Developing market-oriented and value-added products for Irish seafood SMEs

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Declaration of Academic Honesty

This is to certify that the work I am submitting is my own and has not been submitted for another degree, either at University College Cork or elsewhere. All external references and sources are clearly acknowledged and identified within the contents. I have read and understood the regulations of University College Cork concerning plagiarism.

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Abstract

The fisheries sector in Ireland is worth approximately €1.15 billion a year and is characterised by a high proportion of small and medium enterprises (SMEs). A strong market orientation and a consumer driven new product development (NPD) process are critical NPD success factors. Successful NPD requires knowledge exchange between the food related organisations, supply chain partners and the consumer. The Irish seafood industry lacks a market-oriented approach to its NPD activities. The Irish seafood industry is not in a position to capitalise on global trends as there are too many SMEs working in isolation. As a result, there is a lack of coordination and cooperation between supplier, producers and a lack of connection with the consumer and customer. This study aims to examine the use of consumer insights in the development by SMEs, of more sustainable and value-added, new seafood product concepts. Including products with unfamiliar ingredients, this process aims to increase consumer acceptance. The methodology employed was both qualitative and quantitative. Interviews with seafood SMEs and focus groups, conjoint questionnaire and sensory acceptability testing with consumers of seafood were utilised. The interviews conducted with Irish seafood related SMEs suggest that innovation and data collection is occurring, however, it is not being captured and utilised correctly in order to ensure successful product development and ultimately competitive advantage. If this innovation, data and other information gathered is managed correctly, in a formal process, then there is a significant opportunity for Irish seafood SMEs to capitalise on the value-added market. This research highlights appropriate methods of gathering and managing customer insights during the NPD process, specifically the initial stages and applying it to the development of a seafood concept that uses a species of fish, which is currently unavailable on the Irish market, and unfamiliar to consumers i.e. boarfish, via advanced concept optimisation research techniques. These insights through conjoint analysis allowed for the analysis of the products attributes and provided an insightful understanding of customer`s choice motives, which assists organisations in the process of market segmentation and new product design of new seafood products. The research revealed that consumer integration techniques which include the consumer at the early stages of the NPD process can increase consumer acceptance of new seafood products; including those that contain unfamiliar ingredients without a significant strain on the resources of SMEs.

Part 1: Introduction

Chapter 1: Introduction to the Study

1.1 Introduction

This chapter introduces the overall study by providing in Section 1.2 the background to the research. Section 1.3 presents the justification for the research and an outline of the knowledge gaps in this area. Section 1.4 presents the overall aim and objectives of the research. The main research question and all relevant sub-questions are established in Section 1.5. There is also a brief introduction to the methodology in Section 1.6, followed by an outline of the research framework in Section 1.7. This chapter concludes by identifying the research limitations in Section 1.8 and the outputs of the research in Section 1.9.

1.2 Background of the research

This study investigates the levels and points of engagement with consumers of seafood related SMEs during the process of NPD. There is extensive literature on the benefits to an organisation of adopting a market-oriented approach to NPD. However, there is a gap in the literature as to the role that market orientation plays in food products with new ingredients or in the case of this research an ingredient with which the consumer is unfamiliar. The literature also highlights the lack of market orientation within the Irish seafood industry. This study focuses on the use of a sustainable seafood ingredient, boarfish (Capros aper), in producing value-added products. It highlights how Irish seafood SMEs can adopt consumer integration techniques to increase consumer acceptance and ultimately improve NPD success rates for SMEs.

The knowledge contribution of this research is established through an analysis of existing literature. In Part 2, the literature review, the contribution of this thesis is established. Firstly, it is establish that the research question is unique and has not been addressed by previous research. Secondly, it will identify a gap in the existing literature particularly in the areas of market orientation of food product that include ingredients, which are unfamiliar to the consumer. It will synthesise the corpus of

existing research in the specific area of SMEs NPD process in a fresh way. Finally, it will show that the context of this work, seafood SMEs located in Ireland, has not been researched in this way before and as a result will contribute to the body of knowledge. The importance of this research is demonstrated. For example, Research sub-question 3 (RSQ3) addresses a question that is likely to lead to, or contribute to, significant economic gains for the seafood SME sector. The research will elaborate on the economic importance of this research by looking at the value of NPD in the seafood SME sector.

1.3 Justification for the research

The justification for conducting this research is based on the significance of the seafood sector to the Irish food market and the potential benefits to the Irish food and fisheries market on a global scale. The study was also influenced by the predicted increase in demand for seafood products throughout Europe and internationally and the requirement for sustainable seafood.

Agri-food is Ireland's largest and most valuable indigenous industry. Food Wise 2025 is a strategy to grow, develop and progress the agri-food sectors to build and expand their capabilities within Ireland thus allowing them to benefit from opportunities which emerge internationally in the future (Bord Iascaigh Mhara (BIM), 2016a; Department of Agriculture, Food and the Marine (DAFM), 2015a). The goals set out in the strategy for the agri-food sector includes growth through exports of €19 billion, an increase of 85% of value-added products to €13 billion. The creation of 23,000 jobs throughout the industry, ranging from primary production to developing new value-added products represents an increase of 70% in employment in this sector. With increasing demand and fish stocks diminishing, Ireland struggles to meet the demand for popular fish. Any growth in the value-added sector will include increased use of species that will be new to consumers. This research directly addresses this reality. In meeting these demands, some of the principal growth potentials will be obtained through the seafood catch within Ireland, which mainly consists of shellfish, pelagic and demersal fish. There is potential to grow the catches unit value through quality

control, more efficient marketing strategies and processing (BIM, 2016a). These changes would integrate the seafood sector into the Irish food sector (DAFM, 2015a).

An increase in food production will be required to feed the world`s increasing population. Estimations by Failler *et al.* (2007) on behalf of the Food and Agriculture Organisation of the United Nations (FAO) are that EU consumption of fish will increase by 9% in the 25 years to 2030. The average consumption per capita within European countries will rise to 24kg per year. Regarding fish, there will be a requirement to increase supplies by 1.6 million tonnes of sustainable sources of seafood. This will also take into account the expected population growth within the EU over the period from 2012 to 2030 (BIM, 2012a). High levels of demand for fish can also be seen internationally, with Irish seafood exports to international markets in 2016 valued at €559 million (BIM, 2016b) and increased to €666 million in 2017 (BIM, 2018). The strongest internationally exported fish in 2016 was the pelagic fish species, worth €150 million, which accounts for 27% of total value and at a weight of 115,100 tonnes accounts for 54% of the total volume of Irish seafood exports (BIM, 2016b). However, the Irish seafood industry is not operating to its full potential and producers lack connections with consumers and have very little market-oriented focus (Shelman, 2016). This level of demand will allow new and innovative seafood products to enter the market successfully, with a particular emphasis on value-added products. Pelagic fish is Irelands highest value exported seafood resource. Pelagic fish are an oily fish that swim in mid-waters or near the surface such as mackerel, herring, tuna and boarfish (BIM, 2013). Pelagic fish is mainly exported without any value-addition and so the potential for the seafood sector is significant. Also, while exports in this area are high, very little pelagic fish caught off the Irish shores are consumed in Ireland (BIM, 2016b).

The product design of tangible goods and services is viewed as an area of competitive advantage for companies (Luchs and Swan, 2011; Srivastava *et al.*, 1999; Yamamoto and Lambert, 1994). A market-oriented organisation focuses on continuous market research and data collection about, not only the needs of the target market but also the capabilities of their competitors in order to generate consistent customer value (Urde

et al., 2013; Wang *et al.*, 2012; Grewal and Tansuhaj, 2001; Slater and Narver, 1995). The debate on marketed oriented design versus market led design is widely acknowledged (Lindahl and Nordin, 2010; Jang *et al.*, 2009; Biemans and Harmsen, 1995). Much of the current research agrees that the chosen business model, the product itself and management strategies of an organisation can predict the outcome in choosing a marketing concept of either market-oriented or market-led. Slater and Narver (1998) state that both market-oriented design and market-led design consist of different business activities. Market-led design tends to be short-term in focus and concentrated heavily on consumer needs and desires. However, this method results in a lack of innovation and competitive advantage. By comparison, a market-oriented business strives to understand and meet the long-term needs of consumers, acquire and evaluate market information in an anticipatory manner, and coordinate across departments to share knowledge in a focused way (Pascual-Fernández *et al.*, 2016; Boso *et al.*, 2013; Slater and Narver, 1995).

NPD is a complex process which requires the functions and competencies of multiple departments (Seuring and Gmelin, 2014; Tidd and Bessant, 2013; Grunert and Traill, 2012; Mishra and Shah, 2009; Menor and Roth, 2008; Pavlou and El Sawy, 2006) and the NPD strategy requires consistent focus within a business (Cooper, 2001). Superior coordination between multiple functions, particularly the marketing, design, and manufacturing functions have been found to be core to successful NPD (Fuller, 2016; Seuring and Gmelin, 2014; Troy *et al.*, 2008; Brown and Eisenhardt, 1995; Griffin and Hauser, 1992). The importance of multi-function cooperation within an organisation has been highlighted within the NPD process but also has the coordination between an organisation and external parties (Seuring and Gmelin, 2014). The success of NPD efforts requires cooperation and communication between the organisation and the end user of the product and supply chain partners (Bendoly *et al.*, 2012; Grunert and Traill, 2012).

The ability to innovate and launch new products and services is vital to the survival and success of all organisations both large and small (McAdam *et al.*, 2014; Tidd and Bessant, 2013; Susman *et al.*, 2006). Much of the research relating to best practice for

NPD focuses on larger organisation, which suggests that successful SMEs consistently innovate, as large firms do, to remain competitive (Filieri, 2013; Laforet, 2008). Conversely, research states that SMEs are significantly different to larger organisations in a variety of ways (McAdam *et al.,* 2014; Filieri, 2013; Massey, 2002; Boag and Rinholm, 1989). While SMEs often have resource constraints, they are often more informal, innovative, responsive and creative than larger organisations. Large organisations often strive to achieve these attributes through specialised team projects (Tomlinson and Fai, 2013; Massey, 2002).

Knowledge transfer will play a key role in any successful NPD process. Cooper (2006) suggests that the concept of knowledge transfer is strongly associated with knowledge diffusion, that is, idea and innovation sharing over time throughout a social system, individuals or departments. This process can allow for the experiences of one to influence another and instigates change in the knowledge or performance of that unit (Frank *et al.,* 2015; Frank and Echeveste, 2012; Argote and Ingram, 2000). It is necessary to control the management of knowledge between, not only the consumer and organisation, but also within the many functions of an organisation involved in the NPD process. Problems such as consumer acceptance and design issues can occur during the NPD process if knowledge is not managed correctly at all stages of the NPD process (Lawson and Potter, 2012; Sorenson and Bogue, 2005).

While the literature stresses the importance of NPD and market-oriented NPD for the success and development of all organisations, the research highlights a gap in the literature in relation to the development of new products for foods related SMEs. There is no appropriate NPD process or systematic framework for food related SMEs. Howieson *et al.* (2014) conducted a study on one seafood SME to demonstrate how small businesses may deploy a formalised Stage Gate approach to new product development. The study concluded that future research is required to establish an appropriate NPD process or systematic framework for seafood and food related SMEs. There is also no current research on the points of engagement of food related SMEs with consumers as part of the NPD process. Research by McIntyre (2009) concludes that there is a need for more focus and investigation around SMEs attitudes towards

the inclusion of the consumer into the NPD process. Also, the absence of sufficient investment regarding time and resources on certain stages of the NPD process for food related SMEs has been identified but does not elaborate in detail as to the reasoning for the lack of investment. Research conducted by Shelman (2016) and DAFM (2015a) both concluded that seafood related SMEs need to invest time and resources into developing appropriate NPD processes and an investigation is required as to why seafood SMEs do not invest in NPD activities.

There have been many proven successful market-oriented products and numerous successful market-oriented food products. However, generally, the Irish food sector is not a market-oriented industry, there is a significant lack of market orientation in seafood related organisation, and food related SMEs in Ireland. While this is clearly established in the literature, there is a knowledge gap in the identification of what the barriers are that prevent food related SMEs from being more market-oriented. Raju *et al*. (2011) recommend that further research is required to allow for a better understand of how market orientation affects SMEs and the barriers that need to be overcome in order to improve SME performance.

The literature is clear on the benefits of adopting a market-oriented culture to organisational performance. There are a vast array of consumer integration techniques identified in the literature however there is a gap in relation to which techniques are appropriate for food related SMEs based on the barriers they face. There is also a need to consider which consumer integration techniques are appropriate for not only food related SMEs NPD but also which consumer integration techniques are appropriate for food related SMEs when their NPD includes a new ingredient or an ingredient, which is unfamiliar to the consumer. Van Kleef *et al.* (2005) identifies 10 methods and techniques to gather information from the consumer. The research of Van Kleef *et al.* (2005) suggests that the selection of appropriate consumer integration techniques is based on industry and environmental issues. There is no one methods that is appropriate for a specific industry or product type. Research is required on an individual basis to establish the most appropriate consumer integration technique for a specific product or industry.

The literature suggests that the Irish seafood industry is adding very little value to the base product, and this is an area of significant potential for SMEs. This research uses primary and secondary data to identify the areas of potential growth for SMEs NPD activities based on the actual wants and needs of the consumer. The research also identifies the product attribute preferences of multiple market segments for unfamiliar seafood products. According to Bord Bia (2017a), there is more opportunity for the development of certain fish over others. There has been an increased interest in the origin of fish and a enthusiasm to purchase new, lesser-known and underutilised species in order to protect species of fish in the future, however research into these areas is required in order to ensure success (BIM, 2018; Henchion, *et al.,* 2017; Shelman, 2016; DAFMb, 2015).

1.4 Research aim and objectives

The aim of this study (RA) was to examine the use of consumer insights in the development by SMEs, of more sustainable and value-added, new seafood product concepts. Including products with unfamiliar ingredients, this process aims to increase consumer acceptance. The objectives of this study were to:

i. Assess the current NPD activities of seafood related SMEs in Ireland.
ii. Identify the steps in the NPD process of Irish seafood related SMEs.
iii. Identify the strategy and resources associated with the NPD process of Irish seafood related SMEs.
iv. Establish which stakeholders had an input into the NPD process of Irish seafood related SMEs.
v. Establish what consumer integration techniques were being used by Irish seafood related SMEs during the NPD process.
vi. Identify how insights gathered from consumers was managed in Irish seafood related SMEs.
vii. Identify the consumer integration techniques appropriate for Irish seafood related SMEs.

viii. Use consumer integration techniques, appropriate for SMEs, to determine the optimal product design attributes influencing customer's choice motives for new seafood concepts including unfamiliar ingredients.

ix. Establish consumer acceptance of sensory attributes of a new value-added and sustainable seafood concepts including an unfamiliar ingredient.

1.5 Research questions and sub-questions

Research Question (RQ): The overall research question that guided this study was *"What role can consumer integration techniques play in small and medium enterprises, in the Irish seafood sector, in understanding consumer's demands for seafood products?"* The main research question is broken down into three specific sub-questions:

Research sub-question 1 (RSQ1): *To what extent do small and medium enterprises in the Irish seafood sector currently engage in market-oriented new product development?*

Research sub-question 2 (RSQ2): *What are the current frameworks being used in the new product development process of the small and medium Irish seafood enterprises?*

Research sub-question 3 (RSQ3): *What product attributes drive consumer preferences for seafood products using a fish that is unfamiliar to the consumer?*

1.6 Research methodology

A mixed-method approach, which uses both quantitative and qualitative methods of gathering and analysing data, was adopted for this study. The first element of the methodology was exploratory research to assess the NPD activities taking place in seafood related SMEs in Ireland. This allowed the researcher to identify the practical and realistic NPD processes of seafood related SMEs in Ireland, and compare those practices to the literature. This also allowed for an investigation into the level of engagement of SMEs with market orientation during the NPD process and what

consumer integration techniques were being used by Irish seafood related SMEs. This exploratory research was conducted in the form of in-depth interviews with 24 seafood related SMEs in Ireland. The second part of the research was also qualitative, consisting of five focus groups with potential consumers. The purpose of these focus groups was to determine consumer expectations, requirements and preferences for seafood products.

The third element of the research was quantitative in the form of a single conjoint-based questionnaire administered to 300 consumers of seafood, to model consumer`s preferences for seafood products using an ingredient (boarfish) that was unfamiliar to the consumer. This allowed the researcher to evaluate the attributes, which would motivate consumers to commence purchases of a new sustainable value-added seafood product. The fourth and final element of the primary research was sensory acceptability testing. The sensory acceptability testing was conducted using a prototype product, which included a fish (boarfish) that was unfamiliar to the consumer. The purpose of this final element of the research was to establish if a prototype product was acceptable to a sample of the population.

1.7 Research framework

This study is divided into six distinct parts, consisting of both primary and secondary research. Part 1 is an introduction to the research topic (Chapter 1). Part 2 consists of the presentation of literature. Chapter 2 is based on the NPD process and SMEs. Chapter 3 focuses on SMEs, their knowledge management systems and the adoption of market orientation in the organisation. Chapter 4 describes the context of the Irish seafood industry. Part 3 is the conceptual framework of the study (Chapter 5). Part 4 outlines the research methodology of the study (Chapter 6). Part 5 presents the results of the primary research conducted. Chapter 7 and 8 present the findings of the qualitative research derived from the interviews and focus groups respectively. Chapter 9 presents the findings of the conjoint based analysis, and Chapter 10 presents the findings of the sensory acceptability testing. The final element, Part 6 (Chapter 11) presents the research discussion, conclusions, the knowledge contribution, which this

research makes; outlines the implications of the research for stakeholders within the Irish seafood market, and offers suggestions for further research.

1.8 Research limitations

A key limitation of the qualitative data collection methods employed by this study was the small sample size. In the case of the interviews of a possible 187 seafood organisations registered only 24 were interviewed that equates to a sample of 12.5% of the population available. Therefore, the results of the research are not a representative view of all Irish seafood organisations. Similarly only 40 consumers of seafood participated in the focus groups. Therefore, the results of this research are not a representative view of all Irish consumers of seafood. The focus groups, conjoint questionnaire and sensory acceptability testing participant selection was undertaken via non-probability sampling. As the sample was not completely at random, there was not sufficient representation of the population of Irish seafood consumers. In addition, the focus groups, conjoint questionnaire and sensory acceptability testing were conducted on consumers of seafood. The screening question "Do you consume fish products at least once a month?" was asked. This question excluded non-consumers of seafood or those who did not consume seafood on a regular basis from the study. Therefore, it could be assumed that the results of this research are not representative of all seafood consumers in Ireland.

1.9 Research outputs

The research showed that consumer integration techniques that include the consumer at the early stages of the NPD process can increase consumer acceptance of new seafood products, including those that contain unfamiliar ingredients, without a significant strain on the resources of SMEs. The main contribution to knowledge of this research is that it provides Irish seafood SMEs with the specific information required to become a more market-oriented industry.

The insights gathered through the interviews highlight that there was a need for this research to be conducted, as the seafood industry, like the food industry in Ireland, does not maintain a strong market-oriented focus in relation to NPD. The focus groups,

conjoint analysis and sensory acceptability testing provide an example of formal consumer integration techniques that can be adopted by seafood SMEs during their NPD process, that are inexpensive and effective in providing insights into the current market and consumer demands. This study focuses on the use of a sustainable seafood ingredient, boarfish, in producing value-added products. It demonstrated how Irish seafood SMEs can adopt consumer integration techniques to increase consumer acceptance and ultimately improve NPD success rates for SMEs.

This research contributes to the current literature available on market orientation as it identifies the points of engagement of seafood related SMEs with consumers as part of the NPD process. This research also contributed to the current bank of literature in relation to the reasoning for the lack of investment by seafood related SMEs in the NPD process. This adds to current literature which is already available on barriers to innovation and product development in food related SMEs. The research also contributes to the existing literature available on the market trends in the Irish seafood sector. It also contributes to Irish seafood related SMEs areas of potential opportunity and targeting for NPD and assures that a product including boarfish is acceptable to consumers in a sensory context.

1.10 Summary

This chapter introduces an outline of the research conducted, it presents the areas in which this research will contribute to the current knowledge bank. This chapter also outlines the justification and reasoning for conducting this study. The research question, sub-questions and research aims and objectives of this study are established. The research methodology is introduced briefly and the research framework is also outlined. This chapter identifies the research limitations and the output of the research. Part 2 presents the literature review. Chapter 2 examines what SMEs are and the NPD process.

Part 2: Literature Review

Chapter 2: The NPD Process and SMEs

2.1 Introduction

Chapter 2 examines the NPD process in SMEs and large firms, specifically focusing on the points of similarity and difference. It examines whether SMEs are just smaller versions of larger organisations and the implications of any differences. The process and management of innovation in all organisations, with an emphasis on SMEs, is examined. The establishment of an intrapreneurial organisation and the benefits for SMEs in adopting this type of corporate culture are also outlined. Finally, best practice for NPD in SMEs is explored, and the potential frameworks for NPD are also summarised.

2.2 SMEs defined

Carter and Evans-Jones (2009) argue that there is no single definition of small firms due to the different types of businesses. Burns (2010) suggests that a definition for SMEs is dependent on different elements of the business such as employee numbers, turnover and the sector in which it operates. Hence, under 25 employees is deemed to be an SME in the construction industry and for manufacturing under 200 employees is viewed as an SME. In the retail industry, €1,500,000 is the turnover of small firms operating in this sector. However, according to the OECD (2008) the European Union, in most situations, is no longer using these definitions. The European Union has defined small-medium sized businesses as an *"enterprise employing less than 250 employees".* As of January 1st 2007 the definition of an SME in the European Union is as follows:

> *"The category of micro, small and medium-sized enterprises (SMEs) is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding €50 million, and/or an annual balance sheet total not exceeding €43 million."* (European Union, 2003:39).

A micro enterprise is defined as:

> *"An enterprise which employs less than ten employees and has an annual turnover of less than or equal to €2 million and an annual balance sheet total of less than or equal to two million euro."* (European Union, 2003:39).

A small enterprise is defined as:

> *"An enterprise that has fewer than 50 employees and has either an annual turnover and/or an annual balance sheet total not exceeding €10 million."* (European Union, 2003:39).

A medium enterprise is defined as:

> *"An enterprise that has between 50 employees and 249 employees and has either an annual turnover not exceeding €50 million or an annual balance sheet total not exceeding €43 million."* (European Union, 2003:39).

Hill (2001) states that it is accepted that the majority of large businesses have come from small enterprises that were created by entrepreneurs. The OECD (2010) suggests that SMEs are beginning to be recognised as a significant contributor toward economic growth. Kuratko (2016) states that, even though the terms entrepreneurs and small business owners are occasionally referred to interchangeably, it is vital to understand the contrasts in the titles. Kuratko (2016) also notes that small enterprises are not owned by a large organisation but by independent owners and are averse to taking major risks, they are cautious and in turn expect steady development, growth and revenue. However, an entrepreneur can sometimes be seen as having a different outlook on how to grow and develop a business than small business owners. While there are many definitions of an SME, for this study, a simplistic form of the EU definition was used, that is, an organisation with an employee base of fewer than 250 people.

2.2.1 SMEs economic contribution

Entrepreneurship is not a new concept and has attracted extensive interest and demand in research over the years. This is due to the SMEs contribution to the development of the economy. The SME sector is also responsible for the majority of employment within an economy as well as the economy's capability to be innovative and potential to expand (Hynes, 1996). Deakins and Freel (2009) state that the connection between entrepreneurship and the growth and development of an economy is a positive one. The OECD (2010) argues that there are many links between SMEs and growth creation within the economy. Kuratko (2016) supports this and states that the development of entrepreneurship and SMEs is internationally recognised as being a means of growth and development in an economy. Henry *et al.* (2003) suggest that the power and importance of entrepreneurship in driving the economy is unquestionable and it is imperative that entrepreneurship is encouraged for economies to continue to develop and grow. Even though they are relatively small, SMEs make an extensive impact on the level of employment in the economy (Susman, 2007). SMEs reduce unemployment in an area where there are no large firms, this is where SMEs have a significant impact on potential employment and the local economy in that particular area (Madrid-Guijarro *et al.,* 2013; Analoui and Karami, 2003; Henry *et al.,* 2003).

Entrepreneurs can reignite an economy in decline and can rejuvenate an economy in despair (Kuratko, 2016; Adams and Comber, 2013). SMEs are important in the development and growth of an economy and entrepreneurs have created the majority of large businesses (Madrid-Guijarro *et al.,* 2013; Hill, 2001). Irish entrepreneurs have not only achieved success in the market in Ireland but have continually expanded into markets abroad in the hope of continuing their success. Ireland possesses many companies that were created by Irish entrepreneurs (RezaeiZadeh *et al.,* 2017; Cooney and Hill, 2002). The Global Entrepreneurship Monitor (GEM) report is a study that evaluates the importance of entrepreneurship to economies all over the world. GEM (2016) concluded that the connection between entrepreneurship and development and growth in an economy is significant. All countries that have high rates of activity in entrepreneurship have increased levels of growth in the economy well above the

average of countries that do not have any entrepreneurial activity. Countries that have high levels of entrepreneurship in their economy are stronger and have an advantage over competitors in the world markets.

Irish society is largely optimistic on the subject of entrepreneurship. GEM (2016) highlights the fact that Ireland is fundamentally a country of entrepreneurs and is at the forefront in Europe in regards to the rate of entrepreneurial activity. There is a strong desire for individuals to become entrepreneurs and set up new businesses in the SME sector. Entrepreneurship is of vital importance to the economy as the creation of new businesses can produce numerous benefits and can also improve the basis of SMEs while increasing the level of innovation, competitiveness and create further employment. The GEM report (2016) also states that creating and expanding enterprises is key to achieving growth in the economy on a regional scale. The creation of these new enterprises affects each county, and entrepreneurs are vital to the future development and success of Ireland's economy and as a result continuously help provide higher living standards. Additionally, entrepreneurship is viewed by many researchers and economists as a significant element in the development of motivation and wealth of an economy (RezaeiZadeh *et al.,* 2017; Yu and Huarng, 2013; Cooney and Hill, 2002). Cooney and Hill (2002) argue that entrepreneurship is vital to the growth of a modern open economy. It is essential for there to be a constant development and pursuit of innovation, opportunity, flexibility and change regarding entrepreneurship as this is a requirement for countless sectors to survive and expand (Madrid-Guijarro *et al.,* 2013; Yu and Huarng, 2013; Cooney and Hill, 2002).

2.3 A comparison between SMEs and large organisations

SMEs are not merely smaller versions of large companies. In addition to size, there are many both minor and significant differences between SMEs and large organisations (Van de Vrande *et al.,* 2009; Buonanno *et al.,* 2005; Welsh and White, 1981). Differences include areas such as policies employed, structure and management styles (Laforet, 2013; Gray and Mabey, 2005; Ghobadian and Gallear, 1997) as well as the NPD process and specifically the practices, which lead to NPD success (Nicholas *et al.,* 2011). Table 2.3 identifies the key potential differences between

SMEs and large organisations. However, these may not be universally applicable to all large organisations or SMEs and are a general guideline of how each frequently operates (Nicholas *et al.*, 2011). Alegre *et al.* (2013) believes that these characteristics do however identify some areas when SMEs may have an advantage over large organisations in the area of product development. Characteristics such as fewer management layers establish shorter decision-making processes and less resistance to change allows for a more innovative environment. This, in turn, enables the NPD process to flow more effectively in SMEs (Dahlander and Gann, 2010; Tidd *et al.*, 2005).

Table 2.3. Characteristics of SMEs and large organisations

Large Organisation	SMEs
Hierarchical with several layers of management	Flat with few layers of management
Rigid structure and information flow	Flexible structure and information flow
Top management visibility limited	Top management very visible
Top management far from point of delivery	Top management close to point of delivery
Low incidence of innovativeness	High incidence of innovativeness
Slow response to environmental change	Rapid response to environmental change
High degree of formalization	Low degree of formalization
Personnel authority low	Personnel authority high
Good access to human and financial resources	Limited access to human and financial resources
High degree of resistance to change	Negligible resistance to change
Individual creativity stifled	Individual creativity encouraged

Source: Nicholas *et al.* (2011)

Due to their size SMEs face many challenges in comparison to larger enterprises. SMEs need to overcome obstacles to allow for successful NPD. Problems, such as a lack of resources including external contacts, finance and owner or management organisational dominance can all stifle the NPD process within SMEs (Padukkage *et*

al., 2016; Van de Vrande *et al.,* 2009; Tidd *et al.,* 2005; Kaufmann and Tödtling, 2002; Bartlett and Bukvič, 2001; Hadjimanolis, 1999). Due to the lack of economies of scale, SMEs may face the difficulty of competing on cost and price. As a result, SMEs tend to compete by providing a quality product rather than on a price basis (Chesbrough, 2010a; Voss *et al.,* 1998). SMEs can use their flexibility to gain competitive advantage, through aiming to learn about the environment, in which they operate. SMEs have the potential to be agile when required within the environment that they operate in (Bianchi *et al.,* 2010; Gibbons and O'Connor, 2005; Entrialgo *et al.,* 2000; Voss *et al.,* 1998).

2.4 Effective management of organisational innovation

To establish an innovation framework, it is essential to determine both the internal and external contributing factors involved. Effective organisations see innovation as an internal process (Trott, 2008; Dyer and Nobeoka, 2000). Research has shown that successful organisations can adapt to changing environments and evolve in order to survive (Bonesso *et al.,* 2011; Bahemia and Squire, 2010; Cooper and Kleinschmidt, 1987). Trott (2008) shows a simple model to illustrate how the different disciplines within an organisation contribute to innovation (see Figure 2.4.1). It looks at the innovation process from three different perspectives, a business management strategy view, an economic view and an organisational behaviour view. This identifies specific individual roles that have a significant function during the process of innovation in an organisation. Within any organisation, individuals define problems, develop ideas and create associations that lead to innovations. An effective organisation is aware of the dynamics of its competitors and where possible, understands their competitor's innovative process to achieve competitive advantage. Knowledge of competitors and the external environment as a whole is vital in ensuring that an organisation is innovating sufficiently, keeping up to date on current trends and creating in-demand products and services. Finally, it is the role of management to ensure that innovations are appropriate and that sufficient resources are allocated to further develop those innovations. Also, it is the role of management to identify and develop these so-called key individuals in an innovative process such as inventors or intrapreneurs. This

highlights that organisational departments work together and overlap in some areas while also competing with each other in other areas (Trott, 2008).

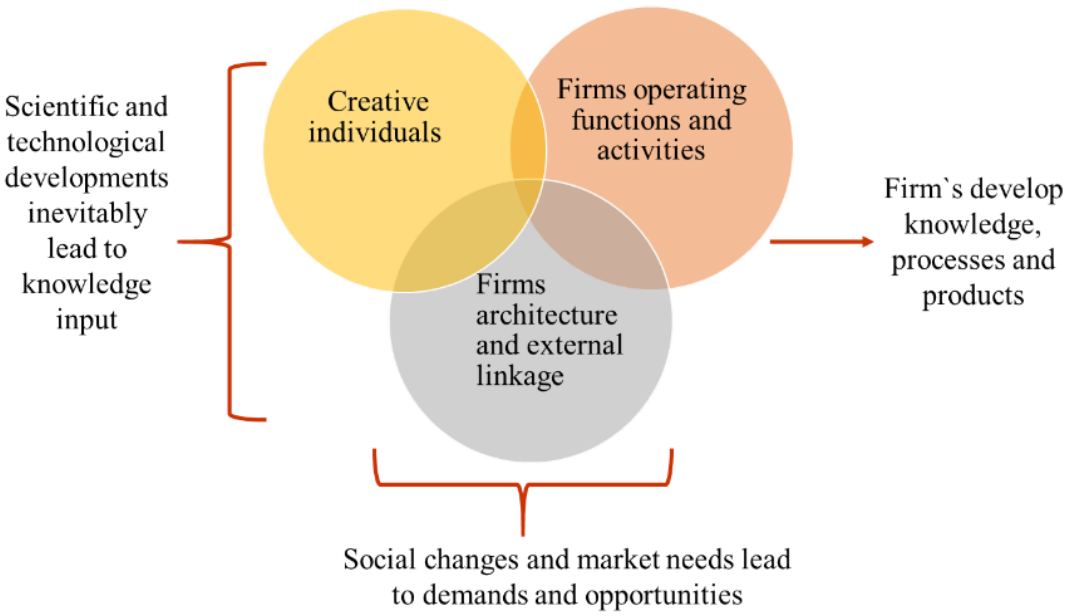


Figure 2.4.1 Overview of the innovation process

Source: Trott, (2008)

The internal organisational environment has an impact on an organisation's innovative success. In many organisations, there is a consistent challenge to create not only a stable environment but also an environment that is accommodating to creativity (Gassmann *et al.*, 2010; Knudsen, 2007). Figure 2.4.1 also clearly illustrates the complex nature of innovation. A study conducted by Prajogo and Ahmed (2006) suggests a strong relationship exists between innovation stimulus and capacity. The same study also found a correlation between innovation capacity and performance. However, this study established no direct correlation between innovation stimulus and performance. An innovative organisation has established innovation supports, such as research and development (R&D) and appropriate leaders, to stimulate innovation in the first instance. It has been found that once these measures have begun to encourage innovation, the organisation then establishes an innovative environment suitable for innovative capacity. This encompasses both technological and human factors.

2.4.1 Developing an innovative corporate culture

Management techniques affect the organisation's ability to innovate. Extensive literature is available on the most appropriate way of managing innovation within an organisation (Bonesso *et al.,* 2011; Bahemia and Squire, 2010; Trott, 2008; Porter and Ketels, 2003; Dyer and Nobeoka, 2000). Adams *et al.* (2006) state that competitive success in the marketplace is based on an organisations management of the innovation process and developed a list of 'ingredients' and a possible 'recipe' required to capitalise on innovation and achieve marketable products. This framework also allows management to evaluate the innovation activities of their organisation, by examining to what extent innovative qualities are embedded within their organisation and identify gaps and areas for potential improvement. The framework consists of seven categories, each with constituent areas of measurement (see Figure 2.4.2). This framework shows the various elements that need to be achieved for a successful innovative process. While the framework provides a map of what to measure and how to achieve a successful innovative process, Trott (2008) questions an organisation`s ability to accurately measure these elements and more precisely, what is the most appropriate matrix to measure the elements. However, Trott (2008) does see merit in the framework as a starting point for organisational reform.

Organisational culture provides opportunities and pitfalls about innovative capacity. There is a significant number of elements that affect an organisation's innovative capacity. One of the foremost is the organisational culture (Uzkurt *et al.,* 2013; Lemon and Sahota, 2004). Creating a culture receptive to innovation is highly dependent on group and departmental cooperation (Coote and Hogan, 2014). An unwillingness to share ideas and work together by individuals can cause large, and numerous, problems for an organisation, from slowing down communication and decision making to complete failure of a project (Trott, 2008; Hartmann, 2006). Coote and Hogan (2014) believe an organisation`s ability to quickly convert ideas into products and services will be the determining factor in achieving competitive advantage. Interdepartmental engagement and conflict appear as a common hurdle to successful innovation. Trott (2008) suggests that this is the case particularly in the relationship between the R&D

and marketing functions as these two departments have very different functions and often lose sight of the fact that they have a common end goal.

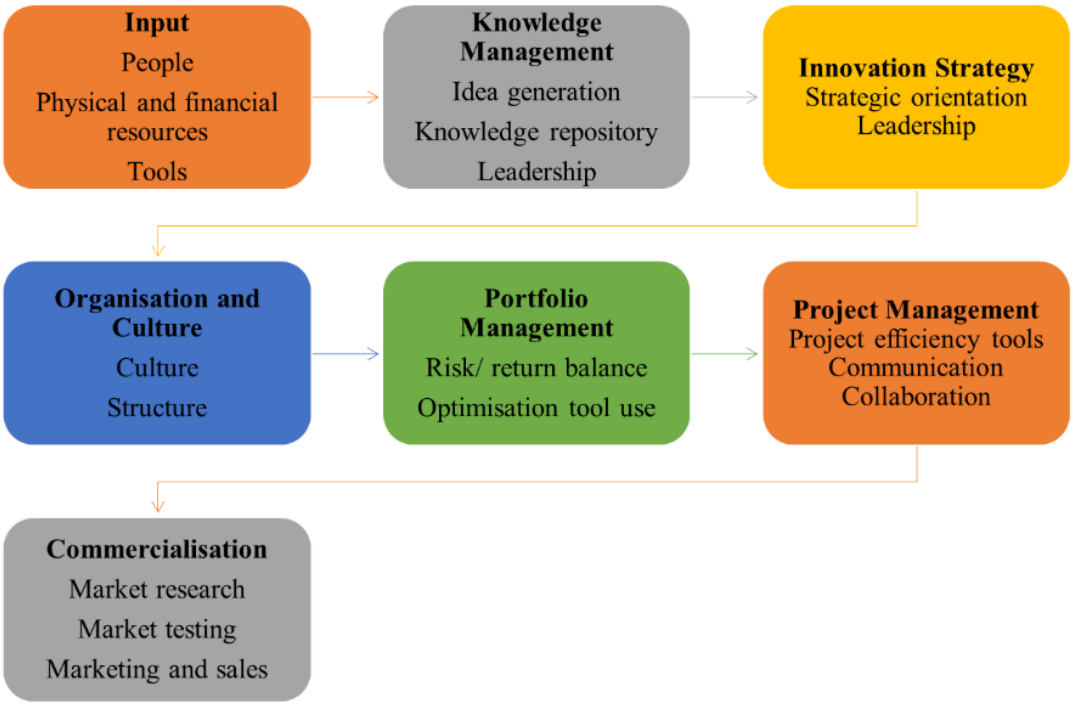


Figure 2.4.2 Innovation management measurement areas

Source: Adams *et al.* (2006)

There is disagreement among researchers regarding the most effective corporate culture in relation to innovation. Coleman *et al.* (2014) and Souder (1987) believe that the presence of conflict, in a limited quantity, can increase the innovative process through creating motivation. The ability to confront and resolve this conflict is the key component in motivation. De Dreu (2006) in contrast, suggests an organisational culture, which supports cross-functional coordination through effective communication and information structures, will be the most successful. Adams *et al.* (2006) state another critical component in creating an innovative organisational culture is the need for space. While efficiency is a crucial component in any organisation`s success as a whole, there needs to be a certain amount of time or 'slack' to allow individuals to think, experiment, create, and discuss ideas. This may mean

allocating a certain amount of time for individuals to work on ideas or interests of their choosing.

