members, practical and achievable’ (Byrne, 2016, p.142). Individual firm reports are drawn up, which detail the firm’s overall linkage data and compare it to the respondent firm group data overall. A template was created by Byrne (2016, p.142) which was closely followed for both the dairy and tourism sector, the structure for each firm report should be as follows:

1. Visualisation of the firm linkages across each geographic scope (local, national, European and international)
2. An audit of firm links identifying the most important and least important linkages for the firm, as well as their linkages by category and by geographic scope.
3. Benchmark of individual firm linkages to the Respondent Firm Group – in terms of the number and strength of linkages which they engage in.

According to Byrne (2016) the firm reports can highlight areas of opportunity for the firms, in terms of strengthening or developing linkages, it also allows them to compare their current footprint against other actors in the cluster.

Byrne (2016, p.142) also determined the structure of the V-LINC cluster report, which is the report for the respondent firm group as a whole. He states that it should include the following:
1. Regional context: detailing the importance and scale of the region, cluster and cluster organisation and a review of relevant national and regional policy.

2. Presentation of the findings from the V-LINC analysis on the linkages reported by the respondent firm group.

3. Visualisations of the respondent firm linkages on geographic maps at each geographic scale.

4. Identification and discussion of key connectors – firms or organisations who are strongly connected and linked to a number of the respondents – as they may play a role in any future initiatives going forward.

5. Application of Porter’s Diamond theory to the respondent firm data, examining the position of all four determinants.

6. Development of targeted policy initiatives based on the findings of the analysis and supported by evidence from the report.

To maximise the dependability of the research, the data collection process and firm reports have followed the suggested steps and structures as detailed by Byrne (2016). The structure of these reports requires a ‘thick description’ of the sector eco-system understudy and so the detail can aid towards transferability of the research.

3.10 Conclusion

The aim of this research is to conduct a bottom-up analysis of two of Ireland’s strong indigenous industries in west Cork: the food processing industry with a specific focus on the dairy specialisation and the tourism sector. The research aims to investigate any cluster behaviour within these sectors, and to determine how suitable a cluster approach to development would be for the firms. V-LINC methodology has been identified as the most suitable approach to this analysis, as this methodology analyses the linkages which firms engage in, while considering not only the geographic scale across which these links occur, but also the type of linkages and their importance to the firms involved. This methodology due to its resource intensive nature demands a
method of non-probability sampling, however this takes place in collaboration with local partner organisations who have the local knowledge and expertise and are best placed to identify a suitable sample, based on firm characteristics. These local partner organisations also play a crucial role in gaining access to the expert opinions required for the research. A number of measures are taken to ensure the reliability and validation of the analysis results, documenting fully the research process, and following precisely the V-LINC methodology framework aims at improving the dependability, credibility and transferability of the research. The next chapter will present the data collected from firms in both the agri-food sector and the tourism sector and a discussion of these findings.
4 Analysis

4.1 Introduction

This chapter presents the data from the V-LINC analysis of the food processing sector and tourism sector in west Cork. The chapter is structured in two sections: Section One will focus on the analysis of the agrifood sector while section two will deal with the tourism sector in Kinsale. For each sector the results will be presented following Byrne’s (2016) cluster report template. This includes an overview of the regional and sectoral context, followed by the analysis of the business linkages reported by the respondent firms. A number of key connectors are identified for each sector, details of these connecting firms and their importance to each of the respondent firm groups is discussed. Porter’s (1998) Diamond of Competitive Advantage is applied to both sectors based on the linkage data provided by the firms and a number of policy recommendations are put forward, aimed at further development of these sectors in Cork.

4.2 The West Cork Dairy Sector

4.2.1 Regional industry context

County Cork is the largest county in Ireland with an area of 750,000 hectares it represents almost 9% of the national area. Cork is part of the South-West, NUTS level 3 region (which includes counties Cork and Kerry). A total of 14,222 farms exist in Cork representing just over 10% of total farms in Ireland (CSO, 2018). O’Connor and Keane (2014, p.7) describe County Cork as Ireland’s leading dairy producing county, responsible for more than 25% of Ireland’s dairy output. County Cork is home to 378,200, 25% of the national dairy herd (Agriland, 2018). As outlined previously Ireland’s climate provides advantages in terms of enabling grass-based production system which is a sustainable method of dairy production (O’Connor and Keane, 2014, Irish Examiner, 2019b).
County Cork has a long history in the international dairy industry, home to the butter exchange in the 19th century, which was at one point the largest international butter market (The Butter Museum, 2018). O’Connor and Keane (2014, p.16) describe Cork as a ‘significant hub for the Irish and international dairy industry,’ due to the presence of a number of Ireland’s leading commercial dairy farmers, as well as a number of international leaders in dairy processing including Dairygold, Carbery Group, and Nutricia (part of the Danone Group). A number of substantial investments amongst dairy processors and dairy industry leaders has occurred in Cork in recent years, examples include the development of Ornua’s (formerly known as the Irish Dairy Board) national centre of excellence for butter packing and exporting located in Mitchelstown, Co. Cork. Teagasc Moorepark Animal and Grassland Research and Innovation Centre also plays an important role in the dairy sector in Ireland as the National Dairy Research centre.

County Cork is home to a number of cooperatives are involved in the processing of dairy produce for independent farmers as well as providing them with access to economies of scale for essential inputs and services required. Often co-operatives will provide their members with additional services such as access to training programmes or opportunities for upskilling. Eight co-ops exist within county cork, five of which are located in west Cork, these include: Lisavaird Co-op, Drinagh Co-op, Carbery Group, Barryroe Co-op and Bandon Co-op.

It is important to note that in terms of educational infrastructure for the dairy industry in Cork, two Higher Education Institutions (HEIs) University College Cork (UCC), and Cork Institute of Technology (CIT) are both involved in supporting the dairy sector through dairy education and research often working collaboratively with industry to develop the sector. The former has established facilities for Dairy Science and Technology within the School of Food and Nutritional Science while the latter provides courses in agriculture, food processing, business management and also
supports in terms of collaboration in research projects, an example being the development of the National Dairy Energy Support Tool\textsuperscript{21}.

County Cork has a strong foothold in the Irish dairy industry with much potential for further development (Lapple and Hennessy, 2012; O’Connor and Keane, 2014). An understanding of the operating environment from the firms’ perspective is important if the most appropriate supports are to be identified. The data gathered through the V-LINC analysis is presented next.

4.2.2 V-LINC Results for the West Cork Dairy Sector

As outlined in Chapter three, eleven respondent firms make up the sample for the dairy specialisation in west Cork, the firm profiles can be seen in Table 3.3. The sample ranges from micro, owner operated firms, employing three full-time staff, to a large multi-national operation responsible for the employment of over five hundred staff. A total of 507 linkages were identified by the sample across the eight linkage categories\textsuperscript{22}. The term respondent firm group (RFG) relates to the summation of data for all of the respondent firms. First the linkage types are considered.

4.2.2.1 Distribution of Linkages by Linkage Category

Table 4.1 presents the breakdown of the linkages recorded, by linkage category, along with the total number of linkages recorded by each firm. This table provides some insight into the types of business connections, which firms in this particular sector engage in. The most populous linkage category is outputs, which accounts for almost 26\% (n=131) of the total linkages for the RFG. This is followed by inputs and

\textsuperscript{21} This tool was developed as a collaborative project between the MeSSO Research Group in CIT, Teagasc and the Sustainable Energy Authority of Ireland (SEAI) to provide a platform for independent farmers to assess their energy needs based on farm and production characteristics and identify renewable energy technologies which may aid in greater sustainability and reduction of costs. (MeSSO Research Group, 2018)
\textsuperscript{22} Linkage Categories include: Government agencies (GA), industry associations (IA), industry peers (IP), inputs (IN), outputs (OU), research and development (RD), specialist services (SS) and training (TN)
specialist services which represent 18% (n=91) and 13% (n=65) of the total linkages recorded by the firms respectively. All businesses operate with the aim of delivering for customers, regardless of whether those outputs are products for distribution or sale, or the delivery of services. In order to deliver their outputs, firms require the appropriate resources or inputs, as well as specialist services which may not be linked directly to the end product however, these services support the production of firm outputs. Specialist services for the agri-food sector in west Cork include services such as distribution, engineering, packaging, branding, legal services, environmental consultancy, insurance and other expertise which may not be available internally to a firm and are outsourced. The three most populous linkage categories for the agri-food firms (outputs, inputs, specialist services) constitute their value chain, this explains the frequency at which these linkages are recorded amongst respondent firms. When combined these three linkage categories represent almost 57% (n=287) of the total linkages recorded by the RFG.
Government agency linkages are the fourth most frequently cited by firms, representing 11% (n=58) of the total linkages. A large portion (46%) of the government agency linkages can be attributed to the regulation of the food production industry in Ireland. Food hygiene legislation, Hazard Analysis and Critical Control Points (HACCP) and traceability (FSAI, 2015) are just some examples of the areas of food production which are all regulated by various government agencies. Firms operating in the agri-food and dairy sector have a legal obligation to engage with the regulatory bodies. Linkages with publicly funded business support agencies e.g. Local Enterprise Office (LEO) were also common amongst the west Cork Firms. Furthermore, government agencies such as Enterprise Ireland and Bord Bia, offer a range of services for firms who are interested in reaching new markets or establishing branches of their operations abroad, and these were also cited by the RFG.

23 Note to Table 1 Column 2 (Size): relates to the size of the firm by no. of employees’ categories are as follows: Large >250; Medium >50 ≤250; Small ≥10 ≤50; Micro <10.
The least frequent linkage categories are training and R&D, accounting for 7% (n=36) and 6% (n=30) respectively. Although these are the least frequent linkage categories, the majority of firms in the RFG do engage in these types of links. Only one firm did not report any training linkages, and similarly just one firm did not report any R&D linkages.

An examination of the types of R&D linkages in which the firms participate is worthwhile. While 30 R&D linkages were recorded, 40% (n=12) of those are research linkages with private businesses, one company alone accounts for almost half of these research links to private firms. The remaining R&D linkages are with universities and colleges 23% (n=7) and publicly funded organisations 37% (n=11). There are two industry-academic collaboration initiatives included in this analysis, both reported by one of the larger firms of the RFG. Another initiative, funded through a European FP7 programme, and run through Tralee IT is known as Trade IT. This initiative focuses on facilitating innovation and technology transfer within the traditional food sector24. One firm within the west Cork RFG recorded a link to this network. This suggests that there are a number of publicly funded resources available to firms in terms of R&D within the agri-food sector, which are not currently being utilised by the firms.

4.2.2.2 Geographic Scope

To understand the situation for firms within a regional economy it is vital to look at the geographic scope of linkage categories and the perceived significance of linkages which firms engage in over various distances. This provides insight into connections within the ‘cluster ecosystem’ and can identify weaknesses in terms of common resources that are unavailable to firms within the locality.

24 [www.tradeitnetwork.eu](http://www.tradeitnetwork.eu)
<table>
<thead>
<tr>
<th>Geographic Scope</th>
<th>Local</th>
<th>National</th>
<th>European</th>
<th>International</th>
<th>Total (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government Agencies</td>
<td>31.0%</td>
<td>60.3%</td>
<td>1.7%</td>
<td>6.9%</td>
<td>58</td>
</tr>
<tr>
<td>Industry Association</td>
<td>42.3%</td>
<td>44.2%</td>
<td>11.5%</td>
<td>1.9%</td>
<td>52</td>
</tr>
<tr>
<td>Industry Peers</td>
<td>56.8%</td>
<td>25.0%</td>
<td>15.9%</td>
<td>2.3%</td>
<td>44</td>
</tr>
<tr>
<td>Inputs</td>
<td>48.4%</td>
<td>24.2%</td>
<td>27.5%</td>
<td>-</td>
<td>91</td>
</tr>
<tr>
<td>Outputs</td>
<td>38.2%</td>
<td>35.1%</td>
<td>19.8%</td>
<td>6.9%</td>
<td>131</td>
</tr>
<tr>
<td>Research Development</td>
<td>40.0%</td>
<td>30.0%</td>
<td>20.0%</td>
<td>10.0%</td>
<td>30</td>
</tr>
<tr>
<td>Specialist Service</td>
<td>60.0%</td>
<td>21.5%</td>
<td>16.9%</td>
<td>1.5%</td>
<td>65</td>
</tr>
<tr>
<td>Training</td>
<td>61.1%</td>
<td>33.3%</td>
<td>5.6%</td>
<td>-</td>
<td>36</td>
</tr>
<tr>
<td>Percentage</td>
<td>45.8%</td>
<td>33.9%</td>
<td>16.6%</td>
<td>3.7%</td>
<td>100%</td>
</tr>
<tr>
<td>Total (n)</td>
<td>232</td>
<td>172</td>
<td>84</td>
<td>19</td>
<td>507</td>
</tr>
</tbody>
</table>

Table 4.2: Distribution of Linkage Categories by Geographic Scope.

Table 4.2 displays the linkages reported by the RFG at each geographic level for the eight linkage categories. This table identifies the dominant geographic scope for each linkage category and highlights that 38% (n=50) of output linkages occur locally in County Cork, while 35% (n=46) occur across the rest of the republic of Ireland. This indicates that the firms of the RFG currently focus on serving the national market, which accounts for 73% of all output linkages. It is important to consider the channels through which these firms export their goods, and the markets in which they trade.

Focusing on the export linkages, the data reveals that of the eleven firms who participated in the study, only three firms do not record any export linkages, two of which are micro-sized firms and the other a medium sized firm. A total of 26 output linkages were recorded between the firms in west Cork and other businesses in Europe, 69% (n=18) of these are linkages to firms based in the United Kingdom. This high proportion of links to the UK is reflective of the exporting pattern nationally, as the UK accounted for 38% of all agrifood exports and 22% of dairy exports from Ireland in 2017 (DAFM, 2019). A closer examination of the RFG output linkages to the UK show that 50% (n=9) of these links are to larger retail and distribution companies such as Tesco and Waitrose, while the other 50% of UK output linkages are to specialist distributors and retailers. Interestingly, micro firms reported distribution linkages.
through specialist distribution channels and retailers, while the larger firms reported linkages to larger distribution channels such as the retail chains. The remaining 8 export linkages to Europe were concentrated around Western Europe. Figure 4.1 illustrates all linkages reported by the RFG by geographic scope. From this map it is clear that there is a dearth of linkages to Eastern Europe. On an international scale, nine output linkages were reported by the RFG, the international export links for west Cork firms include the Middle East, Asia and the U.S.A.

Similarly, to outputs the majority of inputs and specialist services are sourced within Ireland, 73% (n=66) and 82% (n=53) respectively. These linkages relate to essential inputs and services required to produce their finished products. It is important to understand which resources are available to the firms locally or nationally and indeed, those that are not. In terms of the input linkages reported, 25 links identified occurred between the firms in west Cork and suppliers in Europe, these included inputs such as specialised machinery, packaging equipment, and bacterial cultures or starters required for the production of cheeses. Respondents identified no international input linkages. The European specialist services links related predominantly to consultancy services surrounding marketing, environmental practices, enterprise resource planning, quality audits, certification and technical support or maintenance for equipment and machinery. The RFG reported one international specialist service linkage and it related to specialist equipment development in the United States of America.

On considering the geographic scope of R&D linkages for the RFG these links occur within a local and national context, with 70% (n=21) of them occurring within Ireland. Only one firm in the RFG recorded international research linkages and these were focused on market research and product development for international segments.

Michael Porter (1990, 1998a; 1998b and 2003) placed great emphasis on the need for linkages between firms and the surrounding businesses and organisations within the locality. Cluster theory proposes that much competitive advantage is established within the firms’ locality. Evidence from Table 4.2 shows that the local linkages amongst the RFG comprise 46% (n=232) of all linkages recorded in the study, the
remaining 54% of linkages occurring across national (34%), European (16%) and international (4%) scopes.

Figure 4.1: Map of West Cork Agri-food RFG Linkages by Geographic Scope

The maps in Figure 4.1 generated through the V-LINC software, are visual representations of all 507 business links across all linkage categories by geographic scope. These maps highlight the importance of the local community. It is also clear from the maps that on a national scale, Dublin is vital to the agri-food firms based in west Cork, with just over 60% of the 172 national linkages occurring with organisations based in the country’s capital city. A large portion of the business linkages reported between the RFG and organisations in Dublin represent links with government agencies (31% of linkages recorded in Dublin or n=34). The regulation of food production coupled with Ireland’s highly centralised government provide some explanation for this. The second most populous category regarding connections to Dublin are outputs (25% or n=27). The remaining 44% of linkages between the RFG and Dublin are comprised of linkages to industry associations, input linkages, training, specialist services and R&D.
The European map of linkages for the RFG, shows that business connections with Europe occur predominantly in western countries, the majority of these 61% (n=51) represent input and output linkages. The international map depicts connections to America, the Middle East and Asia. Almost 50% (n=9) of international connections are output linkages.

While it is essential to understand across what geographic scope business connections are being established and maintained by the RFG, determining the value of the individual business linkages, from the firm’s perspective provides insight into the operations of the business, this is presented in the next section.

4.2.2.3 Perceived Significance

Each of the business linkages recorded by the respondent firms in west Cork, was scored based on the business significance of that linkage to the respondent. Linkages were then categorised into four perceived significance bands: high, medium, low and tenuous. Table 4.3 to Table 4.7 exhibit the percentage of linkages by linkage category, which fall into the four perceived significance bands. Table 4.3 shows the combined perceived significance results for all linkages, while Table 4.4 to Table 4.7 display the data according to the geographic scope at which linkages occur: local, national, European and international linkages.