Porter (1985) developed the notion of competitive advantage, arguing that any organisation that could achieve above average performances in a marketplace was deemed to have a competitive advantage. The advantage then gives the company the ability to reinvest profits into activities which contributed to the initial competitive advantage and therefore created a virtuous circle of improvement. Working from Porter`s (1985) theory of competitive advantage, Trott (2008) in a more recent report, highlights seven elements of a virtuous circle of innovation (see Figure 2.4.3). This circle of innovation has seven key stages, which take place in a systematic process as one step, then encourages or promotes the step to follow next. However, the process is never ending and is conducted in a continuous loop. Not only the organisation`s capacity but also their reputation for their innovative activities is developed over a period. However, this process of innovation may be accelerated through successful R&D and marketing activities leading to new products, services and research that can attract positive media attention (Coleman *et al.,* 2014). An improved reputation for innovation in an organisation will attract creative people who wish to immerse themselves in a creative and innovative environment (Coleman *et al.,* 2014; Voss, 1992). Uzkurt *et al.* (2013) believes that for an organisation to encourage creativity, that organisation has to develop structures, which encourages creativity, supports new ideas, tolerates mistakes and rewards successful innovative activity. These structures will portray that the organisation is serious about innovation (Salavou *et al.,* 2004).

Constant idea generation is required for successful innovation within an organisation. Developing innovative products entails making actual improvements to a product or service, which is, comparably better than what is currently available in the marketplace (Costa *et al.,* 2016; Sanchez-Famoso *et al.,* 2014). New idea generation and acceptance of new ideas need to be a constant within an innovative organisation, this, in turn, means constant change within an organisation (Costa *et al.,* 2016; Salavou *et al.,* 2004). By rewarding successful idea generation, there will be increased motivation amongst staff. Research shows that it is vital, however, that it is not just successful

ideas that are encouraged and rewarded otherwise this leads to frustration and risk aversion amongst staff. All of these structures will allow an organisation to retain their creative staff and therefore reinforce the organisation's creative capabilities (Costa *et al.*, 2016).

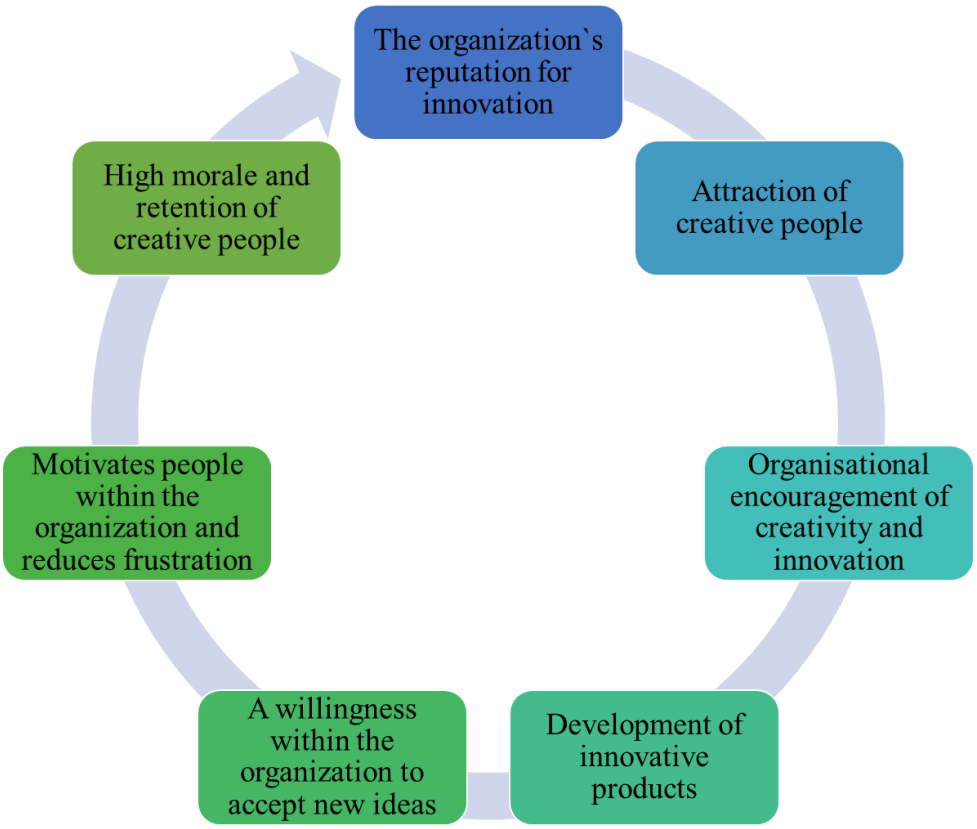


Figure 2.4.3 Virtuous circle of innovation

Source: Trott, (2008)

2.4.2 Barriers to innovation within an organisation

The creation of innovative new products allows organisations to gain competitive advantage while also sustaining profitability and expansion for the future (D'Este *et al.*, 2012; Chesbrough, 2010b; Booz-Allen and Hamilton, 1982; Porter, 1980). However, NPD is a difficult task, and the failure rates of such activities are extraordinarily high with only up to 25% of all new products being successful in their first year (Dijksterhuis, 2016; Cozijnsen *et al.*, 2000; Asplund and Sandin, 1999; Cooper, 1999). This figure is lower for food products with only a 10% success rate in

year one (Fuller, 2016; Little *et al.*, 2015; Grunert and Traill, 2012; Lord, 2000). This has contributed to extensive research in the area of new product failure and the problems associated with the NPD process (Dijksterhuis, 2016; Fuller, 2016; D'Este *et al.*, 2012; Page, 1993; Calantone and Cooper, 1979). As a result of this research, many models have been developed with much focus on the pre-development stage of NPD, including, generation of ideas; screening of ideas; concept development; and concept testing (Cozijnsen *et al.*, 2000). The aim of such a large focus on the pre-development stage is to reduce the likelihood of failure for new products, enhancing the development process and generally reducing the uncertainty, which is associated with the NPD process (Dijksterhuis, 2016; Van der Panne *et al.*, 2003; Cooper, 1998; Dwyer and Mellor, 1991).

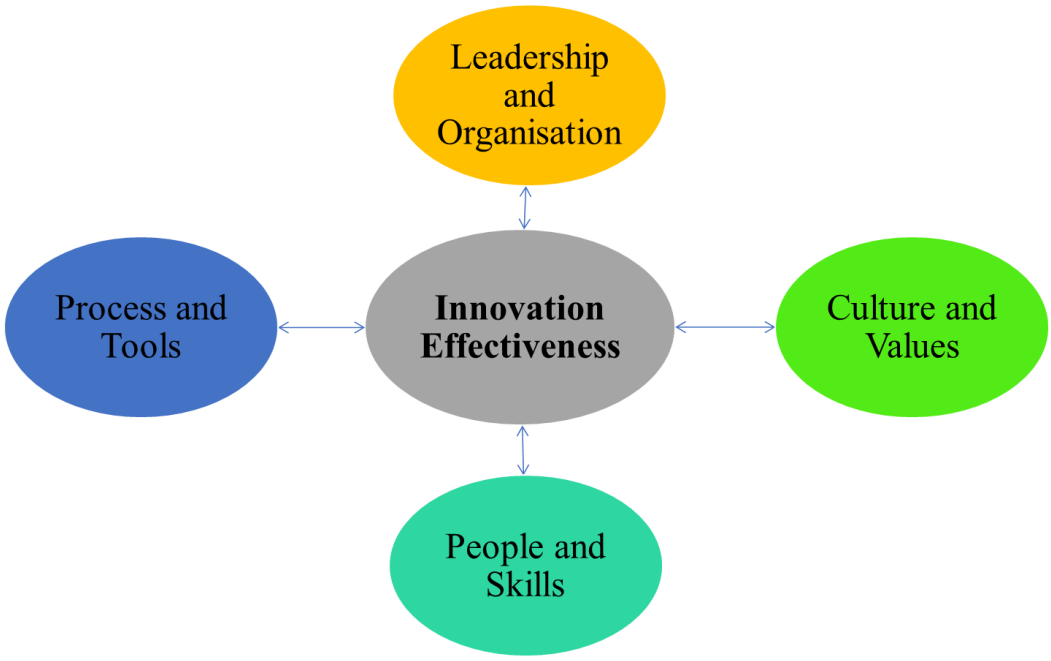


Figure 2.4.4 Systemic innovation capability

Source: Loewe and Dominiquini, (2006)

A variety of factors impacts the effectiveness of any innovation. Loewe and Dominiquini (2006) researched 550 organisations. This research identified six obstacles to innovation; a short-term focus; a lack of resources such as staff or time; management's payoff expectations are unrealistic; a lack of reward systems for

innovation; a lack of a systematic process for innovation and creativity; and finally, there was a belief that innovation is inherently risky. Furthermore, the research of Loewe and Dominiquini (2006), lead to the identification of the four problems for innovation; leadership and organisation; processes and tools; people and skills; and culture and values (see Figure 2.4.4). All four problem areas need to be addressed together, not individually for innovation to be a successful activity of an organisation.

For an organisation to achieve effective 'leadership and organisation' requires the organisation to have visionary leaders and that the organisation is aligned around a common definition of innovation. From the model, 'process and tools' describes the necessity of an organisation having a systematic approach and the necessary supporting tools to enable idea generation and elaboration, and pipeline and portfolio management. A critical mass of people across the organisation proficient in innovative approaches and tools are required to overcome the problem of 'people and skills'. Finally, collaborative, open culture and incentives that reward challenging the status quo will assist with 'culture and values'.

SMEs find it challenging to develop their business. The quantity of 'red-tape' is a significant challenge for SMEs, and to continue to exist and grow, the 'red-tape' needs to be reduced considerably (Chesbrough, 2010b; Salavou *et al.,* 2004; Fogel, 2001). The Organisation for Economic Co-operation and Development (OECD) (2006) states that SMEs have difficulties accessing funding from banks and other financial initiations. SMEs also encounter barriers when trying to be innovative as there is a lack of finance available to them (Chesbrough, 2010b). Many governmental policies relating to the development of entrepreneurship include offering funds; tax deductions and other related incentives; protection of ideas and innovation; investing in R&D and education; and lastly minimising entry barriers (Madrid-Guijarro *et al.,* 2009; Fogel, 2001). Davis and Brady (2015) suggested that SMEs in Ireland encounter a variety of problems, which often prevents them from developing. Problems such as a lack of management commitment and drive to innovate; minimal monitoring of innovative activates, and lack of a clear strategy or policy on NPD all hinder SMEs ability to develop. A SWOT (strengths, weaknesses, opportunities and threats) analysis of Irish

aquaculture industry conducted in 2015 in consultation with stakeholders identified key weakness as; insufficient investment in R&D; insufficient product availability to meet market demand; limited business planning from smaller operations; fragmentation within certain sectors; lack of private investment; narrow focus of skills base; lack of entrepreneurship in the sector; lack of scale in comparison to competitors and market size and lack of support services and ancillary industries. All of these elements lead to stifling of innovation (DAFM, 2015b). Also Strobel and Kratzer (2017) suggests the costs SMEs encounter when doing business is constantly increasing. As a result, it is challenging for SMEs to survive and grow. Such costs affecting these small businesses encompass the continuous increase of energy and labour costs. While these increased costs affect all organisations, due to their financial structures, SMEs are disproportionately affected by increasing fixed costs of compliance with taxes, labour and material costs and SMEs encounter issues due to economic competition and can be forced to reduce the number of employees they have on staff (Immervoll *et al.*, 2011).

2.4.3 Innovation management and NPD process

Intrapreneurs are at the core of organisational innovation. International competition reduces the amount that customers are willing to pay and ensures that organisations have to continually minimise unnecessary costs to stay financially viable. By contrast, customers are willing to pay increased prices if an organisation can provide goods or services with new or improved aspects (Johnsen, 2009; Spulber, 2004; Verloop and Wissema, 2004; Burgess, 1982). To support the economy, it is vital to have intrapreneurs to capitalise on the willingness of customers to spend money on new innovative products (Knutson, 2016; Bhatia and Khan, 2013). Pinchot and Pellman (1999) state that within an organisation, intrapreneurs take ideas and turn them into profitable realities. Furthermore, intrapreneurs are the people who re-organise, re-engineer, re-energise and re-design the business processes to ensure internal innovation within organisations. If within an organisation, there is no empowerment for these intrapreneurs, they will not innovate (Carvalho, 2015; Verloop and Wissema, 2004; Pinchot and Pellman, 1999). Within some organisations, intrapreneurial talent

is not allowed to prosper due to strict restraints that organisations enforce (Bhatia and Khan, 2013). Covin and Miles (2007) maintain that intrapreneurship is the most productive way to achieve superior performance when executed in the right manner.

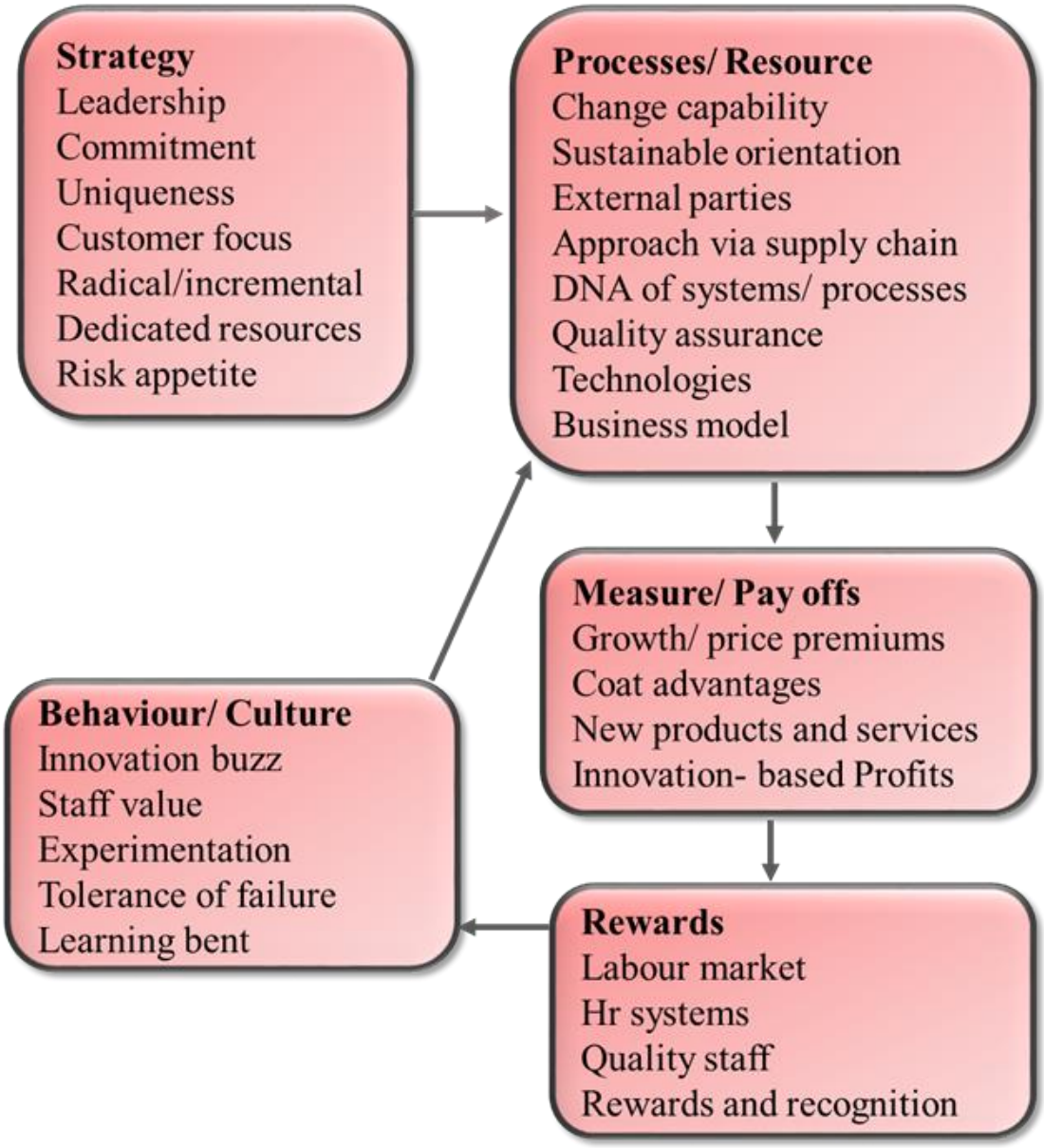


Figure 2.4.5 Framework of systematic innovation capability

Source: Samson, (2010)

There are systems and processes available to assist intrapreneurial innovation. Samson (2010) offers a framework for systematic innovation capability, which highlights the

process exploited by companies to establish effective ideas and innovations that deliver business value. The framework (see Figure 2.4.5) is broad and encompasses aspects of strategy, human resources, knowledge management, leadership and management. This framework, if it is to be productive needs a comprehensive approach to innovation throughout all attributes. Systematic innovation capability is only achievable once each building block is present and established (Amit and Zott, 2012). Samson (2010) views innovation from the perspective of value creation, where there is a system, which encourages and guides innovation and allows for a consistent flow of creation rather than unintended or unstructured innovation.

2.5 The intrapreneurial organisation

The intrapreneur's characteristics offer organisations an array of benefits. Pinchot (1986) states that intrapreneurs are described as 'dreamers who do', that is people who take responsibility for the creation of innovations of every kind within an organisation. Martiarena (2013) states that they are the creator and the dreamer who takes ideas to a profitable reality. Each organisation consists of key individuals, who possess the ability to realise opportunities and take advantage of the organisation's resources to fulfil new requirements and better fulfil existing requirements (Sauermann and Cohen, 2010; Pinchot and Pellman, 1999). Hisrich and Peters (2002) suggest that intrapreneurs have an essential role in creating wealth for the company it is associated with. Through taking risks, identifying new ideas for products and services and then turning those ideas into products and services, which make profits for their organisation.

The intrapreneurs have a vital role in the creation of wealth for an organisation (Bhatia and Khan, 2013; Uzkurt *et al.,* 2013; Hostager *et al.,* 1998). According to Nielsen *et al.* (1985)

> "*Intrapreneurship is the development within a large organisation of internal markets and relatively small independent units designed to create, internally test markets, and expand improved and/or innovate staff services, technologies within the organisation.*" (Nielsen *et al.,* 1985:181).

Burgelman (1983) states that intrepeneurship is also known as corporate entrepreneurship and corporate venturing. Intrapreneurship is about continuously developing new business opportunities and products within an organisation through proactive empowerment (Daft, 2015; Eesley and Longenecker, 2006). Antoncic and Hisrich (2004) state that there are three main areas of research in intrapreneurship, the first is the individual intrapreneur, their characteristics and their contribution to the corporation. The second area of research into intrapreneurship is on the forming of new corporate ventures, the variety of new ventures, how they link into the organisation and their ability to cooperate within the internal environment. The final area is the intrapreneurial organisation, which mainly focuses on the characteristics of such organisations.

Pinchot and Pellman (1999) maintain that innovation is the tool of an intrapreneur. Innovation is the process that defines intrapreneurs. However, this innovation never goes to plan and a good intrapreneur cannot control the innovation but can work with it and adapt to the changes that it produces. Five distinct roles require fulfilment to manage the innovation process; idea generator; intrapreneur; intrapreneurial team; sponsors; and finally the innovative climate maker (Costa *et al.*, 2016; Coleman *et al.*, 2014; De Dreu, 2006; Yeung, 2002). Omitting any one of these roles often leads to a prolonged innovation process. However, the intrapreneur may carry the burden of numerous roles including the idea generator, intrapreneur and part of the intrapreneurial team (Park *et al.*, 2014; Martiarena, 2013; Lemon and Sahota, 2004).

> "*Wall-Street places a higher value on innovation than on any other approach to generating bottom and top-line growth…More than a change in leadership, more than a merger or acquisition, more than a renewed commitment to cost reduction."* (Jonash and Sommerlatte, 1999:1).

A corporate culture of innovation is required for the intrapreneur to thrive. Park *et al.* (2014) state that innovation has assumed a vital position of importance in world competition and to compete in this environment, organisations need to reach a level of innovation and intrapreneurship that was non-existent twenty years ago. Each organisation has a corporate culture, this culture shares the values and beliefs of both

the management and employee. This culture is also reflected in how problems are approached, how decisions are made, the rewards system in place and how customers are dealt with (Kim and Rhee, 2011; Holt *et al.,* 2007; Oden, 1997). Oden (1997:3) defines corporate culture as:

> *"The set of shared behaviours, artefacts, values, beliefs, and assumptions that a corporation develops as it learns to cope with the external and internal aspects of survival and success."*

Hoang *et al.* (2010) argues that an innovative corporate culture is entirely different from that of the traditional corporate culture. Innovative culture refers to the total internal environment that supports, or hinders, NPD throughout the whole enterprise. Furthermore, Oden (1997) suggests that a culture of innovation includes all stakeholders within the entire internal environment of an organisation, which may affect product development. To be innovative, an organisation has to be arranged in a way, which allows for, rather than inhibits innovative practices and the organisational climate is a major factor in the amount of innovation which is captured by an organisation. It is suggested that there is much that organisational leaders can do to create a more intrapreneurial organisation (Dhanesh, 2014; Huang, 2001; Amabile *et al.,* 1996).

For intrapreneurs to reach their potential, they will be aware of the organisation's goals. Pellman and Pinchot (1999) believe that there are four essential activities to create a more intrapreneurial organisation; sharing the business strategy; creating channels for volunteers; provide support; and finally diagnose and improve the company's climate for innovation. Intrapreneurship is most successful if it is in line with the organisation`s business strategy (Dhanesh, 2014). McAdam *et al.* (2014) states that if the intrapreneurs of an organisation know where the company is going and are asked for their help in achieving the goals of the company, staff are empowered to be innovative. If the employees are intrapreneurs and know the company strategy, then their intrapreneurial activity will not be in vain but will be of benefit to the organisation (Hoang *et al.,* 2010; Grunig and Dozier, 2003). Furthermore, once the employees have an understanding of the organisation's strategy and have been asked

for their help in achieving it, the organisation itself needs to be prepared with channels for capturing that potential as intrapreneurs respond with ideas for the implementation of the organisation`s strategy. In effective organisations, these channels are more extensive than a simple suggestion system, as these suggestion systems only work if the ideas incur minor changes which fit in well with the organisation`s existing patterns (Grunig and Kim, 2011).

Intrapreneurs require good channels to be available and efficient. Good channels are defined as providing safety for the intrapreneurs to use, assisting unknown intrapreneurs to get around management's resistance and ensure broad distribution. An example of this includes providing access to seed funds that allows intrapreneurs to test their ideas or an organisation hosting an innovation fair and inviting potential sponsors to attend (Pellman and Pinchot, 1999). The next aspect for consideration when creating a corporate culture receptive to intrapreneurship is support structures. Stegmeier (2008) agrees with the view of Pellman and Pinchot (1999) and states that the organisation needs to support the intrapreneurs with the appropriate resources including training, sponsorship or mentoring to bring new ideas, concepts or products to market. Hayword (2010) suggests another area that is vital for an organisation to assess when establishing a corporate culture receptive to intrapreneurship is the climate of innovation provided by the organisation for the employees and looking at ways in which that climate can be improved. In a competitive marketplace, organisations need to be innovative more quickly than ever, an organisation`s survival and success depends on it. Furthermore, an organisation can create a climate for innovation by making innovation central to everything, not just an add-on. It is essential to create an environment where individuals feel free to raise issues and ideas and they are heard and not laughed at and a culture of innovation is to be encouraged across to whole organisation (Hayword, 2010; Hoang *et al.*, 2010).

Most corporate cultures have a climate and reward system, which supports unadventurous thinking (Spithoven *et al.*, 2013; Hisrich, 2004). There is a significant emphasis on collecting vast amounts of information to assist in making rational decisions rather than using the gathered information to justify decisions, which did not

achieve the required outcome (Filieri, 2013; McAdam and Reid, 2001). Hisrich (2004) continues to argue that risky decisions are delayed until there is enough evidence to suggest that there is little to lose by partaking in a particular decision. Often there is so much 'signing off' and approval needed, that by the time a decision is allowed to proceed, there is no one person who feels responsible for that decision or takes personal ownership of a project. Stegmeier (2008) further argues the point of Hisrich (2004) suggesting that in many organisations decision making is too cumbersome for the special needs to commercialise an innovation, especially in a highly competitive industry. Stegmeier (2008) states that companies who have successfully introduced new ideas, concept products or services to market on a regular basis have developed an explicit decision-making process for issues which may arise during the innovation or implementation stage.

Hisrich *et al.* (2008) state that the traditional culture is unlike an intrapreneurial culture within an organisation. The directives in a traditional organisational corporate culture include a lack of support for error, failure and initiative (Spithoven *et al.,* 2013). Hisrich *et al.* (2008) believe that this limited working environment is not conducive to the guiding principles of intrapreneurs such as creativity or risk-taking. In contrast, an organisation which has an intrapreneurial culture differs from that of traditional corporate culture as it develops goals and rewards for taking the initiative and encourages individuals to experiment even outside of their traditional area (Spithoven *et al.,* 2013; Hisrich, 2004). Pellman and Pinchot (1999) suggest that the intrapreneur needs to be trusted and other than providing them with support, advice and protection, the organisation, and its managers cannot step in to try and control the situation unless the intrapreneur is doing something which may damage the larger organisation. Organisations need to allow the intrapreneur to spend their time innovating rather than trying to get permission, resources and writing reports (Hayword, 2010; Hoang *et al.,* 2010).

Successful organisations adapt to an ever-changing environment. The challenge, which faces organisations, is to self-renew to successfully and continuously improve their products and develop new business (Chesbrough, 2010a; Oden, 1997). This is

how a successful business is measured, but this cannot be achieved unless the company has both an effective innovation process and most importantly, the organisation has an innovative culture (Bayon *et al.*, 2016; Dahlander and Gann, 2010). Jarvis (2000) states that even though many companies do develop and establish an intrapreneurial system, they do not sustain or achieve a positive result for their efforts. With a significant investment in strategically inappropriate ventures and concurrent neglect of the core, mainstream businesses have frequently lead to massive financial losses and a damaged reputation (Clegg *et al.*, 2017). It is not enough to implement an intrapreneurial system if it is not in line with the company's objectives, corporate culture, and monitored sufficiently (Jarvis, 2000). In uncertain economic climates organisations need to be adaptable for survival and innovation is a critical component in achieving adaptability (Molina-Castillo and Munuera-Alemán, 2009).

2.6 Value creation within an organisation

Value creation is a widely used term. While an established definition of value creation does not exist there are specific themes which are consistently apparent in conversations on the topic (Sahay and Sahay, 2017). It is established in the literature that value creation is a complicated process, which involves various levels (Della Corte and Del Gaudio, 2014; Lepak *et al.*, 2007). Lepak *et al.* (2007:182) define value creation as:

> *"Value creation depends on the relative amount of value that is subjectively realized by a target user (or buyer) who is the focus of value creation – whether individual, organisation or society – and that this subjective value realization must at least translate into the user's willingness to exchange a monetary amount for the value received."*

This definition states that there are two types of value, firstly value which is subjective to the consumer`s and their needs and secondly is that of monetary value, is the price appropriate for the value received by the consumer (Bowman and Ambrosini, 2000). Laursen and Svejvig (2016:40) rely on a less complicated definition, which is adapted from Morris (2013) and Quartermain (2002) where *"value is not absolute, but relative,*

and may be viewed differently by different parties in differing situations." Regardless of the definition, the multi-disciplinary nature of value creation can lead to confusion as to its definition according to Lepak *et al.* (2007). This is due to the variety of viewpoints on how value is also created by stakeholders and individual departments within an organisation (Della Corte and Del Gaudio, 2014; Barney, 2013; Lepak *et al.*, 2007). Lepak *et al.* (2007) also suggest that value creations focus has two elements that are content, 'what is value' and process, 'how value is created', which can also lead to confusion in differentiation between each element. Furthermore, the value creation process can also lead to confusion as to who is the creator and who is the capturer of value. According to Bowman and Ambrosini (2010), the need to distinguish between the creator of value and the capturer of value is a great one. To avoid as much of this confusion as possible and to protect the innovation process and product success, business models have to provide structures for the success or failure of a product (Sahay and Sahay, 2017). The use of a proven business model is the key to sustainable innovation and value creation in any organisation (Sosna *et al.*, 2010).

Porter`s (1985) value chain model states that there is the potential to create competitive advantage in all aspects of the organisation. The value chain model (see Figure 2.6) consists of nine value-adding activities, which are further broken down into primary activities, of which there are five and secondary activities, of which there are four (Zott and Amit, 2010). These activities allow for movement from the formulation of a competitive strategy and the implementation of that strategy (Holsapple and Singh, 2001). The five primary activities, in essence, consist of activities relating to the creation of a physical product and are considered to be primary and most important as these are the attributes which add value to a product, such activities include marketing and sales; operation; after sales service; and distribution (White, 2004). Secondary activities are the development and operation of organisational infrastructure and assist with the five primary activities, such as human resource management or information technology (Zott and Amit, 2010; White, 2004; Porter, 1980). The secondary activities have the sole role of being supportive allowing the other activities to take place seamlessly. The primary activities will not run successfully without the secondary activities. Functions such as accounting and management are considered as the

organisation`s infrastructure and are all links in the chain (Holsapple and Singh, 2001). If the secondary activities run smoothly, then the primary activities will in turn benefit in areas such as increases in productivity and new channels of distribution becoming available. All of these improvements in both primary and secondary activities will allow an organisation to achieve competitive advantage (Porter, 1985).

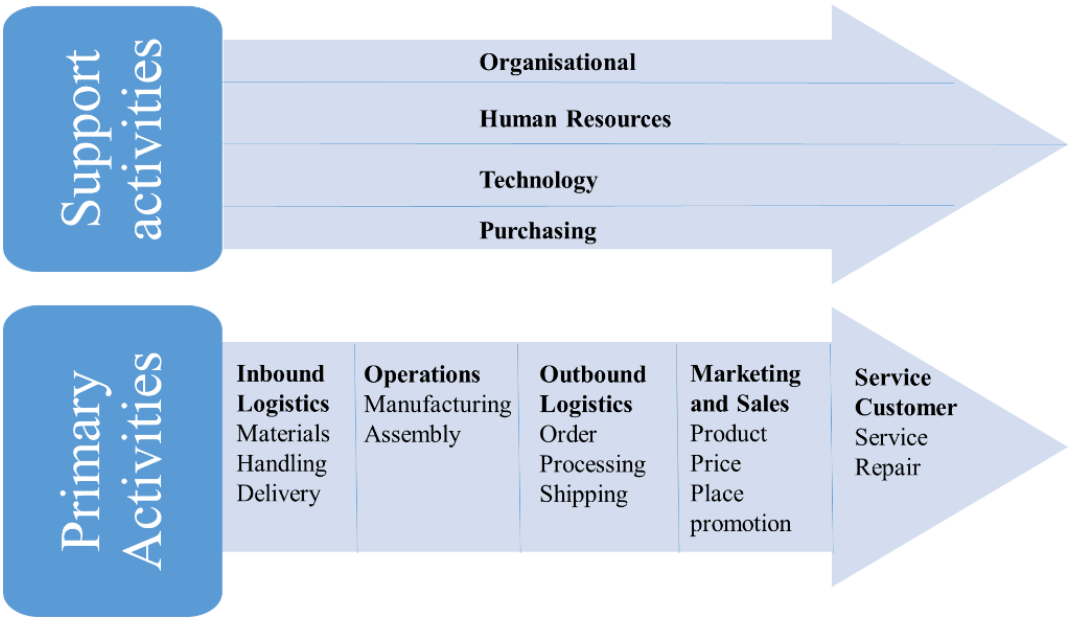


Figure 2.6 Value chain model

Source: Porter (1985)

2.6.1 Product design for value-added new food products

Value-added foods are those, which have a positive addition to the original product (Bleiel, 2010). However, the definition of the word positive can be contextual and is viewed from different perspectives (Ferguson *et al.*, 2010). There are four perspectives of new food product development, that is, the perspective of society as a whole; individuals; food producers; and academics. The perspective of society as a whole usually involves health and wellbeing throughout life taking priority, which in turn can encapsulate a variety of perspectives determined by culture, tradition and habit (Mark-Herbert, 2002). In western society there is no longer a major societal issue in

relation to starvation as a cause of death rather of overindulgence in food, stress and an unbalanced diet leading to health issues and high medical costs causes by diet-related diseases such as cancer, diabetes and coronary heart diseases (Barker, 2012; Barnard, 2011; Stevenson *et al.,* 2007). This leads to a societal view of preventing such diseases through certain value-added foods (Jew *et al.,* 2009).

The perspective of the individual can often be similar to that of society with a desire for health and longevity of life while maintaining conservative food habits and desired indulgence (Nielsen, 2015; Ferguson *et al.,* 2010). With a core concern being health and wellbeing there is a need for foods which provide health benefits without causing a significant change to individual's habits (Bigliardia and Galat, 2013; Jew *et al.,* 2009). With a highly informed consumer who is not only willing to pay for health but also aware of their choices, there is an opportunity for value-added new food products to enter the marketplace (Nielsen, 2015; Kollberg, 2000). The perspective of food businesses and the food and beverage industry as a whole will often focus on minor adjustments to a product to reduce the risk of product failure (Dijksterhuis, 2016; Little *et al.,* 2015; Brody and Lord, 2007). The last perspective is that of the researcher or academic where attention is keenly focused on innovation and high levels of R&D. There is often a focus from this group on innovation and its role in economic development, the growth and competitiveness of high performance of organisations and improvements in quality of life (Gopalakrishnan and Damanpour, 1997).

2.6.2 Consumer-oriented new food product design

Consumer-oriented new food product design is an innovation-based concept, which looks at the needs of the current consumers and the needs of the consumers in the future (Fuller, 2016; Costa and Jongen, 2006). Consumer-oriented new food product design looks at the design of all new developments and improvements made to value-added food products (Grunert *et al.,* 2012; Grunert *et al.,* 2011; van Trijp and Steenkamp, 2005). According to Urban and Hauser (1993) there is a requirement to identify the consumer needs, develop an idea which fulfils the identified need of the consumer, develop a product which still fulfils the need of the consumer, the introduction of the product to the market and finally the communication to the

consumer of the fulfilment of the identified need (see Figure 2.6.1). One of the key elements of the concept is the translation of consumer needs into the product specification to accurately fulfil the consumer needs (Trott, 2008). There is also a need for accurate communication to the consumer of the new product, the benefits it possesses and the characteristics it possesses to meet the customer`s wants and needs in a way, which cannot be achieved by competitors (Fuller, 2016).