Table 4.3 indicates that R&D linkages (43%), followed by outputs (41%), specialist services (40%) and inputs (39%) are rated as the most important connections with regard to the proportion of linkages in the high significance band. Although it was the least frequently recorded linkage type, a large share of the R&D linkages are perceived to be highly significant to the firms in west Cork. Considering the fact that a firm’s customers and suppliers are central to their business success it is not surprising to see that a large portion of outputs, inputs and specialist services also appear within the high significance band. In fact, the majority of linkages (86%) across the eight linkage categories appear within the top two perceived significance bands (high and medium bands).
While it is interesting to have an overview of the perceived significance by linkage category, further detail can be uncovered by assessing the significance of linkages according to the geographic scope across which they occur. As cluster theory focuses on the advantages gained from co-location, understanding the motivations of firms to develop connections beyond that can be useful, and allows some insight into what competencies may not be present locally.

Table 4.3 displays the perceived significance score of 232 local linkages, the most populous geographic scope. The respondent firms’ linkages with local firms and organisations are perceived as the most important of all geographic scopes, with 87% (n=202) appearing in the high and medium perceived significance bands. Those linkage categories with the highest proportion of local linkages occurring in the high band are inputs (48%), followed by outputs (42%), R&D (42%) and specialist services (36%). It is important to qualify these results with the fact that 40% (n=12) of R&D linkages, 60% (n=39) of specialist services and 48% (n=44) are reported at local level, while 38% of outputs (n=50) are local.

<table>
<thead>
<tr>
<th>Category</th>
<th>GA</th>
<th>IA</th>
<th>IP</th>
<th>IN</th>
<th>OU</th>
<th>RD</th>
<th>SS</th>
<th>TN</th>
<th>Total %</th>
<th>(n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>30 to 40</td>
<td>31.0%</td>
<td>32.7%</td>
<td>27.3%</td>
<td>38.5%</td>
<td>40.5%</td>
<td>43.3%</td>
<td>40.0%</td>
<td>25.0%</td>
<td>36.1%</td>
</tr>
<tr>
<td>Medium</td>
<td>20 to 30</td>
<td>48.3%</td>
<td>34.6%</td>
<td>56.8%</td>
<td>56.0%</td>
<td>49.6%</td>
<td>30.0%</td>
<td>53.8%</td>
<td>55.6%</td>
<td>49.5%</td>
</tr>
<tr>
<td>Low</td>
<td>10 to 20</td>
<td>17.2%</td>
<td>28.8%</td>
<td>13.6%</td>
<td>5.5%</td>
<td>9.9%</td>
<td>26.7%</td>
<td>6.2%</td>
<td>19.4%</td>
<td>13.4%</td>
</tr>
<tr>
<td>Tenuous</td>
<td>0 to 10</td>
<td>3.4%</td>
<td>3.8%</td>
<td>2.3%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.0%</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>58</td>
<td>52</td>
<td>44</td>
<td>91</td>
<td>131</td>
<td>30</td>
<td>65</td>
<td>36</td>
<td>507</td>
<td>507</td>
</tr>
</tbody>
</table>

*Table 4.3: Perceived Significance by Linkage Category*
While 33% (n=6) of government agency linkages reported locally occur within the low and tenuous bands, this represents just 9% of the total connections reported in this category.

<table>
<thead>
<tr>
<th>Category</th>
<th>GA</th>
<th>IA</th>
<th>IP</th>
<th>IN</th>
<th>OU</th>
<th>RD</th>
<th>SS</th>
<th>TN</th>
<th>Total %</th>
<th>Total (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>30 to 40</td>
<td>11.1%</td>
<td>36.4%</td>
<td>8%</td>
<td>47.7%</td>
<td>42.0%</td>
<td>41.7%</td>
<td>35.9%</td>
<td>27.3%</td>
<td>34.1%</td>
</tr>
<tr>
<td>Medium</td>
<td>20 to 30</td>
<td>55.6%</td>
<td>36.4%</td>
<td>92%</td>
<td>50.0%</td>
<td>50.0%</td>
<td>25.0%</td>
<td>53.8%</td>
<td>50.0%</td>
<td>53.0%</td>
</tr>
<tr>
<td>Low</td>
<td>10 to 20</td>
<td>22.2%</td>
<td>27.3%</td>
<td>-</td>
<td>2.3%</td>
<td>8.0%</td>
<td>33.3%</td>
<td>10.3%</td>
<td>22.7%</td>
<td>12.1%</td>
</tr>
<tr>
<td>Tenuous</td>
<td>0 to 10</td>
<td>11.1%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.9%</td>
<td>2</td>
</tr>
<tr>
<td>Total (n)</td>
<td>18</td>
<td>22</td>
<td>25</td>
<td>44</td>
<td>50</td>
<td>12</td>
<td>39</td>
<td>22</td>
<td>232</td>
<td>232</td>
</tr>
</tbody>
</table>

Table 4.4: Perceived Significance by Linkage Category - Local Linkages

The perceived significance of 172 national linkages reported are displayed in Table 4.5. Similarly, to the local linkages, the majority of national linkages (87%) score within the top two perceived significance quartiles. With 82% (n=9) of industry peers occurring across the national scope perceived to be of high importance to the RFG while 50% (n=7) of specialist services and 46% (n=16) of government agency linkages occurring at national level are also recorded in the high significance bands.

The number of government agency linkages occurring at a national level are reflective of the statutory regulation of the agri-food sector. The firms rate approximately 90% of these linkages in the high and medium perceived significance bands as without these business connections they could not operate.
The perceived significance of the European linkages is presented in Table 4.6. A total of 84 linkages were recorded across Europe, 85% of which are reported as having high or medium significance to the firms. A large proportion of European linkages reported relate directly to the value chain connections including inputs, outputs and specialist services. R&D (50%) linkages, followed by specialist services (46%) and outputs (39%) represent those categories with the greatest proportion of important connections at this geographic scope. Business linkages to industry peers in Europe appear to be held in low regard, as 85% (n=6) of these linkages appear in the low and tenuous bands.
Table 4.7 records the perceived significance scores for 19 international linkages, reported by the firms in west Cork. Almost half of the international linkages recorded fall within the output category, the majority of which 66% (n=6) are perceived to be significant to the firms, (reported within the high and medium perceived significance bands). R&D linkages, and specialist services linkages occurring internationally are also deemed to be important to the firms.

Table 4.7: Perceived Significance by Linkage Category – International Linkages

<table>
<thead>
<tr>
<th>Category</th>
<th>GA</th>
<th>IA</th>
<th>IP</th>
<th>IN</th>
<th>OU</th>
<th>RD</th>
<th>SS</th>
<th>TN</th>
<th>Total %</th>
<th>Total (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>22.2%</td>
<td>66.7%</td>
</tr>
<tr>
<td>Medium</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>44.4%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>33.3%</td>
<td>-</td>
</tr>
<tr>
<td>Tenuous</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total (n)</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>9</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>19</td>
<td>19</td>
</tr>
</tbody>
</table>

Table 4.8 presents the number and percentage of linkages reported in each of the perceived significance bands for each geographic scope. Porter believes that ‘once a cluster forms, the entire group of industries become mutually supporting. Benefits flow forward, backward and horizontally’ (1990, p.86). It is therefore important to look closely at the perceived significance of local linkages. Local linkages account for 232 of the total 507 business linkages recorded. Of these 34% (n=79) are reported as highly significant, a higher proportion than for European and international scopes. However, 42% (n=73) of national linkages fall within the high perceived significance band. It appears that firms are more likely to engage in linkages which are geographically proximate within Ireland, and less likely to engage in linkages at
further distances (across Europe and internationally), as these linkages are harder to form and maintain.

In terms of the European and international linkages for firms in west Cork, 84% (n=71) and 63% (n=12) of these are reported within the high and medium perceived significance bands, respectively.

<table>
<thead>
<tr>
<th>Geographic Scope</th>
<th>L</th>
<th>N</th>
<th>EU</th>
<th>INT</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Significance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High (30 to 40)</td>
<td>34.1%</td>
<td>42.4%</td>
<td>32.1%</td>
<td>21.1%</td>
<td>183</td>
</tr>
<tr>
<td>Medium (20 to 30)</td>
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<td>44.2%</td>
<td>52.4%</td>
<td>42.1%</td>
<td>251</td>
</tr>
<tr>
<td>Low (10 to 20)</td>
<td>12.1%</td>
<td>12.2%</td>
<td>14.3%</td>
<td>36.8%</td>
<td>68</td>
</tr>
<tr>
<td>Tenuous (0 to 10)</td>
<td>0.9%</td>
<td>1.2%</td>
<td>1.2%</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td>Percentage</td>
<td>45.8%</td>
<td>33.9%</td>
<td>16.6%</td>
<td>3.7%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Total (n)</td>
<td>232</td>
<td>172</td>
<td>84</td>
<td>19</td>
<td>507</td>
</tr>
</tbody>
</table>

Table 4.8: Perceived Significance by Geographic Scope of Linkages

It is clear that linkages within the national and local setting are extremely important to the agrifood firms in west Cork. The V-LINC methodology also facilitates the identification of business connections commonly cited by the RFG. Byrne (2016, p.137) refers to these common connections as ‘key connectors’, they are identified and discussed in the next section.

4.2.2.4 West Cork Agri-food Key Connectors

Figure 4.2 and Table 4.9 illustrate the key connectors amongst the RFG in the west Cork agri-food sector. Key connectors identified by the V-LINC software, are those
organisations who are the most commonly cited business connections amongst the RFG. They are identified through the number of connections that they have with respondent firms across all linkage categories. Table 4.9 provides a summary of the Key Connectors, the types of business linkages they are involved in and the perceived significance of those linkages to respondent firms. It is important to consider these connecting organisations as they have deeper insight into how firms operate within their ecosystem. Key connectors have the potential to perform the role of Institute for Collaboration (IFC) and may prove to be effective and efficient conduits when implementing any new policy initiatives, regional development programmes or strategies.

Figure 4.2: Key Connectors West Cork Agri-food Sector
Five key connectors have been identified for the firms of the west Cork agri-food sector, amongst these there are strong linkages to government agencies, R&D and industry associations. Three government agencies were identified as being heavily involved with the RFG; The Department of Agriculture, Food and Marine (DAFM), Bord Bia and the Food Safety Authority of Ireland (FSAI). Of these three agencies, DAFM is perceived as most beneficial, to the respondent firms, as 100% of the linkages reported to the department were reported in the high and medium perceived significance bands. The department plays a predominantly regulatory role within the industry in that some of the key functions carried out include; monitoring and controlling aspects of food safety, regulation of agriculture, marine and food industries and the development and implementation of national and EU schemes in support of these industries. Business connections to this agency are mandatory for producers working within the agri-food sector.

Bord Bia is another government agency which has been identified as a key connector. Established under An Bord Bia Act 1994 the board operates under the Minister for Agriculture, Food and the Marine. This agency has a facilitative role in the industry, providing a range of supports, which cover: start-up firms, research and industry insights, growing food production businesses, exporting food products and

<table>
<thead>
<tr>
<th>Key Connector</th>
<th>Teagasc</th>
<th>DAFM</th>
<th>UCC</th>
<th>WCDP</th>
<th>Bord Bia</th>
<th>FSAI</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>&gt;30 to 40</td>
<td>38%</td>
<td>50%</td>
<td>36%</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>Medium</td>
<td>&gt;20 to 30</td>
<td>38%</td>
<td>50%</td>
<td>36%</td>
<td>40%</td>
<td>20%</td>
</tr>
<tr>
<td>Low</td>
<td>&gt;10 to 20</td>
<td>16%</td>
<td>-</td>
<td>28%</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>Tenuous</td>
<td>&gt;0 to 10</td>
<td>8%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total (n)</td>
<td></td>
<td>13</td>
<td>12</td>
<td>11</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Linkage Category</td>
<td></td>
<td>5 RD, 4 GA, 3 TN, 1 IP</td>
<td>11 GA, 1 TN</td>
<td>5 TN, 4 RD, 1 SS, 1 OU</td>
<td>8 IA, 1 GA, 1 TN</td>
<td>9 GA, 1 RD, 1 TN</td>
</tr>
</tbody>
</table>

*Table 4.9: Perceived Significance of Key Connectors within west Cork Agri-food Sector*
sustainability in operations. Bord Bia also focuses on marketing Irish food products abroad, operating a number of quality assurance schemes related to different food types, to maintain Ireland’s standard as a supplier of high-quality produce (Bord Bia, 2016). Bord Bia are deemed to be very important to the RFG with 80% of linkages perceived to be highly important to the firms.

The FSAI is the third government agency identified as a key connector for the firms in west Cork. The FSAI was established in 1998 to manage national responsibility for enforcement of food safety legislation in Ireland\(^\text{25}\). Due to the regulatory role of this agency, business connections with the FSAI are essential and the authority is deemed to be very significant to the firms, with almost 90% of linkages appearing in the high and medium perceived significance bands.

Teagasc is also a key connector amongst the RFG, as the national dairy research centre they provide relevant research and important training supports to agrifood producers. University College Cork (UCC) are also commonly cited by the RFG similarly important for knowledge transfer in terms of training and research. While the R&D linkage category was the least populous from an overall perspective (Table 4.3), businesses who did report these knowledge transfer linkages to Teagasc and UCC perceived them to be important 75\% (n=9) and 72\% (n=8) respectively.

The sixth key connector identified for firms in west Cork was the West Cork Development Partnership - an industry association connected to the majority of respondents. Linkages to the WCDP also scored highly in terms of perceived significance with 80\% of linkages appearing in the high and medium bands. This organisation was the only industry association with commonly cited linkages to the RFG.

This concludes the presentation of the data from the V-LINC analysis of the west Cork agrifood sector. The data will now be interpreted using Porter’s (1998b) Competitive

\(^{25}\text{www.fsai.ie} \)
Diamond Model to assess the potential for an agri-food cluster in west Cork based on the findings.

4.2.3 Is there evidence of a ‘Porterian’ Cluster amongst the west Cork Agri-food firms?

Each of the determinants of Porter’s (1998a) Diamond of Competitive Advantage is now considered in relation to the RFG data, to examine the effectual nature of these factors for the firms in west Cork. In relation to the first determinant **Factor Conditions**, basic factors for the dairy specialisation in west Cork exist including favourable climate conditions, quality soil and availability of land for the use of grass based dairy production. As mentioned previously Ireland is currently the lowest carbon emitting dairy sector in the northern hemisphere which is a significant advantage currently when consumers are more climate conscious and seek more sustainable sources of food (Irish Examiner, 2019b). A range of advanced factors have also been established in the local region as outlined previously investments and upgrades to research facilities and dairy innovation centres including Teagasc, UCC and the Dairy Processing Technology Centre (DPTC) have occurred in recent years (Irish Times, 2015, Irish Examiner 2019b). The V-LINC analysis provides empirical evidence that respondent firms in west Cork are reliant on their local region for input factors such as raw ingredients and materials (Table 4.2). This finding reflects the national industry trend that 90% of dairy inputs are sourced within Ireland and there is a minimal import requirement for the industry (Fitzgerald, 2020).

The second determinant **Demand Conditions** relates to the existence of sophisticated consumer demand (Porter, 1998b). Findings of the V-LINC analysis show that the majority of output linkages for the RFG occur on the local (38%) and national (35%) geographic scale. While these linkages don’t indicate the volume of output, these local and national output connections are perceived to be highly important to the firms in west Cork, with 92% of local output linkages and 89% of national output linkages appearing in the high and medium perceived significance bands. When considering outputs, it is also important to consider the distribution channels used by the RFG as Porter (1998b) suggests that dealing with powerful distribution channels which pressure firms to upgrade and innovate equates to serving sophisticated and
demanding customers. Interestingly 45% of output linkages for the RFG include major retailers such as Musgraves and Tesco and specialist dairy distribution channels for example Neals Yard Dairy. Dealing with distributors such as these require dairy producers to ensure consistent standards of quality and pressure firms to improve in terms of packaging, production volumes, management of costs and competitiveness. While Porter’s (1990; 1998a; 1998b) emphasises the importance of dealing with sophisticated domestic customers in terms of the competitiveness of the Irish dairy sector, as Ireland is a small open economy, potential for growth will come from export markets, so an over-reliance on the domestic market (Figure 4.1) may represent a lack of focus on the potential of exports. In terms of the RFG, only one firm did not report any export linkages. While the larger firms in the respondent firm group reported greater numbers of export linkages, it is clear that all firms who engage with export connections value them. Larger firms tend to have an advantage due to the availability of resources at their disposal as business links, which extend beyond the national borders are more difficult to establish and require more effort to maintain, owner operators may not have the time and resources required.

With regard to the third determinant of Porter’s (1990, p.87) model, ‘Related and Supporting Industries’, the situation in west Cork’s dairy specialisation from the data presented shows strong connections locally. Porter (1998b) argues that opportunities for firms to share particular activities within their value chains and knowledge transfer are also opportunities for economies. There are many examples of this amongst the firms in west Cork. Some of the more general examples were joint purchasing between dairy firms and other food producers, joint activities in terms of logistics and specialised central storage, there was also an effort at joint marketing for the region, under the ‘Fuchsia Brand’. Another important example of collaboration is the emergence of Toonsbridge Dairy. Toonsbridge Dairy was established as a partnership between a local farmer and a food producer who specialised in olives. Toonsbridge began producing mozzarella as a complimentary product for the olives. The food producer had facilities for production, access to a distribution system and knowledge of the food production industry, the farmer possessed the land and the experience in

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26 Although firms were involved in establishing and utilising the Fuchsia Brand the value of this was questioned by some who believed it to be detracting from their own brand identity.
managing and maintaining livestock. Both men were actively involved in researching mozzarella production and locating suitable livestock. In addition to this example of collaboration, due to the unique requirements of buffalo livestock, the proprietor of Toonsbridge Dairy faced great difficulty in accessing specialised feeds to provide the appropriate nutrition for buffalo calves, he worked closely with animal feed suppliers to source and establish a feed suitable for his herd. In terms of related industries, connections between the RFG and local hospitality businesses were frequently cited, as well as linkages to other sectors such as engineering, technology, academia and research.

The final determinant refers to ‘Firm Strategy and Rivalry’ (Porter, 1998b) which focuses on the strategic ambitions of firms and the level of competition pushing them to innovate. While a large portion of dairy firms surveyed in west Cork compete directly with each other, there is also a large degree of co-operation to achieve common goals. An example of this is represented by the development of CÁIS – the Association of Irish Farmhouse Cheesemakers, which was established in the 1980’s by a number of cheesemakers and supported by the National Dairy Council. The investment made by a number of larger producers in the Dairy Processing Technology Centre is another example of cooperation to achieve common goals. Furthermore, throughout the data collection process, respondents mentioned the exchange of milk and excess produce between businesses within the region as commonplace, to avoid excess waste, and to assist in meeting greater demands. Throughout his writing, Porter (1998b) notes that industry peer linkages with other companies within the same sector propel a cluster with regard to innovation and economic growth, as their proximity and the competitive rivalry between firms’ forces operations to innovate. Table 4.2 reports that 82% (n=36) of industry peers are recorded at local and national levels, with a strong concentration of national peer linkages occurring within Munster. All but one firm in the RFG reported R&D linkages, and the majority of these formal knowledge transfer linkages were considered to be very important to the firms, this suggests that firms in west Cork are focused on accessing new knowledge and innovating in some way.
The V-LINC analysis has provided a deeper understanding of the types of business connections, which are established and maintained by these businesses. The geographic scope across which these linkages occur and the significance placed on these connections by those who maintain them, provide an insight into the activities, motivations and priorities for these businesses. The application of Porter’s (1990; 1998a; 1998b) model to the findings from the RFG, indicate that theoretically, foundations for an agri-food cluster exist amongst the firms in west Cork.

4.2.4 Policy Recommendations for the Agri-food Sector, West Cork.

Based on the interactions and connections of the RFG there appears to be a strong potential for the development of a cluster in the sector. The targets set out by the DAFM (2015) in ‘Food Wise 2025’ to increase Ireland’s share of the global marketplace in terms of food and beverage and the agri-food sector, and the need to position the country as a sustainable source of premium foods, brings many opportunities but also great challenges for the individual firms operating in the sector. It is important to consider that the dairy industry in west Cork, consists of a wide variety of operators, ranging from the individual farmers operating traditional farming models, to farmers who have diversified their operation. These not only produce milk but are involved in production of secondary goods such a cheese and yoghurts, to the larger firms and co-operatives who have much greater production capacity and greater resources as a collective. The analysis conducted for this study focused on a sample of eleven firms within the dairy specialisation of the agri-food industry. While the dairy specialisation represents one sub-sector of the agri-food industry, the findings do provide some understanding of the situation for agri-food firms operating in west Cork, particularly SME’s. Based on the findings of the V-LINC analysis, a number of recommendations, actionable at a county level, to aid the development of the agri-food sector in County Cork are suggested.
1. Support the development of a cluster organisation with responsibility for the agri-food sector in County Cork.

The agri-food sector is quite diverse with different subsectors having very different focus and utilising a plethora of technologies. Furthermore, to complicate things further MNC’s and co-ops have the scale to compete successfully on a global level, while more focus is required to drive the growth of SME’s related to speciality food production, as these firms face significant scaling challenges. The implementation of a cluster initiative would be a positive step in establishing suitable support structures through a cluster organisation focused on facilitating SME growth and enabling them to take full advantage of the increasing opportunities emerging from global markets. Such an initiative would align with the target set out by the Department of Business, Enterprise and Innovation - DBEI (2019, p.14) to build globally competitive clusters:

‘there is an opportunity to promote and support clustering as an economic development and enterprise capability development tool to support regional growth, and to forge greater linkages and collaborations amongst the plethora of indigenous and foreign owned enterprises across the region and beyond.’

A cluster initiative would provide a number of significant benefits to firms in west Cork and enable them to better face their challenges within the industry. ICN (2014) suggest that a cluster organisation can have a significant influence on strengthening collaboration in a cluster, through the implementation of effective innovation policy.

The need for a cluster organisation stems from the requirements of the firms working within the agri-food sector but also compliments the strategy for the sector as set out in the Department of Agriculture Food and the Marine’s (2015) ‘Food Wise 2025’. In this study SME respondents noted that government regulations are stringent and do not allow for any dialogue with producers in the industry. A cluster organisation would provide a voice for Cork SME’s to respond to changes in existing, or proposals for new legislation through engagement and lobbying for their shared interests. Furthermore, mentoring may also be another benefit provided by a cluster organisation to SME’s when dealing with larger supermarket chains who dominate the consumer
facing end of the marketplace. It could provide the means to solve common problems, for example to create a system of shared services such as the creation of a more efficient and collaborative logistics solutions for businesses in remote locations, which was also identified as an issue for respondent firms\textsuperscript{27}.

While industry peer linkages are an important element of the agri-food ecosystem, a noteworthy finding suggests that these linkages are difficult for start-up firms to create, as some younger firms within the RFG reported no industry peer linkages (Table 4.1). In the highly competitive food industry, it is important to ensure that new and expanding enterprises have the opportunity to be successful. Local supports are vital in this regard to facilitate opportunities for the creation of links with industry peers and business supports. While training linkages are infrequent amongst firms within the agri-food sector in west Cork (Table 4.3), respondents identified the need for business management and staff development training as a priority for firms. Training, staff development and upskilling is something which could be addressed by a cluster organisation through coordination of specific training programmes aligned with member’s needs. A cluster organisation would facilitate better arrangement of resources through shared needs within the area, and enable the agri-food firms in west Cork to prioritise and work towards facing their current challenges, recognising and taking advantage of opportunities which present themselves.

2. Prioritise the facilitation of R&D linkages between firms and with academia.

The V-LINC analysis found evidence that there is a need to assist firms operating in the agri-food sector in County Cork, to innovate and develop. The greatest potential for this is through increased R&D activity not only with academia and research institutions, but also through collaborations with private industry. R&D linkages were the least frequent linkage category reported in this analysis (Table 4.1). There is a tendency for the larger more established firms to engage in more R&D linkages than

\textsuperscript{27} See WCDP (2014)
their smaller counterparts. It is equally important to note that those firms who do engage in R&D activity perceive these linkages to be beneficial: 43% of R&D linkages are rated highly significant (Table 4.3). A study carried out by Renwick et al. (2014, p.4) identified that Ireland has the 5th most innovative agrifood sector in the EU. They report that while Ireland is home to world class innovative companies, there are not enough. They state that:

‘there is a high level of government support for the agrifood sector and for science and technology within agriculture and food sectors in particular. However much of the science and the efforts at encouraging innovation are supply pushed rather than demand pulled. In addition, Ireland lags behind other countries in terms of business investment in research and development. Even when companies are looking to engage with universities, and despite the considerable activity that is going on at high level activity within the university sector, they are finding it difficult to access the knowledge they require. Much of the engagement that occurs is ad hoc.’

There are a number of R&D resources and industry-academic collaborative efforts ongoing such as the ‘Dairy Processing Technology Centre’, ‘Food for Health Ireland’, and ‘Trade IT’ as mentioned earlier. However, such initiatives are not being utilised by the micro firms within the RFG, and while the V-LINC analysis cannot identify why this is the case, it is important to determine whether or not these efforts are of value to the SME’s. If these resources are applicable only to the larger operators within the sector, then there is a need to identify ways to inform and facilitate R&D collaboration amongst smaller operators. Innovation within the agrifood sector is vital if indigenous Irish firms are to compete on the global stage, as this is where competitive advantage will be derived from.

28 Food for Health Ireland is a dairy research centre, based in UCD. It was established in 2006 between representatives for the dairy industry and Enterprise Ireland to fund nutrition and health research to improve public health. (FHI.ie, 2018)
A co-operation programme held up as best in class European Initiative is that of ‘Clusterland’ located in Upper Austria. Co-operation projects have been used by the region since 1998 and have proven to be an effective and efficient method for SMEs to strategically differentiate themselves (TMG, 2014). To be eligible for government funding, a minimum of three companies must participate in a project and at least one of those should be an SME. Results from Clusterland (TMG, 2014) show that: 77% of firms continue to co-operate after projects end; 89% of the projects either would not have been realised without subsidies, or would have had significantly lower expectations. Firms’ discover that pooling competencies enable them to overcome barriers, such as limited funding, lack of management resources and technological competencies. Furthermore, such programmes also train SMEs to undertake R&D projects at a national and European level.

Enterprise Ireland provide a wide range of funding for indigenous firms based on different research needs including: innovation vouchers, R&D funding for in-house projects with collaboration bonuses for business to business (B2B) collaboration and innovation partnerships - aimed at larger collaborative projects between firms and

29 Note to Figure 4.3: The red lines are Research and Development linkages reported in the high perceived significance band (>30 to 40), the blue lines indicate linkages in the medium, low and tenuous bands.
research teams in higher education. The reality is that aside from innovation vouchers, the V-LINC results show very little of these supports were utilized by the RFG. According to DAFM (2013, p.4) ‘Irish enterprise has invested in research but at a very low level (BERD 0.65%).’ The national policy for the development of the agrifood sector states that the expected growth of the industry must come from the delivery of innovative food solutions so continued investment in R&D is essential to achieving these targets, it has also identified that the capacity for SME’s to absorb new research is a challenge.

A model similar to that run by Clusterland applied by a cluster organisation in County Cork may be the conduit for realising more B2B market focused connections and a platform for opening further connections with Europe for the agri-food sector.

3. Facilitate and support market development for the agri-food sector in County Cork.

The V-LINC analysis shows that there in terms of outputs connections are concentrated within the local and national market for the RFG, with 73% of output linkages to customers on the island of Ireland. While most of the firms do have export links to Europe, the majority of activity here is focused on the United Kingdom (Figure 4.4). This is a concern for small operators in light of BREXIT and the potential impact that this will have on Irish companies trading with the UK. With so many small producers reliant on the UK market for their exporting activities supports are essential to ensure that these operators can expand their markets through research, development of new markets and access to new distribution channels. Six of the eleven respondent firms report export links to the international market. A cluster organization could further assist the agrifood sector in County Cork to establish beneficial linkages with distribution channels, enabling greater access to European and international markets.
Each sub-sector of the agri-food industry will face specific challenges, for example, the dairy sector is facing great challenges in relation to the fluctuating milk prices, the devaluation of pounds sterling and increased competition following the abolition of the milk quotas in April 2015. The targets set out in ‘Food Wise 2025’ (DAFM, 2015), means that the growth in agri-food production will lead to oversupply in the domestic market unless firms within the agri-food sector can internationalise. Further supports are required here. Ireland has a reputation as a ‘clean and green’ nation, the grass-based livestock systems mean that agri-food production is more sustainable than other intensive feeding systems. This is something the agri-food sector can capitalize on in order to compete in the global marketplace. Bord Bia offers supports to firms exporting in the food industry e.g. trade fairs, marketing fellowships and market advice. They also operate the ‘Origin Green’ programme to brand Irish agri-food as a sustainable, environmentally friendly and reliable source of food, while this is a very valuable support to the industry this is not sufficient. A cluster organization would be well placed to provide greater supports for the region, allowing firms better access to resources required to internationalise.

In Ireland’s case the future pursuit of global markets is essential to drive growth and development as the domestic market is small when compared to its European and international equivalents. The Irish dairy sector exports 90% of its produce (Irish Examiner, 2019b; National Dairy Council, 2019), the abolition of milk quota’s in April 2015 coupled with dairy expansion across Europe, has created a volatile global market with fluctuations in prices and more intense rivalry. Any future growth for the
dairy sector will rest upon the Irish Dairy sectors ability to compete in the global marketplace. Demand patterns are ever changing also with consumers now demanding more sustainable food sources, and increasingly focusing on sustainability, health, wellness and clear product labelling (Food Insight, 2019). There are a number of unique selling points which suggest that Ireland can effectively compete within this niche. Ireland’s agrifood sector is comprised of small family run farms (Bord Bia, 2016). The dairy sector in Ireland is highly regulated, and so agricultural practices are closely governed, meaning that farmers must operate to the highest standards in terms of environmental, animal welfare, quality and traceability. Ireland’s reputation for being clean and green, has been incorporated into the food industry through initiatives such as Bord Bia’s ‘Origin Green’, and the Sustainable Dairy Assurance Scheme (SDAS), which showcases firms’ commitments to their international customers and that agricultural practices are responsible and sustainable (Bord Bia, 2019). The success of the agrifood sector will rely heavily on the ability of firms to innovate, increase efficiencies where possible and access global markets. Through collaboration and shared vision for the region and sector, achieving these tasks will be more attainable.

4.2.5 Conclusions

A bottom up analysis of the eco-system for agri-food firms provides an understanding of the capabilities and resources within the region, but also the challenges that are faced by the firms. The evidence suggests that factors of Porter’s Competitive Diamond of Competitive Advantage are at work amongst the west Cork dairy sector, and based on the common challenges identified by the firms throughout the analysis, three recommendations have been put forward aimed at further supporting and developing the sector. A cluster initiative to support the agri-food sector would enable the firms to access greater resources, build connections to research linkages, build new markets and find new channels for distribution, however the use of a cluster initiative to support the agri-food sector would not come without certain challenges and these will be discussed in the next chapter.
Section Three will now present the V-LINC analysis of the tourism sector in Kinsale following Byrne's (2016) suggested format similarly to the agri-food analysis.

4.3 The Tourism Sector, Kinsale, Co. Cork.

4.3.1 Regional Industry Context

Kinsale is a small port town located on the coast of west Cork, with a population of over 5,000 people (CSO, 2016). The town is located approximately 29km from Cork City, and Cork International Airport. The tourism data provided by national tourism bodies does not provide granular data for specific locations, however statistics are available for the NUTS 3 level of South West Region (including counties Kerry and Cork). In 2017 the South West region welcomed 2,512,000 overseas visitors with an additional 2,401,000 visitors coming from the domestic market. The total revenue generated within the South West region in 2018 was €1,461 million, making it the second highest revenue generating region in Ireland after Dublin (Fáilte Ireland, 2019).

While the South West region of Ireland is considered the second most visited region, a recent report identified that amongst international and domestic tourists there was a lack of awareness about Cork as a destination (Strategic Tourism Task Force, 2015). A collaborative project began involving stakeholders from the HEI’s, County and City Councils, Cork Convention Bureau, Chambers of Commerce and Chambers of Tourism across the county, supported by the national agencies for tourism Fáilte Ireland and Tourism Ireland along with independent tourism operators. The goal was to increase awareness amongst visitors of all that Cork has to offer through the development of Cork as an attractive destination and ultimately to grow tourist numbers to the county.

As a destination within county Cork, Kinsale town has a well-established tourism industry encompassing numerous accommodation providers including hotels,
guesthouses, bed and breakfasts, and self-catering holiday accommodations. The town is home to a wide variety of restaurants, bars, museums and galleries. The town has a rich history as a commercial port due to its natural harbour at the mouth of the Bandon Estuary. The harbour provides opportunities for marine activities and there are a number of marine based tourism services available to visitors. The narrow streets of the town along with the Georgian and Victorian architecture are evidence of Kinsale’s unique heritage. Two fortifications built in early 1600s to protect the mouth of the harbour still stand today and provide evidence of the rich history of the area, and serve as popular tourist attractions for visitors to the region. As a coastal destination Kinsale is in close proximity to a number of Blue Flag30 beaches (Garrylucas and Garretstown) and Kinsale Marina itself was awarded a blue Flag up until June 2019 (Blue Flag, 2020).

Despite its small size Kinsale is considered to be one of Ireland’s premier tourist destinations, promoted as the Gourmet Capital of Ireland (Irish Times, 2017; Pure Cork, 2019) and designated the start/finish point of the Wild Atlantic Way31 the town has a number of advantages in relation to its situation. The town has established a reputation for good food based on the presence of a wide variety of restaurants and cafes. The community approach to the destination development began as early as the 1970’s. In 1971 the ‘Kinsale Community Promotions’ was established as an organisation to promote tourism in the town (Good Food Circle, 2018). This was the predecessor for the current ‘Kinsale Chamber of Tourism and Business’, which promotes the town of Kinsale locally, nationally and internationally, working with a wide range of tourism bodies.