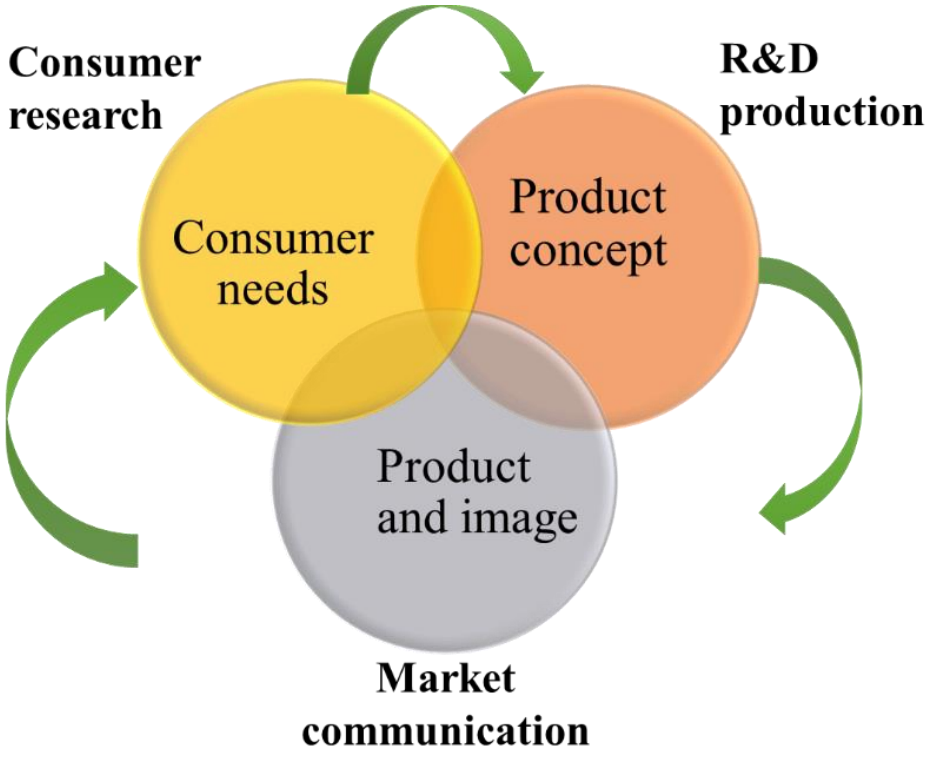


Figure 2.6.1 Consumer-oriented new product design concept

Source: Urban and Hauser (1993)

Building on the consumer-oriented new product design concept the 'means-end chain theory' was developed. The means-end chain theory suggests a way of moving the concept from theory into practice (Aertsens *et al.*, 2009; Grunert and Valli, 2001; Olson and Reynolds, 2001; Hofstede *et al.*, 1999; Audenaert and Steenkamp, 1997; Gutman, 1982). This means-end chain theory identifies the criteria which consumers use to assess and choose a food product (Grunert and Valli, 2001; Olson and Reynolds, 2001). The main assumptions of the theory are that consumers buy products for the

benefits it provides in consumption, not just for the sake of buying the product. The benefits in such a product come from its function, not features, which includes both the psychological and physical benefits of a product, which align with a consumer's goals and values (van Trijp and Steenkamp, 2005).

Means-end chain theory in practice states that organisations can improve the likelihood of purchase of food products by providing the consumer with information (Grunert *et al.*, 2011; Grunert and Valli, 2001; van Trijp and Steenkamp, 2005; Hofstede *et al.*, 1999; Audenaert and Steenkamp, 1997; Gutman, 1982). Means-end chain theory has three key benefits. The first is the key benefits of the food product that the customer can assume they will receive. This can be used as a marketing tool when positioning the food product in a new market or positioning a new product in the current market (Henard and Szymanski, 2001). The second is the removal of any negativity that could be associated with buying and consuming the product (Kaciak and Cullen, 2006). Finally, the creation or establishment of specific benefits of the food for the consumer, which in turn can be used in the communication to the consumer through targeted marketing (Fuller, 2016). By developing and adding to the distribution channels and using accurate information about the consumer, means-end chain theory can improve levels of coordination and communication within the organisation between the marketing team and the R&D department (Kim and Rhee, 2011). Consequently, the NPD process will also improve (Søndergaard, 2002; Hofstede *et al.*, 1999; Griffin and Hauser, 1996).

2.6.3 Sensory development and analysis

Sensory analysis is used to evaluate food products (Choi, 2013). This tool will use a food product and compare it to the product standards (Lawless and Heymann, 2013). It will also assess and evaluate the food product in a variety of areas, such as quality standards, shelf life and storage conditions (Amerine *et al.*, 2013; Nielsen, 1997). It is an essential and cost-effective method of achieving precise information about the food in a short period (Stone *et al.*, 2012). It can measure perceived attributes and allow an organisation to gather information on potential customer's responses to the product (Kilcast, 2010). The way in which an organisation values, measures and defines

quality is subjective, and this can have an impact on the extent to which sensory analysis is included in the product design (Amerine *et al.,* 2013; Kilcast, 2010).

Gavin (1984) states that there are five classical methods of defining product quality. Firstly, is a superior process based on the philosophy that experience defines quality and that will not allow for a precise definition (Hong *et al.,* 2012). Secondly, there is a product-based approach, based on economics and uses specific characteristics or ingredients to measure quality. This approach can change by using variating characteristics or ingredients (Dick *et al.,* 2001). This is followed by a manufacturing-based approach that measures quality based on an organisation`s ability to conform to specification`s, where anything less is viewed as a reduction in quality. The fourth approach is value-based, where costing and pricing are the key components when defining quality. This leads to the suggestion that quality is determined by excellent performance at a reasonable price (Hong *et al.,* 2012). The fifth and final approach is user based which encapsulates the principles of marketing, economics and operations management with customer satisfaction as the focus. This implies that a product of high quality is the one that achieves the highest level of customer satisfaction within the target market (Amerine *et al.,* 2013). The user-based approach or a consumer-focused route is the most appropriate when implementing a sensory quality control programme, as it allows organisations to establish and uphold consistency between the quality of the food and the cost and volume of production (Amerine *et al.,* 2013; Dick *et al.,* 2001; Gavin, 1984).

Stone *et al.* (2012) describe sensory analysis as a scientific discipline that is required in the measurement and interpretation of reactions of the senses (sight, smell, taste, touch and hearing). As fish is a very perishable product, which as a fresh product can only be stored for short periods, the freshness of a fish product can have a significant impact on the quality of the final product and the overall sensory evaluation (Martinsdóttir 1997). Deterioration of fish begins immediately once caught and can affect the sensory process (Martinsdóttir *et al.* 2009). Therefore, panellists need training and supervision of the product to ensure sensory evaluation is conducted only at the stages of the optimal freshness of the fish (Choi 2013). This is not to preclude

sensory evaluation taking place at different stages in the process and the use of different methods of storage as well as temperature control and handling times as these elements give important guidance about the quality (Meilgaard *et al.* 2006). The system of sampling along with the procedure for sensory analysis will be unambiguous, clearly defined and easy to follow if they are to be appropriate for quality management (Choi 2013).

The aims of considering sensory analysis in product design can vary. However, there are many common aims such as that the product is safe; that it complies with the law; that it meets nutritional requirements; and that it can deviate from expectation while still maintaining customer acceptability (Edelstein, 2018). There is a variety of aspects relating to sensory analysis, from visual to textural and taste (Amerine *et al.*, 2013). Visual characteristics can often take priority, as it is the most tangible of the senses (Choi, 2013). This can lead to the physical features of a product, such as consistency of colour taking priority over other sensory attributes (Martinsdóttir *et al.*, 2009).

Sensory analysis is not conducted to the same level in every organisation (Lorente, 2015) as SMEs simply do not have the same resources as large organisations (Padukkage *et al.*, 2016; Van de Vrande *et al.*, 2009; Tidd *et al.*, 2005). Boylston *et al.* (2012) argue that the quality index method is the most appropriate method for sensory analysis on raw whole fish products as it maintains several unique characteristics and can be adjusted for the different species of fish. The grading system for raw fillets of fish needs to encapsulate a variety of sensory elements including the texture, odour, colour and general appearance. Learson and Ronsivalli (1969) devised a grading scale for raw filleted fish. In the scale, there was a range of scores from zero to five of the odour and appearance of the fish. Martinsdóttir and Stefansson (1984) developed a quality grading system for freshness specifically using cod. Bonilla *et al.* (2007) then built on this system for thawed and raw cod fillets. Sensory analysis on filleted cooked fish evaluates their odour and flavour initially. Martinsdóttir (1997) discusses the Torry scale suggesting that it was the most appropriate scheme for assessing the freshness of fish, which has been cooked. The Torry scale comprises of a ten-point scale with the highest being of the utmost freshness in taste and odour to

three which was considered to be spoiled and any score below three being considered not fit for human consumption (Martinsdóttir *et al.,* 2004, 2001).

The Codex guidelines for the sensory evaluation of fish and shellfish in laboratories (Codex 1999) details the necessary facilities, procedures and training to conduct sensory analysis with fish products. Whereas many quality assurance systems use minimal sensory tests and high numbers of well-trained inspectors (Kilcast 2010). There are guidelines for constructing and designing sensory evaluation labs both in Ireland and internationally (Meilgaard *et al.* 2006; International Organization for Standardization (ISO) 8589 1988). However, these standards and guidelines are aimed towards organisations where R&D is a sizable activity and may not be appropriate for SMEs. For quality purposes sensory analysis carried out in smaller organisations cannot be any less precise or diligent than if they were conducted in the R&D labs of large organisations. However the process may not need to be as elaborate as those of larger organisations (Martinsdóttir *et al.* 2009).

Frøst *et al.,* (2015) suggests that to maintain a sensory panel in SMEs is not an affordable option. To allow SMEs to conduct some form of sensory analysis, specific descriptive methodologies that are cost effective may be used. These methodologies may be used on untrained sensory panels including the consumer. While such an approach has been criticised in the past (Moskowitz *et al.,* 2008), there is more acceptance of results stemming from untrained panels as research suggests that the consumer can provide valid descriptive analysis of food products (Bruzzone *et al.,* 2012; Worch *et al.,* 2010). However, this analysis is required to be collected and analysed appropriately to be considered valid (Frøst *et al.,* 2015). There is also an abundance of research which is in agreement that the more involvement the consumer has in the early stage of the NPD process the more likely the product is to be successful (Fuller, 2016; Little *et al.,* 2015; Grunert and Traill, 2012; Sorenson and Bogue, 2005; van Kleef *et al.,* 2005).

2.6.4 Packaging of food products

One of the biggest drivers in the food packaging industry is the need to satisfy the requirements of both society and the economy (Robertson, 2016; Amerine *et al.*, 2013). Therefore, packaging needs to deliver in the areas of innovation, practicality, quality and safety in an efficient manner. Yam and Lee (2012) suggest that there are socio-economic needs that drive food packaging innovations, the first of which is consumer lifestyle (Siegrist, 2008). Consumer lifestyle generally drives innovations in convenient packaged foods (Winger and Wall, 2006). This area is greatly influenced by the older members of the population, higher numbers of small families or single households along with double income households. Such lifestyles demand a convenient, safe, wholesome and flavourful food product (O'Sullivan, 2011; Tonsor, 2011; Zhou *et al.,* 2010). These consumers' needs provide an opportunity for innovation in food packaging in areas of convenience, such as, on the move snacks and nutritionally sound quick meals (Robertson, 2016; De Steur *et al.,* 2012; Aoki *et al.,* 2010).

Value can be viewed as a ratio between benefit and cost, which is consumer driven (Yam, 2010). The enhancement of functional packaging to meet consumer`s needs may be a way to increase the benefits (Robertson, 2016; O'Sullivan, 2011). Similarly achieving lower cost through using less expensive materials or increasing productivity can reduce production costs (Zhou *et al.,* 2010). Whether it be increasing productivity through using heat-sealed containers instead of double seamed containers or reducing distribution costs by using plastic over glass in containers, it is vital that there is no compromise in the quality and safety of the product and ensuring that it meets the requirements of the customer (Robertson, 2016; Tonsor, 2011).

Packaging costs affect product profitability. The purpose of food businesses and all businesses is ultimately to preserve and grow profits (Burgess, 1982). This can be achieved easily once the needs of the consumer are met (Bleiel, 2010). Food companies often use innovative packaging to meet the needs and requirements of a constantly changing marketplace (Robertson, 2016; Siegrist, 2008). Maintenance and growth of profits can also create competition within the packaging industry through

different forms or types of packaging (Arvanitoyannis and Stratakos, 2012). In the case of convenient food, packaging may vary from aluminium foil cases, microwavable dishes or styrofoam containers. This need for variation will allow for innovation by packaging materials suppliers and a more competitive marketplace (O'Sullivan, 2011; Zhou *et al.,* 2010).

Food safety can encourage innovation. This innovation may come in developing ways to protect food and providing the optimum conditions for reducing the risk of food spoilage (Winger and Wall, 2006). In Ireland, there are an estimated 100,000 cases of food poisoning every year (Health Service Executive (HSE), 2015). Microbial contamination can be a significant cause of foodborne illness and can occur at any stage of production from harvesting to packaging (Tonsor, 2011). However, there is also a consumer fear of food bioterrorism, which is the deliberate contamination of food products, and many consumers, particularly in the USA, view this as a real and severe public threat. Innovative food packaging can offer consumer reassurance against microbial contamination and product tampering (Yam, 2010).

Finally, environmental concerns such as providing biodegradable and environmentally friendly packaging can be a push for innovative food packaging materials (Rhim *et al.,* 2013; Sorrentino *et al.,* 2007). This is generally caused by societal pressure in developed countries to use packaging created from a material that can be either reduced, reused, recycled or incinerated over packaging that in dumped into landfills (Marsh and Bugusu, 2007). There is also a demand for biodegradable and environmentally friendly packaging materials to have a high level of reassurance against microbial contamination and product tampering (HSE, 2015).

Packaging needs to be first and foremost functional. While there are socio-economic needs that drive food packaging innovations, there is also the need for food businesses to provide and maintain a level of functionality in their product packaging (Rhim *et al.,* 2013; Sorrentino *et al.,* 2007). Packaging includes some the essential functions of protection, convenience, communication, and containment as a requirement before innovation is considered (Robertson, 2016; Singh and Anderson, 2004; Paine, 1991). It is essential that food be protected from spoilage through physical, microbiological

and chemical sources while also being tamper-proof as this is the function of packaging (Singh and Anderson, 2004). If food is not protected, it will very quickly become unsafe and unappetising (Rhim *et al.,* 2013). The level of protection required can be determined by the food itself, how fragile it is, the required shelf life and distribution environment (Sorrentino *et al.,* 2007). All packaging, where possible and appropriate, will maintain the hermetic condition, such as airtight containers, and stop the possibility of bacterial penetration (Winger and Wall, 2006; Singh and Anderson, 2004; Brown and Williams, 2003). Packaging which is convenient is vital in meeting the needs of the consumer's lifestyle, for example, resealable packaging (Siegrist, 2008). However, this convenient packaging will not compromise the safety of the product and not affect the cost significantly.

There is also an element of marketing and brand management, in packaging. Packaging as brand identity can affect and influence consumers purchasing decisions (Robertson, 2016; Amerine *et al.,* 2013). Written text, logos and graphics are all aspects of packaging that communicate with the customer (Brody *et al.,* 2001). As containment of foodstuffs is the primary function of packaging, there is a need to select packaging based on the requirements such as weight, shape and sizes (Yam and Lee, 2012). Any innovations in the area of food packaging needs to enhance at least one of these functions. Otherwise, it is unlikely to be successful (Rooney, 2012; Brody *et al.,* 2001).

2.6.5 Food choice model

A variety of factors affects consumer's food choices. Such factors include dimensions that are both conscious and unconscious, such as previous experiences, beliefs and current needs. Therefore their decisions cannot always be rational (Franchi, 2012). There is a variety of models based on the process of food choice. Of the models there is a diverse range of views, the focus of these models vary from marketing to sensory analysis. The Steptoe *et al.* (1995) Food Choice Questionnaire measures the food choices of consumers using 32 items to measure nine factors "*health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity and ethical concern"* (Steptoe *et al.,* 1995:267). Criticisms of the model suggest that the

self-reporting approach does not accurately reflect dietary behaviour (Scheibehenne *et al.,* 2007). However, the Food Choice Questionnaire has been the basis of many of the further studies (Carrillo *et al.,* 2011; Fotopoulos *et al.,* 2009; Pieniak *et al.,* 2009; Ares and Gámboro, 2007) in areas such as food motivation and healthy eating.

Jaeger *et al.* (2011) developed a tool to try to manage those factors outside of the control of the producer. The Food Choice Kaleidoscope is "*a tool for structured description and observation or variability in food choice events*" (Jaeger *et al.,* 2011:413). The centre of the kaleidoscope is the food choice or event with the person, place and product being the centre of attention. The person, place and product then consist of subfactors such as a banana being a subfactor of the product and grandma's house being a subfactor of the place. The use of the kaleidoscope allows for analysis of one or more of the factors individually or together. The model allows for insight into the complexity of food choice and provides an understanding of the process (Jaeger *et al.,* 2011).

Grunert *et al.* (2012) developed the Total Food Quality Model, which discusses the considerations for consumption of food using judging quality. The judgement of quality before purchase is based on cues (Grunert, 2002). There are two cues for quality identified, intrinsic and extrinsic. Intrinsic quality cues (physical) such as the colour of a banana being an indicator of ripeness and extrinsic quality cues may be price or design of packaging (Chrea *et al.,* 2011). After purchase, satisfaction is based on the expected quality versus the experience of quality. The producer of the product cannot always control this, as there are multiple impacting factors.

Hamlin (2010) puts another argument for the use of cues in food choice forward. The Cue-based Decision Making model is specially designed for low involvement products such as food. This model while complex focuses on the information immediately available to the consumer about the product rather than a long-term structured consumer evaluation of a product. The example given by Hamlin (2010) to explain the model is of milk in a supermarket and the immediate information available about the milk. That information can be categorised into cues such as the colour of packaging (green versus blue) or brand (Avonmore versus Tesco Own). These cues form a

framework that is individual to that specific product for the consumer to evaluate. The process of evaluation and selection of a product is fast, generally within five seconds. Once the selection is made a consumer moves onto another product, and the process starts again.

Consumer choice and acceptance of novel foods or unfamiliar foods is not the same as those for familiar foods (Henchion *et al.,* 2013; Kuznesof, 2010; Wądołowska *et al.,* 2008). Often new or novel foods fail due to consumer rejection (Fischer and Reinders, 2016). A response to new foods including new ingredients and new technologies (Henchion *et al.,* 2013) is dictated by the consumer's perception of the benefits, risks and costs associated with the food (Siegrist, 2008, Ronteltap *et al.,* 2007). These perceptions can vary based on certain circumstances as outlined in the above food choice models (Fischer and Reinders, 2016). To ensure consumer acceptance, there is a need to include the consumer and their insights at the early stages of new food product development (Van Kleff *et al.,* 2005).

There are numerous theories on consumer food choice and acceptance of innovative and new food products (Siegrist, 2008; Ronteltap *et al.,* 2007; Rodgers, 1995; Ajzen, 1991; Davis, 1989). Ajzen, (1991) developed the theory of planned behaviour to evaluate consumer acceptance of new food products. The theory predicts consumer behaviour based on the intentions of the consumer. The intention of the consumer is dictated by three elements, attitudes, subjective norms and perceived behavioural norms. All three elements are based on the consumers own belief systems including behavioural beliefs, normative beliefs and control beliefs (see Figure 2.6.5).

This model is considered to be appropriate for new foods as it is a straightforward approach. The theory of planned behaviour model has had additional contributions such as moral norms. However the original is most appropriate for new foods (Fischer and Reinders, 2016). A significant number of consumer behaviour and acceptance models for new foods follow a similar pattern and are belief based. Consumers make judgements on product attributes, and rates the product either positively or negatively based on their belief system. However, the stronger a person's beliefs about a products attributes the more difficult they are to change. In such a situation, many food choice

models are ineffective, as they cannot change consumer's beliefs (Tormala *et al.*, 2006; Bizer and Krosnick, 2001). There are also critics of the Theory of Planned Behaviour, as it does not take into consideration unconscious influences that may affect behaviour such as past experiences or fears (Sheeran *et al.*, 2013) and the role that emotions may play in behaviours (Conner *et al.*, 2013). A limitation of the theory is that it does not take into account changes over time as it suggests that behaviour is a linier decision-making process (Edberg, 2013).

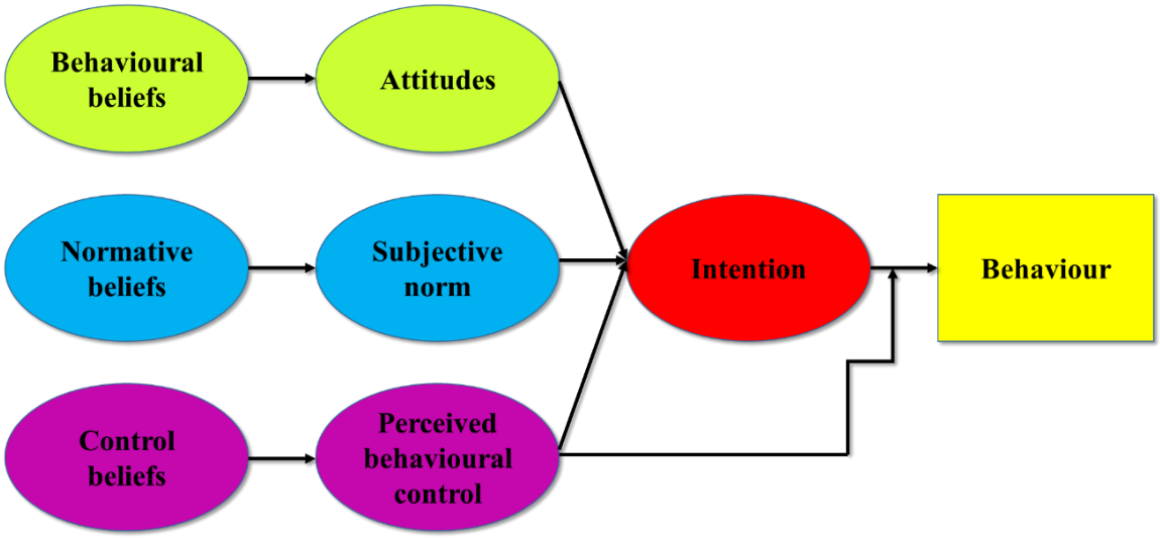


Figure 2.6.5 Theory of planned behaviour
Source: Ajzen, (1991)

2.7 Best practice framework for NPD process: large firms versus SMEs

Extensive time, analysis and consideration are required to ensure that the launch of a new product is given the best possible opportunity for success (Alegre *et al.*, 2013). Successful organisations analyse potential new products to eliminate products and services that will not work. This enables them to concentrate resources on other areas that have a stronger chance of success (Christensen, 2013; Kahn *et al.*, 2006). Camp (1989) maintains that best practice is any method or process that is more effective at delivering the desired outcome than any other method or process within that domain. Nicholas *et al.* (2011) adapted this definition, to define NPD best practices as ones that promote greater success in developing and launching new products and services.

Similarly, Taylor (1967) suggests, regardless of how many methods and tools are adopted by any industry, there is always a particular method accepted as the quickest and the best. This, however, states that best practices are a one-size-fits-all activity. Murray *et al.* (2002) state that best practice within each organisation will adapt over time as markets and the organisation grow and change. Therefore, there is no one method for every organisation to achieve success in the same way. Loch (2000) is of the opinion that even though Stage Gate process (Cooper, 2001) is key to most NPD processes, the competitiveness of an organisation depends on adaption to their specific environment. Davidson *et al.* (2000) who states flexibility within any NPD process is key as adjustments are required to the process as the organisation changes, reinforce this.

There are many NPD frameworks available to every organisation, regardless of its size or capacity. Much of the research in the area of the NPD process, however, focuses on larger organisations, which differ for SMEs, as larger organisations tend to possess more research and technological resources (Bhuiyan, 2011; Gibb, 2000; Martensen and Dahlgaard, 2000; Cooper and Kleinschmidt, 1995). As discussed previously, larger firms innovate differently than SMEs, and therefore the NPD process will differ between larger firms and SMEs. Nicholas *et al.* (2011) conducted research to determine the practices that are reflective of best practice based on the dimensions of The Barczak *et al.* (2009) framework. Table 2.7.1 identifies best practices of the dimensions typical to both large organisations and SMEs. The results would indicate that both types of organisation know what best practice in NPD is. Research conducted by Nicholas *et al.* (2011) seen in Table 2.7.2 identifies best practices that are individual to each type of organisation. Strategy, commercialisation, metrics, and performance evaluation all resulted in significant differences with all other areas only identifying minor differences. This would conclude that while there are commonalities, there are on the whole different best practices for both types of organisations.

Table 2.7.1 NPD best practices for all organisations

Strategy
• Clearly defined and organisation awareness of NPD goals • Organisation views NPD as long-term strategy • NPD goals are clearly aligned with organisation mission and strategic plan • NPD projects and programs are reviewed on a regular basis • Opportunity identification is ongoing and can redirect the strategic plan real-time in order to respond to market forces and new technologies
Research
• A formal market research function exists in the organisation • Ongoing market research is used to anticipate/identify future customer needs and problems • Concept, product and market testing is consistently undertaken and expected with all NPD projects • Customer/user is an integral part of the NPD process
Commercialisation
• A sales and operations planning process exists • The launch team is cross-functional in nature • Cross-functional teams make decisions concerning manufacturing, logistics, marketing, and sales • A project post-mortem meeting is held after the new product is launched • Logistics and marketing work closely together on new product launch • Everyone on the launch team is privy to the new product's promotional campaign • A launch team is established and responsible for launch planning activities
Process
• Go/no-go criteria are clear and pre-defined for each review gate • The NPD process is flexible and adaptable to meet the needs, size, and risk of individual projects • The NPD process is quite visible and well-documented • Knowledge of projects is stored and available to NPD personnel
Project climate
• A NPD group exists and is dedicated to just NPD work • Each project has a clearly identifiable project leader • Each project has core cross-functional team which remains on the project from beginning to end • Team rewards are used to reward successful projects • NPD activities between functional areas are coordinated through formal and informal communication
Company culture
• Top management supports the NPD process • The company actively works with customers to develop new solutions • Management rewards and recognizes entrepreneurship
Metrics and performance evaluation
• No best practices identified by both SMEs and large organisations

Source: Nicholas *et al.* (2011)

Table 2.7.2 A comparison of NPD best practices between SMEs and large organisations

Dimension	Company	Best practice
Strategy	SMEs	• Mission and strategic plan help define strategic arenas for new opportunities
	Large firms	• Organisational mission and strategic plan drives NPD project selection • There is a ranking or prioritization of projects • There is keen consideration for balancing the number of projects and available resources • NPD projects are evaluated relative to other projects in a portfolio
Research	SMEs	• Results of testing (concept, product, market) are formally evaluated
	Large firms	• No unique best practices identified
Commercialisation	SMEs	• No unique best practices identified
	Large firms	• The NPD process is tied to the sales and operations planning process • A liaison is established between development and launch teams • Sales force training is an important consideration before launch • Customer service and support are part of the launch team • A standard protocol for planning a launch exists within the company • Prior to launch, various market tests are used when possible • Policies for returns and replacement are considered
Process	SMEs	• Idea database is maintained • An IT infrastructure with appropriate hardware, software and technical support is available to all NPD personnel
	Large firms	• Project management software and techniques are used to manage projects • Product champions are critical to NPD success
Project climate	SMEs	• No unique best practices identified by either
	Large firms	• No unique best practices identified by either
Company culture	SMEs	• New products are developed with global markets in mind
	Large firms	• No unique best practices identified
Metrics and performance evaluation	SMEs	• Formal business analysis is undertaken • Metric data can be readily accessed for analyses • Metric data is tracked and stored • Multiple review points for all projects
	Large firms	• No unique best practices identified

Source: Nicholas *et al.* (2011)

2.7.1 NPD frameworks for large organisations and SMEs

NPD literature emphasises the importance of new product introduction to the market to maintain business success. The importance of NPD for organisational growth, increased profits and business planning are well highlighted (Ulrich and Eppinger, 2015; Cooper, 2001; Urban and Hauser, 1993; Crawford, 1987; Booz-Allen and Hamilton, 1982). The NPD process comprises the steps which are carried out by an organisation when developing a new product and bringing it to market (Tomlinson and Fai, 2013). The stages include everything from the ideas generation to testing and product launch in the marketplace (Curtin, 2006; Booz-Allen and Hamilton, 1982). This series of events are often viewed as information generation and evaluation opportunity for an organisation. Therefore, the process involves management become increasingly more knowledgeable about the NPD process as a whole. This ultimately reduces the risk of product failure (Grunert and Traill, 2012). The process as a whole varies from sector to sector and from organisation to organisation and needs to be adapted according to the specific needs of the specific organisation (Ulrich and Eppinger, 2015; Bhuiyan, 2011).

The development and design of a model which encapsulates all the essential stages of the NPD process has been attempted by many researchers (Ulrich and Eppinger, 2015; Cooper, 2001; Crawford, 1987; Wind, 1982; Scheuing, 1974). The NPD process as described by Loch (2000) identified the five key dimensions of customer orientation which are; cooperation between functions; support of management; the existence of a champion; formal measurement of the effectiveness; and success of the process. Building on these Dooley *et al.* (2002) used these dimensions to develop a strategic plan for NPD. While Cooper and Kleinschmidt (1995) identify nine dimensions of best practice in the NPD process, Kahn *et al.* (2006) refine those dimensions to the six key subjects of strategy; people; process; market research; portfolio management, and evaluation. Building on Kahn *et al.* (2006), Barczak *et al.* (2009) uses a three-phase Delphi methodology, and identifies seven characteristics of NPD including strategy; process; company culture; commercialisation; evaluation; research; and project climate. A summary and comparison of these frameworks can be seen in Table 2.7.3.

Table 2.7.3 Key dimensions of NPD

Key dimensions of NPD					
Dimensions/ Author	**Cooper and Kleinschmidt (1995)**	**Loch (2000)**	**Kahn *et al.* (2006)**	**Kahn *et al.* (2012)**	**Nicholas *et al.* (2011)**
Process	A high-quality new product process.	Successful process	Process based on best practice of go/kill	Process based on best practice of go/kill	Idea database is maintained
Strategy	A defined new product strategy	No best practice	A defined long term strategy	A defined long term strategy	Mission and strategic plan help define strategic arenas for new opportunities
Culture	An innovative climate and culture	No best practice	No best practice	Innovative corporate culture	New products are developed with global markets in mind
Resources	1. R&D spending for new product development 2. Adequate resources of people and money	No best practice	No best practice	No best practice	Hardware, software and technical support is available to all NPD personnel
Teams and leadership	1. High-quality new product project teams 2. The use of cross-functional project teams	1. The existence of a champion 2. Cooperation between functions	Cross functional teams	Cross functional teams	No best practice
Management	Senior management commitment	Support of management	No best practice	No best practice	No best practice
Portfolio	No best practice	No best practice	A formal and balances portfolio of ideas and projects	No best practice	
Commercialisation	No best practice	No best practice	No best practice	Commercialisation of all communication-related activities.	No best practice
Market research	No best practice	No best practice	Market research with consumers and stakeholders	Market research with consumers and stakeholders	Results of testing (concept, product, market) are formally evaluated
Evaluation	Senior management accountability	Evaluation and measurement of performance	Evaluation and measurement of performance	Evaluation and measurement of performance	Formal business analysis is undertaken

Source: Author, adapted from Kahn *et al.* (2012); Nicholas *et al.* (2011); Kahn *et al.* (2006); Loch (2000); Cooper and Kleinschmidt (1995)

2.7.2 NPD frameworks: Kahn *et al.* (2012)

The Kahn *et al.* (2012) framework builds on multiple best practice studies (Barczak *et al.*, 2009; Adams-Bigelow, 2005; Cooper *et al.*, 2004a, 2004b, 2004c; Leavitt, 2003). The framework identifies seven separate dimensions characterising NPD.

Strategy: This includes the defining and planning stages, establishing the area of concentration for R&D. This stage also involves the idea generation, prioritisation, resource allocation and selection of viable projects. This long-term NPD strategy allows for communication of NPD goals as well as giving an organisation long-term NPD focus (Kahn *et al.*, 2012; Leavitt, 2003; Cooper and Kleinschmidt, 1996, 1995).

Process: This is the implementation of the product development stages, which move the product from the initial concept generation as far as the launch. The use of a formalised process is key to the success of NPD (Cooper and Kleinschmidt, 2011; Griffin, 1997; Brown and Eisenhardt, 1995; Page, 1993; Zirger and Maidique, 1990). Organisation`s which possess an advanced NPD process, generally have formalised definitions of the stages and gates which are well documented (Leavitt, 2003).

Research: This dimension represents techniques to gain knowledge and understanding of macro and microenvironmental forces in the marketplace such as competitors and customers (Barczak *et al.*, 2009; Adams-Bigelow, 2005). Much research states that strong market and customer orientation leads to organisation`s having the most successful product (Martensen and Dahlgaard, 2000; Cooper and Kleinschmidt, 1995). Many organisations that are more advanced will engage in market research with the consumer through the full process (Griffin, 1997). Consumers need to be involved in areas such as concept development, product testing and market research (Leavitt, 2003). Effective research in the initial stages can lead to a clear product definition, which ultimately assists in product success (Adams-Bigelow, 2005; Cooper and Kleinschmidt, 1995).

Project Climate: This is inclusive of all initiatives related to human resources from motivating, managing and leading and structuring the team (Barczak *et al.*, 2009). Obtaining the maximum benefit from teamwork requires cross-departmental or functional teams rather than interdepartmental teams. This cross-departmental

teamwork allows varying expertise to communicate and contribute to the product development, which is a crucial factor in the success of the NPD process (Adams-Bigelow, 2005; Griffin, 1997; Cooper and Kleinschmidt, 1996; Brown and Eisenhardt, 1995; Pittiglio *et al.*, 1995).

Company culture: This dimension encompasses the organisation`s and management value system. It is from this value system that NPD is driven, from creating an intrapreneurial environment to collaboration with external stakeholders such as suppliers and customers (Barczak *et al.*, 2009). Support of senior management for a intrapreneurial climate is a crucial factor in NPD success (Voss *et al.*, 1998; Cooper and Kleinschmidt, 1995). Cooper and Kleinschmidt (1995) state that the organisation`s which had an intrapreneurial environment are the best performing. As discussed above these environments incorporate creative techniques such as encouraging creative thinking, idea generation and personal projects.

Metrics and performance: This involves evaluating the NPD process, measuring, tracking and reporting on each project and the performance of each product on the market (Barczak *et al.*, 2009). Measuring the performance of the NPD process can lead to the improvement of further products and projects (Godener and Söderquist, 2004; Griffin, 1997; Pittiglio *et al.*, 1995). If this process is not undertaken, then an organisation will be unaware of the performance of the product and whether there is an improvement or decline in NPD performance. The advanced organisation`s adopt 'go-kill' gates as well as specific gate criteria, that is, if a product does not reach the required criteria, the project is killed or significantly re-evaluated (Leavitt, 2003).

Commercialisation: This dimension encompasses all communication-related activities, such as marketing, PR, launch and post-launch management of a new product (Barczak *et al.*, 2009). This is a critical point in the NPD process as it may be the ultimate failure or success factor of a product, and may dictate how well a product performs once it is in the market (Cooper and Kleinschmidt, 2011; Adams-Bigelow, 2005; Cooper and Kleinschmidt, 1987). According to Cooper *et al.* (2004b), as the commercialisation of the NPD process is often very expensive, and can often exceed the cost of all the other stages combined, an organisation needs to get the launch right on the first attempt to maximise profits.

2.7.3 NPD frameworks

While there are numerous dimensions to the NPD process, successful systematic processes are less common in the literature, and those that are present follow a similar format see Table 2.7.4. Kotler and Armstrong (2012) identify eight steps in the product development process, and these steps are based on the Stage Gate process with a focus on the marketing of the new product. This model suggests that to create successful new products, organisations will have an understanding of the market and competitors to ensure new products are superior to those currently available to the consumer. This is consistent with a market-oriented approach. However, while the ethos of the process is appropriate and important for SMEs to adopt, particularly at the early stages of the NPD process, the actual process itself is overly complex and too time and resource consuming for SMEs. This can be seen as product or prototype development is stage six of eight in the model compared to the model proposed by Curtin *et al.* (2006) where product or prototype development is stage three of eleven. Curtin *et al.* (2006) developed a product development process specifically for food businesses. However, the literature does not elaborate as to the specific details of the individual steps. While it appears to be more suited to food related companies than the other models available, it is more suited to larger organisations and is too complicated and lengthy for SMEs.

Table 2.7.4 NPD processes

Process Name	Product development process (food)	Stage Gate	Major Stages in New-Product Development
Author	**Curtin *et al.* (2006)**	**Cooper (2001)**	**Kotler and Armstrong (2012)**
Step 1	Concept/ Idea	Discovery stage	Idea generation
Step 2	Market research	Scoping	Idea screening
Step 3	Product design	Build business case	Concept development and testing
Step 4	Feasibility	Development	Marketing strategy development
Step 5	Develop kitchen samples	Testing and validation	Business analysis
Step 6	Product testing	Launch	Product development
Step 7	Factory trials	Post launch review	Test marketing
Step 8	Further product testing and quality controls		Commercialisation
Step 9	First production run		
Step 10	Promotion/Launch		
Step 11	Performance and Monitoring		

Source: Author, adapted from Kotler and Armstrong (2012), Curtin *et al.* (2006) and Cooper (2001)

In the development of a NPD process for a specific industry or organisation the Stage Gate process provides a tested model to base the process on. A Stage Gate system is designed to direct, manage and accelerate organisation`s creativity and innovation efforts (Cooper, 2001). It guides a new product through stages and steps from the initial idea to the launch of the product. Seven goals are required to be achieved in the process. Quality of execution is dependent on systematic approaches from the development to the launch stage. All processed within an organisation can be managed and therefore maintain an emphasis on quality. It states that if an organisation gets the details of the process right then, the result will be one of high quality in product or output.