The Good Food Circle is another good example of the cooperative approach taken to tourism amongst business owners in Kinsale. Restaurateurs in the town began to work cooperatively to attract business into the town, but in 1976, the cooperative relationships between restaurateurs was formalised and the Good Food Circle was established. This initiative focused on the sharing of talent and resources, along with

30 Blue Flag is one of the world’s most recognised eco-labels for beaches, marinas and boats. See www.beachawards.ie for more information
31 The Wild Atlantic Way is Ireland’s first long distance touring route of 2,500km which runs all along the west coast of Ireland. This route has been one of the recent marketing propositions developed and promoted by Fáilte Ireland and Tourism Ireland.
marketing the town of Kinsale as a Gourmet destination. As part of this initiative, restaurants were encouraged to maintain high standards; members were subject to anonymous inspections. The committee discussed these results and disseminated to all members. The competitive nature of the industry and the shared common goal to establish a reputation for high quality food meant that all members of this initiative were motivated and encouraged to improve and maintain standards in their operations. The Good Food Circle working collaboratively with the hotels and other tourism providers developed The Kinsale Gourmet Food Festival, which takes place in October each year, and draws a large number of visitors to the town enabling tourism businesses to extend their season (Good Food Circle, 2018).

Its proximity to Cork City and Cork International Airport provides an opportunity in that it is easily accessible to overseas and domestic tourists alike. Business services are widely available in Cork city and the surrounding areas, and as discussed previously Cork city boasts two Higher Education Institutes UCC and CIT and a number of Further Education Colleges, which provide educational infrastructure, training supports and research capability. Other support agencies include trade associations such as the Irish Hotels Federation (IHF) which is a national organisation providing supports and lobbying on behalf of Irish hoteliers, they operate a Cork branch to deliver supports on a local basis. Other national industry associations include the Restaurant’s Association of Ireland (RAI), the Irish Tourism Industry Confederation (ITIC), Association of Visitor Experiences (AVEA) and the Vintners Federation of Ireland (VFI) who also operate a regional arm to support members interests. Tourism businesses in Kinsale have a number of advantages in terms of their location and access to resources and supports, however in order to understand the operating environment for the firms the V-LINC analysis was conducted. The results of that analysis are presented in the next section.

4.3.2 V-LINC Results for the Tourism Sector in Kinsale.

Interviews were conducted with managers in sixteen tourism businesses in Kinsale, ranging from leisure activities such as sailing, food and beverage providers, hotel and accommodation providers to retail. The firms vary by size, from micro firms
employing two people up to medium sized enterprises employing more than eighty staff. Unlike the agri-food sample, there are no large firms, nor are there any multinational corporations included. The firm profiles can be seen in Table 3.4. The term RFG refers to the summation of data for the group.

4.3.2.1 Distribution of Linkages by linkage category

The V-LINC analysis recorded a total of 450 linkages, reported across the eight linkage categories by the tourism firms. These linkages are displayed in Table 4.11 according to the firm and type of linkage. This uncovers the types and frequency of linkages which the RFG engage in, and it is important for understanding the economic ecosystem in Kinsale for tourism business.

Table 4.11 reports that the most frequent linkages for the tourism RFG are inputs, which account for 27.8% (n=125) of the total linkages reported, of these more than half (53%) are food and beverage related inputs. Inputs are followed closely by outputs at 21.6% (n=97), industry associations 13.8% (n=62) and specialist services at 13.3% (n=60). Similarly, to the agri-food sector results the value chain activities amongst the tourism firms account for a large proportion of business links.

The fourth most populous linkage category is specialist services, with a total of 60 links recorded by the firms. A large portion of specialist service linkages involved marketing activities (62%) and included links with companies for advertising, marketing consultancy or services, web design and printed media design. The remaining services employed by the RFG included solicitors, financial services, and I.T. services and specialised equipment for example rigging equipment for sailing.
The least frequent linkage categories are government agencies and R&D, which account for 5.1% (n=23) and 1.1% (n=5) of all linkages respectively. This is consistent with Nordin (2003) who stated that tourism firms do not have strong links to R&D. Six of the sixteen firms within the RFG recorded no linkages to government agencies. The remaining firms recorded links to a broad range of government agencies including the Department of Transport, Tourism and Sport (DTTAS), the Department of

32 Note to Table 4.10 Column 2 (Size): relates to the size of the firm by no. of employees’ categories are as follows: Large >250; Medium >50 ≤250; Small ≥10 ≤50; Micro <10.
Agriculture, Food and the Marine (DAFM), Fáilte Ireland, the environmental health officer, central bank, to the Harbour board and local councils.

A total of 5 R&D linkages were recorded by three firms of the RFG. Included in these were links to two of Ireland’s Institutes of Technology (IoT), in Cork and Waterford, and a link to the national tourism development authority (Fáilte Ireland).

Training was the sixth most populous linkage category, accounting for 8% (n=36) of the total linkages for the RFG. Four firms within the respondent firm group did not record any training linkages. Twelve firms recorded training linkages, of these, 22% were related to fire and safety training which is mandatory by law. The remaining training linkages were links to private training consultants or training organisations. There were six training linkages to Fáilte Ireland, who provide a range of upskilling and training courses to tourism businesses all over Ireland. There were also two training linkages recorded to Waterford Institute of Technology, but no training linkages recorded to Cork Institute of Technology. The tourism sector is renowned as a labour-intensive sector, but also one with a low skill requirement. Continuous training is essential for any service business to compete in today’s global marketplace, however this data reveals that formal training linkages occur predominantly due to legislative requirements. It is very common for tourism firms to conduct much of their staff training in-house and so a lack of formal training linkages is not surprising.

The Kinsale RFG includes seven accommodation providers, a number of restaurants, bars, retail outlets, and cultural experience or leisure activity providers. It is interesting to review the linkage data for accommodation providers and compare this to the remaining tourism service firms. The accommodation providers’ core business offering has a number of implications for the business model, they tend to be much larger than the other businesses, with higher numbers of employees. They rely on customers travelling from outside their locality to avail of the accommodation, whereas restaurants, bars, retail and activities will cater to both the local population and tourist trade. Considering the variations in the linkage types and the frequency in which they occur for those accommodation providers in comparison to the other
tourism services provides insight into the different challenges they face. The linkage categories for both types of business are displayed in Table 4.11.

The accommodation providers account for 60% (n=14) of the government agency linkages. These include links with Fáilte Ireland, the National Tourism Development Agency. As Fáilte Ireland are responsible for the accommodation standard ratings, accommodation providers must register with them, which explains the increased frequency of linkages. The accommodation providers recorded a larger proportion of input and output linkages. With regard to the outputs, the accommodation providers reported a greater proportion of tour operators and travel agent linkages, while the other tourism services recorded more linkages with large firms based locally (67%, n=32). The other tourism services recorded a larger share of specialist services (61.7%) and they also recorded the majority of R&D linkages (80%, n=4). While training linkages were equally recorded for both accommodation providers and tourism services, the tourism services had training linkages to Higher Education Institutes whereas the accommodation providers did not.

<table>
<thead>
<tr>
<th>Linkage Categories</th>
<th>Accommodation Providers</th>
<th>Other Tourism Services</th>
<th>Total (n)</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government Agencies</td>
<td>60.9%</td>
<td>39.1%</td>
<td>23</td>
<td>5.1%</td>
</tr>
<tr>
<td>Industry Associations</td>
<td>50.0%</td>
<td>50.0%</td>
<td>62</td>
<td>13.8%</td>
</tr>
<tr>
<td>Industry Peers</td>
<td>52.4%</td>
<td>47.6%</td>
<td>42</td>
<td>9.3%</td>
</tr>
<tr>
<td>Inputs</td>
<td>53.6%</td>
<td>46.4%</td>
<td>125</td>
<td>27.8%</td>
</tr>
<tr>
<td>Outputs</td>
<td>58.8%</td>
<td>41.2%</td>
<td>97</td>
<td>21.6%</td>
</tr>
<tr>
<td>Research and Development</td>
<td>20.0%</td>
<td>80.0%</td>
<td>5</td>
<td>1.1%</td>
</tr>
<tr>
<td>Specialist Services</td>
<td>38.3%</td>
<td>61.7%</td>
<td>60</td>
<td>13.3%</td>
</tr>
<tr>
<td>Training</td>
<td>50.0%</td>
<td>50.0%</td>
<td>36</td>
<td>8.0%</td>
</tr>
<tr>
<td>Total (n)</td>
<td>233</td>
<td>217</td>
<td>450</td>
<td></td>
</tr>
<tr>
<td>Total %</td>
<td>51.8%</td>
<td>48.2%</td>
<td>100.0%</td>
<td></td>
</tr>
</tbody>
</table>
Table 4.11: Linkage categories by business type

Examination of the geographic scope of these linkages will provide greater insight into the ecosystem for the Kinsale tourism firms.

4.3.3 Geographic Scope

Table 4.12 exhibits the distribution of linkage categories by geographic scope. This facilitates an understanding of the distance across which the tourism RFG are maintaining their business relationships. This provides valuable insight into the potential cluster ecosystem and enables an evaluation of the environment in terms of the existence or lack of factor conditions, demand conditions and related and supporting industries.

<table>
<thead>
<tr>
<th>Geographic Scope</th>
<th>Local</th>
<th>National</th>
<th>European</th>
<th>International</th>
<th>Total (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government Agencies</td>
<td>47.8%</td>
<td>52.2%</td>
<td>-</td>
<td>-</td>
<td>23</td>
</tr>
<tr>
<td>Industry Association</td>
<td>66.1%</td>
<td>32.3%</td>
<td>1.6%</td>
<td>-</td>
<td>62</td>
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<tr>
<td>Industry Peers</td>
<td>95.2%</td>
<td>4.8%</td>
<td>-</td>
<td>-</td>
<td>42</td>
</tr>
<tr>
<td>Inputs</td>
<td>71.2%</td>
<td>24.8%</td>
<td>4.0%</td>
<td>-</td>
<td>125</td>
</tr>
<tr>
<td>Outputs</td>
<td>52.6%</td>
<td>26.8%</td>
<td>10.3%</td>
<td>10.3%</td>
<td>97</td>
</tr>
<tr>
<td>Research &amp; Development</td>
<td>40.0%</td>
<td>60.0%</td>
<td>-</td>
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<td>5</td>
</tr>
<tr>
<td>Specialist Service</td>
<td>73.3%</td>
<td>21.7%</td>
<td>3.3%</td>
<td>1.7%</td>
<td>60</td>
</tr>
<tr>
<td>Training</td>
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<td>52.8%</td>
<td>2.8%</td>
<td>-</td>
<td>36</td>
</tr>
<tr>
<td>Total (%)</td>
<td>65%</td>
<td>28%</td>
<td>4.5%</td>
<td>2.5%</td>
<td>100%</td>
</tr>
<tr>
<td>Total (n)</td>
<td>294</td>
<td>124</td>
<td>21</td>
<td>11</td>
<td>450</td>
</tr>
</tbody>
</table>

Table 4.12: Distribution of Linkage Categories by Geographic Scope
From Table 4.12 it is clear that the majority of business linkages for the RFG in Kinsale are local with 65% (n=294) of linkages for the Kinsale tourism RFG occurring within the boundaries of County Cork. The majority of inputs (71.2%) and specialist services (73.3%) are sourced locally. It is important to note that just 4% (n=5) of inputs and 5% (n=3) of specialist services are sourced from outside Ireland, showing that the necessary resources are readily available within the domestic market. This is consistent with the characterisation of the tourism industry as an industry with low import requirements (Fáilte Ireland, 2018).

With regards to the outputs, 52.6% (n=51) of these linkages for firms in Kinsale are local, while another 26.8% (n=26) are national. On closer examination of the local output linkages, it is interesting to note that 45% of these (n=23) are output links to other tourism businesses, meaning that customers come from other tourism businesses in the area. This indicates that referrals and recommendations are happening amongst the tourism businesses in Kinsale, and while this is not surprising within the tourism industry, it suggests a level of trust and cooperation amongst those businesses. A tourist will judge their experience of a destination holistically, rather than as a series of separate services. Tourism firms within a destination rely on each other to provide a standard of service that ensures all visitors have an enjoyable experience. Poor performance of one firm will lead to dissatisfaction with the destination overall, and negatively impact all other operators in the area. When a firm recommends another service provider to their customers, they are demonstrating a level of trust in that company to deliver quality service.

Interestingly there are few output linkages between tourism firms in Kinsale and the global market with only 20.6% (n=20) of all output linkages occurring across Europe and internationally. Considering that the tourism sector is an export industry, a greater frequency of export linkages was expected, however the tourism industry is unique in that it requires its international customers to come to Kinsale to avail of the service. While the Kinsale firms do cater to international guests, the methodology used in this analysis cannot record linkages to individual guests, nor can the tourism firms provide that level of detail, therefore the RFG recorded their output linkages to distribution channels, corporate clients and intermediaries and this had a direct impact on the
quantity of European and international output linkages. This will be discussed further in the next chapter.

Looking at the European linkages, these account for 4.5% of all linkages recorded by the RFG. These links occur within a number of categories including industry associations, inputs, outputs, specialist services and training linkages. Similarly, to the agrifood RFG the majority of European linkages for the Kinsale tourism firms are with businesses in the United Kingdom 81% (n=17). According to Fáilte Ireland (2019, p.3), Britain is the largest source market for overseas tourists, and UK visitors represented 36% of all overseas visitors to Ireland in 2018, this reflects the importance of the UK to Ireland’s tourism industry. Other European linkages for the RFG were recorded to France, Germany and the Netherlands. Mainland Europe accounts for 36% of the overseas visitors to Ireland (Fáilte Ireland, 2019, p.3). International linkages account for just 2.5% of the total recorded for the RFG, these international linkages fall within two categories outputs and specialist services. The majority of these unsurprisingly are relationships with organisations in the U.S.A. (n=8), while the remaining links (n=3) are with Canada, Thailand, and U.A.E.

Figure 4.5 is a visualisation of the linkages recorded by the tourism firms in Kinsale, by geographic scope. From these maps it is apparent that a large amount of national linkages, almost 73%, are concentrated in the capital of Dublin. These business ties to Dublin are comprised of linkages within each of the eight linkage categories. Local linkages for the tourism firms are concentrated closely around the area of Kinsale and Cork City. This is in stark contrast to the agrifood firms whose local linkages spread across County Cork. Tourism linkages to Europe as mentioned previously are focused on the UK and on the USA on the international scale. Almost all (91%) of the international linkages are output links.
Figure 4.5: Kinsale Tourism Linkages by Geographic Scope

The visualisations in Figure 4.5 clearly show a lack of linkages to key tourism source markets for the South West region, as mentioned previously this is due to the way in which output linkages are recorded for the firms and this will be addressed in the findings of the study.

Considering the geographic scope of output linkages for the other tourism services in comparison to the accommodation providers it becomes apparent that the accommodation providers recorded a higher level of output linkages on the national, European and international scales. This can be seen clearly in the maps from Figures 4.6 to 4.8.
The accommodation providers have a higher number of international linkages, while the other tourism services have a greater number of European linkages. All but one of the international linkages relate to outputs, however many of the European links fall under inputs and specialist services. Due to the diversity amongst the other tourism services often, specialist activities such as sailing, cruise and even retail have to source
inputs from further afield, whereas the local markets can provide almost all of the inputs for the accommodation providers. This can be seen clearly in Figure 4.9.

Figure 4.9: National, European and International Input and Specialist Service Linkages for the Accommodation Providers and the Other Tourism Services

While these visualisations offer much detail as to where these firms source their inputs and what markets they have connections to, it is important to understand what business linkages are the most valuable to the firms, and in what areas they may require further support.

4.3.4 Perceived Significance

Table 4.13 to Table 4.17 display the percentage of linkages, by category, that fall into the perceived significance bands; High, Medium, Low and Tenuous. Table 4.13 displays the perceived significance of all linkages for the RFG, while Table 4.14 to Table 4.17 display this information according to the geographic scope over which they occur; local, national, European and international.

Table 4.13 clearly shows that a higher proportion of specialist services (21.7%, n=13) are rated of highest significance, followed by industry peers (16.7%, n=7), industry associations, (14.5%, n=9), and outputs (12.4%, n=12). It is not surprising to see specialist services appearing in the highly significant band, as these are essential for the delivery of outputs. Outputs are important for all business, however only a small proportion are deemed to be highly significant to the firms, while almost 40% (n=38)
occur within the low and tenuous perceived significance bands. Just over half (51%) of the total linkages recorded by the firms in Kinsale are perceived to be of high or medium import to the firms. This is very different to the agrifood sector for which the majority of recorded linkages were perceived to be important. R&D (60%, n=3), training (41.7%, n=15) and industry association (24.2%, n=15) linkages have the highest proportion of links scored as tenuous to the firms.

<table>
<thead>
<tr>
<th>Category</th>
<th>GA</th>
<th>IA</th>
<th>IP</th>
<th>IN</th>
<th>OU</th>
<th>RD</th>
<th>SS</th>
<th>TN</th>
<th>Total %</th>
<th>Total (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>4.3%</td>
<td>14.5%</td>
<td>16.7%</td>
<td>4.0%</td>
<td>12.4%</td>
<td>-</td>
<td>21.7%</td>
<td>5.6%</td>
<td>10.9%</td>
<td>49</td>
</tr>
<tr>
<td>Medium</td>
<td>&gt; 20 to 30</td>
<td>43.5%</td>
<td>33.9%</td>
<td>35.7%</td>
<td>40.8%</td>
<td>48.5%</td>
<td>40%</td>
<td>35.9%</td>
<td>41.7%</td>
<td>40.4%</td>
</tr>
<tr>
<td>Low</td>
<td>&gt; 10 to 20</td>
<td>34.8%</td>
<td>27.4%</td>
<td>28.6%</td>
<td>45.6%</td>
<td>28.9%</td>
<td>-</td>
<td>43.3%</td>
<td>11.0%</td>
<td>33.8%</td>
</tr>
<tr>
<td>Tenuous</td>
<td>&gt; 0 to 10</td>
<td>17.4%</td>
<td>24.2%</td>
<td>19.0%</td>
<td>9.6%</td>
<td>10.2%</td>
<td>60%</td>
<td>-</td>
<td>41.7%</td>
<td>14.9%</td>
</tr>
<tr>
<td>Total (n)</td>
<td>23</td>
<td>62</td>
<td>42</td>
<td>125</td>
<td>97</td>
<td>5</td>
<td>60</td>
<td>36</td>
<td>450</td>
<td>450</td>
</tr>
</tbody>
</table>

Table 4.13: Perceived Significance by Linkage Category

Examination of the importance of business linkages according to the geographic scope across which they occur provides greater insight into the business environment for tourism firms in Kinsale. Table 4.14 displays the perceived significance of 294 local linkages, this is the most populous geographic scope for the Kinsale RFG. Specialist services (18.2%), industry peers (17.5%), industry associations (17%) and outputs (13.7%) have the highest proportion of linkages recorded within the high perceived significance band. It is important to qualify these results with the fact that 73% of specialist services (n=44), 95% of industry peers (n=40), 66% of industry associations (n=41) and 53% of outputs (n=51) are reported at local level. It is noteworthy that the majority of local output linkages to other tourism firms (69% n=16) are scored within the top two perceived significance bands, providing evidence of the cooperation and reliance amongst the tourism businesses within the destination. Industry peers also appear to be highly important to the RFG.
It is important to note that just over 50% of all linkages at local level are deemed to be of low importance to the firms, as they fall within the low and tenuous perceived significance bands. 68.8% of training linkages (n=11) and 50.5% of input linkages (n=50) fall within these categories. Input linkages identified as being of low importance to the RFG in Kinsale consisted mainly of suppliers of consumable goods which could be easily sourced elsewhere if necessary reflecting a wide availability of similar suppliers in the area for these firms.

<table>
<thead>
<tr>
<th>Category</th>
<th>GA</th>
<th>IA</th>
<th>IP</th>
<th>IN</th>
<th>OU</th>
<th>RD</th>
<th>SS</th>
<th>TN</th>
<th>Total %</th>
<th>Total (n)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>&gt; 30 to 40</td>
<td>9.1%</td>
<td>17.0%</td>
<td>17.5%</td>
<td>4.5%</td>
<td>13.7%</td>
<td>-</td>
<td>18.2%</td>
<td>-</td>
<td>11.6%</td>
</tr>
<tr>
<td>Medium</td>
<td>&gt; 20 to 30</td>
<td>45.5%</td>
<td>36.6%</td>
<td>32.5%</td>
<td>44.9%</td>
<td>37.3%</td>
<td>50%</td>
<td>31.8%</td>
<td>31.3%</td>
<td>38.0%</td>
</tr>
<tr>
<td>Low</td>
<td>&gt; 10 to 20</td>
<td>36.4%</td>
<td>24.4%</td>
<td>30.0%</td>
<td>39.3%</td>
<td>35.3%</td>
<td>-</td>
<td>50.0%</td>
<td>-</td>
<td>34.4%</td>
</tr>
<tr>
<td>Tenuous</td>
<td>&gt; 0 to 10</td>
<td>9.0%</td>
<td>22.0%</td>
<td>20.5%</td>
<td>11.3%</td>
<td>13.7%</td>
<td>50%</td>
<td>-</td>
<td>68.7%</td>
<td>16.0%</td>
</tr>
<tr>
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<td>89</td>
<td>51</td>
<td>2</td>
<td>44</td>
<td>16</td>
<td>294</td>
<td>294</td>
</tr>
</tbody>
</table>

Table 4.14: Perceived Significance by Linkage Category – Local Linkages

Table 4.15 presents the perceived significance of 124 national linkages recorded by the RFG. The table shows that almost 55% of the national linkages fall within the top two perceived significance bands. Specialist service linkages have the greatest proportion of linkages scored as highly important to the firms at 31% (n=4). Training linkages at national level are deemed to be more important that those a local level with 63% (n=12) appearing within the high and medium perceived significance bands. Those linkage categories with a higher proportion of national links perceived to be of low or tenuous importance to the firms include R&D at 66.7% (n=2), inputs at 61% (n=19), 60% of industry association (n=12) and 58% of government agencies (n=7). To show perspective 66% of R&D (n=3), 25% of inputs (n=31), 32% of industry association (n=20) and 52% of government agencies (n=12) linkages are recorded at the national level.
The perceived significance of 21 European linkages is displayed in Table 4.16, 47% of which are recorded to be of high or medium perceived significance. The majority of European connections are reported across value chain type linkages (inputs, specialist services and outputs). Interestingly, while there are only two specialist service linkages reported on a European scale they are from different tourism businesses in Kinsale to the same marketing consultancy firm in the United Kingdom. This may be an indication of knowledge transfer amongst the tourism firms and evidence of knowledge sharing. The European output linkages are links to tour operators, travel agents and distribution channels. While the output category has the greatest number of links appearing in the top two bands, only one business connection is deemed to be highly significant. European linkages under inputs, industry associations and training are deemed to be of low import to the firms in Kinsale.
The perceived significance for 11 international linkages is displayed in Table 4.17. The majority of linkages occurring at this geographic scope are output linkages except for one specialist service to a producer of guide books in the U.S.A. The international linkages for the RFG are deemed as important to the firms with 64% of them appearing in the high and medium perceived significance bands. Those output linkages that are deemed to be of low importance, consisted of linkages to independent travel agents and a sales intermediary. The majority of the international linkages were recorded by accommodation providers in Kinsale, with only three linkages reported by other tourism businesses.
Understanding the types of linkages which are developed and maintained across varying geographic scopes, and how important they are to firms, is very revealing with regard to the business environment for the tourism businesses in Kinsale. To get a more general view of the importance of connections across the various spatial scales, Table 4.18 reports the percentage of linkages reported in each of the perceived significance bands for each geographic scope. This allows a comparison of the overall perceived significance of linkages at each geographic scope. Local linkages account for just over 65% of the total business linkages recorded (n=294), of these 11.6% (n=34) are recorded as highly significant to the firms. This is a larger proportion than that for national, European and international scopes. A high proportion of business linkages on the national (55%, n=68) and international (63.6%, n=7) scales are deemed to be of high and medium importance to the firms. European linkages (47.4%, n=10) have the lowest share of linkages scored within the high and medium perceived significance band.

<table>
<thead>
<tr>
<th>Geographic Scope</th>
<th>L</th>
<th>N</th>
<th>EU</th>
<th>INT</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Significance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>&gt; 30 to 40</td>
<td>11.6%</td>
<td>9.7%</td>
<td>9.5%</td>
<td>9.1%</td>
</tr>
<tr>
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<td>45.2%</td>
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<td>54.5%</td>
</tr>
<tr>
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<td>30.6%</td>
<td>42.9%</td>
<td>36.4%</td>
</tr>
<tr>
<td>Tenuous</td>
<td>&gt; 0 to 10</td>
<td>16.0%</td>
<td>14.5%</td>
<td>9.5%</td>
<td>-</td>
</tr>
<tr>
<td>Percentage</td>
<td></td>
<td>65%</td>
<td>28%</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td>Total (n)</td>
<td></td>
<td>294</td>
<td>124</td>
<td>21</td>
<td>11</td>
</tr>
</tbody>
</table>

*Table 4.18: Perceived Significance of Linkages by Geographic Scope*
When considering the importance of linkages across the various geographic scales, it is interesting to examine the differences between the accommodation providers and the other tourism business in the RFG. Table 4.19 represents the perceived significance of linkages by geographic scope for the accommodation providers, while Table 4.20 represents those details for the other tourism businesses.

<table>
<thead>
<tr>
<th>Geographic Scope</th>
<th>L</th>
<th>N</th>
<th>EU</th>
<th>INT</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Significance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High &gt; 30 to 40</td>
<td>15.0%</td>
<td>12.9%</td>
<td>-</td>
<td>-</td>
<td>31</td>
</tr>
<tr>
<td>Medium &gt; 20 to 30</td>
<td>40.4%</td>
<td>47.1%</td>
<td>44.4%</td>
<td>50.0%</td>
<td>100</td>
</tr>
<tr>
<td>Low &gt; 10 to 20</td>
<td>25.3%</td>
<td>22.9%</td>
<td>33.4%</td>
<td>50.0%</td>
<td>60</td>
</tr>
<tr>
<td>Tenuous &gt; 0 to 10</td>
<td>19.3%</td>
<td>17.1%</td>
<td>22.2%</td>
<td>-</td>
<td>42</td>
</tr>
<tr>
<td>Percentage</td>
<td>62.7%</td>
<td>30.0%</td>
<td>3.9%</td>
<td>3.4%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Total (n)</td>
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<td>70</td>
<td>9</td>
<td>8</td>
<td>233</td>
</tr>
</tbody>
</table>

Table 4.19: Accommodation Providers; Perceived Significance of Linkages by Geographic Scope

The accommodation providers scored 56% (n=131) of all linkages in the top two perceived significance bands. Table 4.19 shows that the national linkages for accommodation providers are most important, as they have the greatest share of linkages recorded in the top two perceived significance bands (60%, n=42). This is followed by the local geographic scope with 55% (n=81) of local links perceived to be of high or medium import to those firms. The European business linkages show the highest percentage within the low and tenuous perceived significance bands at almost 56% (n=5).
The linkages for other tourism businesses are displayed in Table 4.20. The other tourism businesses perceive only 46% (n=100) of all linkages to be important to the firms. In terms of the geographic scales of linkages, in contrast to the accommodation providers the international linkages (100%) and European linkages (50%) for other tourism firms have the greatest percentage of linkages perceived to be of high and medium significance. This may be due to a lack of resources available to smaller enterprises to take advantage of networking opportunities therefore having to work harder to establish and maintain connections across greater distance.

For the other tourism businesses local linkages have the highest proportion of links within the low and tenuous bands at 56% (n=83).

<table>
<thead>
<tr>
<th>Geographic Scope</th>
<th>L</th>
<th>N</th>
<th>EU</th>
<th>INT</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Significance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>&gt; 30 to 40</td>
<td>8.1%</td>
<td>5.6%</td>
<td>16.7%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Medium</td>
<td>&gt; 20 to 30</td>
<td>35.8%</td>
<td>42.6%</td>
<td>33.3%</td>
<td>66.7%</td>
</tr>
<tr>
<td>Low</td>
<td>&gt; 10 to 20</td>
<td>43.3%</td>
<td>40.7%</td>
<td>50.0%</td>
<td>-</td>
</tr>
<tr>
<td>Tenuous</td>
<td>&gt; 0 to 10</td>
<td>12.8%</td>
<td>11.1%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Percentage</td>
<td>65.3%</td>
<td>27.6%</td>
<td>4.7%</td>
<td>2.4%</td>
<td>100.0%</td>
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<tr>
<td>Total (n)</td>
<td>148</td>
<td>54</td>
<td>12</td>
<td>3</td>
<td>217</td>
</tr>
</tbody>
</table>

Table 4.20: Other Tourism Service; Perceived Significance of Linkages by Geographic Scope

4.3.5 Key Connectors

Throughout the V-LINC analysis a number of key connectors for Kinsale firms were identified and these have been illustrated in Figure 4.10 and Table 4.21 illustrate the key connectors in the Kinsale tourism sector. They have been identified through the
number of linkages they have with respondent firms the types of linkages and their importance to respondents is also reported.

![Map of Ireland](image)

**Figure 4.10: Key Connectors Kinsale Tourism Sector**

<table>
<thead>
<tr>
<th>Key Connector</th>
<th>Fáilte Ireland</th>
<th>Kinsale Chamber of Tourism</th>
<th>Eli Lilly Group</th>
<th>Gleeson Group</th>
<th>Pallas Foods</th>
<th>Carlton Hotel</th>
<th>Old Head Golf Links</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>&gt;30 to 40</td>
<td>6%</td>
<td>6%</td>
<td>12.5%</td>
<td>-</td>
<td>-</td>
<td>14%</td>
</tr>
<tr>
<td>Medium</td>
<td>&gt;20 to 30</td>
<td>33%</td>
<td>25%</td>
<td>25%</td>
<td>75%</td>
<td>25%</td>
<td>14%</td>
</tr>
<tr>
<td>Low</td>
<td>&gt;10 to 20</td>
<td>22%</td>
<td>19%</td>
<td>37.5%</td>
<td>25%</td>
<td>50%</td>
<td>29%</td>
</tr>
<tr>
<td>Tenuous</td>
<td>&gt;0 to 10</td>
<td>39%</td>
<td>50%</td>
<td>25%</td>
<td>-</td>
<td>25%</td>
<td>57%</td>
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<td>8</td>
<td>8</td>
<td>8</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
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<td>16 IA</td>
<td>8 OU</td>
<td>8 IN</td>
<td>8 IN</td>
<td>5 IP, 2 OU</td>
<td>7 OU</td>
</tr>
</tbody>
</table>

**Table 4.21: Perceived Significance of Key Connectors within the Kinsale Tourism Sector**
In terms of the key connectors identified in the Kinsale tourism sector, there are strong linkages to government agencies, industry associations, inputs, outputs and industry peers. As a government agency, Fáilte Ireland was identified as a key connector. Fáilte Ireland, is the national tourism development agency, operating under the aegis of the Department of Transport Tourism and Sport. This agency is the most commonly cited organisation, with a total of eighteen linkages reported by the firms in the tourism sector in Kinsale. Fáilte Ireland was established to support the Irish tourism industry and work to maintain Ireland’s reputation as a high-quality, competitive tourism destination. They perform a number of roles within the tourism industry, predominantly the agency provides a variety of practical business supports to aid tourism businesses in managing and marketing their products and services. They commission and conduct much of the tourist traffic and tourism related research within Ireland. They operate a website aimed at the promotion of Ireland as a destination to the domestic market. Fáilte Ireland are also responsible for the regulation of the accommodation sector within tourism. Under the Tourist Traffic Acts 1939-2003, any business operating as a hotel, guesthouse, hostel, campsites, or self-catering holiday unit must register their property with Fáilte Ireland. The agency operates the classification system for hotels and guesthouses and they operate a number of other quality assurance schemes for other types of accommodation providers.

Regarding their importance to the sector, Fáilte Ireland is most often perceived as beneficial to respondent firms with 56% (n=10) of all linkages to the agency scored in the High and Medium bands. The agency has much higher perceived significance for respondent firms when the linkages relate to training. Of the seven training linkages which were reported, five of those are regarded as important to firms. In its regulatory capacity as a government agency however Fáilte Ireland does not score as highly, with 5 out of 7 of these linkages perceived to be of low importance to the firms. While Fáilte Ireland do provide a wide range of training supports for the tourism industry, the lack of trained professionals available for recruitment, especially chefs, was commonly cited by respondents as a major concern.

The industry association identified as a key connector for the respondents was the Kinsale Chamber of Tourism where all sixteen respondent firms had a connection to the organisation. The association was set-up to promote the town of Kinsale locally,
nationally and internationally, and they work with many other national bodies to do this. At the time of data collection, the Chamber of tourism in Kinsale was largely a voluntary organisation with a rotating chairperson, and very few dedicated resources. Only five of the linkages reported to the chamber appear in the High and Medium perceived significance bands, indicating that it is not highly regarded among firms in the RFG. Many of the respondents voiced their frustration with the Chamber of Tourism, as a cooperative organisation, it relied on input from all members, however some respondents believed that the work was left to the same people and other businesses engaged in free-riding behaviour resulted in resentment, mistrust and reluctance to make a long-term commitment to the strategic development of the destination. Others perceived the Chamber of tourism to focus solely on accommodation providers and restaurants rather than other tourism related businesses and therefore they perceived very little benefit from membership of the Chamber. Since the data collection, however, the Chamber has established a new funding mechanism. The organisation operates the Kinsale.ie website and charges a membership fee for businesses looking to join, ranging from €225 to €665 depending on the size of the organisation. The benefits which they promise in return for the membership fee are; greater visibility for business while driving referrals, raised profile through ‘regular marketing, PR and social media activity’, and promotion of Kinsale to national and international audiences through the ‘Wild Atlantic Way’ (Kinsale Chamber of Tourism and Business, 2020, p.1).

The other key connectors identified within the data consisted of two supplier companies. Pallas Foods are one of the leading food wholesalers who operate nationwide, while the Gleeson group are a leading drinks distributer in Ireland. Throughout the interviews it was mentioned that these suppliers were valuable not only in terms of their produce, but also as a reliable source of information in relation to emerging trends and new products. Another key connector was Eli Lilly, this was identified as eight of the respondent firms reported this company as an output connection. Eli Lilly is a multi-national pharmaceutical company based near Kinsale, the fact that this is commonly cited as an output for the firms, shows the impact which the firm has on the local economy.
The final two key connectors included the Old Head of Kinsale, which is a Golf Club located just outside Kinsale town. This club had a total of 7 linkages to firms within the RFG, each of which were reported as output links. The Carlton Hotel was another, with a total of seven linkages; five as an industry peer and two output links for the RFG. These output linkages provide further evidence of the relationships amongst the tourism firms in Kinsale, where referrals and recommendations between businesses are commonplace.