The ideal NPD plan will encompass a focus on completeness and a focus on quality (Chao *et al.,* 2009; Sosa and Mihm, 2008; Anderson and Joglekar, 2005). Cooper (2001) states that a lack of focus leads to a lack of adequate process evaluations, a failure to establish and maintain priorities and accurate information during the 'go-kill' decision making. These 'gates' weed out poor projects and ensure that the critical activities have been completed in a quality fashion. The gates act as a quality control checkpoint on the assembly point. They ensure that the quality, merit, economic viability and the progress of the project are kept on track. Depending on the answers to such questions management will determine whether to 'kill' the project or not (see Figure 2.7.1).

Parallel processing can meet the need for a quality process, which also takes into consideration the time pressures. During this parallel process, many activities are run congruently rather than as a series of actions. Traditionally, new ideas have been put through a series approach, which is time-consuming. This parallel approach means there is less of a chance of a similar project being undertaken in parallel and therefore reducing any time wasting (Chao *et al.,* 2014). Each team from a wide variety of disciplines ensures that each department has input in each gate review and the product has completed a rigorous process from all aspects of the markets. The process necessitates a contribution and participation from multiple departments, and functions, throughout the organisation. The Stage Gate process needs each project to be run by a cross-departmental team. The team is required to be committed, and senior management has to ensure that they have the free time required to facilitate the

commitment (Hutchison-Krupat and Kavadias, 2013). To some members it may be their full-time jobs working on a new product. However, Cooper (2001) highlights the word 'true' in describing the cross-functional team. This is because some members of the team may not be given the commitment required because of other work requirements (Chao *et al.*, 2014).

Cooper (2001) believes that without market orientation and market assessment new products are more likely to fail. If this is the case, it states that marketing activities conducted by organisations are critical to ensuring that new product success rates are high. This model has addressed nine marketing actions that are 'integral and mandatory plays' during the NPD process. The success of a new product is regularly determined in the initial stages of the process. Initial research and product definition are key to a successful product process, and these early stages have to be carried out sufficiently before a project is allowed to proceed (Cooper, 2014).

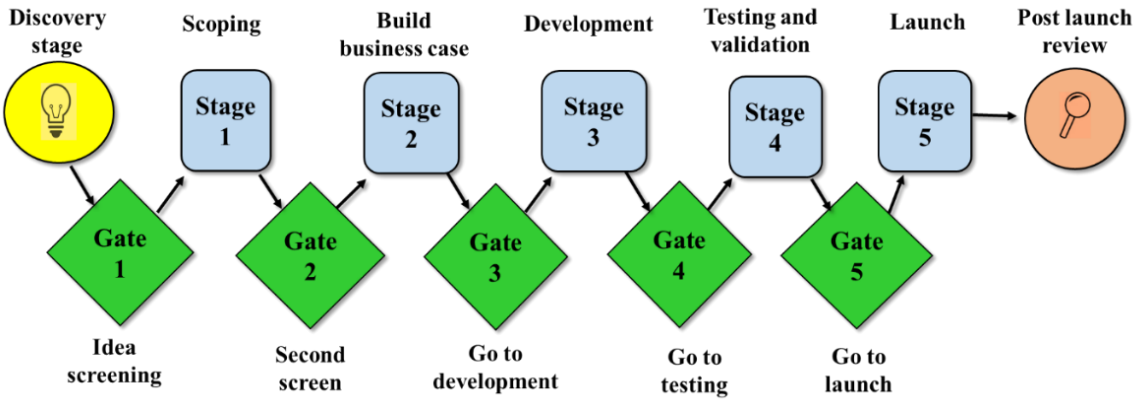


Figure 2.7.1 Stage Gate process

Source: Cooper (2001)

Becker (2006) states that the Stage Gate process is somewhat dated and comes with many problems that hinder innovation, including, but not limited to the following it is a slow process; it has very high overheads; the emphasis is focused on form rather than substance; and all projects are treated alike regardless of differences. Ale Ebrahim *et al.* (2009) states that in today's dynamic and ever-changing marketplace, companies are under pressure to continuously produce new and innovative products in a timely manner. The pace that is required cannot be accomplished with the use of the Stage Gate model as it too time-consuming. However, as a result, Ale Ebrahim *et al.* (2009)

believes that there is a need for the model to be altered to ensure a faster development and launch of products. Tranfield *et al.* (2003) suggest a simpler model with three intercepting phases of knowledge activity, which are discovery, realisation, and nurture. The Stage Gate model is a guide for the developing new products. It takes the product from the very beginning, the discovery stage, to the end, where the product is launched. It gives organisations seven very clear and concise goals, five gates and six stages from which to work. Each goal, gate and stage have a set of criteria to be passed before the product can move any further.

2.8 Summary

This chapter examines NPD process of both SMEs and large organisations. The process of innovation and how it is managed within an organisation is established. There is also a focus on what value is within an organisation and particulary value adding element of food related organisations. There is an investigation into best practice frameworks for potential adoption by SMEs for the NPD process. The literature available on the NPD process is vast, as is the literature available on the NPD process in large organisations. There is less literature available on the NPD process in SMEs. However, there is enough to be able to identify common themes and the differences between SMEs and large organisation in this area. The frameworks discussed in this chapter, while well established and adopted by many organisations may not be appropriate for food related SMEs. An altered or a more simplistic version of one of these processes may be more appropriate. Such a process is essential to combat the high failure rates of new food products and ensure that Irish food related SMEs continue to contribute to the economy and promote Irish value-added food products. Chapter 3 focused on knowledge management within SMEs and its impact on the NPD process. Chapter 3 will also examine the benefits of adopting a culture of market orientation and the impact that would have on NPD in an organisation and specifically food related SMEs.

Chapter 3: SMEs Knowledge Management and the Adoption of a Market-Orientated Culture

3.1 Introduction

Chapter 3 discusses knowledge management and its implementation into organisational culture for the benefit of the NPD process. Furthermore, a clear definition of market orientation is also established, and the benefits and barriers to adopting a market-oriented approach to NPD are explored along with the importance of strategic planning around market orientation. The development and importance of a market-oriented culture in food related SMEs is examined and the appropriate consumer integration techniques for SMEs are highlighted. Finally, how an organisation can measure market orientation is discussed.

3.2 Knowledge management

Modern strategic management puts significance importance on knowledge as a whole and specifically on the concept of knowledge management (Hislop, 2013; Darroch, 2005; Davenport *et al.*, 1997; Grant, 1996. Knowledge management in its own right is a critical aspect in the survival of long running organisations, as it is the underpinning success factor to many of an organisation`s activities by interlinking strategic objectives and knowledge management within an organisation (Rhodes *et al.*, 2008; Cooper, 2006; Darroch, 2005). While knowledge economy is a vital part of an organisations success through knowledge generation, knowledge integrating and knowledge-protecting (Teece, 2000), Wiig (1997) states that this is only the case if organisations can enhance, manage and effectively use the knowledge acquired. Therefore, management's role should centre on the creation, diffusion, storage and application of both current and newly acquired knowledge with a knowledge management system (Canter *et al.*, 2011). A knowledge management system should acquire, identify, develop, diffuse and use key concepts of knowledge or get, use, apply and contribute (Canter *et al.*, 2011; Rhodes *et al.*, 2008).

Knowledge management is "*the management function that creates or locates knowledge, manages the flow of knowledge within the organisation, and ensures that the knowledge is used effectively and efficiently for long-term benefit of the organisation*" (Darroch and McNaughton, 2002:211). Creating and sustaining

competitive advantage is dependent on the knowledge that is rooted in people and their interactions with other people, tools they use and the tasks they complete (Liebowitz, 2016; Argote and Ingram, 2000). Lee, (2001) insists that successful knowledge management activities will result in increased competitive advantage for an organisation. While researchers provide many different views and definition of what knowledge management is, the purpose is clear, that is, increase the firms understanding or wisdom, in order to increase overall performance and competitive advantage (Rhodes *et al.*, 2008; Brown and Duigad, 2000; Grant, 1996). Knowledge management has two main components; the significance of knowledge within and to an organisation and how the knowledge moves within an organisation and between organisations (Shaw and Williams, 2009; Tsai, 2001; Cooper, 2006; McElroy, 2003). The transfer of this knowledge necessitates that the information can be absorbed and translated into information which can then be enacted at a fast pace, ultimately leading to competitive advantage for the purpose of innovation (Liebowitz, 2016).

Innovation may be viewed as a combination of current and conceptual knowledge (Schumpeter, 1934). The ability of organisations in the exploitation of the knowledge acquired and innovation accordingly is necessary in order to maintain success (Fuglsang *et al.*, 2011). An organisations ability to acquire knowledge and uses that knowledge to innovate in dependant on accumulating skills and knowledge through team work; networks and/or alliances (Fuller, 2012; Cooper, 2006; Cavusgil *et al.*, 2003; Mowery *et al.*, 1996). Cavusgil *et al.* (2003) states that while explicit knowledge may be easily transferred; tacit knowledge transfer makes a greater overall contribution to the innovation capacities of an organisation. Tacit knowledge can improve the knowledge processing ability, which leads to a faster pace for future innovations, which is key to the successful exploitation of external knowledge (Fuller, 2012; Canter *et al.*, 2011; Cohen and Levinthal, 1990).

3.3 Knowledge transfer

Once there is an accumulative amount and movement of knowledge and information within an organisation, it can be a problem due to the need to utilize information correctly and within the appropriate context (Leiponen and Helfat 2010; Cooper, 2006; Cohendet and Steinmueller, 2000). However, knowledge and information are not one

in the same (Cohendet and Steinmueller, 2000). They differ in two main ways. The first is that knowledge creation happens through a costly and complex process of codification, and the second, the creators of this codification are to be understood by the receiver (Inkpen and Tsang, 2005; Cohendet and Steinmueller, 2000). Much research states that knowledge is always codified, however, this is not the case as knowledge can present itself in many forms such as human capital through skill and experience or systems capital such as policy's or operating procedures (Leiponen and Helfat 2010; Shaw and Williams, 2009; Inkpen and Tsang, 2005). Knowledge may be 'sticky' in how it is rooted in an individual or an organisation and can be a difficult to translate into the market (Canter, 2011; Tsai, 2001; Mowery *et al.,* 1996; Cohen and Levinthal, 1990).

Knowledge is either explicit or tacit (Puusa and Eerikäinen, 2010; Polanyi, 1996; Nonanka, 1991). Knowledge, which is considered explicit, is less 'sticky' and is fluid as it presents itself in a logical form and can be structured into knowledge resources such as databases or reports (Shaw and Williams, 2009; Tamer Cavusgil *et al.,* 2003). Tacit knowledge, on the other hand, is much more difficult to codify or transfer and it is often referred to as 'know- how' (Shaw and Willaims, 2009; Cooper, 2006). Tacit knowledge is much more 'sticky' than explicit knowledge. This states that the collection, arrangement and transfer of this type of knowledge can be challenging for managers and thus makes the management of tacit knowledge much more complicated in modern times (Spraggon and Bodolicia, 2012; Mowery *et al.,* 1996). Over time, it is possible to convert knowledge from tacit to explicit via articulation. As a result, this will escalate the possibility of the movement of knowledge within or between organisations. The more knowledge within an organisation that is accumulated, the more knowledge stock an organisation will acquire (Hislop, 2013; Cooper, 2006; Hislop *et al.,* 1997).

The accumulation of this knowledge stock is dependent on the sharing of knowledge and this will lead to the attainment of a competitive advantage. The knowledge stock of an organisation is generally considered an asset to an organisation. However, it can highlight an organisation`s weaknesses, as it can highlight gaps in the necessary amounts of explicit and/or tacit knowledge (Machlup, 2014). This exposure may be counteracted through knowledge management which focuses on inter and intra-firm

collaboration (Canter *et al.,* 2011; Baggio and Cooper, 2010). Successful knowledge management requires an understanding of various elements within the existing organisational environment in order to allow for the identification of the knowledge gaps and therefore the knowledge required (Cooper, 2006). The concept of knowledge transfer requires successful distribution of knowledge where experiences, ideas and/or innovations are shared within a social system over time (Baggio and Cooper, 2010; Cooper, 2006; Argote and Ingram, 2000). These collaborations may manifest themselves in a variety of forms such as joint departmental collaboration of innovative strategies, which encourage open communication between departments, as well as regular meetings between department heads and mutual support in problem solving (Canter *et al.,* 2011). This collaborative departmental approach may require much change and change management within an organisation and the understanding that no longer can the assumption be that 'knowledge is power', but the organisation must alter this position to 'sharing is power' (Baggio and Cooper, 2010).

It is suggested that knowledge transfer has three purposes; knowledge acquisition, creation and reuse (Rhodes *et al.,* 2008). Given that every organisation possess its own set of characteristics and has its own specific needs and criteria for knowledge accumulation the challenge for many organisations is the identification of the most suitable method of knowledge transfer. The spiral model for knowledge creation, developed by Nonaka and Takeuchi (1995) views knowledge creation in four forms, (see Figure 3.3). The first form is tacit to tacit via socialisation, the second being tacit to explicit via externalisation, the third form is explicit to explicit via combination and finally explicit to tacit via internalisation. Brauner and Becker (2006) and Lee (2003) do question the superior performance of the first form, tacit to tacit through socialisation, as unshared explicit knowledge may often be more valuable to an organisation then tacit knowledge, which is shared. The creation of innovation and competitive advantage may be determined by the way in which such tacit knowledge is codified, sourced, transferred and combined (Te Velde, 2004; Schumpeter, 1934).

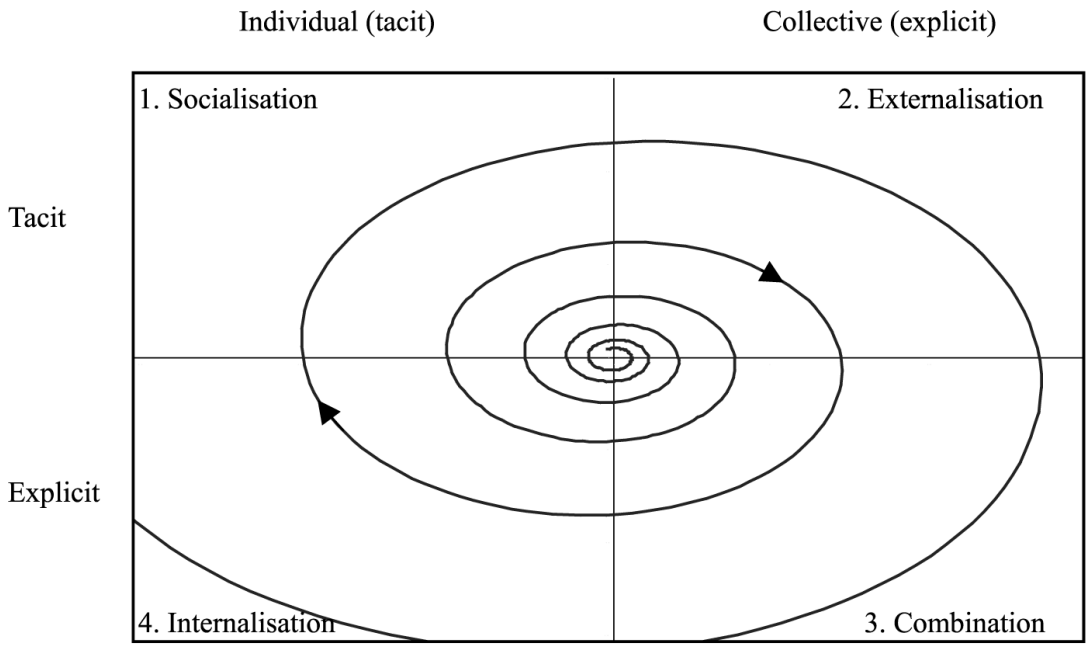


Figure 3.3 Spiral model of knowledge creation

Source: Nonaka and Takeuchi's (1995)

Considering the diversity in knowledge types, forms and dimensions there is a need for suitable channels and tool for knowledge transfer to be provided to allow for the objective of achieving successful inter and intra organisational knowledge transfer (Frank *et al.*, 2015; Frey, 2001). Learning through observation, mimicking or inter and intra firm surveillance can lead to successful knowledge transfer (Hall and Williams, 2008). Also through vertical and horizontal collaboration with suppliers or competitors, and through labour mobility (Frank and Echeveste, 2012; Baggio and Cooper, 2010; Cooper, 2006; Hjalager, 2002; Argote and Ingram, 2000). Regardless of the method the vital component in successful knowledge management ensures that each members involved has only a constructive impact on knowledge transfer (Frank *et al.*, 2015). All parties involved must aim to create an intellectual asset; adjust or create structures, which aid knowledge management and improve the capability to develop and grow successful knowledge transfer (Cooper, 2006). There may be no discriminating in the process, all cultures of various parties must be allowed for (Baggio and Cooper, 2010; Cooper, 2006; Galbraith, 2002) and the current informal and formal structures and process accommodated (Shaw and Williams, 2009; Rhodes, 2008). Likewise, the knowledge transfer needs to be managed through clear methods

via leadership and human resources management (Rhodes *et al.*, 2008). This management is vital in the timely achievement of potential competitive advantage and innovative changes to the processes of an organisation (Shaw, 2004).

Knowledge management aims to establish platforms for collaborations; this however does not mean that the desired level of knowledge transfer will be achieved (Adams and Comber, 2013). Much research conducted into the area of barriers to knowledge transfer realises issues such as use of inappropriate knowledge transfer process and structures, and choosing adequate sources of information (Spraggon and Bodolicia, 2012; Shaw and Williams, 2009; Cooper, 2006; Hjalager, 2002; Walsh and Ungson, 1991). The type of knowledge being transferred and the nature of the task must be taken into consideration (Spraggon and Bodolicia, 2012; Cavusgil *et al.*, 2003; Cohen and Levinthal, 1990). Other considerations need to be acknowledged by the organisation, such as the attributes of the knowledge; the complexity of knowledge; its context and the destination (Cooper, 2006; Tsoukas and Vladimirou, 2001). There is also a need to examine the media and the selection of an appropriate media is imperative to increase and ensure understanding by the recipient (Spraggon and Bodolicia, 2012).

3.4 Organisational management of knowledge capturing and diffusion

There are two main sources of knowledge. The first source is all knowledge excluding that created in higher education such as that created by governments, consultants and industry as a whole. The second source is that created within higher educational institutes (Platenkamp and Botterill, 2013). Argote and Ingram (2000) state that the former is a blend of both explicit and tacit knowledge and is located in numerous locations or repositories. There are five such repositories in organisations according to Walsh and Ungson (1991); individuals; organisational structure and roles; organisations SOPs; the organisational culture and the practices, policies and procedures adopted by the organisations. These repositories can pose challenges for management when attempting intra or inter organisational knowledge transfer, as management must select the correct tools and tasks for successful knowledge transfer (Shaw and Williams, 2009; Argote and Ingram, 2000).

With this multitude of permutations, the knowledge source must be reliable and trustworthy. The assessment of the reliability and trustworthiness of a source can be achieved through various activities such as, employing similar strategic plans as the organisation with which collaboration will occur; maintaining formal networks and alliances or possible informal relationships may ensure reliability and assure knowledge recipients (Alvarez, 2016). The modified work of Hjalager (2002) and Kacker, (1988) by Shaw and Williams, (2009) implies both indirect and direct sources of knowledge flow. Knowledge transfer as a direct flow between joint ventures, franchising and management contracts. Knowledge transfer as an indirect flow include trade press, observation, seminars and labour movement. Hjalager (2002) supported by Cooper (2006) states four elements in such a process; the first being trade system, followed by the regulatory system, then the infrastructure system and finally technological system. In Cooper`s support of this models he does pose a question relating to the possibility of a fifth system as the above addresses the area of new trends and knowledge concepts; but not that of education. Cooper (2006) states that different levels of education achieved by various employees will be the determinant factor, in their ability to both transfer and absorb knowledge in a timely manner. The exposure to reliable sources of knowledge however is not enough to achieve successful knowledge transfer; organisations must then capture and integrate the knowledge into the organisation.

Knowledge capture aims to filter out any unrequired or out dated knowledge which may currently exist within an organisation (Cooper, 2006). As previously stated this means that the trust and reliability of a source is vital, as is the necessity for management, employees and all stakeholders to want change. Research by Baggio and Cooper (2010) identifies a similarity to disease in order to fully explain the knowledge capture process, where a receiver of the disease will first be 'susceptible' (S) to a disease and then after a prescribed length of time of exposure the recipient becomes 'infected' (I). In order for the knowledge transfer to be accomplished, the infection stage must be completed (Baggio and Cooper, 2010). In some organisations, there is a third stage and that may be 'recovery' (R), that is, previously identified knowledge gaps may be filled, while other organisations may identify new knowledge gaps through re-evaluation. This re-evaluation will then lead to the organisation becoming

susceptible once again and the process begins once more. This means that the two potential outcomes for an organisation are either SIR or SIS.

The development of a learning culture within an organisation can be challenging to obtain (Hoang, *et al.,* 2010). Consistent memory development and as well as the development of knowledge repositories, increases a firm's capability for the acquisition of knowledge which then facilitates the possibility of building new stocks of knowledge (Machlup, 2014). Developing a constant environment of learning within an organisation is vital and prior experiences can assist particularly if a gap in knowledge can be linked with an existing problem and lead to a solution (Hoang, *et al.,* 2010; Cohen and Levinthal, 1990). Previous knowledge and learning skills along with the foresight to see the potential value of newly acquired information, understanding of such information and linking the information to the strategic goals of an organisation is considered to be absorption capacity (Cohen and Levinthal, 1990). Developing absorption capacity and thus competitive advantage and business performance within an organisation is based on inspiring and encouraging employees to develop their agility, motivation and opportunity (Tsai, 2001). An organisation, which lacks absorption capacity, involved in a collaboration, will decrease the networks rate of knowledge transfer (Hansen, 1999). Prior learning, competencies, the organisations position in a network and technical capabilities will all be determining factors of absorption capacity (Tsai 2001).

There are according to Zahara and George, (2002) two types of absorption capacity. The first is the potential for capacity, a firm possesses absorption capacity and acquires knowledge, however there is little evidence of change within the organisation. The second is realised absorption capacity; a firm accomplishes knowledge transfer and thus change within the organisation. Previous research states that absorption capacity is the capability of organisations to take newly acquired knowledge and appreciate, apply and integrate that knowledge for the purpose of innovation (Zahara and George, 2002; Cohen and Levinthal, 1990).

Codification is a method of developing statements, which are received and understood (Cowan *et al.,* 2000). Explicit knowledge is prepared as conditional statements, this does not guarantee that the recipient understands and tacit knowledge does not guarantee that the recipient comprehends. In addressing these issues, the purpose of

codification is to take information and develop it into messages, which ensure the capabilities that comprise knowledge and a reproduction of capacities (Hau, *et al.*, 2013; Cohendet and Seitmueller, 2000). According to David and Foray (1995), this process consists of three steps, the creation of models, languages and messages. Models and languages need to be used so that all parties understand them, once this has happened then a 'codebook' has been developed (Cowan *et al.*, 2000). Once the models and languages within the codebook are established and embedded within an organisation there will be a greater level of knowledge transfer between the networks developed. This will allow for the development and introduction of ideas and concepts, leaving the process open to the development of new models and languages once again (Hau, *et al.*, 2013; Cohendet and Seitmueller, 2000).

The cognitive framework which includes an organisation`s previous learning experiences and a willingness to learn and change within the organisation will be the determining factors in the level of effectiveness and understanding of the codified knowledge by the recipient (Cooper, 2006; Cohen and Seitmueller, 2000; Cowan *et al.*, 2000). The inter-personal relationships within a network can aid the development of capabilities of understanding, which will increase the codification of knowledge (Lamberts and Shanks, 2013). Altering the habits of recipients or groups within an organisation can pose a challenge in the process of knowledge transfer. A greater emphasis is required on the development, understanding and skill at codification of tacit knowledge in order to change habits (Lamberts and Shanks, 2013; Cohendet and Seitmueller, 2000). Emphasis must be placed on the purpose of knowledge codification rather than the process in order to achieve effective knowledge management (Cooper, 2006). For this to be accomplished, it is vital to choose the most appropriate medium of communication that has the ability to support effective knowledge transfer (Spraggon and Bodolica, 2012). This method of communication must use language and a media, which is appropriate for all the communication needs of the organisation (Cohen and Levinthal, 1990).

3.5 Organisational culture and knowledge transfer

Each organisation is unique and has a unique environment. Factors that determine that environment are strategy, structure, technology and culture (Filieri, 2013). These

factors may also be the determining element in the overall performance of the organisation (Galbraith, 2002). The motivations of management will determine the culture of an organisation of which Shaw (2004) identifies two types. The first is the business-oriented entrepreneur, the key to this type of manager is the aggressive nature in which key trends in processes and practices are sought out and used in NPD (Keller, 2006). The second is the less innovative type of manager, which is often referred to as being a passive entrepreneur (Ioannides and Petersen, 2003). Hamel *et al.,* (1989) suggest that these qualities within a manager can infect an organisations culture, for example a manager's motivations and desire to learn can penetrate throughout the organisation and may create a culture of change and learning (Dayasindhu, 2002). Argote and Ingram (2000) states that there are a number of ways in which a willingness to embrace change can be achieved, for example the allocations of resources to ensure appropriate technologies.

The organisational culture is not only effected by, but also effects, the inter and intra personal relationships of the organisation (Uzkurt *et al.,* 2013). Knowledge transfer is directly impacted by these relationships and a lack of personal relationships greatly reduces the possibility of knowledge transfer being successful (Baggio and Cooper, 2010; Tsai, 2001). Having positive relationships between both teams and individuals, particularly in the case of peers provides many advantages such as; effective and timely informal and formal communication and encourages sharing of solutions to problems encountered (Abzari and Teimouri, 2008; Chin-Loy and Mujtaba, 2007; Cohen and Levinthal, 1990). Relationship development, which can contribute to successful knowledge transfer and can be encouraged through regular interactions, mutual confidence and developing an extended history (Schein, 2009). Such interactions can occur at many locations such as meetings, training sessions, workshops and seminars. Formal and informal environments allow for interaction of multidimensional cues such as cognitive, bodily, affective and spiritual, which may not be visible in voice or text communications as easily as they are visible in person-to-person contact (Lewis, 2004).

Maintaining good relationships between and within an organisation can affect the knowledge transfer rate (Anaya, 2012; Cohen and Levinthal, 1990). Knowledge may be rooted in individuals or groups and an organisation`s absorption capacity dictates

the organisations ability to interact with external knowledge not the absorption capacity of its members (Cohen and Levinthal, 1990). This implies that the person, often referred to as the gatekeeper, who processes external knowledge along with their inter and intra organisational personal relationships have a vital role to play within the knowledge transfer process (Hjalager, 2002). This gatekeeper is imperative to the knowledge management process as they must monitor external environments and select the relevant sources of knowledge required by the organisation in order to close knowledge gaps (Hislop, 2013). They must also codify this knowledge so it is understood by the organisation, to allow for the appropriate use of knowledge (Tsai, 2001). Brachos *et al.*, (2007), states that this level of responsibility means the professional relationships of this individual are imperative to the knowledge transfer process. In addition, the relationships they hold socially and personally, as they are involved in all stages of the knowledge transfer process including the acquisition, assimilation and transformation stages for the successful transformation and exploitation of knowledge (Cooper, 2006). There must be sufficient and appropriate formal and informal structures in place between management and personnel to effectively achieve inter an intra-organisational communication (Fuller, 2012).

Argote and Ingram (2000) poses that if personal relationships effect the rate of knowledge transfer then labour plays a role in knowledge transfer also. Labour can be the cause of problems but also solutions in the process of knowledge transfer (Machlup, 2014). The movement for employees can speed up the rate of knowledge transfer and is associated with high levels of competitive advantage (Cohen and Levinthal, 1990). There are negative elements to personnel movement, while it may increase learning and expertise, it can also stifle experimentation and potentially innovation (Machlup, 2014). Movement of labour within an organisation is however preferable to the movement between organisations by employees and the knowledge which is embedded within individuals can often be specific to a certain context (Cooper, 2006; Argote and Ingram, 2000).

The structure of the networks is important and can often dictate how effective knowledge transfer is in creating innovation and competitive advantage (Baggio and Cooper, 2010; Argote and Ingram, 2000). Organisations, which have a horizontal structure or a non-hierarchical structure, encourage organisational learning and

encourage the development of knowledge transfer through strong personal relationships (Rhodes *et al.*, 2008; Tsai, 2001). Rhodes *et al.* (2008) states that the structure of an organisation may be determined by the type of knowledge transfer, suggesting that a formal structure is best to facilitate explicit knowledge transfer while informal structure are required for the transfer of tacit knowledge. The organisation needs to be flexible within the structure while still maintaining a level of formal structure type otherwise there may be a slower rate of knowledge transfer (Grant, 1996; Nonaka and Takeucki, 1995).

Knowledge is the main driver for research, creativity and innovation in corporate environments. The ability of organisations to be innovative in knowledge intensive sectors is determined by links established between innovation styles and types of knowledge (Alegre, *et al.*, 2013). Within such an environment the capabilities of management in relation to knowledge management is vital to realise innovative potential and performance (Alegre, *et al.*, 2013; Miles, 2007). As knowledge intensive firms maintain and create value via innovation, an organisations approach to knowledge management will affect an organisations innovation ability and could develop the foundation for competitive advantage (Muller and Doloreux, 2009). This can lead to problems if an organisation wished to establish innovation at its core due to the complex knowledge management process and variety of approaches available (Malhotra and Morris, 2009).

3.6 Knowledge management within SMEs

The practice of knowledge management was created and advanced in large organisations and then later applied in SMEs (Durst and Edvardsson, 2012; McAdam and Reid, 2001). Much of the literature about knowledge management is based around processes, policies and structures within organisations, such as knowledge transfer; organisational culture; absorption capacity; and the taxonomy of knowledge (Spraggon and Bodolica, 2012; Baggio and Cooper, 2010; Zahara and George, 2002). The literature also focuses significantly on larger organisations over SMEs (Cyril Eze *et al.*, 2013; Durst and Edvardsson, 2012). This may be because there is a lack of systematic knowledge management within SMEs and where there is it is considered

less superior than that in larger organisations (Yew Wong and Aspinwall, 2005; McAdam and Reid, 2001).

Numerous challenges face SMEs in relation to knowledge, which are not faced by larger organisations (Chesbrough, 2010a). Resource constraints can mean that many SMEs may not have the ability to develop or possess a strategic knowledge management policy and tend to manage knowledge on an operative level, placing more emphasis on tacit knowledge management (Cyril Eze *et al.,* 2013; Buonanno *et al.,* 2005; McAdam and Reid, 2001; Matlay, 2000). This implies that SMEs will be less inclined to share knowledge (Cyril Eze *et al.,* 2013). SMEs generally do not apply long-term structured methods of organisational learning, and management often tries to block the flow of knowledge from their organisation, this, in turn, hinders the sharing of knowledge (Hutchinson and Quintas, 2008; Corso *et al.,* 2003).

A knowledge management process in an SME is vital to ensure the effective use of that knowledge. Many researchers state that approaches to different elements of knowledge management, such as knowledge identification; creation; storage; dissemination; and application, have an influence on the SMEs capability when dealing with the challenges of business and therefore its survival (Cyril Eze *et al.,* 2013; Yew Wong and Aspinwall, 2005; McAdam and Reid, 2001; Wiig, 1997). Thorpe *et al.* (2005) suggests that knowledge management within SMEs is divided into three areas. The first is the knowledge manager; followed by the knowledge systems and procedures embedded within the organisation and their networks; finally, the organisation`s policies and framework which is in place to support knowledge production within the organisation. It is of the utmost importance that SMEs have significant control over their collective intellectual assets, and this cannot be achieved by just scaling down the practices of larger organisations (Frey, 2001; Sparrow, 2001).

Desouza and Awazu (2006) suggest five traits when it comes to the area of knowledge management that SMEs possess over larger organisations. The first is that SMEs do not maintain specific knowledge repositories rather individuals such as managers are the repository, it is the inherently private knowledge that moves in one dimension from manager to employee, rarely moving in the opposite direction. Secondly, ‘common knowledge’ is something, which all members of staff are aware of over a vast array of issues, and is deeply embedded within individuals. Such knowledge allows for ease of

knowledge transfer and application of information. Thirdly, SMEs naturally avoid loss of knowledge as members have close ties, which encourages employees to stay with the organisation for the long term. Even in a situation where an employee leaves, the resources of knowledge within the SME, allow for ease of training and therefore minimal knowledge loss occurs. The fourth point is that SMEs can exploit knowledge from outside the organisation because they lack the resources to continuously create new knowledge. Finally, SMEs generally manage knowledge efficiently at a human level, and technology usage is limited by comparison to larger organisations.

Sparrow (2001) suggests four elements that have a strong influence on SMEs knowledge related projects; the awareness of the importance of personal information and shared understanding; knowledge bases and systems; the understanding of context required for knowledge projects; and organisational learning and knowledge processes in SMEs. Khaldi *et al.* (2005) developed a knowledge management lifecycle model or The Five C's Model. The Five C's Model consists of the capture; creation; codification; communication; and capitalisation of knolwledge. It is suggested that each phase is applied in SMEs to utilise the knowledge that employees possess (see Figure 3.6).

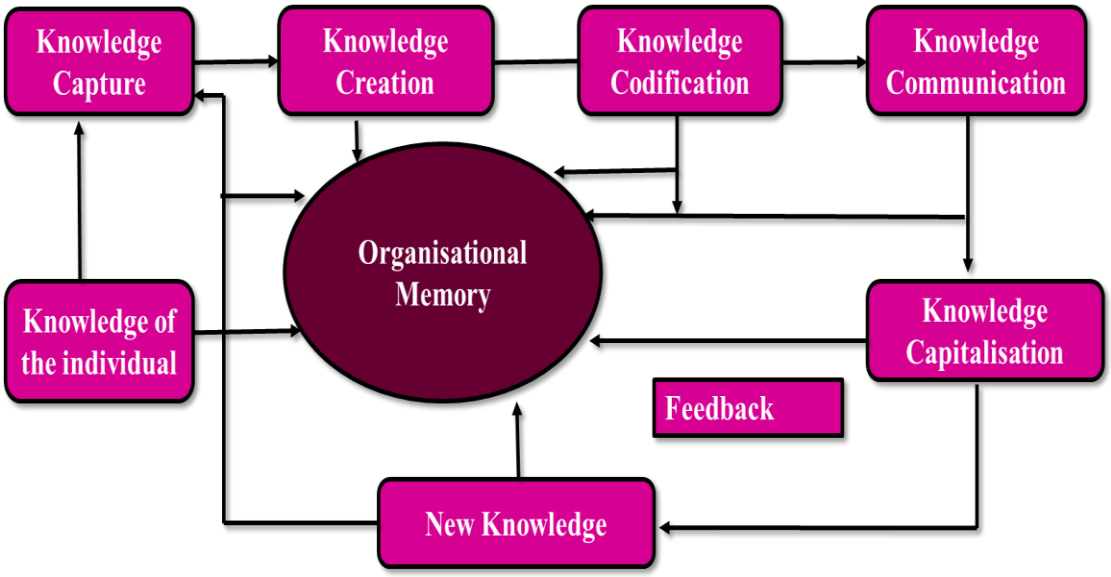


Figure 3.6 The knowledge management lifecycle

Source: Khaldi *et al.* (2005)

Knowledge as a resource requires management within an organisation (Cormican and O'Sullivan, 2003). Codification, which is the management of explicit knowledge, and

personalisation, which is the management of tacit knowledge, are the two main strategies relating to the management of knowledge. It is vital that there is a harmonious balance between knowledge codification and personalisation for a specific organisation, regardless of its size (Cyril Eze *et al.,* 2013). The development of a knowledge management strategy is dependent on the whole organisation establishing and maintaining an all-inclusive approach. Therefore, all knowledge management initiatives will encapsulate people, process and technology (Cormican *et al.,* 2012).

SMEs are more dependent than larger organisations on their networks for knowledge sharing due to their limited resources (Kaufmann & Tödtling 2003). The development and use of networks is required for the sharing of various types of knowledge via direct and indirect relationships (Tolstoy, 2009). Specifically in the area of innovation for SMEs, 'strong ties' are required, that is a network of trusting relationships such as cooperation with customers and suppliers. 'Weak ties' for SMEs would more likely be to cooperation with public or private consultants particularly in the innovation process (Gretzinger *et al.,* 2011). A balancing of these 'strong ties' and 'weak ties' is required (Fliaster and Spiess, 2008) as SMEs are more likely to depend on strong ties when it comes to choosing the cooperation partners in the innovation process and generally only depend on 'weak ties' if they can control them (Gretzinger *et al.,* 2011).

3.7 Knowledge management and NPD

As already discussed, research has shown the factors which contribute to efficient and successful NPD (Marra *et al.,* 2012; Hirunyawipada *et al.,* 2010; Shankar *et al.,* 2009; Cooper *et al.,* 2004a; Zahra, 1994; Cooper and Kleinschmidt, 1987; Booz-Allen and Hamilton, 1982; Myers and Marquis, 1969). The development, management and exploitation of knowledge within an organisation are fundamental to innovation, which in turn allows an organisation to survive, compete, and grow (Shankar *et al.,* 2009; Collinson, 2003; Kogut and Zander, 1992). An organisation, which possesses a competitive advantage, is continuously involved in rigorous knowledge related activities and maintains efficient NPD processes (Hirunyawipada *et al.,* 2010; Shankar *et al.,* 2009; Clark and Fujimoto, 1991). From the extensive research available, Brown and Eisenhardt (1995) organise the empirical literature into three perspectives; product

development as rational planning; communication webs; and disciplined problem-solving.

Rational planning is intended to meet the goals and objectives laid out in the innovation and NPD strategic plan (Richtnér and Åhlström, 2010). This includes processes that are well structured, proactive and systematic with the aim of addressing the goals of the project (Tripsas and Gavetti, 2000). While rational planning should work in harmony with problem-solving, the latter also deals with issues of uncertainty or the serendipitous nature of NPD. Problem-solving relating to NPD activities are generally focused on short-term solutions (Hirunyawipada *et al.,* 2010; Richtnér and Åhlström, 2010). The communication web is focused on human and social sides of NPD and includes factors such as group and individual goal-oriented behaviours, formal communication lines, relationships, and activities related to social networking (Hirunyawipada *et al.,* 2010). Krishnan and Gupta (2001) focus on the platform based product development configurations. Whereas Lewis *et al.* (2002) categorise different models by their focus.

The similarities of most of the models are that the knowledge which is acquired is not centralised but distributed and tacit and stored in the minds of specialised employees (Alavi and Tiwana, 2002; Kreiner, 2002). Therefore, methods, practices and processes of managing knowledge can affect how an organisation generates, stores and mobilises precisely what is known about NPD. Processes which are knowledge enabling about NPD cannot be too formally managed or based on standardised best practices if optimal performance is the goal (Kahn *et al.,* 2012). This can pose a problem for management as formality and standardisation can ground NPD, which by its nature is unpredictable and requires patience, dedication and creativity. This may lead to the need for contrasting opinions to coexist in an environment of unease (Cooper *et al.,* 2004c).

Innovation in the food industry in the form of product development is necessary for any organisation to be competitive on a national or international level (Stewart-Knox and Mitchell, 2003). Considering the research previously conducted and the optimisation of the NPD process, the rate of failure of new products throughout the world, specifically in the area of food, is high (Sorenson and Bogue, 2005). However, if the term ‘new’ only applies to food products that are ‘new to the consumer’ then the

number of food products that fail is significantly lower, as only 7-25% of new food products are considered to be truly innovative (Grunert and Traill, 2012; Lord, 2000; Rudolph, 1995). Taking the low innovation rate, combined with the high failure rates for new food products once they reach the marketplace, it is clear that the process and methods for food related NPD need further development. Stewart-Knox and Mitchell (2003) state that the process will be 'focused, quantitative, rapid and knowledge-based'. Sorenson and Bogue (2005:11) state, "*New food product development is a multidisciplinary knowledge-intensive process, which necessitates the generation, dissemination and management of knowledge across all functions involved in the development of new foods and beverages.*" Sorenson and Bogue`s (2005) research highlights the importance in the early stages of the NPD process for controlled knowledge management. This is within the context of both managing the organisation`s capabilities internally and the external factors, particularly the needs of the customer. This research states that the risks associated with food related NPD, along with the suggestion that operating in the competitive marketplace, requires effective knowledge management within the NPD process. In the initial stages of food related NPD, a high level of customer involvement and integration enhances tacit knowledge management.

This knowledge can be used in the design of the product by converting tacit knowledge received from the consumer to explicit actionable knowledge, and in turn, will influence the marketing plan and design of new products and innovations through market orientation. This can lead to cross-functional coordination between functions, particularly the marketing and R&D departments, which will lead to better management of knowledge. Organisation`s clear understanding of the needs and wants of the consumer, along with their motivations for purchasing, at the initial stage NPD can increase the success of food related products (Sorenson and Bogue, 2005). This argument is in agreement with previous research carried out (Stewart-Knox *et al.*, 2003; Hoban, 1998; Kristensen *et al.*, 1998), which states that it is the knowledge, gathered from consumers, retailers and the market as a whole that are linked to product success. All three studies agree that original and innovative products that were truly novel had a higher chance of success (see Table 3.7).

Table 3.7 Factors determining success in new food product development

Source of data	Stewart-Knox et al. (2003)	Hoban (1998)	Kristensen et al. (1998)
Unique product of high quality	Original concepts more successful	Product adaptations more successful	Most important factor for success
Market/ consumer knowledge	Predictive of success	Predictive of success	Second important factor for success
Senior management involvement	No association with outcome	Predictive of success	Third important factor for success
Product development organised/ technical synergy	No association with outcome	No association with outcome	Factors for success
Customer/ retailer involvement	Predictive of success	Predictive of success	Factors for success
Supplier and other involvement	Predictive of success	Not assessed	Factors for success
Food technologist involvement	Predictive of success	Not assessed	Not assessed

Source: Stewart-Knox and Mitchell (2003)

3.8 Market orientation

There is a variety of viewpoints on market orientation. A market-oriented organisation is effective as it focuses on continuous market research and data collection about, not only the needs of the target market but also the capabilities of their competitors. Also, the data and information collected if used correctly can generate consistent customer value (Urde *et al.*, 2013; Wang *et al.*, 2012; Grewal and Tansuhaj, 2001; Slater and Narver, 1995). Research on the nature and consequences of market-oriented organisations are well-established (Noble *et al.*, 2002; Grewal and Tansuhaj, 2001; Voss and Voss, 2000; Kohli and Jaworski, 1990; Narver and Slater, 1990; Shapiro, 1988). There is an abundance of literature, which highlights the positive association between market orientation and the improved performance of an organisation (Urde *et al.*, 2013; Wang *et al.*, 2012; Grewal and Tansuhaj, 2001; Voss and Voss, 2000; Slater and Narver, 1994; Deshpandé *et al.*, 1993; Jaworski and Kohli, 1993; Ruekert, 1992; Narver and Slater, 1990). At the core of any discussion, relating to marketing strategy and management strategy is a market orientation (Ozkaya *et al.*, 2015; Ramani and Kumar, 2008; Day, 1992).

According to Griffiths and Grover (1998), there are two key viewpoints on market orientation; the first behavioural perspective examines market orientation relating to

specific behaviours such as the generation of market intelligence (Homburg and Pflesser, 2000; Kohli and Jaworski, 1990). The second viewpoint is a cultural perspective that concentrates on the characteristics of an organisation, for example, Narver and Slater (1990:91) define market orientation as "*The organisational culture that most effectively and efficiently creates the necessary behaviours for the creation of superior value for buyers and, thus, continuous superior performance for the business*." A third perspective was added by Shapiro (1988), the decision-making perspective. This involves management sharing information across departments and maintaining open decision making between departments. In a later study, according to Kohli and Jaworski (1990), there are three key parts to market orientation; generation of intelligence; reaction to intelligence gathered and diffusion of intelligence. Ruekert (1992) combines aspects of both definitions and focuses on the business unit instead of the individual market. This perspective allows management to collect and divide the data collected and use it in setting goals and allocating resources. Ruekert (1992) puts the customer at the centre of market orientation followed by the development of a customer-focused strategy. This is followed by the implementation and execution of that strategy. Slater and Narver (1995) and Deshpandé *et al.* (1993) hold a similar view and suggest that market orientation is a culture that prioritises profitability, superior consumer value and is responsive to market information.

Deshpandé *et al.* (1999:7) believes there are three dimensions to market orientation, "*the generation of; the dissemination of; and the response to market intelligence.*" Such an approach allows organisations to identify problems and design and implement procedures to address the specific needs of the organisation and consumer. This is conducted by taking specific actions as a response to insights into the market. This action can be targeted at specific markets via developing or adjust products to meet the consumer`s needs. In adopting a market-oriented approach to NPD, the business will see three key benefits; employee commitment; customer satisfaction and better business performance (Deshpandé *et al.*, 1999).

3.8.1 Strategic marketing

West *et al.* (2015:55) suggest competitive marketing strategy is:

"A market-oriented approach that establishes a profitable competitive position for the organisation against all forces that determine competition by continuously creating and developing a sustainable competitive advantage from the potential sources that exist in a firm's value chain."

The main component of this is market orientation, which is based upon a strategy that focuses on the desires and requirements of the market (Ozkaya *et al.*, 2015; Kudina *et al.*, 2006). Kotler and Keller (2006) stated that the traditional view of marketing involves 'making and selling' a product (see Figure 3.8). This implies that marketing would take place in the second phase of the process. In essence, the organisation knows what needs to be made and how many so that the entire product is sold and a profit is made. This type of traditional view is appropriate if the quality and style of a product are not important to the consumer.

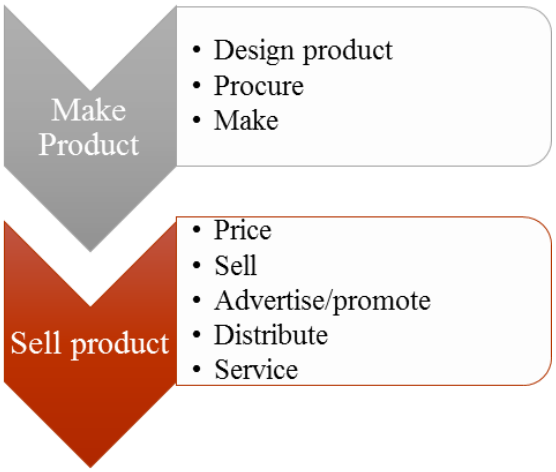


Figure 3.8 Traditional physical process sequence

Source: Kotler and Keller (2006)

Strategic marketing is more appropriate where consumers face a wealth of choice from the market. Figure 3.8.1 illustrates the value creation and delivery sequence, which is broken down into three parts. The first is the 'choose the value' phase, which consists of marketing before the product even exists. This involves market segmentation, selecting an appropriate target market, and developing offering and positioning (STP). STP is the essence of target marketing. The second and third phase is providing value to the consumer and then communicating that value to the consumer (Kotler and Keller, 2006).

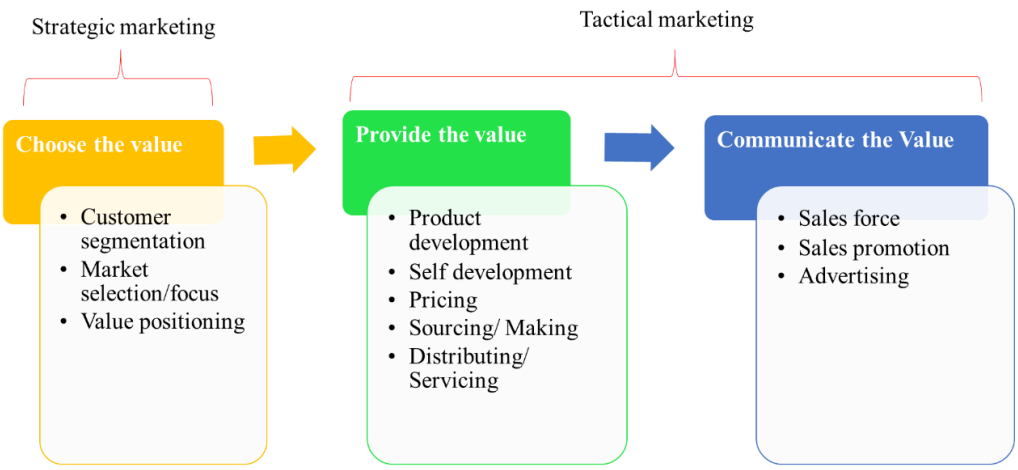


Figure 3.8.1 Value creation and delivery sequence

Source: Kotler and Keller (2006)

3.8.2 Market-oriented strategic planning

Market-oriented strategic planning involves developing and maintaining organisational goals, skills and resources by management in a diverse marketplace (West *et al.*, 2015; Wilson and Gilligan, 2012). Strategic planning aims to develop an organisation`s products so that there are both profits and company growth, regardless of any threats that may arise (Aaker and McLoughlin, 2010; Kotler, 2002). Kotler (2002) discusses the three critical areas of action (see Figure 3.8.2). The first is strategic planning, then the implementation of strategies and finally strategic control. Grünig and Gaggl (2013) support this model and state that it first involves setting out the long-term goals, which allows management to decide what activities and resources will be required. Once this is complete, it allows for clear direction into phase two, implementation. Grünig and Gaggl (2013) examined the final stage and defined it as having a dual function, providing feedback and information on how the strategy was realised while also checking if the assumptions underlying the strategy correspond to reality. While the three phases join in establishing one process, this is not done sequentially. Stage two and three will happen simultaneously. Due to the overlap, there is interlinkage between the three tasks and each area of action, influences the other two (Kotler, 2002).

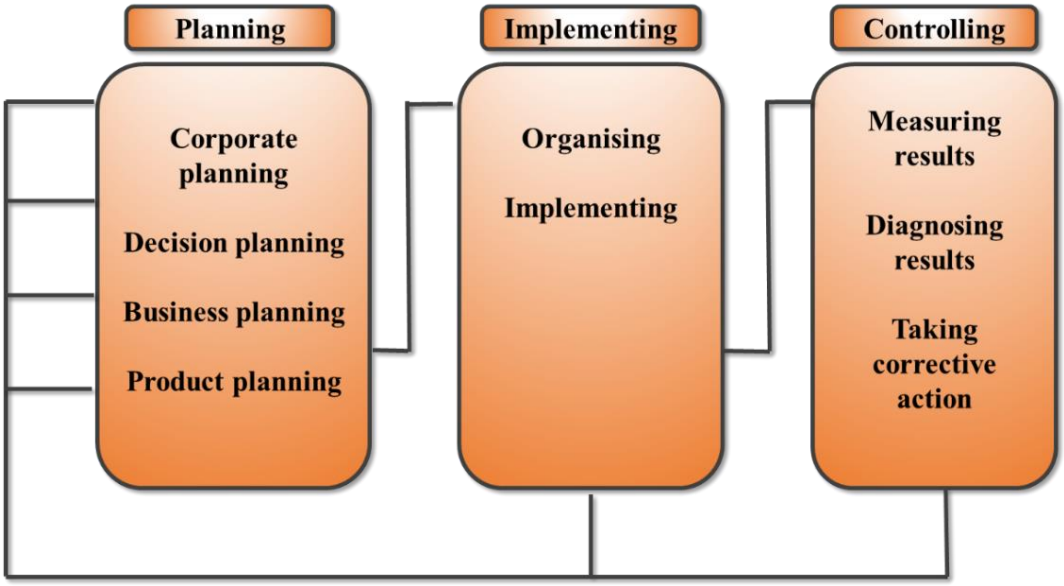


Figure 3.8.2 Strategic planning, implementation, and control process

Source: Kotler (2002)

3.8.3 Consumer integration techniques for market-oriented organisations

As the cost of launching new products increases and the cost of the new product, failure is significant, organisations need to adopt strategies to ensure success (Van Kleef *et al.*, 2005). The role of market orientation in an organisation is an indicator as to how prepared organisations are for the marketplace (Lamore *et al.*, 2016). A large part of market-oriented NPD is the evaluation of competitor products and an understanding of consumer`s preferences to identify opportunities in the marketplace (Cheng and Krumwiede, 2011; Gebauer *et al.*, 2011; Lukas and Ferrel, 2000; Bogue *et al.*, 1999). Sensory analysis, market analysis and eye tracking technologies are some of the approached used in the development of market-oriented food products (Mitterer-Daltoé *et al.*, 2014; Bogue *et al.*, 1999). Each of these methods will provide different types of consumer insights and it is suggested that a multi-functional approach be adopted as one method alone will not give enough detail or level of detail to identify the wants and need of the consumer (Van Kleef *et al.*, 2005; Bogue *et al.*, 1999).

Van Kleef *et al.* (2005) identifies 10 methods and techniques to gather information from the consumer; empathic design; category appraisal (including preference analysis); conjoint analysis; focus group; free elicitation; information acceleration;

kelly repertory grid; laddering; lead user technique; and zaltman metaphor elicitation technique (ZMET). The choice of which method/s to adopt is based on three elements, information source for need elicitation; task format; and need actionability. These three element then break down further to establish the appropriate method of data collection of any scenario (see Figure 3.8.3).

During the information source for need elicitation, it is essential to identify if the consumer is need driven or product driven. In the need driven method, a consumer is asked to identify their need (e.g. hunger) without access to visuals of products. The consumer`s needs are the source of information. Product-driven methods expose consumers to stimuli (e.g. picture of a burger or salad) which arouses a recognition of a need in the consumer. This allows the insight gathered from the consumer to be limited or focused on the specific food product or range that the organisation produces. A level of familiarity has a significant impact on the evaluation task. Unfamiliar ingredients make the evaluation process significantly more difficult. This can be because the consumers may not be aware of the wants and needs that the product may satisfy. If a consumer has minimal experience of a product, it can be difficult for them to evaluate the appropriate attributes and therefore selection of the correct data collection techniques is vital.

The task format is based on the expressed consumer needs. The consumer needs are affected by whether they are assessing a solo product or multiple products or comparing multiple products. Methods for consumer input can be based on the type of response required by consumers. An association task could be used, for example, consumers are shown a picture and asked to say the first word they think of or a preference test. The information gathered from consumers can also be impacted by whether the methods involve consumer`s self-articulated needs (from them directly) or indirectly (e.g. through observations). Finally, the data collection methods vary in levels of standardisation. In a high level of structure, the possible answers a consumer could give are predetermined. This can leads to tailored data but leaves no room for personal input on the consumer’s part. In unstructured data collection, such as focus groups, there may be more depth and insight to consumer responses. However the personal views of the researcher may create bias in the interpretation of results.

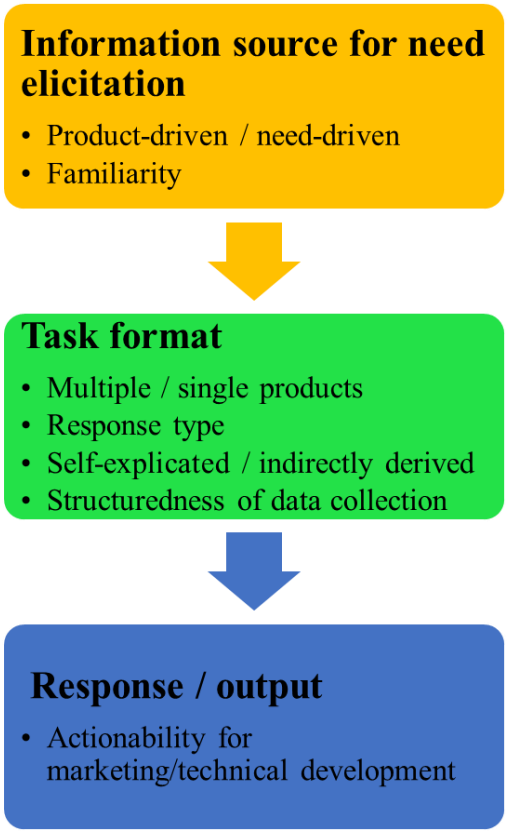


Figure 3.8.3 Categorisation scheme of methods in this review

Source: Van Kleef *et al.*, (2005)

The information gathered is then converted to actionable use. Consumer research will provide an understanding of the consumer`s preference and wants, to allow for the generation of product ideas. This data also provides a guide during the technical development stage of the NPD process. Finally, this data will identify the product characteristics as desired by the consumer. Taking into consideration all of those elements will provide organisations with a guide as to what method/s are most appropriate for the type of data they wish to retrieve from consumers (see Table 3.8.3).

While these techniques are still used extensively to gather consumer insights, technology has developed new techniques which could also assist with consumer insights such as specifically designed apps and eye tracking (Mitterer-Daltoé *et al.*, 2014; Persaud and Azhar, 2012). Research conducted by Mitterer-Daltoé *et al.* (2014) concluded that the use of eye tracking methods gives better insights of consumer perceptions of food quality in a non-invasive manner. Such technology has also been tested on nutritional labels and packaging to evaluate consumer`s perceptions of the extrinsic attributes of a product (Piqueras-Fiszman *et al.*, 2013; Graham *et al.*, 2012).

Table 3.8.3 Ten methods described on stimuli, task format, and actionability

Method	Stimuli		Task format				Actionability
	Product/ need driven	**Familiarity**	**Multiple / single products**	**Response type**	**Self-explicated/ indirectly derived**	**Structure of data collection**	**Abstractness**
Category appraisal	Product driven	Familiar	Multiple products	Perceptions/preference	Indirectly derived	Structured	Characteristics and benefits
Conjoint analysis	Product driven	Unfamiliar	Multiple products	Preference	Indirectly derived	Structured	Characteristics and benefits
Empathic design	Need driven	No stimuli presented	No product evaluation: observation	No judgements asked	Indirectly derived	Unstructured	Benefits
Focus group	Product/ need driven	Familiar/ Unfamiliar	Multiple / single products	Preference	Self-articulated	Unstructured	Characteristics and benefits
Free elicitation	Product driven	Familiar	Single products	Association	Self-articulated	Unstructured	Characteristics and benefits
Information acceleration	Product driven	Unfamiliar	Multiple products	Perceptions/preference	Self-articulated	Structured	Characteristics and benefits
Kelly repertory grid;	Product driven	Familiar	Multiple products	Perceptions	Self-articulated	Unstructured	Characteristics
Laddering	Product driven	Familiar/ Unfamiliar	Multiple products	Perceptions/preference	Self-articulated	Unstructured	Characteristics, benefits, and values
Lead user technique	Need driven	Familiar	Multiple / single products	No perceptions/ preference, but solutions	Self-articulated	Unstructured	Characteristics and benefits
ZMET	Need driven	Unfamiliar	No product evaluation	Association	Self-articulated	Unstructured	Benefits and values

Source: Van Kleff *et al.*, (2005)

These techniques provide valuable consumer insights, on not only an organisations product but can be used to evaluate a competitor's product. An evaluation of what consumers notice and pay attention to on packaging or displays can allow organisations to use this information in the development of market-oriented products (Rayner *et al.,* 2008). While a useful resource, eye tracking has to be used in coordination with other methods such as focus groups as it is not possible to investigate the cognition processes of eye movement (Graham *et al.,* 2012). Most SMEs simply do not have the ability or mechanisms required to access the skill and knowledge that is so vital to develop consumer insights (European Technology Platform, 2018). SMEs tend to possess limited research and technological resources, therefore making the use of eye tracking for example a less viable an option (Bhuiyan, 2011; Gibb, 2000; Martensen and Dahlgaard, 2000; Cooper and Kleinschmidt, 1995). Research suggests that cooperation with other similar organisation or industry partner in identifying consumer insights can reduce the cost of research for SMEs. Also adopting approaches to research from the social sciences such as focus groups and interviews is an appropriate method of formalising feedback as it provide an understanding the consumer behaviour in the food domain for SMEs (European Technology Platform, 2018).

3.9 Market-oriented corporate culture

The organisational culture is an integral part of the success of production within a company and the ability to achieve effectiveness in the long term (Black, 2003). There have been various analysis conducted on organisational culture, and the number of research studies in this area is growing. However, there has been no one agreed definition or theory of culture (Guiso *et al.,* 2015). Pareek (2007:22) states that culture can be defined as the "*Cumulative beliefs, values and assumptions, underlying transaction with nature and important phenomena."* Burnes (2009) states that the way in which work and tasks are conducted by managers and employees and the order in which the work and tasks are carried out, is managed and guided by the culture of an organisation which would include a specific set of values, beliefs, customs and systems that are exclusive to that particular organisation. Burnes (2009) further summarises culture as defining how individuals in an organisation ought to conduct themselves in a specific situation. It affects all members of an organisation, from top

management down to interns; guarantees that all co-workers actions are examined by themselves and fellow employees about the standard way in which to behave; and validates specific areas of action.

Pareek (2007) believed that an organisation`s culture is based on four different styles of power. The first is an autocratic culture, which resembles a dictatorship where all the control of an organisation is in the power of one person or very few people and has a very rigid set of rules. The second is a bureaucratic culture, which is an incredibly organised culture, which is made up of policies and procedures with a hierarchical structure put in place. This form of culture also operates types of relationships that are distant and formal. The third is a technocratic culture, the focus of which is of constant improvement in the organisation as well as having high technological and expert standards. Finally, the fourth is an entrepreneurial culture, which concentrates on accomplishing the best results and offers exceptional services to consumers.

In an earlier study, Black (2003) also proposed that there are four types of organisational cultures. These four types of corporate cultures are based on the following; firstly, 'control' the main focus of which is to value the responsibility top management undertake to guide the company. The aim is to ensure all members of the organisation are united and 'under control'. The second is 'performance' this evaluates the performance of the organisation as a whole and the performance of each member of the organisation. In addition to this, the organisation strives to become more effective and efficient. Thirdly is 'relationship' where development and security are valued, this takes into account employees working as a team, a flow of open communication, fair dealings and sharing parts of organisational life. Lastly is 'responsive' which emphasises the importance to be in sync with the external environment as well as continuing to be competitive and recognising any new opportunities.

3.9.1 Barriers to establishing a market-oriented culture for SMEs

Market-oriented organisational culture has been identified as being a key factor in successful business performance (Hernández-Mogollon *et al.,* 2010; Barringer and Bluedorn, 1999; Slater and Narver, 1998). A culture in a market-oriented organisational is often a critical element in excellence for SMEs (Spicer and Sadler-

Smith, 2006; Gray and Mabey, 2005; Pelham, 2000; Appiah-Adu and Singh, 1998; Pelham and Wilson, 1995). While it is clear that the establishment of a market-oriented culture is important for organisations especially SMEs, there can be many barriers to achieving such a culture (Dimitratos *et al.,* 2016). Tomaskova (2009) states that barrier`s to establishing a market-oriented culture can be within three areas the internal; the sector; and the external environment. Research conducted by Kohli and Jaworski (1990) identify three organisational levels of market orientation; individual, inter-group, and organisation-wide. Market orientation can have determining factors such as management and interdepartmental barriers (Sanz-Valle *et al.,* 2011; O'Connor and Van Egeren, 1998; Ruekert, 1992).

Management is often viewed as a barrier to creating a market-oriented culture (Kohli and Jaworski, 1990; Narver and Slater, 1990). Managers need a variety of skills and knowledge, however having the skills and knowledge to deal with every possible situation is impossible, and this can make it difficult to ensure that managers can identify the benefits of market orientation if they do not have the knowledge (Harris and Ogbonna, 2001). Managers need to have a high learning orientation as market orientation involves constant change and adaption for maximum benefit and ultimately survival (Farrell, 2000). Lack of management support and leadership can also become a barrier to market orientation (Harris, 1998). From top management down, there is to be complete support for market orientation and leadership will ultimately motivate and encourage employees in buying into the market orientation concept (Kumar *et al.,* 2011). The goals, mission and strategy of the organisation set out by management will be aligned with maintaining market orientation at the core of the organisation (Pumphrey, 2004). Within SMEs, market-orientation is often a problem as many managers lack focus on long-term strategic goals rather, putting excessive focus on short-term value and profits. Market orientation is a long-term strategy (Harris, 1998). A system of long-term planning within SMEs can lead to enhanced market orientation (Pulendran *et al.,* 2000).

Another barrier to the implementation of a market-oriented culture is interdepartmental coordination (Kumar *et al.,* 2011; Lafferty and Tomas, 2001; Harris, 1996; Slater and Narver, 1995). The cause of this barrier can be further broken down into three areas organisational culture; organisational system; and information

coordination. Tomaskova (2009) states that a cultural framework is necessary for successful implementation and maintenance of a market-oriented culture. Organisational culture and systems are inclusive and dependant on communication (Slater and Narver, 1995). Communication is important between departments, e.g. R&D and marketing departments involved in product development. Without this level of communication, not only will the product development aspect of an organisation suffer, but the relationships between employees will also suffer (Trueman, 2004). The centralisation of communication rather than interdepartmental communication can negatively affect decision-making and innovation, as it can also be too formal. Innovation is a core element of a market-oriented culture. Therefore anything such as, centralised or formal communication, which may negatively affect innovation, are considered a barrier (Kumar *et al.,* 2011; Maydeu-Olivares and Lado, 2003; Pulendran *et al.,* 2000). There is also a need for communication and cooperation between departments and management. Therefore communication within an organisation will be both horizontal and vertical. The core issue here is enabling information sharing for management to make decisions (Fonfara, 2001).

In relation to the Irish seafood sector, specifically Article 34 of the Common Fisheries Policy Regulation demands that all states develop a national strategic plan for aquiculture activates. Such a plan must identify the areas, which require most investment by the European Maritime and Fisheries Fund. This fund is intended to identify and allocate funds for the sustainable development and growth of aquaculture organisations in Europe (DAFM, 2015b). A SWOT analysis of Irish aquaculture industry conducted in 2015 in consultation with stakeholders identified one of the key weakness in the sustainable development and growth of the industry as lack of support services and ancillary industries (DAFM, 2015b). One of the key needs identified from the SWOT analysis is assistance and support of the evolution of seafood related SMEs. In a Mid-Term Assessment National Strategic Plan Sustainable Aquaculture Development *"Enhance the competitiveness of EU aquaculture"* (DAFM, 2018:18) was one of the four key priority areas for the governments focus in the industry. Of the 41 funded projects in 2016 and 2017 worth €2.3 million, the majority was allocated to the development of oyster farms. While the industry has seen output increases of 10% the supports are focused on specific high profit areas such as oysters, salmon and mussels and no new actions are foreseen at the time of writing the Mid-Term

Assessment National Strategic Plan Sustainable Aquaculture Development (DAFM, 2018). There is a lack of support for the seafood industry be comparison to other food related industries in Ireland by the Department of Agriculture, Food and the Marine. The 2018 budget for example allocated €74.5 million to animal related R&D programmes while allocating €25 million to seafood related R&D programmes (Department of Business, Enterprise and Innovation (DBEI), 2018). As a core element of market orientation the generation of to market intelligence R&D budgets and strategies are required (Kahn *et al.,* 2012).

3.9.2 Market-oriented culture and innovation

Market orientation affects the performance of all organisations positively (Pascual-Fernández *et al.,* 2016; Pumphrey, 2004; Sandvik and Sandvik, 2003; Deshpandé, 1999; Jaworski and Kohli, 1993; Narver and Slater, 1990) and this includes SMEs (Pelham, 2000). Within large organisations, innovation has been identified as a key component in the positive correlation between the performance of an organisation and their market-oriented activities (Govindarajan and Trimble, 2005; Jaworski *et al.,* 2000; Connor, 1999; Slater and Narver, 1999; Han *et al.,* 1998; Hurley and Hult, 1998; Atuahene-Gima, 1996; Slater and Narver, 1995). However, as discussed throughout Chapter 2 innovation manifests itself and takes on a different form in large firms than it does in SMEs. Therefore, it is not possible to generalise regarding the relationship between market orientation and innovation (Hull and Rothenberg, 2008; Audretsch, 2001; Tether, 1998; Eden *et al.,* 1997; Van Dijk *et al.,* 1997; Cohen and Klepper, 1992; Acs and Audretsch, 1988).

Verhees and Meulenberg (2004) conducted a study, which focused on the correlations between innovation, organisational performance and market orientation. That research suggests that the relationship between market orientation and organisational performance within SMEs is a positive one. There was also the conclusion that market orientation both stimulated and inhibited innovation (Rheea *et al.,* 2010). It is likely that intrapreneurial SMEs are highly innovative and market orientation and market intelligence may stifle such organisations. On the other hand, less innovative and entrepreneurial SMEs may be stimulated by market orientation and market intelligence. The innovativeness of the owners or managers of SMEs is an important element within the organisation as an entrepreneurial orientation is highly correlated

with performance. A positive relationship between market orientation and innovation is completely dependent upon management or owner decision making in SMEs (Rheea *et al.,* 2010; Slater and Narver, 1995; Kirton, 1994; Foxall and Bhate, 1993). Market orientation provides the customers with value via product innovation and value to the SME through an increased product portfolio (Smallbone and North, 1999). The innovativeness of SME owners and managers is an asset to stakeholders, without which the organisation would deteriorate in competitiveness (Christensen *et al.,* 2005).

3.10 Market orientation and organisational performance

Market orientation has one main aim, making profits for the organisation via delivery of value to the consumer. This is developed from consumer and competitor information, which is accumulated and distributed throughout the organisation (Jiménez-Jiménez and Sanz-Valle, 2011; Kumar *et al.,* 2011; Narver and Slater, 1990; Felton, 1959). A high degree of attention to customer needs, the current trends in the marketplace and competitor analysis allow organisations to establish what organisational attributes are necessary for successful performance in the long term (Day, 1994). An investment in the development of attributes such as developing open communication channels and sharing information with partners and suppliers; incorporating the market intelligence into the activities of the organisation; and knowledge transfer of information gathered in relation to competitors and customers is necessary. These are all long-term activities of market orientation which can ultimately bring about better performance, higher customer satisfaction and higher profits for an organisation (Jiménez-Jiménez and Sanz-Valle, 2011; Kumar *et al.,* 2011).

As discussed previously a culture based on market orientation and the learning organisation are essential elements toward achieving effectiveness in the long term within an organisation (Santos-Vijande *et al.,* 2005; Black, 2003; Deshpandé and Farley, 1998; Slater and Narver, 1995). With continuous accumulation and sharing of information, market-oriented organisations possess the ability to develop an organisational memory, which is key to a learning organisation (Jiménez-Jiménez and Sanz-Valle, 2011). Market orientation also inspires a culture of experimentation; enables continuous improvement in systems and processes; and allows an organisation to become distinctive over time, resulting in sustainable competitive advantage

(Kumar *et al.,* 2011). Research by Narver *et al.* (1999) and Slater and Narver (1999) states that highly market-oriented organisations had the highest return on assets as well as higher sales and the difference in return on assets and sales between the two organisations was significant.

There are criticisms of this viewpoint, many indicators pointing towards the fact that market orientation alone, will not provide a sustainable competitive advantage. Hamel and Prahlad (1995) and Slater and Narver (1995) in their earlier research both agree market orientation can cause an organisation to concentrate its energies specifically towards existing consumers and their specific requirements. This limited focus may lead an organisation to be unable to identify and anticipate threats from non-traditional sources of competition, and therefore restricting the ability to achieve superior performance and competitive advantage. Furthermore, the benefits of market orientation in the long term can only be realised if it is unique to the organisation and based on that organisation`s core values and beliefs. If this is achieved, then it will become impossible to replicate it by competitors. Day (1994:17) states, *"Capabilities and processes are not imitable if they provide firms with tacit knowledge that enables them to understand customers' latent needs."* Numerous researchers stress the important link between market orientation and organisational performance, however there can be an underestimation of the ability of an organisation to adopt and apply market orientation (Jiménez-Jiménez and Sanz-Valle, 2011; Kumar *et al.,* 2011; Fritz, 1996; Jaworski and Kohli, 1993; Ruekert, 1992; Narver and Slater, 1990).

3.11 Market orientation and new product performance

The development of a market-oriented culture is dependent upon the creation and distribution of intelligence gathered from the market to gain competitive advantage and increase organisational performance (Bilgihan *et al.,* 2011; Cheng and Krumwiede, 2011; Gebauer *et al.,* 2011; Ren *et al.,* 2009; Slater and Narver, 1995; Day, 1994). Two methods of viewing market orientation, from cultural or operative perspectives, are available (Kohli and Jaworski, 1990; Narver and Slater, 1990). Within the culture of a successful organisation, market orientation encourages firm-wide, cross-departmental and cross-functional cooperation, both horizontally and vertically. This coordination creates high value for consumers, the outperformance of competitors and increased profits for an organisation (Li *et al.,* 2010; Baker and

Sinkula, 2007; Narver and Slater, 1990). Overall market orientation involves using firm-wide cooperation to identify consumer needs and then meet those needs by gaining specific knowledge that contributed to greater value for the customer (Kotler *et al.,* 2017; Li *et al.,* 2010; Carson and Carson, 2003; Kahn, 2001; Narver and Slater, 1990).

Developing consumer-oriented products is essential to new product success (Ren *et al.,* 2009; Voss and Voss, 2000). The perception of a product by the target customer is an essential element of new product success (Cohen *et al.,* 1996). Therefore, the marketing department need to be in tune with what the consumer`s needs and wants are, in order to pass this information onto the R&D department, which in turn, can be translated into the product features (Bilgihan *et al.,* 2011; Ren *et al.,* 2009; Voss and Voss, 2000; Kohli and Jaworski, 1990; Mattson, 1985). Value co-creation is a concept that moves away from an organisations ability to create value and deliver that value to the consumer and focuses on a joint process, which creates value between organisations and consumers (Agrawal and Rahman, 2015; Festa *et al.,* 2015). In value co-creation the consumer is the most important stakeholder and plays many roles such as co-producer; co-distributor; co-promoter; co-manufacturer; co-consumer and co-innovator (Agrawal and Rahman, 2015). Market orientation allows organisations to become capable of listening to the needs of the customer and responding to those needs and therefore maximising profits (Atuahene-Gima and Evangelista, 2000). Kotler *et al.* (2017) and Bowman and Gatignon (1995) argue that understanding what the customer wants and needs is not sufficient to be considered a market-oriented organisation. Competitors can initiate market change by the introduction of new products. Therefore, it is not adequate to understand the needs of the consumer it is necessary also to know what competitors are doing to meet those needs (Cheng and Krumwiede, 2011; Gebauer *et al.,* 2011).