The lack of any other key connectors beyond common links with inputs and outputs, reflects the fragmented nature of the tourism industry in general. While there are various industry associations linked to various facets of the tourism industry (examples include: Irish Hotels Federation (IHF), Restaurants Association of Ireland (RAI), Vintners Federation of Ireland (VFI), Irish Tourist Industry Confederation (ITIC), the Irish Hospitality Institute (IHI), the Craft Council of Ireland (CCI)), there are no associations which are commonly cited by the firms within the RFG. This lack of common linkages indicates that of all these Key Connectors the Chamber of Tourism in Kinsale is currently the best placed association to perform the role of IFC should a cluster initiative be deemed appropriate.

4.3.6 Does a ‘Porterian Cluster’ exist for the tourism sector in Kinsale?

Using Porter’s (1990; 1998a; 1998b) competitive diamond model to consider the V-LINC data provides a greater understanding of the situation for firms in Kinsale. In relation to the factor conditions, Porter (1998a) maintains that the basic factors available within a location are more important for services that attract customers to them from elsewhere. Kinsale is a historic port town, designated as the beginning (or end) of the Wild Atlantic Way, it is in close proximity to award winning beaches, and the marina itself has previously been awarded the Blue Flag demonstrating a high environmental quality. The heritage of the harbour and the town mean that there are a number of interesting attractions for tourists who visit the area including; Charles Fort, an example of a 17th century star shaped fort and Desmond Castle. These are all
considered factor conditions, and they provide a unique selling point for the destination overall, and a valuable business proposition for the firms located there. It is also important to consider the input linkages maintained by the firms in Kinsale. As outlined previously the RFG recorded that 71.2% of inputs and 73.3% of specialist services were sourced locally, indicating that the necessary resources are readily available within the county boundaries. The majority of the input linkages reported by the firms related to consumable products, food and beverage inputs accounted for the greatest proportion at 53%. Kinsale as a destination relies on its gourmet reputation as a unique selling point, explaining the high proportion of linkages to food and beverage inputs.

Other vital inputs for the sector include tourism skills. As outlined by Nordin (2003) due to the fact that many tourism businesses are low technology, business knowledge resides in people. The characteristics of the tourism industry and the seasonal fluctuations of demand require the adoption of part-time jobs and seasonal contracts, which in turn result in high turnover levels in the industry in general. This movement of labour in the industry could provide a great advantage in terms of knowledge transfer amongst firms. The V-LINC methodology does not include human resources or skills amongst the eight linkage categories, and the input linkages recorded by the firms did not include access to skills. Nationally however the tourism industry is facing a skills shortage particularly in relation to culinary skills, which is a disadvantage for tourism firms. Currently, CIT provides education and training in tourism management, hospitality management, bar management, and hospitality skills, however only one link to CIT was recorded by the firms in Kinsale and this was in relation to R&D rather than training. No formal training linkages were recorded with either of the higher education institutes or the further education colleges in the locality.

Demand Factors are the second determinant within Porter’s competitive diamond, and on examination of the data from the tourism firms in Kinsale, it is clear that the majority of output linkages recorded are local and national (79%). While tourism is considered to be an export industry, the domestic tourism market is very important to the firms in Kinsale. The RFG include a diverse range of tourism services (restaurants, bars, retailers, tourism activity providers, and accommodation providers), combining
both traded and local industries. According to Porter (1998a) traded industries are more likely to export, while local industries cater predominantly to local demand and do not typically locate within clusters but are usually more dispersed throughout national economies. The traded industry, in this case the accommodation providers are most likely to export, while local industry (restaurants, bars and other tourism services) serve not only tourists but a high level of local demand. This is evident on examination of the output linkages by firm type when accommodation providers and other tourism services are considered separately. The results displayed in Figure 4.6 clearly show that the accommodation providers have a much smaller proportion of local output linkages when compared to the other tourism services. Accommodation providers rely on tourists travelling away from home who require their accommodation products, and as such they have less dependence on the local market and greater proportion of output linkages beyond the local scope than their counterparts (Figure 4.8). The domestic tourism market represents a strong market for destinations within Ireland, however any potential for future growth will come from international markets and therefore it is vital that tourism firms can access these markets.

Porter (1998b) discusses the benefit for firms of dealing with sophisticated local customers who force firms to upgrade and innovate in order to remain competitive; he argues that dominant distributors can have the same influence over firms. In recent years, the tourism industry has been disrupted by the emergence of a number of dominant distribution channels who offer comparative information for travellers looking to book. These distributors include Booking.com and Expedia. Interestingly amongst the tourism firms in Kinsale only one business recorded a link to either of these firms. Other output linkages included other tourism businesses in the area, which confirms that referral of business amongst the firms in Kinsale is commonplace.

The third determinant of Porter’s ‘diamond’ is related and supporting industry. Local business linkages are very important for the tourism businesses in Kinsale. From the V-LINC data it is clear that the tourism businesses rely on and work closely with a number of supporting industries. In terms of direct inputs, they have strong connections with businesses in the local food and beverage industry. Included within
this is the fishing industry which is hugely important to the Kinsale tourism sector. Businesses in Kinsale have been very proactive in terms of developing the town as a gourmet destination. As part of that they hold a number of different food focused festivals throughout the year, these include the Kinsale Gourmet festival, the All Ireland Chowder Cook-Off, and the Taste the Wild Atlantic Way street food festival. A number of industry association linkages were connections with the Good Food Circle in Kinsale. This association was established by restaurants within Kinsale, and they are the driving force behind many of these festivals to extend the tourist season from April and October. This would not be possible without the strong connections to the local food and fishing industries. The RFG also reported many strong linkages to digital marketing and web-based service providers, as well as financial institutions, craft and design industry, training agencies and local media within the specialist service linkages. Interestingly a large percentage of the input linkages (55.2%) and specialist service linkages (43.3%) were perceived to be of low importance to the RFG appearing in the low and tenuous perceived significance bands. This may be an indication that suppliers for the industry are in plentiful supply, switching costs are low and so the firms can easily switch suppliers in the event of price increases.

The fourth and final determinant of Porter’s diamond relates to firm structure, strategy and rivalry. The tourism sector in Kinsale is very diverse, with a wide range of varied tourism products. The town itself is small in size with a population of just over 5,000 people. For such a small location there is a concentration of tourism firms with over 50 restaurants and bed and breakfasts, five hotels, and more than 32 tourist attractions and activities, there is an intense rivalry for potential tourists in the area. In tourism destinations, there is an acceptance that while firms and operators work together to attract visitors to the destination, they then compete with each other for those visitors on the ground. The V-LINC data provides much evidence of cooperation and collaboration amongst the firms in the tourism sector. The Good Food Circle run and organise a number of festivals, some of which have already been mentioned, to attract visitors to the town. The Kinsale Chamber of Tourism and Business is another example of cooperation, this organisation focuses on marketing Kinsale as a destination across the globe. Other examples include an initiative by the hotels within Kinsale to establish the town as the wedding capital of Ireland. Collaboration occurs with the local sports clubs to organise events within the area such as the Kinsale
seven’s rugby tournament, and the Kinsale Regatta Festival. All of these demonstrate a willingness and ability of the firms to collaborate on projects and events for the good of the destination as a whole. Despite this evidence of cooperation, there is also a great deal of competitive rivalry amongst the firms in Kinsale. While respondents acknowledge the value in participating in these cooperative efforts, they also identified that some operators in the destination engaged in opportunistic free-riding behaviour, this leads to a great deal of frustration for firm and damages trust amongst those who want to work collectively.

Looking at the results of the V-LINC analysis it appears that while the basic factor conditions exist for Kinsale firms, there is little evidence of the development of those advanced factors required for competitive advantage. While the destination itself is a busy location for tourism, the V-LINC data provides little evidence to suggest that the demand faced by the RFG is sophisticated. A caveat to this however is that the lack of output linkages may relate to the method of recording these linkages for services rather than a lack of those linkages for firms and this will be discussed further in the next chapter. In terms of related and supporting industries the firms in Kinsale do not rely on world class suppliers, but rather have access to a variety of substitute suppliers and can change between suppliers very easily. In terms of other supporting industry common linkages exist between the RFG and food processing sector with many firms dealing directly with the food producers themselves, there are also many linkages to industry associations and industry peers meaning that those related and supporting industries very much exist for the tourism firms in Kinsale. The competitive rivalry and cooperation discussed previously, also acts as a driver of competitive advantage. Two of the determinants of competitive advantage are already at work. A number of policy recommendations will be presented in order to further support the growth and development of the sector in Kinsale.
4.3.7 Policy Recommendations

The tourism sector in Kinsale is vibrant, with many proactive entrepreneurs who have spent many years working towards the development of Kinsale as a destination. The V-LINC analysis shows much evidence of collaboration amongst the businesses located in Kinsale, however in terms of furthering the development of Kinsale as a destination brand, they face a great deal of challenges. Based on the historical policy supports which have been put in place for the tourism sector, along with the findings of the V-LINC analysis a number of suggested policy initiatives are made to aid the industry in facing those challenges and developing it further.

1. **Encourage and facilitate greater involvement in R&D linkages with academia, state agencies and firms.**

Competitiveness relies on the ability to innovate and continuously upgrade (Porter, 1990). In traditional manufacturing, firms engage in R&D to test new product ideas or modifications, often firms create links with academia whereby academia create knowledge which is then transferred to business to be further developed (Hjalager, 2002). According to Hjalager (2002) the tourism industry does not have a strong tradition in pursuing R&D, for a number of reasons. As a service industry there is little scope for the protection of intellectual property when new service ideas and products are easily observed by the competition. Firms who do innovate in this way are pressured to continuously upgrade as the advantage tends to be short term. Due to the structure of the industry dominated by small owner operated businesses, time to innovate and develop new products and services is limited amongst smaller firms. SME’s tend to only implement change when success is guaranteed or out of necessity. Access to capital is another challenge, rather than investing in machinery or land, many investments for tourism innovations involve investment in human capital or new technology which are not suitable as a security for investment. The V-LINC data clearly shows that the tourism firms in Kinsale are not focused on R&D, with only five R&D linkages recorded from all of the firms. Formal training linkages are also
the least frequently reported linkage category for the firms, both of these relate to formal connections through which knowledge transfer can occur, and this will directly impact the ability of firms to innovate.

There is an urgent need for the tourism industry to gain access to reliable and accurate data in order to incorporate this into their business planning. According to ITIC (2018, p84):

‘Currently the data available to Ireland’s tourism industry is far slower than it should be, examples include data on Ireland’s value for money perceptions and the regional spread of tourism which, although captured contemporaneously, tend not to be published and made available to the tourism industry until the following year. To a hotel, tourist attraction or activity-provider this means that as they price or plan for a busy summer they have often no choice but to use data from two summers previously.’

More importantly for innovation amongst tourism operators, tourism firms require access to forward looking data. The industry requires assistance from state agencies to access data which can provide insight into consumer behaviour, perceptions and consumption patterns if they are to be in a position to cater to changing demand from source markets. Access to data and information regarding emerging markets is also a priority for firms who wish to expand and innovate by tapping into new potential markets. This data on a national basis is essential for all tourism firms, however equally important is access to regional data.

State agencies in tourism and the CSO have historically recorded data based on county boundaries; only since 2017 Fáilte Ireland altered their reporting of statistics to fit the European regional sector as determined within the NUTS framework. More importantly however, access to data on a regional or local basis is impossible, as currently firms do not have access to this level of granularity. It is important for destinations to recognise their own performance in terms of visitor numbers, revenue, customer segments, and patterns of behaviour. For firms in Kinsale access to this type of data can facilitate greater strategic planning and measurement of performance in terms of any
cooperative events. With access to this type of data firms in Kinsale would be better placed to identify a shared vision and strategy for the town and a method of performance measurement also. While individual firms do not have the capacity for such data collection, collectively and in cooperation with higher education institutes and other agencies this is something that could be achieved.

2. Support and encourage networking amongst Destination
Management Organisations (DMO) to share best practice.

As part of the Irish Government’s tourism policy three key aims have been identified, broadly speaking these include growth of tourism revenue, growth in tourism employment and growth in tourists’ numbers by 2025 (DTTAS, 2019, p6). Any attempt to achieve growth in tourism will require support for the industry.

The V-LINC analysis of the Kinsale tourism firms identified many examples of collaborative projects and efforts, however many of the respondents voiced their concerns about the lack of an agreed strategic focus for the town as a destination. The tourism industry in Ireland consists of a large proportion of SME’s, where managers often multi-task in a range of functions and therefore have little free time for more strategic endeavours. This was commonly cited amongst the Kinsale RFG, while respondents were happy to become involved in key events and initiatives they were torn between the needs of their individual businesses and the effort required to progress the development and promotion of the destination. A destination management organisation with the appropriate resources would be better placed to oversee the development of an agreed strategy to develop the tourism destination. Through this organisation the firms in Kinsale could coordinate activities to ensure greater efficacy and ensure that the effort required to progress the destination is shared by all members rather than a few, thereby increasing trust and commitment from all member firms.

An organisation such as this is in a position to encourage firms in developing greater linkages with R&D, and disseminating relevant information and knowledge to
member firms. Common issues faced by the firms could also be addressed through a DMO such as this. For example, one of the most commonly cited specialist services required by the firms includes skills in marketing, digital marketing and advertising. Considering the pressure that firms face in trying to compete at destination level, knowledge and skills in marketing are essential for survival. Larger firms with a greater workforce are more likely to be in a position to hire these skills, however smaller operators are often times not in a position to justify the expense of a marketing professional. It is important to note that since the data collection period of this research, the Chamber of Tourism in Kinsale has begun to charge a membership fee to garner greater levels of commitment from firms and ensure access to capital for shared resources. While much of the money raised is used for shared marketing efforts funds can also be spend on additional training supports for firms.

Organisations such as the Kinsale Chamber of Tourism could be supported within their roles. Destination management organisations such as these play a similar role to cluster organisations in that they represent the SME’s and operators who are members. As such DMO’s across Ireland need support in being able to fulfil this role. Also, through these organisations it could be possible to encourage and facilitate greater linkages to other institutions such as HEI’s. As mentioned previously training linkages are the third least populous linkage category and in terms of the importance of these linkages, more than 50% are perceived to be of little import to the firms in Kinsale. An interesting finding from this analysis is that there are very few linkages to the higher education colleges in relation to training. The town of Kinsale is located a mere 30km away from Cork Institute of Technology, and 135km from Tralee IT, however the only two training linkages which were recorded to a higher education authority were to Waterford Institute of Technology which is located further away (146km). Another important consideration is the national tourism development agency, Fáilte Ireland is identified by 7 firms as a training linkage. On closer examination linkages to Fáilte Ireland are predominantly reported by larger hospitality firms, (hotels and food and beverage). A tourism service provider reports only one link to Fáilte Ireland and the linkage is perceived to be tenuous. Due to the fragmented nature of the tourism industry different businesses have very different needs in terms of training requirements, this suggests that greater collaboration between higher education and
industry could allow for more tailored training delivered in a number of ways which may be more accessible to sole traders in the industry.

As discussed previously due to the low technological nature of the tourism industry, much of the knowledge resides in the staff and people involved in the industry, while developing skills is one challenge, retaining those skills is another, and the tourism industry According to ITIC (2018, p115):

‘While much effort is required in the development of talent, management of existing talent within the sector is of equal, if not greater importance. Generally, there are significant costs associated with recruitment and loss of good employees results in a loss of experience.’

The tourism industry has long experienced high turnover rates due to seasonal fluctuations and the use of part time contracts, however retention of skills is vital to firms who wish to innovate and upgrade, and dealing with high rates of turnover ultimately impacts productivity of firms. Greater supports are required if talent is to be retained within the tourism industry. Further training for firms in the human resource management area is essential so that employers can identify suitable remuneration packages, career development paths and the tool necessary to retain their talent.

Ensuring that destination management organisations engage in networking events and build links with each other to share best practice would encourage knowledge transfer between these organisations. This in turn would help to build awareness of other initiatives being developed at destination level, not only in Ireland but in other locations on an international scale. Exposing DMO’s to new ideas would help them to encourage and facilitate member firms in developing new connections beyond the destination, thereby avoiding cognitive lock in. Destinations within Ireland could also engage in collaborative efforts for example destination towns along the touring route of the Wild Atlantic Way could collaborate on the delivery of new packages aimed at tourists travelling the route. Exposing the SME’s to connections outside of the local area could greatly enhance knowledge transfer and increase innovation activity, and this would be easier to achieve through a DMO such as the Kinsale Chamber of Tourism.
4.3.8 Conclusions

It is clear from the research that some of the forces of Porter’s (1990; 1998a; 1998b) Competitive Diamond are present in the ecosystems for both the agri-food sector in west Cork and the tourism firms in Kinsale. Through analysis of the data collected a number of key findings have been identified, and these will be outlined in the next chapter.
5 Findings

5.1 Introduction

The previous chapter presented the results of the V-LINC analysis for both the agrifood and tourism sectors in west Cork. While there is evidence to show that some of Porter’s (1998a; 1998b) determinants exist for both sectors, in terms of cluster development a one size fits all approach would not be effective. To adopt a cluster strategy for either of these sectors would take much consideration, planning and ultimately have a number of implications for policy-makers. The suitability of a cluster approach for each sector will be discussed here. The limitations of the research are outlined and recommendations for further research studies are put forward.