The resource-based view of an organisation (RBV) is a framework for understanding how an organisation can create, achieve and maintain competitive advantage overtime (Barney, 1991). It focuses on the internal organisation; its structures, strategies; resources; ability to remain flexible and adaptable for the development of competitive advantage (Davenport *et al.,* 2006). The aim is to develop new products and business models rather than improving existing products and changing elements of the current

business models (Teece, 2012). Research conducted by Mosey (2005) states that for SMEs to build dynamic capabilities, as a core activity, they have to develop 'new to market' products, to allow for survival and growth. While 'new to market' products can be of benefit to large firms, they are not as necessary for survival as they are for SMEs (Cooper, 2017; Storey, 2016; Bhuiyan, 2011). Market orientation is particularly effective with 'new to market' products along with 'new to organisation' products (Gebauer *et al.,* 2011; Sandvik and Sandvik, 2003). Cooper (1994) states that the organisation is offering 'new to the organisation' products for the first time. However, there may be competitors in the market offering a similar product, and in fact, the 'new to the organisation' products may be an imitation of a competitor's successful product. 'New to market' products are the very first type on the market and have been developed by the organisation (Al-alak and Tarabieh, 2011).

As previously discussed there is a suggestion that market orientation can hinder creativity and innovation and ultimately the development of new products, particularly those that are 'new to the market', leaving organisations to focus on the products which may only be 'new to the organisation' (Ulwick, 2002; Bennett and Cooper, 1981; Hayes and Abernathy, 1980). This is because customers cannot always foresee or articulate their future needs (Al-alak and Tarabieh, 2011; Ulwick, 2002; Gatignon and Xuereb, 1997; Carpenter and Nakamoto, 1989; Von Hippel, 1986). Therefore, according to O'Connor and Van Egeren (1998) market orientation with the consumer as the main source of ideas is likely to result in the production of additional products, which are 'new to the market'. However, it is also suggested that a culture of market orientation will allow for innovations which are matched to the wants of the consumer and that market orientation will allow the organisation to be innovative and attain new product success (Sandvik and Sandvik, 2003; Lukas and Ferrell, 2000; Atuahene-Gima, 1996; Calantone *et al.,* 1994; Cooper, 1994; Slater and Narver, 1994; Deshpandé *et al.,* 1993; Kohli and Jaworski, 1990).

3.12 Market-oriented food products

Food preference is influenced by personal situations, socio-economic factors and the attributes of a new product on offer and overall it is considered a complex process (Brody and Lord, 2007). There is a variety of approaches to analysing purchase preference, the most common is a trade-off, which is what the customer will offer to

receive a product or service, usually of monetary value and what it is that the customer received in return (Moskowitz *et al.*, 2012). The expectation, of the potential customer, of the new product or service has a supposed value and quality level compared to the products or services currently available. Successful food organisations, therefore, develop and adapt the range of new products that are of superior quality and value, which the consumer will embrace (Dijksterhuis, 2016). Any organisation, which is incapable of creating and marketing food, which the consumer needs and accepts, is likely to fail (Jaeger and MacFie, 2010).

Bruhn (2008) is of the opinion that the food and beverage industry is unusually slow moving in relation to innovation and NPD. Innovation is considered to be incremental or radical according to many authors (Tidd *et al.*, 2005; Johannessen *et al.*, 2001; Damanpour, 1996; Mole and Elliot, 1987). Tidd *et al.* (2005) and Mole and Elliot (1987) both suggest incremental innovation to be continuous improvements to the products, services or processes of an organisation. Radial innovation is associated with significant advancement in developing new products, services or processes for an organisation. Incremental innovation can give a sustainable source of competitive advantage to SMEs as management can implement it quickly and easily. This type of innovation is also considered an important strategic tool for SMEs and specifically seafood organisations (Bhaskaran, 2006).

Incremental innovation is mostly associated with the food industry according to Bhaskaran (2006). The food and beverage industry is known more for cost reductions and ingredient substitutions than they are for innovation and even when innovation occurs, it is more often than not focused on areas such as new packaging or new processes rather than new product (Costa *et al.*, 2016). The food and beverage industry has in the past been categorised as an industry, in which the consumer lacks interest and involvement when products are being, developed (Hjelmar, 2011; Verbeke and Vackier, 2004; Beharrell and Dennison, 1995). The level of interest and involvement can vary hugely from individual to individual and can have an overall impact on food preferences and food choice (Bell and Marshall, 2003). Jaeger and MacFie (2010) further state that to achieve consistent involvement from potential consumers in the development process of food, there needs be an enjoyable experience and the process will capture the interest of the consumer. This interest in the food product will lead to

engagement by the consumer in the process and minimise the perceived risk they may have of making a wrong choice at the point of purchase (Hjelmar, 2011). When the consumer has a pleasant experience, the expectation of positive experiences in the future is reinforced, which in turn leads to repeat purchasing and brand loyalty (Bell and Marshall, 2003).

Research suggests that for food products a user-oriented approach to innovation is required, that is, innovation where there has been significant input into the innovation process by the consumer (Grunert, 2008). As this process includes both consumer and end users it is a border concept then simply consumer led innovation (Grunert and Valli, 2001). As discussed previously market orientation involves the generation and dissemination of information from the market (Deshpandé *et al.,* 1999). The incorporation of this information into the NPD process is a prerequisite for user-oriented innovation as an understanding of the users needs is required and then that knowledge is incorporated into the NPD process (Grunert, 2008). The Irish food industry is generally not market-oriented, and more focus is required on consumer insights from the Irish food industry to enter new markets, specifically beyond the United Kingdom (UK) market (Bord Bia, 2018). The seafood industry, in particular, lacks a market-oriented approach to its NPD activities. The Irish seafood industry is not in a position to capitalise on global trends as there are too many SMEs working in isolation. As a result, there is a lack of coordination and cooperation between supplier, producers and a lack of connection with the consumer and customer. This is evident as 70% of the core product is being exported as a bulk commodity. Of the remainder, only 1% ends up on Irish retail shelves as a value-added product (Shelman, 2016). The potential for the industry is immense particularly in the area of NPD that used sustainable and underutilised species of fish (EEA, 2016; DAFMb, 2015).

3.13 Measuring market orientation

Measuring market orientation may be completed on a variety of established scales (Wang *et al.,* 2012). Narver and Slater (1990) are considered to have developed the first validated scale to measure market orientation, which includes customer and competitor orientation and interfunctional cooperation along with two decision components, long-lasting and profit. This scale is known as MKTOR. The scale consisted of fifteen items on a seven-point Likert scale. While this was a key

development in the progression of this field of research, there are concerns about the use of culture for interpreting results without a measure of culture (Webster, 1992). The second piece of seminal research in the area is from Kohli *et al.* (1993) who developed a twenty-point scale using a five-point Likert scale known as MARKOR. This scales deals with the gaining and dissemination of the information as well as planned response and the implemented response. Criticisms of this scale are mainly based on the lack of definition of what market orientation is (Farrell, 2002).

Gray *et al.* (1998) then built on the work of Narver and Slater (1990) adding two dimensions, that is, responsiveness, and profit emphasis to amount to five dimensions. Anwar (2008) reinforces the importance of consumers, competitors, the working environment and organisational strategy in the development of new products and services. Pulendran *et al.* (2003) concurred that there is a dependency on a marketing plan for the measurement of market orientation. This scale is based on the MARKOR measurement using general; rational; political; and interactional perspectives. The scale looks at each element from a planning and interfunctional cooperation perspective. Wang *et al.* (2012) argue that the type of organisation will determine which model is most appropriate as some organisation will utilise their chosen scale for data collection and others will use it internally for organisational improvements and innovation (Vieira, 2010).

3.14 Summary

This chapter defines knowledge management. The use of knowledge management for the organisations benefit as part of developing a market-oriented organisation is explored. While there is extensive literature and various approaches to market orientation, general agreement on the importance of efficient knowledge management as part of an overall strategic plan for a market-oriented culture has been established. Finally, an examination of market orientation and its impact on organisations is outlined and provides evidence of its importance to an organisation`s performance. Chapter 4 provides an overview of the Irish fishing industry and the seafood market.

Chapter 4: Irish Seafood Industry

4.1 Introduction

Chapter 4 provides an overview of the Irish fishing industry and the seafood market. There is an exploration of how Irish seafood organisations can capitalise on value creation through the development of value-added products. This chapter highlights the importance of the seafood industry to Ireland. It examines the necessity for sustainable growth and development via value creation to ensure that the Irish seafood industry remains competitive both on a European level and internationally. There is also the identification of the areas that have the most potential for seafood related SMEs in their value-added NPD. Finally, an examination of the consumer trends such as a demand for sustainable and healthy seafood products are established.

4.2 Irish fishing industry: an overview

Ireland's sea to land ratio is 10:1, which is the largest amongst the EU members. One of the most utilised fishing waters in the EU is those off the coast of Ireland (Marine Institute, 2013). The high levels of productivity in Irish waters is caused by the seasonal cycle of light and nutrients which allows for plankton to grow excessively, with large amounts of plankton encouraging large shoals of fish (Environmental Protection Agency (EPA), 2008). The Irish waters notably host the most valuable pelagic stock of mackerel, blue whiting, horse mackerel, tuna, boarfish and sprat in the North Atlantic (BIM, 2016a; Gerritsen and Lordan, 2014). The west coast boasts an abundance of white fish stocks such as monkfish, megrim and hake, with the south and south-east coast (Irish Sea) producing pelagic and white fish such as herring, haddock and cod. Irish coastal waters also host much young fish and shellfish and is an important nursery for them (Marine Institute, 2009).

Ireland has many ports, harbours and piers dotted around the coast, that record landings. There are four main ports where the majority of the fish caught on Irish shores is landed, Killybegs; Castletownbere; Dingle, and Dunmore East (see Table 4.2). These ports are evenly and strategically, distributed throughout the island. The fishing fleet has over 2,000 registered vessels including refrigerated tanks, white fish trawlers and factory boats. In 2017, Killybegs port was the largest primary port and tallied landings of 192,200 tonnes of seafood valued at over €125 million (see Figure

4.2 and Figure 4.2.1). Killybegs is the biggest port for domestic landings at 84%. By contrast, 72% of fish landed into Castletownbere are from foreign vessels (BIM, 2018). Of the top ten fish landed in Irish ports throughout the country in 2017 (see Figure 4.2.2), the pelagic species is the largest with 185,000 tonnes caught with a value of €115 million (BIM, 2018)

Table 4.2 Value of fishing industry by port

Port name	Value	Tonnes
Killybegs	€125 M	192,200
Castletownbere	€ 108 M	30,500
Dingle	€20 M	8,200
Dunmore East	€16 M	7,700
Ros A Mhíl	€12 M	2,700
Howth	€11.3 M	4,200
Kilmore Quay	€11 M	4,300
Greencastle	€9.4 M	3,800
Union Hall	€9 M	2,400
Clogherhead	€8 M	1,500
Other	€71 M	56,500

Source: BIM, (2018)

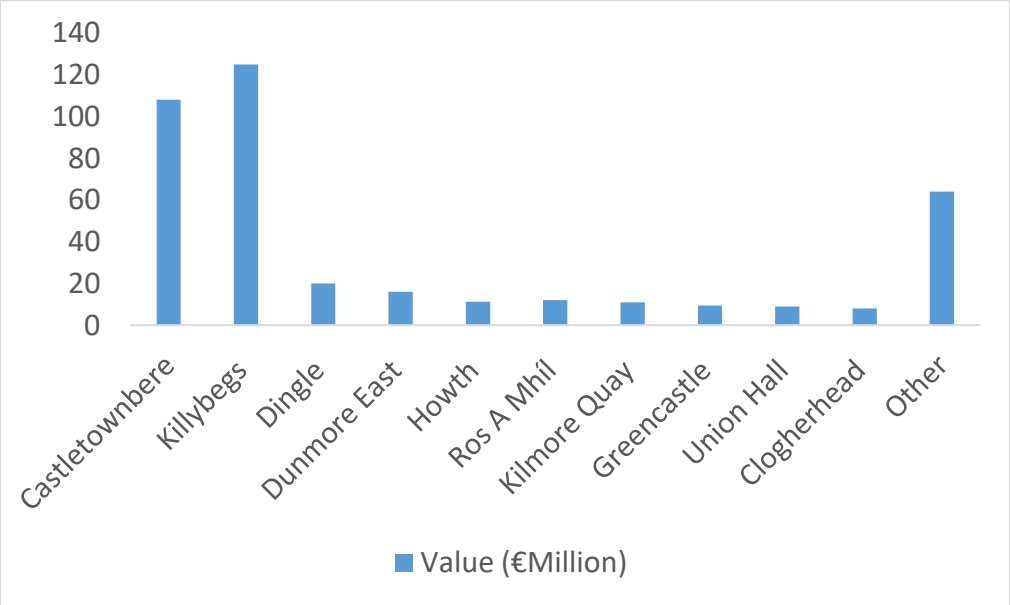


Figure 4.2 Monetary value of fishing industry by port

Source: BIM, (2018)

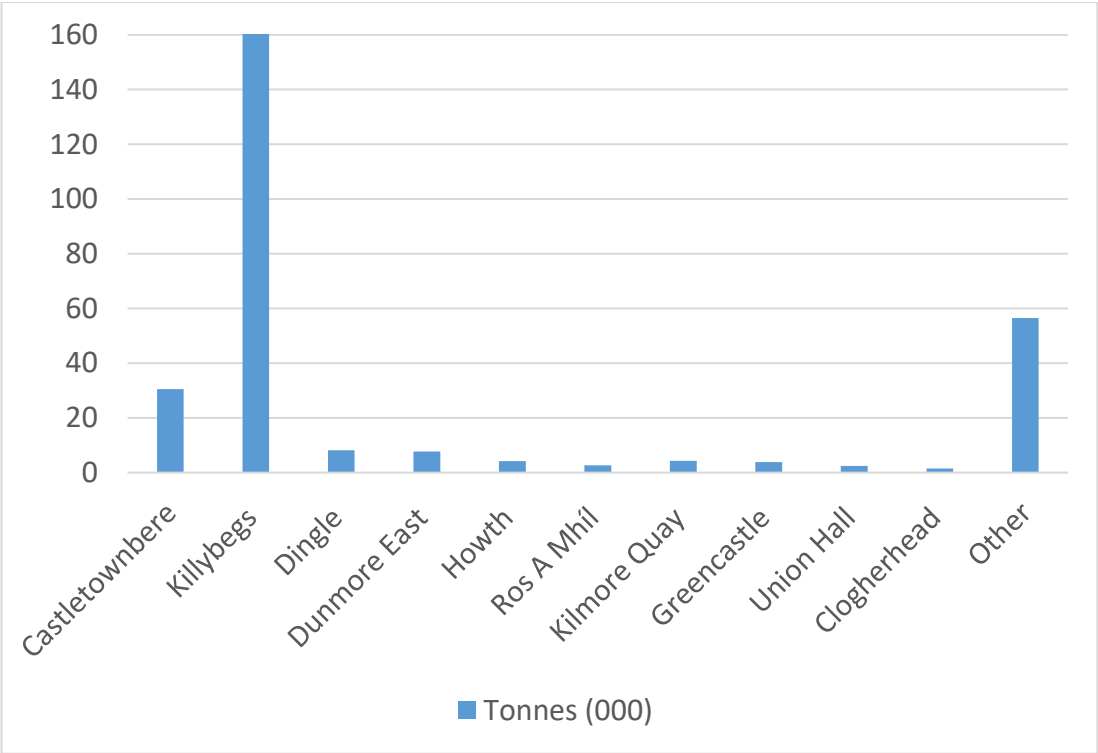


Figure 4.2.1 Value by weight of fishing industry by port

Source: BIM, (2018)

Irish seafood exports were valued at €666 million in 2017, and within that, pelagic exports were valued at €169 million (BIM, 2018). A complete breakdown of the fisheries sector exports and imports is provided in section 4.4, later in the chapter. With the highest landings in Ireland being pelagic (see Figure 4.2.2), this suggests that the most viable area for product development of secondary or value-added processing would be in the pelagic sector. This was further encouraged by the adopted species to the human food chain of boarfish in 2012, a sustainable source of seafood (Bord Bia, 2017a), with BIM recording the landing of more than 15,500 tonnes of boarfish in 2017 (BIM, 2018). Of that 15,500 tonnes of boarfish, it does not rank in the top 20 species available in Irish retail nor the top 20 species exported from Ireland. Therefore, there is an opportunity to add value to this sustainable source of seafood for the Irish market and/or export (BIM, 2018; Shelman, 2016).

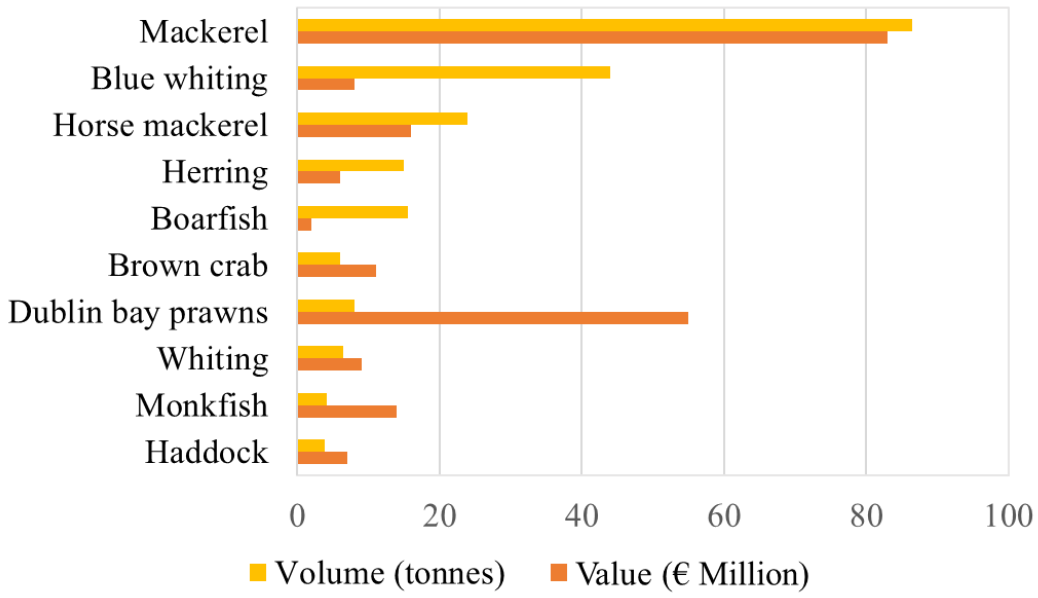


Figure 4.2.2 Value of top ten fish caught in Ireland

Source: BIM, (2018)

In Ireland, SMEs make up 71% of employment in the private sector (European Commission (EC), 2016). As Ireland's largest indigenous industry, in addition to the fact that 90% of this industry is made up of SMEs, the agri-food and fisheries sector is vital to the Irish economy (DAFM, 2015a). One of the most significant opportunities for increasing the value of the seafood sector is through greater innovation. Currently, Ireland exports 70% of its seafood as a bulk commodity, unprocessed in any way. However, it is suggested that the future success of the fisheries sector is sustainable value-added seafood. To achieve this, it will be necessary to develop new consumer friendly products as well as innovative techniques that can overcome the challenges of shelf life and transportation (BIM, 2016b).

4.3 Value-added seafood products in Ireland

Adding value to food products, after primary processing can encompass a variety of categories from infant formula to prepared consumer foods (Bleiel, 2010). Within Ireland, this will also include meat products and artisan foods. The sustainability of the Irish agri-food sector is dependent on the continuous development of value-added foods for the marketplace (DAFM, 2015c). The sales of such value-added products will benefit the economy through job creation (Hu *et al.*, 2011). While numerous large

organisation within Ireland show growth in the export-focused sector, the most significant potential for growth lies within the SMEs. SMEs have the potential to upscale and become the driver of the sector (Shokria *et al.*, 2010). Accelerating the growth of SMEs with a greater focus on value addition in the food sector will lead to significant growth in regional development and the creation of employment (DAFM, 2015a). To be successful and capitalise on consumer trends, the value-added sector needs to focus on market research, innovation and NPD. DAFM (2015a) outlines in Food Wise 2025 components required to be successful in meeting their target of increasing value-added food and beverage output by 40% by 2025, those components are competitiveness, innovation, and market development.

Developing value-added products can provide many benefits to a seafood organisation, including the development of a diverse product range, allowing for higher sales; the creation of off-season income; an increase in the profitability of seafood related products; a knock on effect for other sectors such as the retail, to create income for seafood producers; the development and encouragement of creativity; and to ensure the use of excess product (BIM, 2014a). Consumer behaviours have changed as customers now shop around more. This provides a substantial opportunity for SMEs to build value-added products that will be accepted over, and compete with, international brands (Dora *et al.*, 2013). Burke (2010) states that there is an advantage for SMEs in relation to value-added products, as due to their size, they can relate to and understand their customers wants and needs, better than larger companies.

Value-added products allow food businesses, through product diversity, to increase sales, which in turn increase and stabilise gross profits (Teagasc, 2016). Product diversity involves maintaining a range of products, which all offer different attributes while tapping into a variety of market sectors and having a product that stands out from the products that competitors are offering (Abernethy *et al.*, 2001). Diversity can be realised by changing the product. However, the physical product need not always change rather the packaging or the advertising may change (Dora *et al.*, 2013). Product diversity aims to reach out to potential customers and allow them to perceive the organisation`s product as being different and superior to that which competitors offer (Trott, 2008). In the case of seafood, the organisation has control over a variety of important issues such as, pricing and the outlets in which to sell the product. This is

because value-added products are unique and incomparable with the products of competitors (Bradbear, 2009).

The Irish food sector has a reputation both nationally and internationally for maintaining the highest levels of quality and food safety. As the independent food regulator, this is achieved through the Food Safety Authority of Ireland (FSAI) who ensures consumer confidence in Irish food products (FSAI, 2011). To aid this process of ensuring quality and safe value-added products, many sectors provide grants in the area. One such grant is the Seafood Value-adding Scheme. The scheme will fund 40% of the project cost with a minimum of €12,500 up to a maximum of €30,000 (BIM, 2014a). The Seafood Value-adding Scheme has the primary objective of supporting seafood companies, developing and improving the overall value-added market via multiple routes such as NPD innovation, technology, information and business development (BIM, 2014a).

Many organisations need to analyse a new product or potential new product. This will eliminate products and services that will not work and concentrate resources on other areas that have a stronger chance of success (Bleiel, 2010). SMEs can often have problems and face obstacles in obtaining correctly sized equipment for their needs in producing and maintaining production of their value-added products (Dora *et al.*, 2013). Other than equipment costs, the other central costs associated with production will be an addition to the current operating expenses. It is not always just new equipment that is necessary, there can also be other additional expenses such as packaging and establishing distribution lines (Teagasc, 2016). In Ireland where consumer safety, product standards, sanitary conditions and HACCP systems are fully implemented, food production units also have to be designed and consistently maintained in accordance with the I.S:340/2007. This can lead to an increase in initial investment in ensuring that all standards are met (Bradbear, 2009; National Standards Authority of Ireland (NSAI), 2007). All of these factors can determine if a product is viable for production or not. The cost of developing and maintaining a value-added project could be significant (Bleiel, 2010). Schemes such as the BIM`s Seafood Value-adding Scheme, mentioned above, aid businesses not only in monetary ways but also in knowledge and mentoring such as identification of opportunities in the market; product development processes; food testing; packaging; concept testing; feasibility

studies; and innovative practices to increase the likelihood of success for a value-added new seafood product (BIM, 2016a).

Market orientation will assist in the launch of a value-added product. Once a product is developed, tested and ready for production, it is necessary to gain access to and maintain product and brand consistency in a new market (Abernethy *et al.,* 2001). This is why a solid marketing strategy is necessary which will require both time and money to develop the brand. Cooper (2001) believes that a lack of market orientation and insufficient market assessment are consistently cited as the reasons for new products failing. If this is the case, it states that marketing activities conducted by organisations are critical to ensuring that new product success rates are high (Boso *et al.,* 2013). Marketing any product requires innovation and creativity (Knutson, 2016).

Food Wise 2025 has directed a significant amount of its strategy on value-added products. This means that many companies will be at a disadvantage if they do not begin to produce value-added products (DAFM, 2015a). The cost of developing and maintaining a value-added product could be extensive, particularly in the initial stages of the process (Abdeen and Haight, 2002). However, it can have significant benefits to any SME in Ireland in the long term including increased profits and breaking into new customer markets. It can also have a significant impact at a national level and assist with the development of the Irish economy (Minarelli *et al.,* 2015).

4.3.1 Areas of opportunity for value creation in Irish seafood industry

Within the seafood industry, there has been a shortage in the supply of established and conventional species of fish. Such a change has required that the seafood processing industry in Ireland adapt and explore the possibility of using less well-established species of fish in the creation of value-added products (Farrelly *et al.,* 2014; Fagan *et al.,* 2006). The development of new markets will also call for organisations to not only use underutilised species but also to become innovative and diversify their new product range (DAFMb, 2015; Farrelly *et al.,* 2014). The seafood industry in Ireland consists of primary, secondary and value-added processing. Of these three, the main one is the primary processing as it makes up to 75%, this would be mainly whole fish exports. The secondary processing is next largest at 24%, and this can involve as little as filleting or head and gut removal. By far the smallest section of the seafood industry is value-added seafood processing. The last 1% of fish landed in Irish waters is used

for value-added processing (Marine Institute, 2013). The potential growth of the value-added processing in Ireland could aid the growth of the national economy significantly (Farrelly *et al.,* 2014). Food Wise 2025 aims to increase the primary processing outputs by 33%. Food Wise 2025 also states that it will increase the value-added sector by not only 40% but also the value of those exports by 42% (DAFM, 2015a). For this reason, the agri-food and fisheries industry is fundamental to plans for economic growth within Ireland (Farrelly *et al.,* 2014). There is a significant opportunity for value creation in the Irish seafood industry.

According to Bord Bia (2017a), there is more opportunity for the development of certain fish over others. Table 4.3 outline the fish product with the most production potential. This table ranks the species based on the production in Ireland by weight. However, this table excludes shellfish and only focus on finfish potential. This indicated that the most value lies in the pelagic sector with the top five fish ranked with the highest potential are mackerel, blue whiting, horse mackerel, herring and boarfish, all of the pelagic species. There is also a second view, which could be taken on Table 4.3, that is, from a market share perspective. Market share is a percentage of an industry`s total (Kotler and Armstrong, 2012). Keller and Kotler (2016) suggest that a market leader is one, which has the largest market share and can then be a leader in new product introductions along with other areas of business development. Working from this perspective, the top five species with potential are boarfish (69%), mackerel (17%), whiting (17%), horse mackerel (12%) and salmon (9%). Once again, the pelagic species have a high amount of market share in Europe. With boarfish having a significantly high market share, there is the potential for Ireland to become a market leader, at both a European and international level, in the development of value-added pelagic fish products.

Table 4.3 Top ten species for production potential in Ireland

Rank	Species	Production in Ireland (tonnes)	Production in total EU (tonnes)	Irelands market share
1	Mackerel	86,426	505,438	17%
2	Blue Whiting	45,547	659,967	7%
3	Horse Mackerel	21,706	183,836	12%
4	Herring	19,419	472,238	4%
5	Boarfish	18,858	27,288	69%
6	Salmon	16,000	173,000	9%
7	Whiting	7,716	46,257	17%
8	Hake	3,732	127,112	3%
9	Haddock	3,525	48,126	7%
10	Monkfish	3,305	69,122	5%

Source: Author, adapted from Bord Bia (2017a)

4.3.2 Prepared consumer foods

The Irish prepared consumer food market is of significant economic importance. According to the Food and Drink Industry Ireland (FDII) (2015), the prepared consumer food sector in Ireland is defined as any organisation which is producing products with the aim of selling to retailers either nationally or internationally, including ingredients, prepared consumer foods and value-added seafood or horticulture products. The prepared consumer food market accounted for €1.84 billion of exports and increased by 8% in 2014 (Tyner, 2015). The prepared consumer food industry in Ireland has a vast growth potential with the expected creation of 7,000 jobs throughout the industry, export increase to almost €4 billion and reduce imports in the area by 10% by the year 2025 (DAFM, 2015a). Food Wise 2025 outlines the importance of prepared consumer foods in the value-added food sector. An aim of 40% increase in output for the value-added sector is expected to be reached. Also, it will contribute to developing and maintaining a sustainable agri-food economy, as the prepared consumer food market in Ireland has the potential to sustain existing jobs and create new ones (Minarelli *et al.*, 2015). However, to capitalise on future opportunities in prepared consumer foods, there is a need for organisations to fundamentally adapt

their business models to increase productivity, focus on sustainability and develop a deeper understanding of consumer needs (FDII, 2011).

The projected future increase in world population will create opportunities for food businesses. United Nations (2017) predicts a global population growth from 8 billion in 2017 to 9.8 billion in the year 2050. This increase would require an increase of 70% in food production worldwide. The seafood industry in Ireland has the potential to play a significant role in the production of products to ensure food security (Troell *et al.*, 2014). To meet the future demands of consumer's innovation is required. Innovations in areas such as food processing are necessary, to enable prepared consumer food organisations in Ireland to create or adapt current products to meet the needs of the consumer (DAFM, 2015a). Innovations such as preservation techniques allow consumers to enjoy foods from all over the world or foods, which would traditionally be out of season (Bord Bia, 2016a).

4.4 Consumer behaviour and market trends

Having discussed the overall size of the seafood sector in section 4.2, a further breakdown of the composite parts will be provided. In 2017, Irish seafood exports were valued at €666 million (see Figure 4.4) (BIM, 2018). Ireland's strongest export by value is shellfish at €218 million followed by demersal €170 million, €121 million of which is salmon, and pelagic at €169 million. By volume, Ireland exported 138,000 tonnes of the pelagic species in 2017, 42,000 tonnes of demersal and 37,000 tonnes of shellfish. Of these exported products, there is €198 million leaving Ireland completely unprocessed or minimally processed and the value-added market is only worth €88 million to the Irish economy.

While the Irish market is generally supplied with Irish products such as smoked and marinated salmon, filleted fresh fish and live shellfish, over 85% of the pelagic stock is exported to Europe, Africa and Asia (BIM, 2016a). This offers significant possibilities for growth in the industry that could increase the seafood manufacturing industry. Such an increase would have a significant economic and environmental impact both regionally and nationally (BIM, 2013).

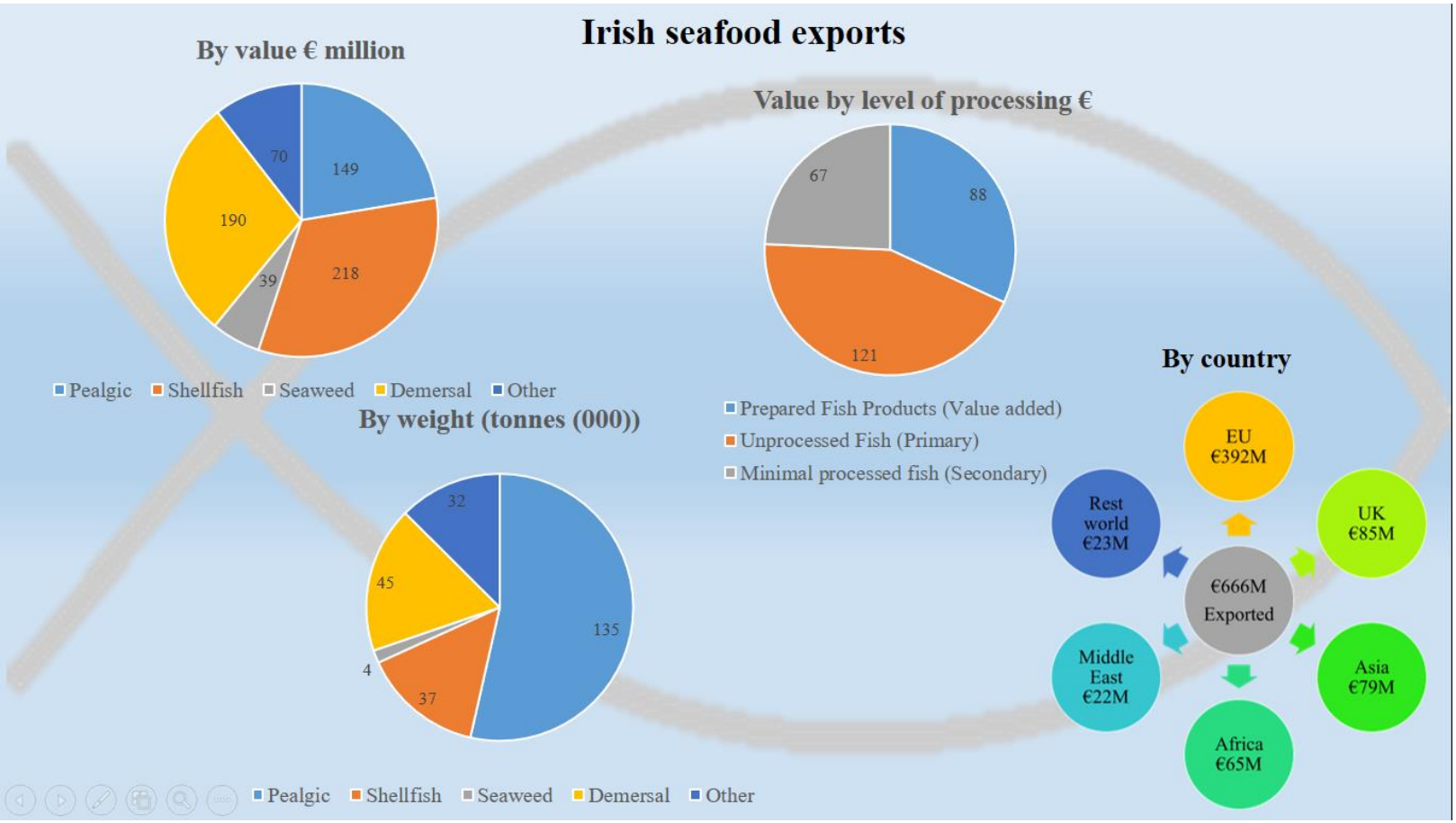


Figure 4.4 Irish seafood exports overview

Source: Adapted from BIM (2018); BIM (2016b)

Irish retail outlets rely heavily (over 70%) on fish imports to satisfy the domestic market (BIM, 2012). This percentage has increased steadily at a rate of 3%-7% per annum since the mid-1900`s. Further market research aiming to identify the factors that caused this increase in imports, reveals 'limited availability of reasonably priced product'. In 2017, €304 million worth of seafood products were imported into Ireland from the UK and EU, with the remaining €31 million coming from around the world (see Figure 4.4.1). Of all the seafood products imported, €73 million (30%) were prepared fish products (BIM, 2016b). The purchasing behaviour of Irish consumers in relation to seafood shows the fresh fish industry having a 5.5% increase in sales value, which is valued at €170 million. Within this market pre-packed fish increases by 8% in value since 2015. Whereas frozen fish has seen a decline of 3.9% since 2015 (Bord Bia, 2017b).

In Ireland 68% of seafood imports at a value of €228 million (64,400 tonnes) were imported from the UK and 13% of seafood exports (€85 million) were exported to the UK in 2017 (BIM, 2018). Brexit (The British exit from the European Union) will have a significant impact on the agri-food sector, including the trade of seafood products. By 2030, trade and production of agri-foods are expected to drop below the non-Brexit baseline (Copenhagen Economics, 2018). The impact on the agri-food sector (excluding beef, sheep, other cattle meat and dairy products) is that exports to the UK from the European Economic Area will be reduced by anywhere from 40%-87% by the year 2030 from what it was during the non-Brexit baseline level. This is expected to be caused by tariffs, customs costs and the risk of regulatory divergence (Copenhagen Economics, 2018; Phillipson and Symes, 2018). 15 Irish seafood SMEs exported goods in 2017 and 80% of those exports were to the UK (Bord Bia, 2017c). New trade agreements with the UK will be developed however free access is not guaranteed (Irish Business and Employers Confederation (IBEC), 2018) therefore the development of new markets for Irish food companies will be important for the sustainability and growth of Irish seafood SMEs (Bord Bia, 2017c). To develop new business outside of the UK will require Irish seafood SMEs to develop local and specific marketing strategies based in consumer insights, which are gathered in a structured manner (Bord Bia, 2017c).