5.2 Using a cluster approach to develop agri-food in Ireland

The bottom up analysis gained through the V-LINC methodology facilitates a deeper understanding of the current eco-system for firms within the dairy specialisation. The data presented in the previous chapter provides evidence that the four determinants of competitive advantage identified by Porter (1990; 1998a; 1998b) exist in the west Cork region. Cluster theory explicitly states that clusters should not be created by policy-makers, but rather driven by industry and based on advantages developed within the region. The analysis of the data allows for the identification of cluster specific characteristics. The west Cork dairy specialisation will be considered in relation to these characteristics in order to determine the suitability of a cluster approach to this sector.

The first characteristic is geographic concentration, the firms within the respondent firm group were all located in west Cork, with the exception of one firm located in Cork central so they are geographically proximate to each other. While cluster theory does not provide a means of delimiting cluster boundaries, Porter (1998b) suggests that the identification of cluster boundaries requires an understanding of the important
linkages and connections amongst cluster participants. The visualisations for the RFG in terms of the local and national geographic scales shown in Figure 5.1 clearly show that the firms in west Cork are heavily reliant on linkages to Dublin which accounts for 60% (n=108) of all national linkages for the RFG. It is not merely Dublin however, important linkages for the RFG occur across the national scope including in counties Waterford, Wicklow, Meath, Tipperary, Limerick and Clare to name a few. Considering the types of linkages across the national scope it is noteworthy that 25% (n=11) of all industry peer linkages occur nationally, 28% (n=15) of industry associations linkages occur across the national scope while 20% of all specialist services recorded occur nationally and three linkage categories are of high importance to the RFG. The theory is clear that a cluster should incorporate these strong business linkages, and therefore any attempt to establish a cluster for the dairy specialisation in Cork would have to encompass those national linkages. This would require a cluster boundary to incorporate both the Munster and Leinster regions. It may be beneficial to delimit the cluster using the NUTS 2 level classification of the Southern Region as this would not only incorporate the important linkages for the firms, but it would allow for comparison of competitive regions across the Eurozone as data and statistics are more widely available at this level of aggregation.

![Figure 5.1: Local and National Linkages for the West Cork Dairy RFG](image)

Specialisation is another characteristic relating to the transfer of knowledge and collaboration amongst member firms. While the firms within the RFG were all involved in the dairy specialisation the data shows a number of linkages to other
agrifood sectors including the beef sector, prepared foods, edible horticulture and cereals, poultry and live animals. A characteristic of the Irish agrifood sector is that a large number of producers are SME’s, regardless of the subsector these smaller firms face common issues in relation to research and developing new products, scaling up, accessing new markets, developing distribution channels and accessing resources. Consideration would need to be given to whether a cluster initiative would focus solely on the dairy specialisation or should it incorporate other subsectors of agrifood to ensure more efficient use of resources and to provide broader range of supports to a greater number of indigenous businesses.

The variety of cluster actors is also an important characteristic and many institutions, associations and agencies have already been identified within the previous chapters. For example, supportive linkages with government and regulatory agencies such as FSAI, Bord Bia, formal knowledge transfers with Academia through the various higher education institutes, linkages to specialised research facilities including Teagasc and the DTPC and informal knowledge transfer and supportive linkages with industry associations such as the West Cork Development Partnership.

The dynamics amongst members which involve both cooperation and competition is another key characteristic of clusters. Many examples of the RFG involvement in collaborative projects have already been discussed. However, amongst the west Cork dairy firms, while they are perceived as important formal knowledge linkages identified through training, R&D connections are least frequently reported. Those formal knowledge linkages which do exist happen predominantly on the local and national scale with only 30% of R&D and 5.6% of training linkages occurring outside of Ireland. Bathelt et al. (2004), discuss the significance of those local connections but also outline the importance of developing strong connections to businesses outside the cluster boundaries in what they term global pipelines. Establishing connections beyond the cluster boundary and the national scope will expose firms to ideas, research, knowledge and capabilities internationally and lead to greater knowledge transfer and the avoidance of cognitive lock-in. The lack of these formal linkages for firms in west Cork is something that a cluster organisation and cluster initiatives could address.
As outlined in chapter two critical mass refers to the number of cluster members and the resources available within the cluster itself. This is an important feature as it is argued that the greater the number of actors involved the more positive the cluster dynamics which leads to greater benefits for all members (Rosenfeld, 1997; Fornahl and Menzel, 2003; Anderson et al., 2004, INNO, 2010; Szanyi et al., 2010). While many recognise that this is an important feature of clusters, there is no agreed level of acceptable mass, or a means to determine at what point an acceptable number of members and resources has been achieved. This analysis has focused on data from a sample of eleven firms, and while the recommendations put forward here are applicable to all SME’s operating in the dairy specialisation in west Cork, much work and effort would be required to engage with industry in order to determine the level of acceptance and willingness of firms to participate in a cluster initiative. Policy should not be used to create a cluster, but rather to support a group of proactive motivated cluster members in achieving their common goals (Porter, 1998b). In relation to the dairy sector, it is important to consider the cooperatives that already engage with large numbers of members and provide a number of benefits and services as part of their function. Should a cluster be developed, in order to ensure maximum participation, it would be vital to engage with all stakeholders to identify the specific requirements of an industry, the potential benefits of a cluster to the individual firms and to determine the strategic goals which would be achieved through the initiative.

Innovation is perhaps the most crucial characteristic for an agrifood cluster in Ireland, as it is through innovation that the growth required to meet the strategic goals of ‘Food Wise 2025’ will be achieved (DAFM, 2015). Many of the west Cork firms included in the RFG were established by dairy farmers who wanted to diversify, providing evidence of the entrepreneurial spirit which exists among producers in the region. Examples of innovative activity include researching product ideas shared while working at a farmers’ market, or investing heavily in new product development for a new export market. As stated previously the firms in west Cork invest in R&D, and they value these linkages, but may need supports to increase their research connections not only locally but to international clusters in agrifood. Cross sectoral activity among firms can also spur innovative activity, collaboration between an agrifood cluster and an energy cluster, or engineering cluster could provide great opportunity for innovation among member firms. All of this could be supported by the development
of a cluster organisation to encourage and facilitate these types of activities for member firms and to represent their needs.

The evidence from this research suggests that a cluster approach would be suitable for the future development of the agrifood sector in Ireland. Evidence of the competitive determinants along with some of the characteristics of clusters suggest that the firms are proactive and operating in a competitive environment. Using a cluster framework would result in more targeted initiatives with greater benefit for the firms and should have a deeper impact on the regional economy.

However, it is recommended that further discussion is required on how this cluster approach should occur. Such as the industry specialisations that should be involved, the geographic boundaries would need to be agreed. Another key consideration for the use of establishing a cluster organisation relates to the long-term funding model for such an organisation. In other European regions public financing is made available for supporting a cluster organisation in its foundation and first 2-3 years of existence (ECO, 2013; Byrne, 2016). Longer term a cluster organisation has to move towards a model of self-financing or a mixture of public and private financing through the provision of activities and services to members. The Council of European Bioregions (2014 p.1) note that:

‘Cluster managers are under increased pressure to generate revenue away from the regional government purse. This brings many challenges, particularly where there is a not a critical mass of companies. Moving from 100% public funding requires significant planning to maintain core cluster services and avoid competition with commercial providers within the community.’

To make such decisions further research on the other sub-sectors within agri-food would be an excellent first step; this could be continued with a process of consultation with key stakeholders and firms in the region to input their needs.
5.3 Using a Cluster approach to develop tourism in Kinsale

The V-LINC data shows that the tourism firms operate in a highly competitive environment, with the advantage of a number of basic factor conditions. While intense rivalry exists, many businesses are more than willing to cooperate on collective projects. Similarly, to the agrifood findings, the tourism findings will be discussed in relation to the characteristics of clusters in order to determine the suitability for a cluster approach to tourism development.

The firms in the tourism sample are all located in Kinsale town, Figure 5.2 displays the local and national linkages of the tourism RFG in Kinsale. Local linkages for the firms are the most populous with 65% of all linkages occurring within County Cork. It is clear that the tourism firms’ local linkages are more highly concentrated between Kinsale town and Cork City, as opposed to having a wider regional spread.

![Local and National Linkages](image)

*Figure 5.2: Tourism RFG Local and National Linkages*

It is important to note that 95% (n=40) of industry peer linkages and 66% (n=41) of industry associations are reported at local level. The local scale is very important for the Kinsale firms. In terms of the potential for a cluster approach to developing the sector further, it is important to consider where the important linkages occur for the Kinsale firms. Based on the data from the RFG in almost 50% of the national linkages are perceived as highly important to the firms particularly specialist service and training linkages. The national map shown in Figure 5.2 clearly demonstrates the Kinsale firms’ reliance on Dublin connections accounting for 71% (n=89) of all
national linkages with almost 50% of these scoring in the top two perceived significance bands. Any attempt to create a cluster for tourism should include these important linkages. While the cluster approach to tourism seems synonymous with the development of destinations, a cluster with too narrow a focus may risk experiencing issues of group think, whereby the creativity of the collective group is stifled. According to Porter (1998a, p.17) ‘if companies in a cluster are too inward looking, the whole cluster suffers from a collective inertia, making it harder for individual companies to embrace new ideas, much less perceive the need for radical innovation.’

As mentioned previously the tourism sector is a highly fragmented sector incorporating numerous subsectors and industries (transportation, aviation, hospitality services, visitor attractions, heritage sites, travel agencies, tour operators, leisure activities, entertainment services, events). The respondent firm group for the Kinsale tourism sector included accommodation providers, visitor attractions and activities, retail and restaurants. Porter (1998b) distinguished between traded and local industry and argued that because traded industries cater to markets beyond their location they faced greater competition, tended to have higher wages and engage in innovation activity more often than local industries who had lower skill requirements and tend to pay lower wages and focus predominantly on local demand. From the V-LINC data it is clear that in terms of the European linkages, just three links were recorded by the firms which Porter refers to as local industry (Retail and Restaurants) and these linkages were perceived to be of low importance to those firms. Of the international linkages just two links were reported by local industry. This is consistent with Porter’s (1998b) argument that local industries tend to focus predominantly on service local markets and therefore should not be included in clusters.

If a cluster approach were to be adopted for the development of the tourism sector there are a number of key considerations relating to the industry specialisations that should be included. The town of Kinsale has tried to position itself as the Gourmet Capital of Ireland, any attempt to develop the sector based on that premise must include the restaurant sector. Fáilte Ireland has also devised the ‘Food and Drink strategy 2018-2023’ to focus on the development of Ireland not only as a producer of high-quality foods but also a destination of authentic cuisine. To achieve the goals set out in this strategy would be impossible without the involvement and commitment of the food and beverage industry. The inclusion of these sectors in a cluster would
directly impact the measurement of performance, for example if an increase in innovation activity were a strategic outcome of a cluster initiative, including sectors who are known to have little engagement in innovative activity, or who have a higher tendency to engage in incremental innovation which is harder to detect (Nordin, 2003; Hjalager, 2002) will directly impact the success of such an initiative and its ability to meet that outcome. The strategic aims of a cluster initiative would need to be identified in consultation with member firms and appropriate measures for determining the success of such an initiative would need to be carefully considered.

The variety of cluster actors is also important for successful dynamics which drive innovative behaviour. The tourism firms reported a total of 450 linkages, almost 64% of those linkages comprised those value chain linkages (inputs, specialist services and outputs). Other industries linkages included to government support agencies such as the County Council, Fáilte Ireland, Cork Convention Bureau, Tourism Ireland. Industry association linkages to organisations such as the Kinsale Chamber of Tourism, the Kinsale Good Food Circle, South Cork Enterprise Board, West Cork Development Partnership, IHF. The industry peers recorded by the RFG were predominantly other tourism related businesses located in Kinsale with only two of these linkages occurring beyond the local scale. As discussed earlier there were very few linkages with academia and this is something that would have to be addressed in order to try to increase innovative activity and knowledge transfer.

The dynamics amongst Kinsale firms should also be examined. The data presented in chapter four shows evidence of cooperation and competition amongst the Kinsale firms, with recommendations to competitors happening frequently. An important finding however is the lack of formal knowledge linkages, as discussed R&D linkages were the least frequently reported by the firms, training linkages were the sixth most populous linkage category. While this may be as a result of a lack of resources and management time, it may also be indicative of a lack of access to these linkages, and a failure to recognise the importance of these formal knowledge linkages for new knowledge and innovation. The lack of linkages to industry peers beyond the local scale is also an interesting finding with only 2 industry peer linkages occurring on a national level while no industry linkages were recorded outside Ireland. While Granovetter (1985) identified the importance of weak ties within a social network for the diffusion of information, Bathelt et al (2004) identified the need to develop global
pipelines business connections to industry peers, international suppliers and others, that can inform cluster members of developments and international best practice. The linkages recorded by the RFG in Kinsale were predominantly focused within Ireland while a mere 7% (n=32) of business connections were recorded to firms outside of Ireland. Even more telling is the fact that only two of these linkages were not value chain linkages, one training linkage and one industry association linkage were the only knowledge transfer linkages recorded outside of Ireland and they were both reported by the same firm. Bathelt et al (2004) suggested that these global pipelines were important to ensure that clusters and networks avoid cognitive ‘lock-in’. An issue raised by some of the respondents during the data collection was frustration with the same ideas being put forward by the same people during collective meetings for the destination. If a cluster approach was to be adopted for the development of the tourism sector, building networks to other operators and other destinations who deal with the same markets, and the same resources would be greatly beneficial to the firms in sharing and creating new knowledge and this may lead to greater innovation or new product development.

The respondent firm group for the tourism sector in Kinsale included sixteen tourism related businesses across a range of subsectors. Critical mass, as discussed previously is a key feature of clusters, as it will impact the dynamics and ability to gain the benefits associated with clusters. Kinsale is home to a large number of tourism firms (the sample frame identified seventy-nine tourism related firms in Kinsale) however very few were willing to participate in this research. A common feeling amongst the respondents was that many firms in the town were solely focused on their own business and did not have the resources or inclination to engage with collaborative initiatives. As the competitive rivalry amongst the Kinsale firms is high issues around opportunistic or free-riding behaviour, which were raised as a concern by respondents, can damage the connections and social capital in the region (Hjalager, 2002). If a cluster approach was to be adopted, a great deal of work and industry engagement would need to be carried out in order to persuade business owners of the potential benefits to be gained from participating in such an initiative.
The final characteristic to be examined is innovation. As discussed previously formal knowledge linkages are not common amongst the RFG in Kinsale, and neither are they deemed to be very important. Innovation relies on the ability to create new knowledge and apply new knowledge within a business in order to generate value. Innovation in the tourism sector has received very little attention in research, however Nordin (2003) suggests that innovation in the tourism industry occurs less frequently than in manufacturing and it often involves process or organisational innovations or the adoption of new technologies which are harder to detect than new product developments. Due to the fact that increased innovation is one of the key benefits of industry clusters, oftentimes the performance or success of clusters is measured by the level of innovative activity usually by using patent data. The nature of innovation in tourism however is that any advantage gained is often short lived because new service processes and procedures cannot be patented and are therefore easily emulated (Hjalager, 2002; Nordin, 2003). An inability to record the innovative practices of firms would limit the ability to use this measure to assess the performance of a cluster approach and therefore alternative measures would be required. The three main issues identified here are the drawing of cluster boundaries considering that many of the support linkages exist within Dublin, the issue of specialisation and determining what industry subsectors should or should not be included and how this would impact performance measurement of such an initiative. Thirdly the expectation for increase innovations in a sector in which this type of activity is less frequent and usually results in a process change as opposed to new product development.

While there is evidence of cluster characteristics and the competitive diamond at work amongst the tourism firms in Kinsale, to address some of the implications of a cluster approach for the tourism sector it might be more appropriate to consider establishing a cluster at a much greater scale of aggregation. As mentioned previously the tourism industry is highly competitive and creating a cluster with such a narrow focus may result in the exclusion of important linkages over a greater geographic distance. If a cluster initiative was established based on the tourism sector located along the Wild Atlantic Way for example, and destinations involved within that cluster initiative had to compete to access resources made available through such an initiative it would help to focus the RFG in Kinsale to compete against other destinations as opposed to
competing internally. Sharing a common goal of gaining access to resources through such an initiative would aid firms in building social capital and trust (Nordin, 2003; Sölvell et al, 2003). An initiative with a broader geographic focus would also expose the Kinsale firms to activities occurring outside the local area, and encourage them to develop new business connections which would increase the likelihood of knowledge transfers. The theory is clear that knowledge transfer leads to greater levels of innovation. Successful clusters are driven by industry, this requires commitment from business owners and operators to be involved in such initiatives. Consultation with industry would be vital in order to determine whether or not firms could commit to such an initiative and to establish the common goals, if this were to be developed.

In addition to these findings regarding the suitability of a cluster approach for the agrifood and tourism sectors, other findings emerged regarding the use of the V-LINC methodology for services and these will be discussed next.