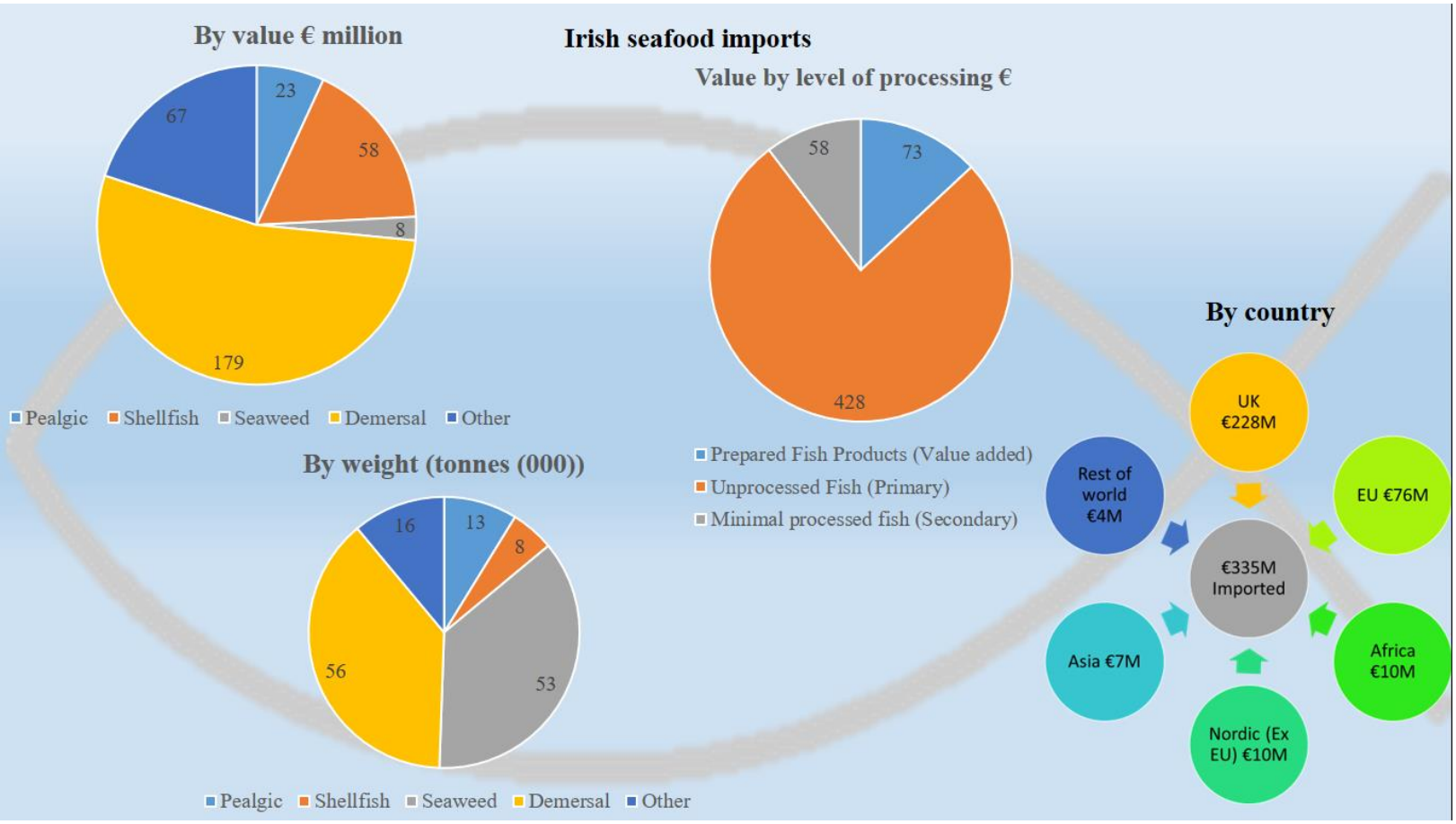


Figure 4.4.1 Irish seafood imports overview

Source: Adapted from BIM (2018); BIM (2016b)

Bord Bia (2014) has identified four possible scenarios for the future of the global seafood industry (see Figure 4.4.2). The first scenario called 'Super Protein' is a response to the increased and continuous demand for a sustainable supply of protein (Bord Bia, 2014). The seafood industry's focus on achieving economies of scale through advanced technologies and product standardisation has encouraged a change in consumer attitudes and increased trust (Thong and Solgaard, 2017). Innovation in the industry is focused on better resource management to optimise health and trust (Milošević *et al.*, 2012; Ferguson *et al.*, 2010). As consumers are becoming increasingly aware of the benefits of maintaining a healthy lifestyle, there is an increased demand for foods that demonstrate enhanced nutritional and wellness benefits (Bord Bia, 2017b; Burger and Gochfeld, 2009; Trondsen *et al.*, 2004; Olsen, 2003). The perception of seafood as a health food means that consumers naturally are inclined towards it when wanting to achieve a healthy lifestyle (Trondsen *et al.*, 2004; Olsen, 2003). However, as the concept of health evolves so does the demands from the consumer on the seafood industry. Consumer requirements include seafood that will reliably improve their brain health, their mood, their skin, their fitness and ultimately be a functional source of protein (Sidhu, 2003). As a result, the seafood industry has a new competitor that is alternative protein sources, such as supplements and vegetable-based proteins (Gazabara, 2016).

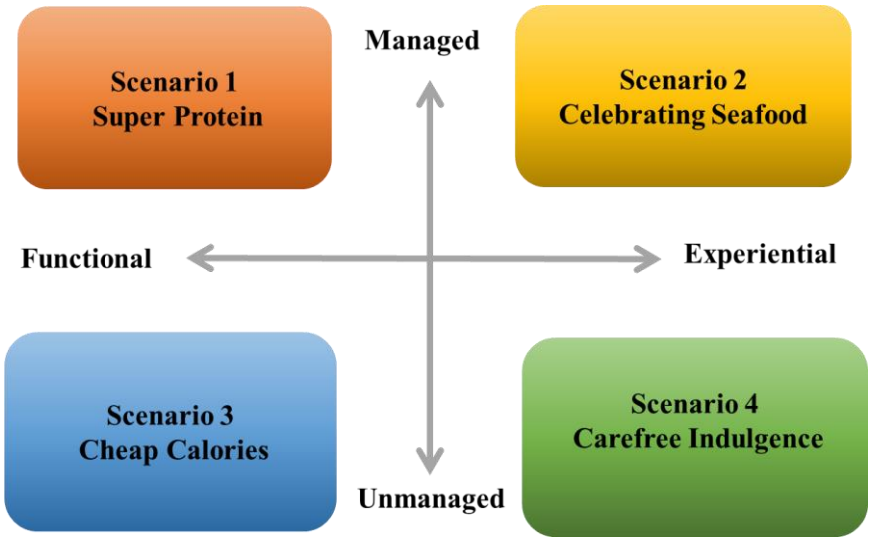


Figure 4.4.2 The future of the global seafood industry

Source: Bord Bia (2014)

The second scenario as outlined by Bord Bia (2014) is known as 'Celebrating Seafood'. This is a response to consumer concerns regarding the management of fishing resources worldwide. This results in a consumer desire that the industry should focus on the management of seafood resources to increase value rather than volume (Gazabara, 2016; Bord Bia, 2014). This implies an industry shift from being a product provider to being a service provider. This will result in a high level of consumer engagement in the industry to protect resources and a need to focus on rituals that deepen the everyday experience of consuming seafood (Honkanen and Olsen, 2009). The increased consumer awareness of the depletion of seafood stocks leads to the development of an environment where sustainability becomes key in consumer selection of products to protect the species of the future (Honkanen *et al.,* 2006). Within this environment consumers intend on savouring seafood and maintain a desire to reduced intake of the product to protect the valuable resource (Gazabara, 2016). As a result, there are two emerging categories, the first is for fresh, whole seafood, professionally prepared and cooked, and the second is for pre-prepared value-added products, which maintain the authenticity of the product but in a more convenient way (Thong and Olsen, 2012).

The third scenario 'Cheap Calories'. This scenario arises due to increased pressure on the seafood industry to rapidly increase the volume of raw material due to the global seafood sector becoming more industrial at an unprecedented rate (Thong and Solgaard, 2017; Bord Bia, 2014). Fast technological changes and the failure of regulations to keep up with the speed of this change has resulted in the industry being viewed externally as unmanaged. Also, this has been compounded by the increased visibility of food safety scares (Bonesso *et al.,* 2011). These factors will lead to a decline in trust from consumers and will speed up the industries commoditisation, which will then result in innovation in areas such as price and product efficiency (Thong and Solgaard, 2017). The focus for consumers will be to find cheap sources of protein, which encompass functional health benefits, convenience and will 'go a long way' (Thong and Olsen, 2012; Olsen, 2003). These consumer demands will result in mass production to achieve cheap, convenient protein, which will lead to the questions over seafood as a health food (Gazabara, 2016). The result of all these combined forces is a market divided and characterised by the 'death of the middle'. This is where there

is a minimal niche for premium seafood and mass undifferentiated products sold on the basis of value (Bord Bia, 2014).

The fourth and final scenario 'Carefree Indulgence' is in response to the increased demand for luxury products to satisfy a sophisticated food culture as income rises and allows for more disposable income (Bord Bia, 2014). The competition will begin to supply premium and exotic seafood products, however by its very nature, this will ultimately become unmanageable. This will encourage high levels of fraud and product mislabelling may manifest to make the product go further (Gazabara, 2016; Thong *et al.*, 2015). Those producers who can source reliable exotic seafood may be afforded the opportunity to charge a premium price (Bord Bia, 2014).

It is clear that there is an opportunity for organisations to utilise their packaging to highlight the health benefits of their products, communications such as 'high in protein' or 'gluten-free'. There is also an opportunity for NPD in frozen seafood products through highlighting health benefits to target the market of cheaper calories for those with less income to spend on protein or those who are time poor and require convenient foods (Bord Bia, 2017b).

4.5 Health benefits of seafood

Fish and shellfish are becoming an essential source of protein as consumers become more health conscious (Nielsen, 2015; Burger and Gochfeld, 2006; Knuth *et al.*, 2003; Burger, 2002). Consumers are demanding alternative sources of protein to red meat and dairy. Meat consumption has numerous benefits. However, consumers are expressing concerns relating to excessive consumption of saturated fatty acids and the negative effects that they can have on health (Henchion *et al.*, 2017). While plant-derived protein is an alternative to meat, there are concerns that as a major source of protein, a plant-based diet may lack other nutrient found in muscle sources of protein (Elorinne *et al.*, 2016). Fish and shellfish provide an alternative source of protein to meat which has many health benefits including assistance with reducing cholesterol, which is a crucial part of combating chronic illness, while also being an excellent source of omega-3 fatty acids (BIM, 2014b; Bouzan *et al.*, 2005; Cohen *et al.*, 2005a, 2005b; McMichael and Butler, 2005; Willett, 2005; Daviglus *et al.*, 2002; Patterson, 2002). Protein is needed for healthy growth and development in children and to help maintain muscle in adults. As white fish and shellfish are all low in fat, they are an

ideal source of protein for anyone who is trying to reduce the amount of fat they eat. Oil-rich fish, do contain more fat but have the benefit of including the healthy omega-3 fats, of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Almost all fish are rich in vitamin B12, which has benefits ranging from keeping blood healthy to helping to reduce tiredness and fatigue (BIM, 2014b).

The Sea Fish Industry Authority (2015) suggests ten key health benefits of consuming seafood regularly. This includes links between fish and fish oil consumption to reduced symptoms of rheumatoid arthritis; protection of and clearer vision; preventing and relieving the symptoms of asthma in children; avoiding the development of short-term illnesses such as post-natal depression; reducing the symptoms of some skin conditions such as dermatitis's, eczema; and inflammatory bowel diseases. There has also been a link made between consuming high levels of omega-3 fat found in seafood and improved memory and concentration levels (Seow and Wang, 2017). These benefits to human health are due to the nutritional values of fish and shellfish, and therefore they are a precious resource (Caughey *et al.*, 2010).

The nutritional benefits of fish are attributed mostly to its exceptionally advantageous fatty acid profile and polyunsaturated fatty acids in particular (Hossain, 2011). The species of fish will determine lipid content and fatty acid profile, however, there are many other factors to consider, like temperature, season, size, age, and diet of the species (Saito *et al.*, 1999; Sargent *et al.*, 1995; Ackman, 1989). Pelagic fish maintain the highest levels of EPA and DHA, two of the most sought-after of the polyunsaturated fatty acids. Like other species of fish as stated above, the level and type of polyunsaturated fatty acids found in pelagic fish can vary depending on factors such as season, age and gender of the fish (Brunner *et al.*, 2008; Ackman, 1982).

4.6 Sustainability of Irish seafood

In 2016, most fish stocks were just at or being pushed above their sustainability levels, this has been increasing steadily since 1974. In 2013, only 10.5% of the world's fisheries were underfished (Henchion, *et al.*, 2017; FAO, 2016). This overfishing has put significant pressure on ecosystems and is continuing to make them more vulnerable (EEA, 2015; UN, 2016). Food security and sustainability are fast becoming a top priority for governments worldwide, trying to balance a current need to secure

adequate access to appropriate and nutritious food sources and also planning for the need of a growing population (Maggio *et al.* 2015; UN, 2015; Safefood, 2012). The requirement to be able to feed 9.5 billion people by 2050 will require sustainable fishing from both the sea and fish farms (Shelman, 2016). In the EU, this commitment is seen in the Blue Growth strategy, which aims to develop the seafood and marine industry sustainabily for the long-term (EC, 2012). This is a commitment also made in the Food Wise 2025 strategy and through Origin Green, in Ireland (DAFM, 2015a; Bord Bia, 2016b). That commitment is that the Irish seafood industry will develop in an economically, environmentally and socially responsible manner (BIM, 2108).

Seafood is going to be an essential source of protein and nutrition moving into the future as the agriculture industry succumbs to the pressures of climate change and limited resources (EEA, 2016). This is a very achievable target in theory, as farmed fish is the most economical of all the animal proteins regarding feed conversion. To produce 1 kg of farmed fish 1.2 kg of feed is required. By comparison, to the next lowest of poultry at 2.4 kg of feed for 1 kg of meat or beef at 7 kg of feed to produce 1 kg of beef (Shelman, 2016). Another area of opportunity is to develop under fished or underutilised species of fish (DAFMb, 2015). With a shortage in conventional seafood, there is a need to examine the potential of underutilised fish species, as both fresh fillets and added value products (Henchion *et al.,* 2017; DAFMb, 2015; Fagan *et al.,* 2006).

The concerns of the public have grown in some areas about seafood, including food safety; environmental impact; traceability; and sustainability (Shelman, 2016). Consumer trends indicate that there is a demand for more sustainably caught seafood as consumer awareness of the depletion of seafood stocks increases (BIM, 2018; Honkanen *et al.,* 2006). This knowledge, which consumers have acquired, has led to an increased interest in the origin of fish and an enthusiasm to purchase new, lesser-known and underutilised species in order to protect species of fish in the future (BIM, 2018; Henchion, *et al.,* 2017; Shelman, 2016; DAFMb, 2015; Honkanen *et al.,* 2006). McClenachan *et al.* (2016) concluded that consumers are willing to pay a higher price for three types of sustainable seafood products; ecological sustainability, local origin and social sustainability. Organisations can capitalise upon in this area. By using an internationally recognised programme, such as the Origin Green programme and engaging with the consumer, organisations have an opportunity to develop, unique;

sustainable; profitable; and market-oriented products (Bord Bia, 2016b; Shelman, 2016).

4.7 Summary

Chapter 5 provides an overview of the Irish seafood industry and focuses on the current demands of the market that provide many opportunities for the growth, now and in the future for this industry. These opportunities are in the area of sustainable, value-added products and this chapter establishes significant areas where these opportunities can be capitalised. This chapter also establishes the importance of value creation and most significantly, the areas of most potential lucrativeness for Irish seafood related SMEs, which is the pelagic sector.

4.8 Summary of literature

This brings to an end the literature review that has established that there is a vast amount of information available about many aspects of market orientation, the NPD process, SMEs, and the Irish seafood industry. The literature review has highlighted three main areas of importance. The first is the area of innovation and the NPD process in food related SMEs. This literature suggests there are significant differences between SMEs and large organisation in the methods they use to innovate and during the NPD process. The need for SMEs to develop a framework based on a proven model such as the Stage Gate process and tailored to the individual needs of the organisation is established. The use of such a model will aid in the development of sustainable, value-added products and help ensure the success of those products in Irish, European and international markets.

Chapter 3 outlines the need for market-oriented products and their general success in the market. The benefits of a market-oriented organisational culture and a market-oriented method of product development are highlighted. The use of knowledge management for the organisations benefit as part of developing a market-oriented organisation is established. However, it is shown that the Irish food industry and specifically the Irish seafood industry are not market-oriented enough in their approach to NPD. It is established that through organisation`s maintaining a clear understanding of the needs and wants of the consumer, along with their motivations

for purchasing, at the initial stage NPD can increase the success of food related products.

Finally, Chapter 4 provides an insight into the seafood industry in Ireland and the market and consumer demands. There is also a focus on the predicted future demands, which will be placed on the Irish seafood industry and the need for sustainable growth and development via value creation. The final element that the literature review highlights is the area that has the most potential for seafood related SMEs in their value-added NPD that is value-added sustainable pelagic fish products.

The review of literature has identified four key research gaps, three of which have multiple components (see Figure 4.8). While the literature stresses the importance of NPD and market-oriented NPD for the success and development of all organisations, the research highlights a gap in the literature in relation to the development of new products for foods related SMEs. There is no appropriate NPD process or systematic framework for food related SMEs. There is also no current research on the points of engagement of food related SMEs with consumers as part of the NPD process. Also, the absence of sufficient investment regarding time and resources on certain stages of the NPD process for food related SMEs has been identified but does not elaborate in detail as to the reasoning for the lack of investment.

There have been many proven successful market-oriented products and numerous successful market-oriented food products. However, generally, the Irish food sector is not a market-oriented industry, there is a significant lack of market orientation in seafood related organisation, and food related SMEs in Ireland. While this is clearly established in the literature, there is a knowledge gap in the identification of what the barriers are that prevent food related SMEs from being more market-oriented.

The literature is clear on the benefits of adopting a market-oriented culture to organisational performance. There are a vast array of consumer integration techniques identified in the literature however there is a gap in relation to which techniques are appropriate for food related SMEs based on the barriers they face. There is also a need to consider which consumer integration techniques are appropriate for not only food related SMEs NPD but also which consumer integration techniques are appropriate

for food related SMEs when their NPD includes a new ingredient or an ingredient, which is unfamiliar to the consumer.

The literature suggests that Irish seafood industry is adding very little value to the base product, and this is an area of significant potential for SMEs. This research uses primary and secondary data to identify the areas of potential growth for SMEs NPD activities based on the actual wants and needs of the consumer. The research also identifies the product attribute preferences of multiple market segments for unfamiliar seafood products. Chapter 5 establishes the conceptual framework used for this study based on the literature review and the knowledge gaps.

Research Gap 1: (RQ) (RSQ1) (RSQ2)

An NPD process appropriate for seafood related SMEs.

The points of engagement of seafood related SMEs with consumers as part of the NPD process.

The reasoning for the lack of investment by seafood related SMEs in the NPD process

Research Gap 2: (RQ) (RSQ1)

The barriers that prevent seafood related SMEs from being more market-oriented.

Research Gap 3: (RQ) (RSQ1) (RSQ2)

The appropriate consumer integration for seafood related SMEs based on the barriers they face during the NPD process.

The appropriate consumer integration for seafood related SMEs, in the development of products which includes an ingredient, which is unfamiliar to the consumer

Research Gap 4:(RQ) (RSQ3)

The areas of potential growth for seafood related SMEs NPD activities based on the actual wants and needs of the consumer and current market trends.

The identification of the product attribute preferences of multiple market segments for unfamiliar seafood products

Figure 4.8 Knowledge gaps

Source: Author

Part 3: Conceptual Framework

Chapter 5: Conceptual Framework

5.1 Introduction

This chapter presents the conceptual framework as a result of a review of the relevant and key research on market orientation and consumer integration techniques; SMEs; the NPD process; and the seafood industry in Ireland, which were the basis of this study. The conceptual framework for this study can be broken down into three interlinking areas; the structure of and frameworks for the NPD process; the Irish seafood market demands; and market-oriented focused NPD. The conceptual framework demonstrates how these three concepts can contribute to the development of sustainable market-oriented value-added seafood products in Irish seafood SMEs and the implications for the Irish seafood industry of developing such products.

5.2 The conceptual framework

The conceptual framework is a structure that presents the research in a logical format and highlights the key issues stemming from the literature about a study (Brotherton, 2015; Savin-Baden and Howell Major, 2012). Savin-Baden and Howell Major (2012) suggest that the conceptual framework supports the requirement to investigate the research question. Brotherton (2015) further suggests that a correlational framework establishes connections or relationships between multiple factors whereas a causal framework is more appropriate when establishing the nature of a relationship such as a cause-effect link between factors. Regardless of which method is chosen, the conceptual framework informs all other elements of the research, as the *"concepts, constructs and variables are the building blocks for the conceptual framework"* (Brotherton, 2015:97). A review of the literature provides a basis for a correlational framework in this study, as the relationships between adopting a market-oriented approach to NPD and new product acceptability by consumers are examined.

5.3 The conceptual framework guiding the study

The conceptual framework guiding this study illustrates that to obtain new product success for SMEs, there are three requirements, a structured NPD process; knowledge

of market demands; and market-oriented NPD activities. The core of this research is adopting a market-oriented approach to NPD as it contributes to the development of successful new food products in multiple ways (see Figure 5.3).

The development of a framework for market-oriented NPD in SMEs is required, as can be seen in Step 1 of Figure 5.3. This NPD framework needs to be based on a variety of factors. The first is the creation of a new model, or adoption of an established model, which can be easily adapted by SMEs. Many researchers (Ulrich and Eppinger, 2015; Cooper, 2001; Crawford, 1987; Wind, 1982; Scheuing, 1974) have attempted the development and design of a model, which encapsulates all of the important stages of the NPD process. There are many NPD frameworks, such as the Stage Gate process (Cooper, 2001) (see Figure 2.7.1), available to every organisation, regardless of its size or capacity. However, much of the research in the area of NPD processes focuses on larger organisations, which differ from SMEs, as larger organisations tend to possess more research and technological resources (Bhuiyan, 2011; Gibb, 2000; Martensen and Dahlgaard, 2000; Cooper and Kleinschmidt, 1995). Therefore, the NPD process will differ in SMEs and large organisations as their structures, processes and resources differ. Finally, Dhanesh (2014) believes that a flexible and formal NPD process for the intrapreneurial organisation is required. Some organisations naturally possess and maintain a more intrapreneurial focused environment. Research states that SMEs keep an innovative atmosphere due to the lack of stipulations by management (Tidd and Bessant, 2013). This lack of formality allows for the stimulation of innovation easily within an organisation (Henard and Szymanski, 2001; Loch, 2000). By comparison, due to their more formalised processes, large organisations sometimes struggle with innovation, idea generation and creativity (Grunert and Traill, 2012; Ghobadian and Gallear, 1997). Therefore, a process, flexible enough to support innovation and formal enough to ensure efficiency, is required for successful innovation in the NPD process for SMEs (Nicholas *et al.*, 2011).

The next key element is the adoption of a market-oriented culture and the implementation of a market-oriented strategy into the NPD process. Market orientation is a fundamental concept in the area of marketing strategy and management (West *et al.*, 2015; Day, 1992). For the creation and maintenance of a successful SME, market orientation is critical (Pelham and Wilson, 1995). Laforet and Tann (2006)

suggest that market orientation is not related to the size of an organisation and can affect the performance of all organisations regardless of size, as customer focus is one of the drivers of the SMEs innovation process. That customer focus is based on an understanding of the consumer's wants and needs through consumer integration techniques. Maintaining an understanding of consumer's perceptions of a product is a key component of market orientation (Bogue *et al.* 1999).

A market-oriented culture required the generation of market intelligence through consumer integration techniques and the dissemination of market intelligence through knowledge management (Deshpandé *et al.*, 1999). Knowledge management is key, as it is core in the development of a market-oriented culture and in managing the information gathered from primary research in the form of consumer integration techniques and in the form of secondary research such as information gathered from sources such as industry reports on market demands. The consumer integration techniques are also key as they will need to be incorporated into the first step of a formal and flexible NPD process.

Step 2 involves in-depth knowledge of the demands of the market. For the development of market-oriented value-added seafood products, it is important that Irish seafood SMEs know the demands of the Irish seafood market and the opportunities, which are present for those organisations. A significant element of the European and global market is sustainability. A priority for the future is ensuring that seafood is caught, distributed and consumed in a manner which is economically, environmentally and socially acceptable (European Environmental Agency (EEA), 2016). The development of new markets may motivate organisations to use underutilised species, become innovative and diversify their new product range (Farrelly *et al.*, 2014).

One of the most significant opportunities for increasing the value of the seafood sector is through greater innovation. Currently, Ireland exports 70% of its seafood as a bulk commodity (BIM, 2016b). However, Farrelly *et al.* (2014) believe the sector of greatest potential growth is value-added seafood. To adequately address this potential new consumer friendly products are required as well as innovative techniques that can overcome the challenges of shelf life and transportation (BIM, 2016b). Developing value-added products can provide many benefits to a seafood related organisation

(BIM, 2014a). The seafood industry in Ireland consists of primary, secondary and value-added processing. Of these three, the main sector is the primary processing as it makes up to 75%. This involves mainly whole fish exports. Secondary processing is the next largest sector at 24%, and secondary processing ranges from as little as head and gut removal to filleting. The smallest sector at 1% of fish landed in Irish waters is used for value-added processing (Marine Institute, 2013). Farrelly *et al.* (2014) believe that starting from such a low base, the growth of value-added processing in Ireland offers the most significant potential to the national economy.

As mentioned in Step 1, the adoption of a market-oriented culture and the implementation of a market-oriented strategy in the NPD process is an important element in the development of an appropriate NPD framework for SMEs. However, the use of market orientation is also important in providing insights into what the consumer demands are and how these insights will influence the product design (Fuller, 2016; Grunert *et al.,* 2012). A high level of customer involvement and interaction enhances the organisation's customer knowledge in the initial stages of NPD (Van Kleef *et al.,* 2005; Bogue *et al.,* 1999). Sorenson and Bogue (2005) suggest that this knowledge is used in important stages of product development, particularly the design stage, which facilitates the conversion of information gathered from consumers and stakeholders to explicit knowledge. This explicit and actionable knowledge often influences the marketing strategy and the design of new innovative foods, through a market-oriented methodology.

There is a significant link between Step 1 and Step 2. Step 2 is not static. As market demands and trends changes there will be an impact on Step 1, and elements of the NPD framework in SMEs have to be adjusted accordingly. All elements of Step 1 and Step 2 are required to be considered by Irish seafood SMEs to develop market-oriented value-added seafood products. While some elements of Step 1 and Step 2 are interlinked, the combination of the seven elements of Step 1 and Step 2 will lead to Step 3, which consists of three key success factors in NPD, which are all linked. A formalised framework (Step 1) and a knowledge of the market demands (Step 2) work collectively and aid the development of sustainable market-oriented value-added seafood products that achieve increased consumer acceptance with superior product design (Step 3). However, if an appropriate framework for the organisation is not

developed as described in Step 1 and there is no accurate information relating to the market demands, which is managed correctly, as outlined in Step 2, then SMEs may not be successful in the development of market-oriented value-added seafood products.

The development of seafood products in such a manner contributes to the Irish seafood industry in a variety of ways. Firstly, there would be a NPD process appropriate for food related SMEs that could be tailored and adapted to meet the specific needs of organisations and adjusted as an organisation grows and the market demands changes. Secondly, the adoption of a market-oriented approach to NPD would lead to improved new product success rates for SMEs and an increase in the competitiveness of Irish SMEs through innovative and market-oriented products. There would also be increased competitiveness of SMEs through innovation, and market-oriented products. Finally, such an approach to NPD would contribute more value-added products to the market both in Europe and internationally, allowing for entry into new markets for Irish SMEs.

5.4 Summary

This chapter presents the conceptual framework for this research. The conceptual framework encompasses the pillars of the study and is examined under three distinct but interrelated areas; the structure of the NPD process (Step 1); the seafood market demands (Step 2) and market-oriented focused NPD (Step 3). These three pillars guided the research and assisted in the investigation into the research questions in a structured manner.

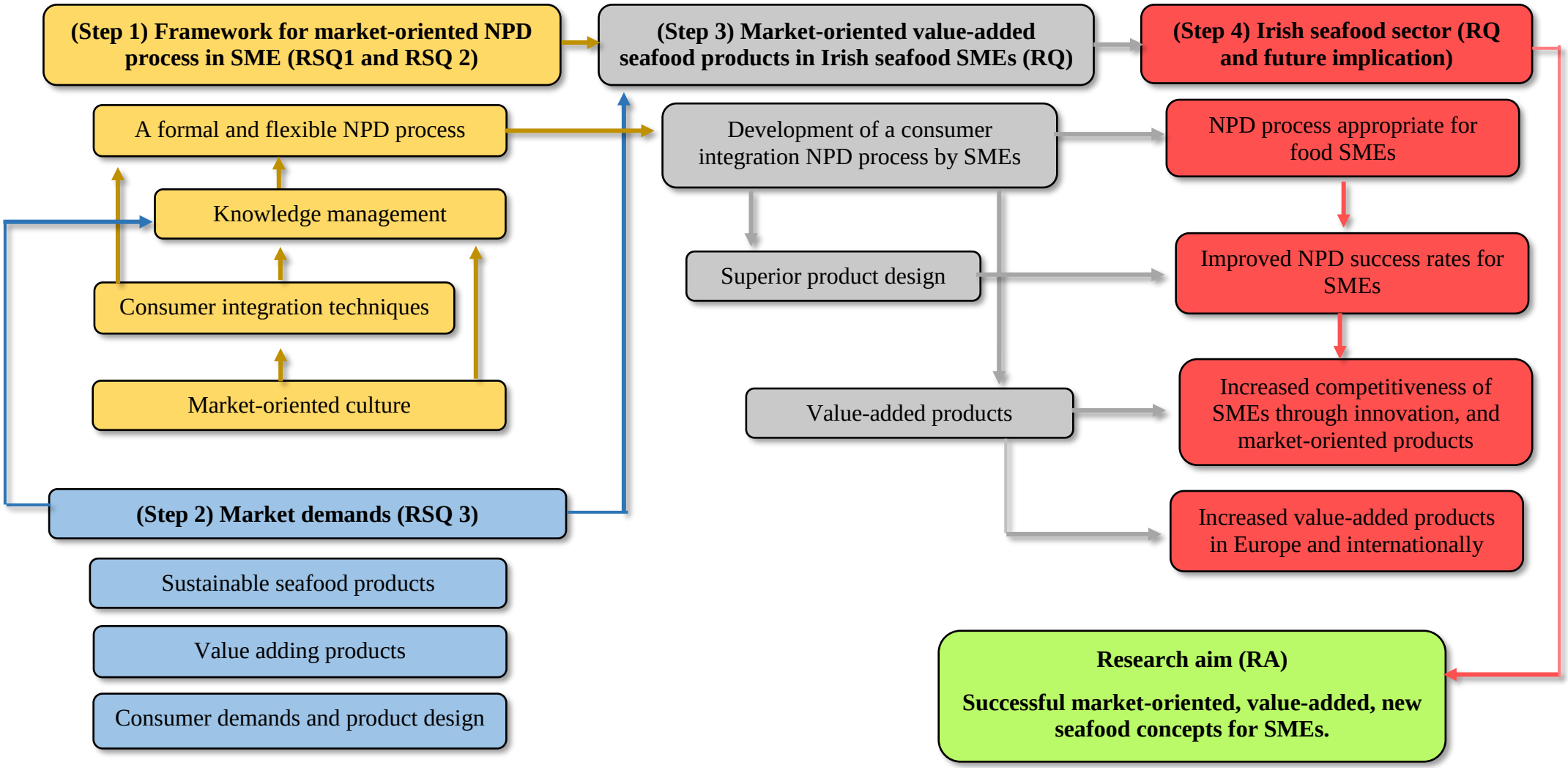


Figure 5.3 Conceptual framework for the research

Source: Author

Part 4: Research Methodology

Chapter 6: Research Methodology

6.1 Introduction

This chapter presents the research design and methodology employed in this study. An overview of the research design strategy used during this research is outlined along with the research's philosophical stance. Following on from the theoretical element of the methodology, the actual research choice is established. The qualitative and quantitative aspects of this research are detailed and justified.

6.2 Research questions and sub-questions

Research Question (RQ): The overall research question that guided this study was *"What role can consumer integration techniques play in small and medium enterprises, in the Irish seafood sector, in understanding consumer's demands for seafood products?"* The main research question is broken down into three specific sub-questions:

Research sub-question 1 (RSQ1): *To what extent do small and medium enterprises in the Irish seafood sector currently engage in market-oriented new product development?*

Research sub-question 2 (RSQ2): *What are the current frameworks being used in the new product development process of the small and medium Irish seafood enterprises?*

Research sub-question 3 (RSQ3): *What product attributes drive consumer preferences for seafood products using a fish that is unfamiliar to the consumer?*

The methodology was strategically chosen to address the knowledge gaps established from the literature review (see Figure 4.8). There is a focus throughout the methodology and subsequent research on addressing those knowledge gaps. There was also a specific focus placed on the pelagic fish sector, with particular emphasis on boarfish as an unfamiliar ingredient.

6.3 Research design strategy

The research design strategy creates linkage between the research question, the method of collecting data and the techniques of analysing the data collected (Denscombe, 2012). Well designed research will provide information and descriptions of the elements to be investigated, show an appropriate relationship between the research question and the research strategy employed and show how all the elements of the research come together (see Figure 6.3). Overall, it ensures that the research design strategy is 'fit for purpose' and that all the components in the research process and the transition from one phase to the next are logical. This includes ensuring the appropriate method of collecting and analysing data are employed and that such methods are in line with the general philosophy of the research.

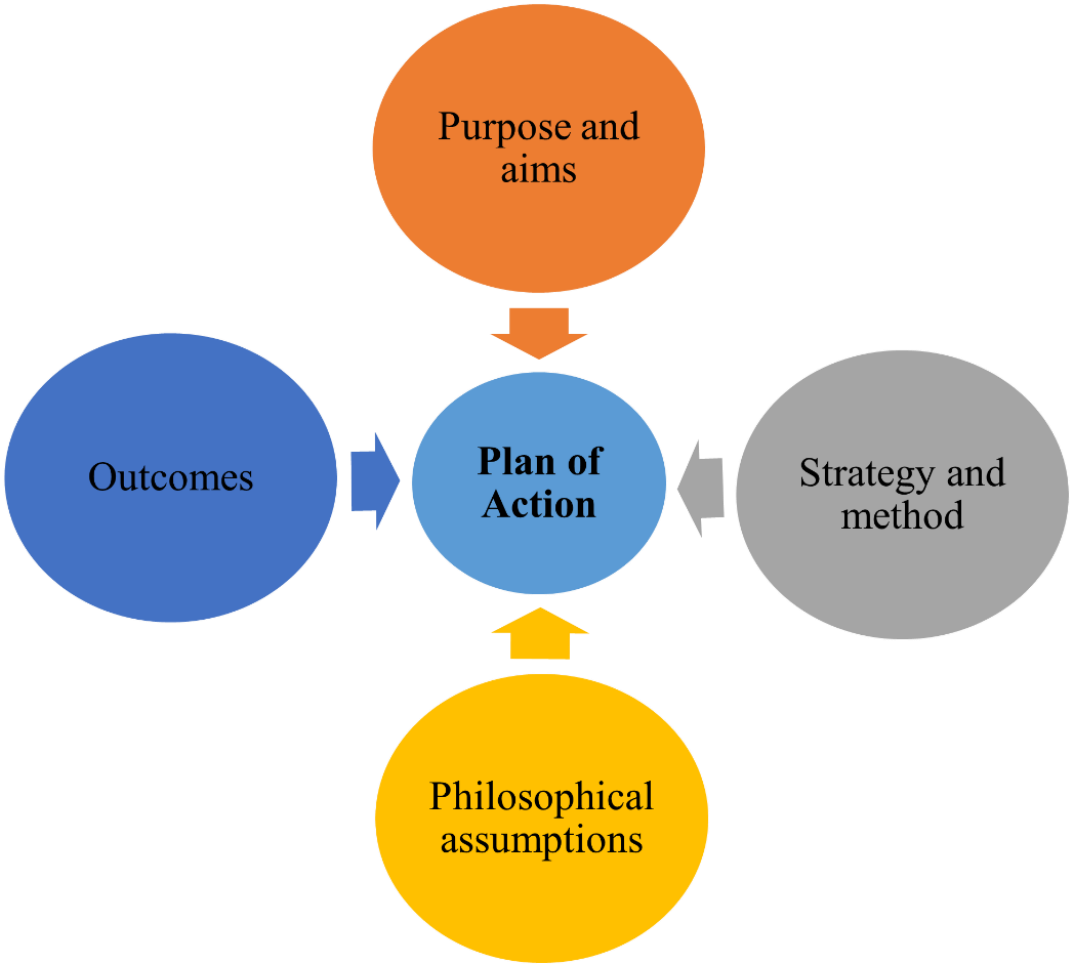


Figure 6.3 Research design

Source: Denscombe (2012)

There are many theories and approaches to research design. Kagioglou *et al.* (1998) suggest that the chosen approach will have a flow about it. The research philosophy will easily lead to the research approach and then follow on again to the research techniques. Saunders *et al.* (2009) who suggests three extra stages, strategy, choice and time horizon, built on the work of Kagioglou *et al.* (1998). This research design is a layered process working from the research philosophy into the techniques and procedures and therefore given the name 'The Research Onion' (see Figure 6.3.1). Whilst there is variance in the definitions of these terms, Saunders *et al.* (2009) put forward a classification that provides a framework, which is clear and concise, for completing the research process. The framework places the research question at the core with layers built up around it. These layers will be 'peeled away' in order to come to the centre. The layers represent the issues to be considered when determining the methodology that will be employed for each individual research study. How each element of the research onion was addressed in this study is discussed throughout the chapter.