5.4 The V-LINC methodology for services

While the key findings in relation to the agrifood and tourism sectors in west Cork and Kinsale have been discussed, a number of other findings in relation to the V-LINC methodology were identified in the study. A number of studies have applied the V-LINC methodology to manufacturing industries, however this study was the first application of the V-LINC methodology to a service sector. Manufacturing and services are very different and have a number of different characteristics. Services are more complex in that they produce both tangible and intangible goods, they are inseparable meaning that consumption of the service happens simultaneously to production and for tourism as an export service industry the tourists are required to travel to the site location rather than exports in the traditional sense of manufacturing. Due to the uniform application of the V-LINC methodology there was little flexibility to adjust the data collection when dealing with the unique characteristics of services. Therefore, this influenced the number of output linkages recorded by the firms as well as the visualisation of the economic footprint of the tourism firms in Kinsale.

When the manufacturing firms recorded output linkages the identification of key customers and distribution channels was straightforward, and this provided the
required information to create the visualisations of linkages to all relevant markets. However, for the tourism firms this was more complex. Rather than distributing their services to wholesalers and retailers they often sell direct to the consumer, and many encourage direct bookings by offering incentives to the guests to book directly with the company thereby limited the cost of commissions. Using the V-LINC methodology it would not be practical or legal to record linkages to individual guests. Therefore, in order to report outputs, the tourism firms recorded links which they had with local companies with whom they have a steady stream of business (50%), tour operators, travel agents and destination management companies (39%). Local festivals and events (11%) in which participant firms are involved were also recorded as outputs, due to the exposure they provide by raising awareness of Kinsale as a destination and also generating a great deal of tourism traffic to the area. These links to distribution channels, intermediaries and events does not reflect the true market reach of the tourism RFG in Kinsale. For example, a hotel who distributes their product through an on-line travel agent, gains customers through this agent from across the globe, however for the purposes of the V-LINC analysis can only provide details of the individual travel agent, this implies that the level of outputs for the tourism sector is underrepresented due to the method of analysis.

While the V-LINC analysis recorded that only 7% of output linkages occur on a European and international scale, this does not give any indication of the volume of visitors which are gained from these linkages. Business linkages are a representation of B2B connections. While we can determine how significant these links are to the firms who engage in them, unfortunately the analysis provides little by way of detail into the performance or productivity of that connection. It would be natural to assume that due to the lack of international linkages for the RFG, that those linkages which firms do engage in on an international scale would be significant to the firms. This is indeed the case with all of the international output linkages scored within the top two perceived significance bands.

A much greater volume of international and European output linkages would be expected for an export industry such as tourism. In order to overcome this issue of recording output linkages in the future, the suggestion would be to record linkages to markets under respective distribution channels. For example, in terms of direct bookings for a hotel, the hotel would be in a position to identify the link as a direct
booking but to enter an address to the market which it attracts such as Direct Bookings - Germany, Direct Bookings - Britain Direct Bookings-USA and repeat this for each of the distribution channels adopted. Accommodation providers and tourist attractions have access to the nationality data as part of their reporting requirements for Fáilte Ireland hotels and attractions create nationality data and supply it to Fáilte Ireland on a regular basis.

Another consideration in terms of the methodology is including access to skills as a key input for tourism firms, as labour is considered to be the greatest cost for tourism firms, and therefore in traditional performance measurement systems for tourism firms labour is considered in terms of a manager’s ability to maintain a low cost. Access to labour should be recorded amongst the inputs or specialist services linkages in the cases where businesses employ the services of an agency. Recording linkage data around the movement of labour and skills would also highlight the potential for knowledge transfer amongst tourism organisations as a characteristic of the tourism industry is that knowledge is held in people as opposed to technology.

5.5 Limitations of the research

There are a number of limitations to this study which must be addressed. The methodology was chosen as it was deemed to be the most appropriate means for gaining the bottom-up analysis required to understand the operating environment for the firms involved. The data collection process requires an interview to record all business linkages data, and as such this interview requires a commitment of management time. Both sectors under study for this research are dominated by the presence of SME’s and as such management time is a precious resource. This influenced managers willingness to participate in the study and as outlined in Chapter 3 the response rates for the research interviews were low with a response rate of 17.7% for the agrifood sector and 20% for the tourism sector. As a result of this while they do identify issues and conditions common for many firms in each sector the samples discussed here are not representative of the sectors as a whole and therefore the results cannot be generalised.
The lack of experience of the researcher is also a limiting factor, in terms of familiarity with the methodology and the interview process. In order to overcome this however the researcher spent time shadowing the creators of the methodology Hobbs (2010) and Byrne (2016) to gain familiarity with the interview process, and the ability to record the data efficiently and accurately.

The interview process identifies the linkages that exist, and the importance of those linkages at a point in time. For that reason, it is considered to be a static study offering an understanding of the ecosystem at one time. Despite this, the V-LINC methodology is an efficient method for conducting a bottom up analysis of the important linkages which firms engage in, and could provide a very useful tool to revisit clusters and measure changes in the linkage data to identify whether supports or cluster activities have had the desired impact.

As discussed, in the previous section, prior to this study the V-LINC methodology had not been applied to a service industry. The findings suggest in order to improve the quality of the data for the tourism sector, the methodology should be altered slightly to record market information specific to distribution channels, and independent travellers. As skills are a vital input for the tourism industry, ensuring that skill-based linkages are included in the input and specialist service categories will enable researchers in the future to identify from where and how tourism firms access their skills which would also be a strong indicator of knowledge transfer for this sector.

5.6 Areas of further study

This investigative study provides an understanding of the environment for the firms in Kinsale tourism sector and the agrifood sector in west Cork and while a cluster approach may be suitable for the future development of these sectors and align with current policy there is a need for further research. An econometric analysis of the sectors would be beneficial to support and measure the current performance of those sectors in terms of employment concentrations and this may also aid in the formalisation of cluster boundaries. An evaluation of the current performance would serve as a benchmark to determine the impact of any cluster initiatives established in the future.
In terms of the tourism industry in Ireland, it is clear that the current methods for recording performance and providing statistical information are lacking. For example, there is a two-year time lag for tourism firms who wish to access tourism statistics, and Fáilte Ireland (2019) often use estimates when reporting tourism trends and statistics. If the Irish government are to support the Irish tourism industry it is vital that they determine the real economic contribution of this industry by identifying its true contribution through the use of more accurate and regular statistical information from the state agencies. This is an area of vital importance and one worthy of further research to identify how the national tourism statistics could be improved.

As identified in this study, the tourism industry while it actively innovates, it often does so through incremental methods or the application of new technologies developed elsewhere for process improvements. Typically, in clusters innovation activity is measured through the use of patent data, however the nature of innovation in tourism means that this would not identify innovation activity amongst tourism firms, therefore further research into how this could be better measured would be valuable.

5.7 Policy implications

From this research it is clear that a cluster approach would be a valuable framework to adopt for the provision of supports for indigenous industry that benefit Irish indigenous firms rather than the delivery of nationally targeted policies which prioritise MNC’s.

The policy targets set for both the agrifood and tourism sectors in Ireland are ambitious and both industries require support if they are to be achieved. Through cluster approaches policy-makers could encourage collaborations between tourism and the indigenous food industry, while the Irish food offering may be attractive to new markets, the tourism industry could aid agrifood in building brand awareness for sustainable Irish food products.

It is important for the Irish government to address the lack of a coherent cluster policy, as these economic phenomena are emerging across the nation.
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Appendices
Appendix A – Cover Letter for V-LINC Analysis Invitation

Dear Ms Walsh,

Your company has been identified by the (local partner organisation) as being a critical contributor to the (industry) sector in (region) and is cordially invited to participate in a research study focused on understanding the cluster ecosystem.

This analysis will inform regional and national policy, and highlight areas where the (local partner organisation) can further support the cluster. The analysis will investigate the linkages key firms within the sector have with suppliers, customers and also supporting cluster-type linkages with industry associations, universities, government agencies and suppliers of specialist services through a structured 1 to 1.5 hour interview.

The study will examine how to strengthen collaborative relationships, co-operation and supporting services to create a more competitive and innovative (industry) Cluster in (region). I would be delighted to meet with you, at your convenience to perform the analysis.

Attached is a further explanation of the V-LINC software, which specifies what is involved in the interview and the benefits of participating for your firm. Selected firms will benefit from participating by receiving a V-LINC firm report which audits your firm’s linkages and benchmarks your firm with other participants in the (industry) Cluster in (region).

I look forward to hearing from you.

With kind regards,
Brigid Walsh Postgraduate
Department of Management & Enterprise, Bishopstown, Cork, Ireland.
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E: brigid.walsh@cit.ie W: www.cit.ie
APPENDIX B
Visualisation of Linkages in Networked Clusters

V-LINC is an interactive software which maps, visualises and analyses complex cluster linkages which has been developed by the Cork Institute of Technology (CIT).

The programme facilitates the measurement and benchmarking of relationships across geographic areas, ranging from local to international; such information is of great value to firms and policy makers. V-LINC aids the understanding and visualisation of cluster ecosystems through measuring the business value of linkages between organisations from their perspective. It’s functionality also supports the development of new collaborative activities and matchmaking across enterprises and territories.

Firms Linkages are assigned to one of eight categories below:

Figure 1: V-LINCs eight linkage

V-LINC maps give a visual representation of the relative reliance on Local, National, European or International linkages of a company, and when combined, of a cluster.

Firm Linkages Analysis

CIT research personnel would visit your organisation for a period of 1 – 1.5 hours. The assessment works best if we have access to staff who have a good knowledge of the linkages your firm engages in (Figure 1). For SMEs this may be the founder or CEO. For larger firms this would involve interviews with senior personnel in functions such as; operations, logistics, purchasing, sales, HR and general management.

If your company would be interested in being part of this research and benefiting from its results I would be delighted if you could contact me so that we can discuss this further.

Brigid Walsh, Dept of Management & Enterprise
European Projects Research,

Office: 00353 21 4335149
Email: brigid.walsh@cit.ie

<table>
<thead>
<tr>
<th>High</th>
<th>Medium</th>
<th>Low</th>
<th>Tenuous</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;30 to 40</td>
<td>&gt;20 to 30</td>
<td>&gt;10 to 20</td>
<td>&gt;1 to 10</td>
</tr>
</tbody>
</table>
Benefits to firms who engage in V-LINC analysis: Audit & Benchmarking

Firms who engage in the V-LINC analysis receive a PDF report which benchmarks their firm using the V-LINC analysis software with others within the Agri-Food sector in West Cork.

The report is broken into 3 sections.

Section A: Visualises your firm’s linkages. Mapping the global, EU, national and local footprint of your firm.

Section B: Provides an audit of your firm’s linkages, showing your most and least significant relationships, the nature of them and where they occur.

Section C: Benchmarks firms in terms of the number of linkages and strengths of linkages they operate when compared to other participants in the Agri-Food sector in West Cork.

The data collected using V-LINC will allow CIT and the West Cork Development Partnership to inform policy for the Agri-Food sector in West Cork, through a more accurate understanding of the linkages which underpin the demand and supply side of the sector.

Confidentiality:

The specific linkages your company reports will remain entirely confidential. The data will only be viewed by the researchers conducting the interviews. It will not be released publicly and any information collected during the interviews will be used only with the approval of your company.

If your company would be interested in being part of this research and benefiting from its results I would be delighted if you could contact me so that we can discuss this further.

Brigid Walsh, Dept of Management & Enterprise European Projects Research, Office: 00353 21 4335149 Email: brigid.walsh@cit.ie
**Linkage Categories Description**

- **Government Agency linkages:** are comprised of all forms of linkages to government departments and agencies including state support for enterprise. Regional authorities and local agencies such as city or county councils are also included.

- **Industry Association linkages:** includes all memberships and relationships with organisations for collaboration, such as industry association groups, chambers of commerce and cluster organisations.

- **Industry Peer linkages:** are defined as formal and informal relationships with companies: in similar or related industries, who share technologies or target complimentary markets.

- **Input linkages:** are links with suppliers of raw materials, goods and services which have a critical impact on the end product or service of the surveyed firm.

- **Output linkages:** relate to customers of a surveyed firm and channel sellers from both a goods and services perspective. Outputs may be with individual customers or broken down by customer segments and regions.

- **Research and Development linkages:** include research and development relationships between companies and also with academic and research institutes.

- **Specialist Service linkages:** relationships with vendors who supply other essential services to a surveyed firm, outside of inputs, where the expertise or capacity is not contained in-house e.g. services specific to an industry, distribution, IT, consultancy, marketing, financial and legal services.

- **Training linkages:** are linkages with third parties who provide specific training or learning for employees, e.g. relationships with academic institutes in regard to inputting on course modules to address future skills needs.
Appendix C Sample Firm Report

1. Executive Summary

The agri-food industry is considered one of Ireland’s most significant indigenous industries. It is important that industry players, business support organisations and policy makers understand how the agri-food ecosystem operates both within West Cork as well as its external relationships forged beyond the island, so that collaboratively, they can deliver growth and employment through supportive policy.

The aim of this study is to explore that ecosystem to determine the nature and extent of linkages that Agri-food operators in West Cork have with other companies, industry associations, government agencies and academia.

Data was gathered from October 2014 to January 2015 via face to face interviews with persons in 11 agri-food companies in West Cork. These companies are referred to in this report as the respondent firm group (RFG). Linkages with other organisations are grouped into eight categories and four geographic scopes. Comparisons between Company A’s linkages and those of the RFG are summarised below. Company A recorded 24 individual linkages, 4.7% of all linkages reported by the RFG.

<table>
<thead>
<tr>
<th>Linkage Categories and Geographic Scope</th>
<th>Company A</th>
<th>Respondent Firm Group (RFG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution of Linkages</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output linkages are most frequent followed by Inputs.</td>
<td>Output linkages are most frequent followed by Inputs and Specialist Services.</td>
<td></td>
</tr>
<tr>
<td>Training links are the least frequent linkage category and no Industry Peer or Research and Development linkages were recorded.</td>
<td>Research and Development links are the least frequent linkage category.</td>
<td></td>
</tr>
<tr>
<td>Perceived Significance of Linkages</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specialist Service linkages were perceived as most significant followed by Inputs and Government Agencies.</td>
<td>Research and Development linkages were perceived as most significant, followed by Outputs and Specialist service linkages.</td>
<td></td>
</tr>
<tr>
<td>Training linkages were perceived as least significant.</td>
<td>Industry Association linkages were perceived as least significant.</td>
<td></td>
</tr>
<tr>
<td>Geographic Scope of Linkages</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linkages were spread with 54% local, 29% National, 17% EU, and 0% International.</td>
<td>Linkages were spread with 46% local, 34% National, 16% EU, and 4% International.</td>
<td></td>
</tr>
<tr>
<td>European linkages have the highest perceived significance to the firm.</td>
<td>The Local, National and European geographic scopes were scored equally high, with over 80% of these linkages deemed important to the firms.</td>
<td></td>
</tr>
<tr>
<td>National linkages were perceived as least important.</td>
<td>International linkages had the lowest perceived significance.</td>
<td></td>
</tr>
<tr>
<td>Linkage Categories and Geographic Scope</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inputs are spread evenly between local and European linkages.</td>
<td>Local linkages dominate in Inputs</td>
<td></td>
</tr>
<tr>
<td>European outputs are spread evenly between local and national linkages.</td>
<td>Local and National linkages dominate in Outputs</td>
<td></td>
</tr>
<tr>
<td>No Research and Development linkages were recorded.</td>
<td>Local linkages dominate in Research and Development.</td>
<td></td>
</tr>
</tbody>
</table>

1 Linkages are grouped into eight distinct categories. These are: Government Agency (GA), Industry Association (IA), Industry Peer (IP), Input (IN), Output (OU), Research and Development (RD), Specialist Service (SS) or Training (TN). There are four geographic scopes: local (L) within Co. Cork, national (N) within Republic of Ireland, European (EU), and international (INT).
2. Mapping / Graphical Presentation

Each individual linkage is depicted by a line; while its geographic scope is represented on the map. Maps are presented in the following section for Toonsbridge Dairy on the left side and all the linkages for the RFG on the right side at four geographic levels:

- **Local Linkages**
  - [Map Image]
  - [Map Image]

- **National Linkages**
  - [Map Image]
  - [Map Image]

- **European Linkages**
  - [Map Image]
  - [Map Image]

- **International Linkages**
  - [Map Image]
  - [Map Image]

No international linkages were recorded for the firm.

Figure 1 compares the number of linkages reported by Company A, in each linkage category, against that of the RFG.

Figure 1: Distribution of Linkages per Category: Company A vs. RFG

Each linkage is given a perceived significance score out of 40 to identify the strength of the relationship between your company and the linked firm/organisation. Figure 2 compares the median perceived significance score, by linkage category, for Company A vs. RFG.

Figure 2: Median Perceived Significance Score by Linkage Category: Company A vs. RFG

Figure 3 expresses the geographic scope of Company A’s linkages compared to the RFG.

Figure 3: Geographic Scope of Linkages [distribution expressed as a percentage]
This report has recorded the nature and extent of Company A's and 10 other respondent firms' linkages with other parties, including value chain and knowledge flow perspectives. The appendix gives details of all of Company A's individual linkages reported by Company A personnel. From this list Company A's linkages of greatest significance and Company A's least significant linkages can be identified.

### 3. Appendix: Company A's Linkages Ranked by Perceived Significance

<table>
<thead>
<tr>
<th>No.</th>
<th>Linkage Category</th>
<th>Linkage Name</th>
<th>Country</th>
<th>Geographic Scope</th>
<th>Perceived Significance</th>
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