6.3.1 Research philosophy

The research onion was chosen as the framework for the structure for the remainder of this section as outlined below. For the first element of the research onion (Figure 6.3.1), there is a vast array of research philosophies. Research from multiple authors (Ritchie *et al.*, 2013; Mkansi and Acheampong, 2012; Saunders *et al.*, 2009; Guba, 1990; Guba and Lincoln, 1989) proffers different classifications, categories and descriptions of research philosophies and paradigms. All this information can result in complex overlap. Key authors in the area of research philosophies (Saunders *et al.*, 2009; Becker, 1996; Guba and Lincoln, 1994) have proposed their theories on the subject area with their input on the definition of ontology, epistemology, and axiology while maintaining shared themes.

Research philosophies can contribute significantly to the overall research from an early stage, aiding in the identification of the type of evidence required, how that evidence will be collected and the most appropriate form of interpretation required in answering the research question. A lack of focus and understanding of this area may lead to negative effects on the quality of the research results (Easterby-Smith *et al.*, 2015). Baker (2001) suggests that there are two contrasting philosophies, that is,

positivism and interpretivism, while Saunders *et al.* (2009) believe there is a middle ground between positivism and interpretivism called realism and there is the pragmatist view. Furthermore, Sexton (2003) argues that these contrasting views on philosophy stem from contrasting opinions on ontological, epistemological and axiological assumptions.

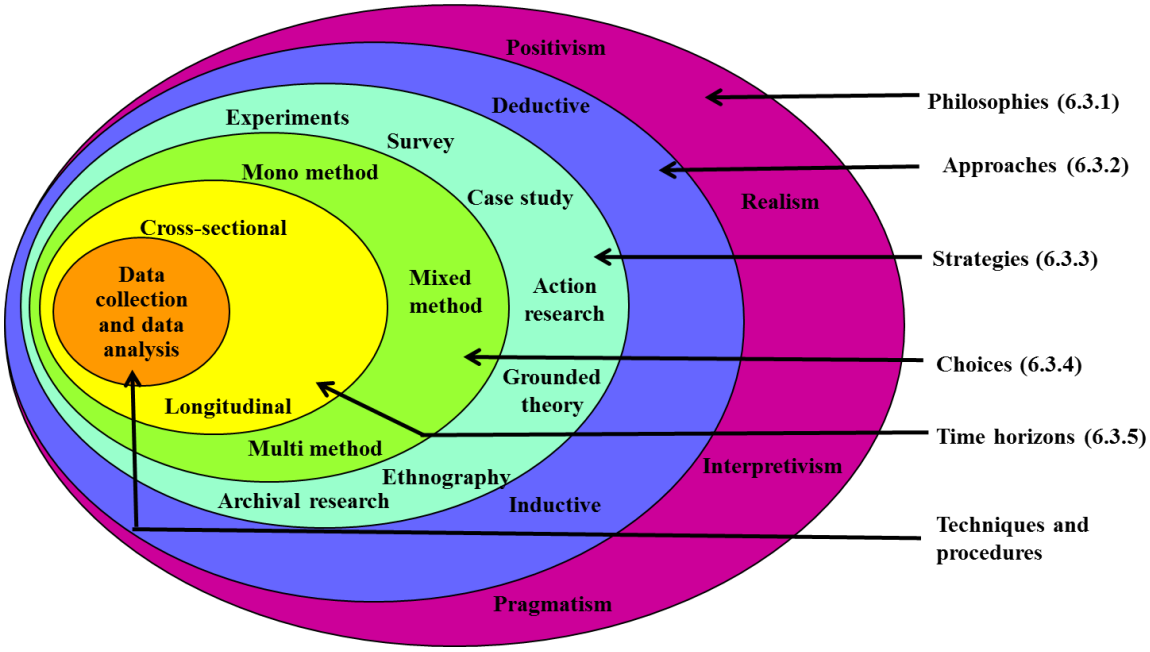


Figure 6.3.1 The research onion

Source: Saunders *et al.* (2009)

Sexton (2003) believes that before choosing an appropriate philosophy, a view on ontological, epistemological and axiological assumptions are established. Epistemology is about what acceptably constitutes knowledge in a specific discipline (Saunders *et al.*, 2009). Epistemology is broken into two parts, the first is 'how one will understand the world' and the second is the explanation of 'how we know what we know' (Crotty, 2003; Burrell and Morgan, 1979). Burrell and Morgan (1979) furthermore suggest that the world is relative and can only be viewed and therefore understood from the viewpoint of the individual who is directly connected to the activities that are being examined. Epistemology is also *"concerned with providing a philosophical grounding for deciding what kinds of knowledge are possible and how we can ensure that they are both adequate and legitimate"* (Crotty, 1998:10).

Axiological assumption focuses on the nature and foundation of value judgements (Sexton, 2003). This allows for a broad spectrum from 'value-free' when a researcher imposes none of their value judgements onto the subject to the other extreme of 'value-laden' when a researcher imposes their value judgements onto the subject. Heron (1996) suggests that our values are the reasoning behind our actions and may include values we have in areas such as ethics. The role of the researcher's values in the research can affect the credibility of the results (Saunders *et al.,* 2009). Heron's (1996) research on axiology suggests the researcher write a declaration of their values as they pertain to the research topic, thus making the values of the researcher clear to the reader, as those values affect every decision in the research process.

Ontology is defined by Crotty (1998) as 'the study of being'. Guba and Lincolin (1989) believe that ontological assumptions ask 'what is there that can be known?' and 'what is the nature of reality?' Saunders *et al.* (2009) state that ontology is about the nature of reality. Such an approach suggests that researchers work and process information relating to how the world works from their perspective.

The philosophical stance of realism is a reflection of reality, that objects exist independently of the human mind. Idealism and realism are considered complete opposites results (Easterby-Smith *et al.,* 2015). The scientific approach of realism is similar to positivism. This scientific approach translates into data collection as well as the analysis and understanding of the data. Realism is seen in two forms, direct and critical realism. Direct realism suggests that what you see, you get. Also, the world is portrayed in reality through our senses. Critical realism suggests that our experiences are what we see and feel about certain 'things' in our environment rather than 'things' themselves. An argument for the latter is that our senses can deceive us and is often created by illusions. Direct realists, however, suggest that illusions are due to an individual not being in possession of all the necessary facts or information (Dobson, 2002). Direct realism was considered for this research and could provide an appropriate stance as it would allow the research to be conducted as an examination of the experiences of the organisations interviewed. However, the pragmatist approach is more in line with the aims of the study as it provides an understanding of the 'what' and 'how' of the research problem.

From an epistemological view, realism requires an examinational of a phenomenon or situation. As it is generally observational, data can be misinterpretation. Axiological assumptions of realism are that the researcher is value laden and the researchers is bias due to their own experiences. Finally, an ontological view of realism is objective and is not impacted by the researchers (Saunders *et al.,* 2009).

Positivism, which has similar attributes of realism, reflects a philosophical stance of natural science. Such a researcher will favour "*working with an observable social reality and that the end product of such research can be law-like generalisations similar to those produced by the physical and natural scientists"* (Remenyi and Williams, 1998:32). Positivism from an epistemological view suggests that only observable situations can provide data and makes casual generalisations. The axiological assumptions of positivism is that the researcher will be value free and does not impose their values on to the situation or data. From an ontological viewpoint the researcher is completely independent and objective (Saunders *et al.,* 2009). This approach could potentially have been adopted for this study as researchers often use a structured approach when developing a methodology as it enables ease of replication for future research, which is similar to the chosen methodologies for this study. However, as with realism, the pragmatism approach is more appropriate as it is more in line with the aims and objectives of this study.

Interpretivism suggests that the viewpoint of the subject will be understood. It is essential that the researcher is aware, and understands how conducting research with people differs from conducting research on objects and to understand the role that people play as 'social actors'. Saunders *et al.* (2009) believe a key component of this philosophy is the empathy of the researcher. Interpretivism examines people's actions and the problems faced in choosing those actions and how those problems are dealt with. It is well suited to observational studies and is subjective in nature. Interpretivism from an epistemological view is subjective and examines the meanings behind situations and social phenomena's. The axiological assumptions of interpretivism is that the researcher will be part of the research and cannot be separated from the research. From an ontological viewpoint, the researchers view is subjective and may change according to the situation (Saunders *et al.,* 2009). This research aims to establish consumer's motives for purchasing, or not purchasing, a product as opposed

to the understanding of consumer purchasing behaviours. It thus implies that interpretivism is not appropriate for this research.

The philosophical stance adopted for this study is pragmatism. Pragmatism focuses on the 'what' and 'how' of the research problem, with the research question being at the centre and focuses on understanding the problem (Creswell and Creswell, 2017). Tashakkori and Teddlie (1998) suggest the focus for research will be on the philosophy adopted as a continuum rather than opposite positions. Furthermore, Tashakkori and Teddlie (1998) believe that pragmatism is naturally appealing to researchers as it eliminates any debate of concepts of truth and reality. They further suggest that researchers should *"study what interests you and is of value to you, study in the different ways in which you deem appropriate, and use the results in ways that can bring about positive consequences within your value system"* (Tashakkori and Teddlie, 1998:30).

For this study, the pragmatism approach was selected, as there is a need to focus on the research question in this study. This approach is aligned with the aim of NPD and market orientation research as it endeavours to comprehend the reasoning for producing or not producing a new product from the organisation`s perspective and purchasing or not purchasing a new product from the consumers perspective. In order to maintain an understanding of what is happening around us in the world, we need to comprehend and appreciate social structures, which underpin the sensations, which we endeavour to understand (Dobson, 2002). Again this is most appropriate for this research as an aim of this study was to use consumer insights in the development for SMEs of more sustainable and value-added, new seafood concepts in order to increase consumer acceptance including products with unfamiliar ingredients and this requires a multi-level study which incorporates multiple parties.

Pragmatism from an epistemological view focuses on practical and applied research and involves different perspectives on data interpretation. The axiological assumptions of pragmatism is that the researcher's values will play a large role in the interpretation of the results and the researcher will be subjective and objective as necessary. From an ontological viewpoint, the researcher`s view is based on that which best enables the researcher to answer the research question (Saunders *et al.*, 2009). The pragmatism approach to research uses the approach that best fits the research question. This

approach ensures the researcher is focused and conscious of what they do (Ormston *et al.,* 2014). Pragmatism generally combines multiple approaches and mixed method research to answer the research question (Teddlie and Tashakkori, 2009). Pragmatism at its core is asking the question 'what works' (Creswell and Creswell, 2017) and the use of mixed methods provides a workable approach to problem-solving (Morgan, 2014). Such an approach is consistent with the methodologies chosen and discussed later in this chapter.

6.3.2 Research approaches

The importance of choosing an appropriate research approach cannot be understated. Easterby-Smith *et al.* (2015) state that the research approach lets the researcher make a decision that is well informed regarding the research design. This can determine the kind of data, which needs to be collected and from where and how that data will be interpreted to establish the most reliable answer to the questions being asked by the researcher. It also assists the researcher in determining which research strategies will be chosen and possibly, more importantly, the ones which will be avoided. Finally, understanding the different approaches allows for the adaption of the research design if necessary due to unforeseen problems, for example, limited access to data (Saunders *et al.,* 2009).

There are two approaches to choose from when designing a research strategy; inductive and deductive. The deductive approach is considered to be theory testing, which begins broadly and ends being very precise and specific (Saunders *et al.,* 2009; Trochim, 2006). Creswell *et al.* (2007) suggests this style of research works from a top-down approach, beginning with establishing a theory to hypothesise, then collecting data or challenging the established theory. Trochim (2006) also notes that any arguments based on laws or rules should express deductively. Induction is the exact opposite of deductive as it moves from specific to general (Trochim, 2006). Induction is a bottom-up approach using the views of participants to build upon and generate an interconnecting theory (Creswell *et al.,* 2007). Trochim (2006) suggests that inductive arguments are based on experiments or observation.

To answer the research question *"What role can consumer integration techniques play in small and medium enterprises, in the Irish seafood sector, in understanding*

consumer's demands for seafood products?" through identifying the relationships of different variables a combination of both the inductive and deductive approach is required. The adoption of both inductive and deductive approaches is consistent with a pragmatic philosophical stance, and a mixed method design is necessary to investigate and answer the research question. At different stages of the research an inductive and deductive approach were used.

Deduction consists of theory building that is subject to rigorous testing. In conducting the conjoint analysis and sensory acceptability testing a deductive approach was taken (Saunders *et al.,* 2009). The main aim of deduction is to describe the relationships between different variables. Once the relationship has been establishing a hypothesis is developed stating what exactly the relationship is between said variables. Data is collected to test the stated hypothesis, in this research it is quantitative data. Deduction as an approach suggests that the researcher are independent of what they observe or in the questions they choose and also how the questions are phrased and expressed. This issue was addressed during pilot testing (Creswell *et al.,* 2007). Furthermore, the concept needs to be effective in the way, which allows for the quantitative measurement of the facts. Generalisation is the last significant characteristic of deduction. A sample of sufficient representation of the population needs to be available to be able to generalise about social and human behaviour (Saunders *et al.,* 2009).

Induction is the opposite of deduction as it follows the data rather than the theory. This is the chosen method by the social sciences as they question anything that has a cause/effect link between variables while not having an in-depth understanding of how people interpret their world. Such an understanding is a key element and strength of the approach (Saunders *et al.,* 2009). Advocates of induction often believe that deduction is too rigid a methodology and will not allow any other explanation for what may be happening. A small sample is generally more appropriate for the inductive approach as the context is the most important element. Qualitative data is most likely the data collection method used as it allows for the establishment of different viewpoints (Easterby-Smith *et al.,* 2008). All of these characteristics of the inductive approach are appropriate for the qualitative elements of this research. Both the interviews and focus groups require an in-depth understanding of the participant's

viewpoints and explanation for what is happening and important to the participants. This would be difficult to achieve through a deductive approach, as it is too rigid.

6.3.3 Research strategies

The third element of the research onion involves the research strategy. The way in which a research question is asked will lead to different types of answers, either exploratory, descriptive, or explanatory. Adams and Schvaneveldt (1991) suggest that the main advantage of conducting an exploratory study is that it allows for flexibility and adaptability. Robson (2002:59) further suggests that the nature of descriptive research is *"to portray an accurate profile of persons, events or situations"*. Such research is often an extension or addition to exploratory or explanatory research. The collection of data by this means requires a clear perspective and underpinning knowledge of the phenomena, as an issue cannot be explained if it is not understood.

Explanatory research establishes the existence of relationships between variables. To establish a clear insight into the relationship, statistical tests such as correlation are often employed. Qualitative data is used to explain the reasons behind the established relationship further. Brotherton (2015) establishes the critical goals of exploratory, descriptive and explanatory research (see Table 6.3.3). Saunders *et al.* (2009) state that some strategies have a clear deductive or inductive approach. However, each strategy has the potential for use in exploratory, descriptive and explanatory research as no strategy can be stringently applied to any one approach or is superior to any other strategy (Yin, 2003). The conjoint based questionnaire and sensory acceptability testing conducted as part of this research were explanatory. Conjoint analysis questionnaire are used to try to answer many questions and measure multiple factors by collecting large amounts of data from a sizeable population (Brotherton, 2015; Easterby-Smith *et al.*, 2015; Saunders *et al.*, 2009; Forza, 2002). Conjoint analysis and sensory acceptability testing investigate, by means of an explanatory study, the importance consumers place on different attributes when making a purchase decision in relation to seafood (Claret *et al.*, 2012).

The other strategies chosen for this research are exploratory. This takes the form of a literature review, of past and current literature, in-depth interviews and focus groups. Exploratory research is both flexible and adaptable when compares to descriptive and

explanatory research (Saunders *et al.*, 2009). These characteristics are not only an advantage but also are an inherent part of this research process as the focus of this research was broad initially and narrowed continuously as the research proceeded.

Table 6.3.3 The goals of exploratory, descriptive and explanatory research

Exploratory research	Descriptive research	Explanatory research
Become familiar with the basic facts, people and concerns involved	Provide an accurate profile of a group	Determine the accuracy of a principle or theory
Develop a well-grounded mental picture of what is happening.	Describe a process, mechanism or relationship.	Find out which competing explanation is better.
Generate many ideas and develop tentative theories and conjectures.	Give a verbal or numerical picture.	Advance knowledge about an underlying process.
Determine the feasibility of doing additional research.	Find information to stimulate new explanations.	Link different issues or topics under a common general statement.
Formulate questions and refine issues for more systematic enquiry.	Present basic background information or a context.	Build and elaborate a theory so it becomes complete.
Develop techniques and a sense of direction for future research.	Create a set of categories or classify types.	Extend a theory or principle into new areas or issues.
	Clarify a sequence, set of stages or steps.	Provide evidence to support or refute and explanation.
	Document information that contradicts prior beliefs about a subject.	

Source: Brotherton (2015)

Exploratory research is a method of examining and finding out *"what is happening; to seek new insights; to ask questions and to assess phenomena in a new light"* (Robson, 2002:59). The adoption of exploratory research strategies is effective as it provides clarity and an understanding of issues (Robson, 2011). This research was in pursuit of identifying the current NPD activities of seafood related SMEs in Ireland and understanding the NPD process and the consumer integration techniques used by Irish seafood SMEs. There was a need for the researcher to be able to probe organisations to establish a clear understanding of the processes in each organisation in order to address the knowledge gaps.

6.3.4 Research choices

The research choice is the fourth element of the research onion, and it raises the question of whether to use quantitative and/or qualitative means to collect data. The most basic difference in quantitative and qualitative data collection techniques is that the former is numeric (numbers) and the latter is non-numeric (words) data. Saunders *et al.* (2009) suggest that the method the researcher uses to decide between methods is called research choice. Tashakkori and Teddlie (2003) suggest two methods of research choice, that is, either the mono-method or the multiple method. This suggests that researchers will use single or multiple techniques for the collection of data and corresponding data analysis techniques. The multiple method is the most appropriate for this research as it is a mixture of two or more data collection methods and corresponding data analysis techniques. The multiple method can lead to four possibilities according to Saunders *et al.* (2009) (see Figure 6.3.4).

While a mono-method is acceptable, it is generally considered that multiple methods of research, regardless of the form, are superior (Brotherton, 2015). Tashakkori and Teddlie (2003) suggest that using mixed methods can have many advantages as a variety of methods may be employed for various purposes in a study. The use of focus groups at the exploratory stage of this research showed key issues that were then considered in the development of the conjoint analysis questionnaire. Furthermore, Bryman (2006) suggests that if quantitative and qualitative are combined, this will allow for assurances and confidence in the research conclusions. The use of mixed-method research can also provide strength to the research conclusions as a combination of both quantitative and qualitative provide a more comprehensive understanding of the area of research than either quantitative and qualitative methods would alone. As a result mixed-method research is appropriate for this study rather than mono-method.

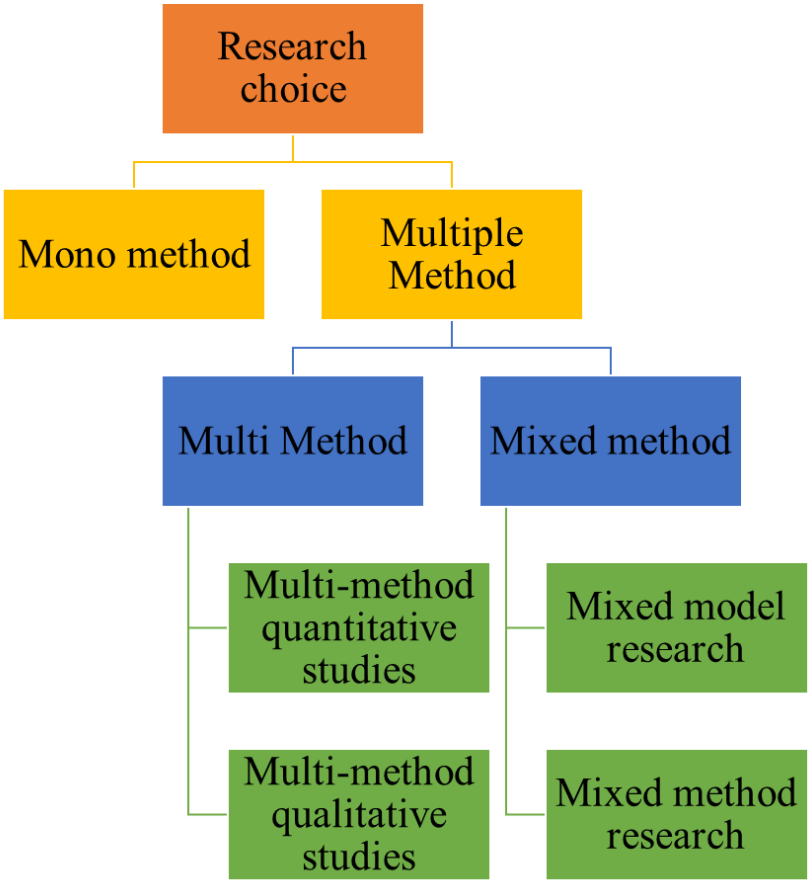


Figure 6.3.4 Research choice

Source: Saunders *et al.* (2009)

For this study, mixed-method research was adopted. Mixed-method research employs both quantitative and qualitative methods for gathering and analysing data either at the same time (parallel) or one after the other (sequential). This allows for the use of both qualitative and quantitative studies to be conducted. The first of the mixed-method approaches is mixed-model research, which mixes both quantitative and qualitative methods for collecting and analysing data throughout the research. There are a variety of models available to the researcher relating to research choice (Saunders *et al.*, 2009). Areas of overlap and repetition occur in many of these models. The research choice for this study can fit into one or more of each of the models in Table 6.3.4. In the model, Creswell and Plano Clark (2011) present the convergent parallel design element, and Creswell *et al.* (2003) present the sequential transformative element. Both of these could be considered to be partially representative of this study.

Table 6.3.4 Summary of research choice models

Creswell and Plano Clark (2011)
Convergent parallel design: The QUAN and QUAL strands of the research are performed independently. Results are brought together in the overall interpretation
Explanatory sequential design: First QUAN data collection and analysis, followed by QUAL data collection, which is used to explain the initial QUAN results.
Exploratory sequential design: First QUAL data collection and analysis, followed by the collection of QUAN data collection to test the initial QUAL results
Embedded design: In a traditional QUAL or QUAN design, a strand of the other type is added to enhance the overall design
Transformative design: Conduct any QUAN, QUAL, or mixed methods study with a transformative purpose.
Multiphase design: More than two phases or both sequential and concurrent strands are combined over a period within a study addressing an overall objective
Teddlie and Tashakkori (2009)
Parallel mixed design: QUAL questions, data collection and analysis techniques. QUAN questions, data collection and analysis techniques. The results of each form conclusions
Sequential mixed design: One type of data (e.g. QUAL) provides the basis for the collection of a different kind of data (e.g. QUAN). Answers either QUAL or QUAN type of question. Conclusion based on analysis of both types of data.
Conversion mixed design: One type of data is collected. Data is transformed and reanalysed in another approach to add to the conclusion.
Multi-level mixed design: Hierarchical linear models. QUAL data are collected at one level. QUAN data are collected at a higher level sequentially to answer different aspects of the same question. Data is analysed accordingly to inform conclusions
Fully integrated mixed design: QUAL and QUAN approaches occur and interact throughout the study. One form (e.g. QUAL) affect the formulation of the other (e.g. QUAN)
Creswell *et al.* (2003)
Sequential explanatory: Collection and analysis of QUAN data, followed by collection and analysis of QUAL data. Priority is given to QUAN element
Sequential exploratory: Collection and analysis of QUAL data, followed by collection and analysis of QUAN data. Priority is given to QUAL element
Sequential transformative: QUAN data may be collected and analysed, followed by QUAL data being collected and analysed, or vice versa. Integration of both types of data usually occurs at the data interpretation stage and in the discussion.
Concurrent triangulation: Both QUAL and QUAN approaches are used to confirm, cross-validated, or corroborate findings within a single study
Concurrent nested: A QUAN strand is embedded within a predominantly QUAL study (Quan + QUAL) or vice versa. QUAL and QUAN approaches are used to confirm, cross-validated, or corroborate findings within a single study
Concurrent transformative: QUAN and QUAL data are collected and analysed at the same time. Data integration usually occurs at the data interpretation stage.

Source: Author, adapted from Creswell and Plano Clark (2011); Teddlie and Tashakkori (2009); Creswell *et al.* (2003)

This study used a sequential mixed design research choices suggested by Teddlie and Tashakkori (2009). A summary of the potential research choice models which were reviewed and considered for this research can be seen in Table 6.3.4. A sequential mixed design is most appropriate as the data collected and analysed from the qualitative research (interviews and focus group) provided the basis for the collection of quantitative data (conjoint analysis and sensory acceptability testing). The results and conclusions of the research were then based on both types of data.

The use of the sequential mixed design research choices suggested by Teddlie and Tashakkori (2009) allows that the information gathered in the interview be used to inform the focus group questions and themes. The data generated from the focus group then became the basis for the conjoint analysis questionnaire as suggested by Lee *et al.* (2000). The data gathered in the conjoint analysis, focus groups and interviews then informed the sensory acceptability testing. This method allow for the assembly of all data into single data set to ensure all the information and data collected was consistent and contributed to answering the research question. The data collection methods and sequence used for this study is briefly outlined in Figure 6.3.5 and were achieved through utilising the work of Saunders *et al.* (2009). Figure 6.3.5 identifies which tool is used to answer the research question and each sub question. Figure 6.3.5 highlights how each research sub question is answered by one or more data collection method. It identifies the links between each research sub question and how each method contributes towards answering the main research question.

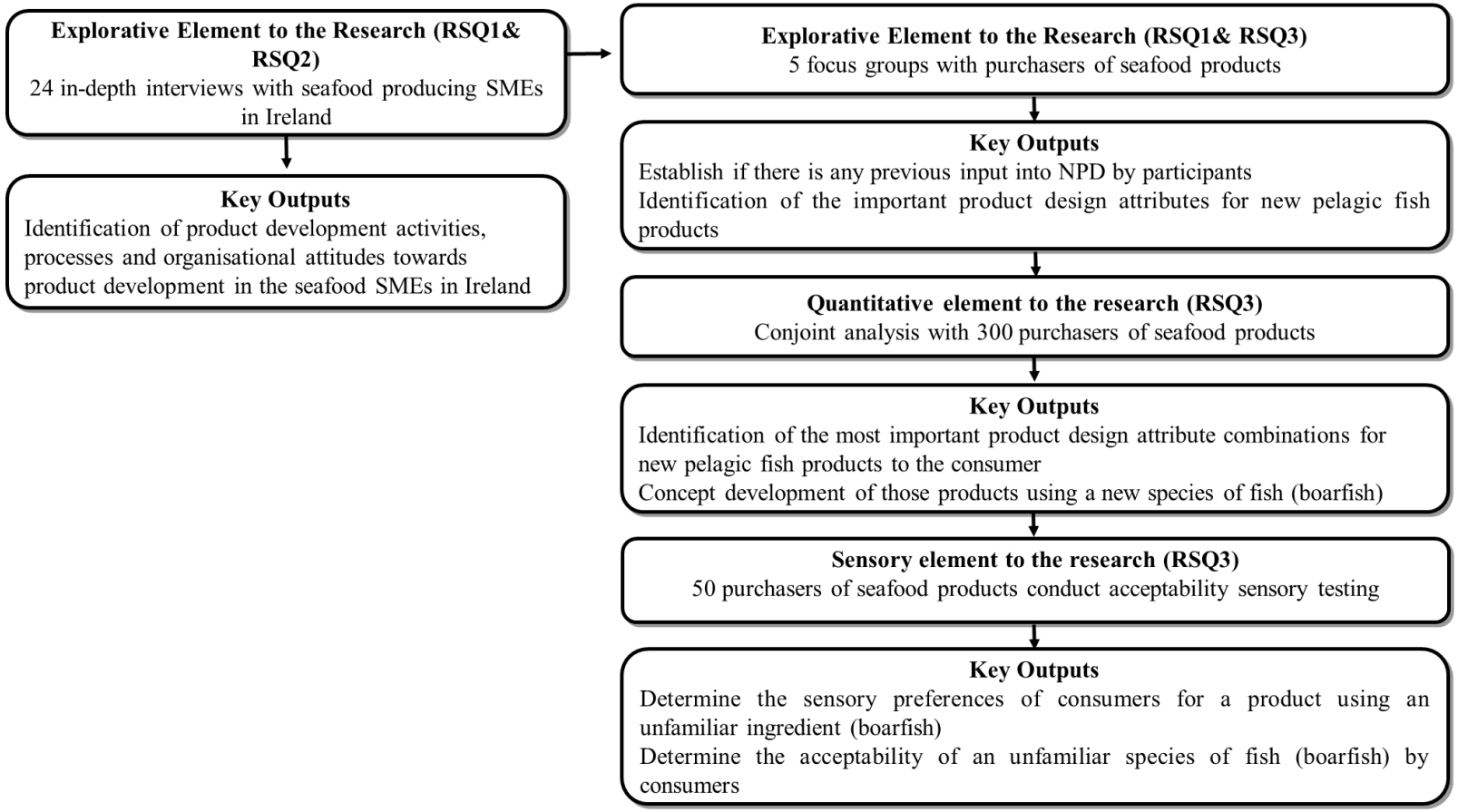


Figure 6.3.5 Data collection methods used in this research

Source: Author

6.4 The credibility of research findings

All research has to have credible research findings. Raimond (1993:55) stated that *"scientific methodology needs to be seen for what it truly is, a way of preventing me from deceiving myself in regard to my creatively formed subjective hunches which have developed out of the relationship between me and my material".* This suggests that there needs to be an importance placed on the reliability and validity of every study. Guba and Lincoln (1989) suggest that the terms reliability and validity are only applicable in relation to quantitative research, not qualitative research. Rather the concept of 'trustworthiness' is more suited to qualitative research. According to Stenbacka (2001:552), *"the concept of reliability is even misleading in qualitative research, if a qualitative study is discussed with reliability as a criterion; the consequence is rather that the study is no good".*

Within this study, reliability and validity were ensured through the use of a mixed method research approach which encompasses in-depth interviews, conjoint analysis, focus groups and sensory acceptability testing and all elements were pilot tested. Research shows that the use of a mixed method approach allows for a greater understanding of the topic being studied (Hurmerinta-Peltomaki and Nummela, 2006). Also, they are generally considered to increase validity in the findings with fewer shortcomings compared to those that use either a quantitative or qualitative approach individually (Molina-Azorin, 2011; O'Cathain *et al.*, 2007; Hurmerinta-Peltomaki and Nummela, 2006). The use of mixed methods research harnesses the strengths of each chosen methodology and reduces the weaknesses of the chosen methodologies (Creswell and Plano Clark, 2007). The questions in all elements of the research were pilot tested on 10% (Connelly, 2008) of suitable participants to ensure that they could be easily understood and answered.

In ensuring reliability and validity in qualitative research, there are numerous actions that can be taken. These include extended observation of data, mixed method research strategy, triangulation and external or peer auditing of findings (Creswell and Creswell, 2017; McMillan and Schumacher, 2006; Stenbacka, 2001; Seale, 1999; Lincoln and Guba, 1985). The computer software system, NVivo, was used in the analysis of qualitative data, which allowed for extended and prolonged observation of data. The use of software such as NVivo provides reliable results as it removes the

human error element of analysing qualitative data (Kaefer *et al.* 2015). Also, use of this software ensured that the researcher who interpreted the data was not unduly influenced by their memories, for example during the focus groups or interviews (Welsh, 2002). Finally, in ensuring the reliability and validity of the qualitative elements of this study, there was the use of debriefing to ensure that participants views and opinions were being accurately recorded by the researcher. The participants were afforded the opportunity to review a copy of the transcripts and ensure that their views and opinions were accurately recorded. There are multiple different types of debriefing, for this study a second type, "*debriefing the participant on completion of the study"* (Given, 2008:199) was used. This allowed the researcher to explain the aim and purpose and outcome of the study if participants wished. This option was made available to all participants.

According to Litwin and Fink (1995) the opinions and attitudes of people change due to learning and experience. However, meaningful changes do not fluctuate at random. Therefore, a questionnaire that is reliable will deliver consistency in measurement of the important elements regardless of new experiences or learnings of participants. To ensure the reliability and validity of the conjoint based questionnaire in this study a number of steps were taken. Firstly, the questionnaire was designed based on previously peer-reviewed research as a guide to structure (Sorenson, 2006). Additionally, the researcher considered a number of other issues such as the wording and structure of statements. The wording used can affect the response received from participants (Kumar, 2011). As a result, all statements and questions were phrased in a clear, concise and orderly manner with general, uncomplicated English spelling and grammar and no double-barrelled questions. Double-barrelled questions are those which ask more than one question (De Vaus, 2002). The opinion of experts in the field and industry partners were sought and considered when developing the questionnaire. The questions were tested on thirty suitable participants to ensure that they could be easily understood and answered. Once testing was complete the appropriate changes and alterations were made. As a result, quality responses were collected, as there was a high level of understanding of the questions.

The honesty of participants is a crucial aspect of using questionnaires, to achieve meaningful results and conclusions. Social desirability is the tendency of the

participant`s taking part in research to portray themselves desirably and this can have an impact on the responses given by participants (Weiner and Craighead, 2010). In this study participants were assured that any information which they revealed would be completely confidential. This was achieved by removing all significant identifiable information from the questionnaire, except for a demographic survey and participants were advised not to give any information such as names or contact details to the researcher. All the data collected was kept in a secure and locked cabinet that was only accessible to the researcher or the researcher's supervisor on request.

In the development of the questions for the questionnaire, only the most appropriate attributes deriving from the focus group were considered. This along with the use of the fractional factorial design procedure in SPSS v23 generated a reduced number of potential questions in the questionnaire. This allows for a reduction in respondent fatigue, which in turn gives the study fewer problems relating to reliability, and validity, which can be associated with conjoint models (International Business Machines Corporation (IBM), 2016). This is considered to be easily replicated due to the extremely structured nature of the methodology and replication is vital to ensure reliability (Gill and Johnson, 2010).

6.5 Semi-structured interviews

An interview is a conversation between two or more people with the purpose of exploring the aims and objectives of the research through questions and discussion (Kumar, 2011; Hall and Hall, 1998; Kahn and Cannell, 1957). Interviews and focus groups can be either semi-structured in-depth or structured group interviews (Saunders *et al.,* 2009). Structured interviews allow for a high level of standardisation in responses (Easterby-Smith *et al.,* 2015). However, there is the argument that they can be very restrictive and too specific not allowing for exploration of a topic (Sims, 1993). Semi-structured interviews were chosen for this research as they allow for more in-depth responses and give flexibility in guiding the interview around the subject area or topic. The semi-structured in-depth interviews were conducted in accordance with the guidelines set out by Easterby-Smith *et al.* (2015) and the guide can be viewed in Appendix 1.

The in-depth interviews were conducted with 24 seafood related SMEs in Ireland. The in-depth interviews covered four main themes NPD activities; NPD process; market orientation and consumer interaction techniques; and innovation. As seen in Appendix 1 there are a number of areas addressed in the interviews. The questions were structured and chosen to ensure the researcher could assess the general NPD activities in the organisation; the NPD process employed; and why that process was chosen over others and the inclusion of the consumer and other stakeholders in the NPD process.

6.5.1 Data collection for semi-structured interviews

A sample is a small group selected from a larger population, which is representative of the characteristics and beliefs of the larger population (Brotherton, 2015; Easterby-Smith *et al.*, 2015; Kumar, 2011; Walker, 1995). Easterby-Smith *et al.* (2015) maintain that while there are numerous different approaches to sampling, all of these approaches fit into one of two categories, probability or non-probability sampling. Quantitative research generally uses probability sampling. Essentially, the population is defined and for all members of that population, there is the same chance of selection as part of the sample (Marshall, 1996). The selection is entirely random (Brotherton, 2015).

In contrast, non-probability sampling does not give the same chance of selection as part of the sample for all members of that population. Qualitative research generally uses non-probability sampling, due to the nature of the research as it is concerned with a specific context and this type of research tends to collect in-depth data from a small representation of the overall population (Brotherton, 2015). For the purpose of this research, interview participants were selected through cluster sampling. While quantitative research generally uses probability sampling and qualitative research generally uses non-probability, because the population in this element of the research was small, it was possible to define the population and give all members an equal chance of participation. Cluster sampling allows representatives of the population to be identified and included in a sample, and so combines the advantages of both (Jackson, 2015).

A population who shares significant characteristics but otherwise have their own individual traits can be categorised into clusters based on their shared characteristics (Walliman, 2011). In this research, organisations were selected based on the criteria

that they were registered as a fresh fishery products plant, approved under Regulation (EC) No 853 / 2004, Ireland in 2016. In addition, the criteria included that they met the definitions of an SME, adopted for this study, that is, an organisation with an employee base of fewer than 250 people. There was a population of 187 companies registered under Regulation (EC) No 853 / 2004, Ireland in 2016. 24 in-depth interviews took place that equates to a sample of 12.5% of the population available. Figure 6.5.1 outlines the process of sampling.

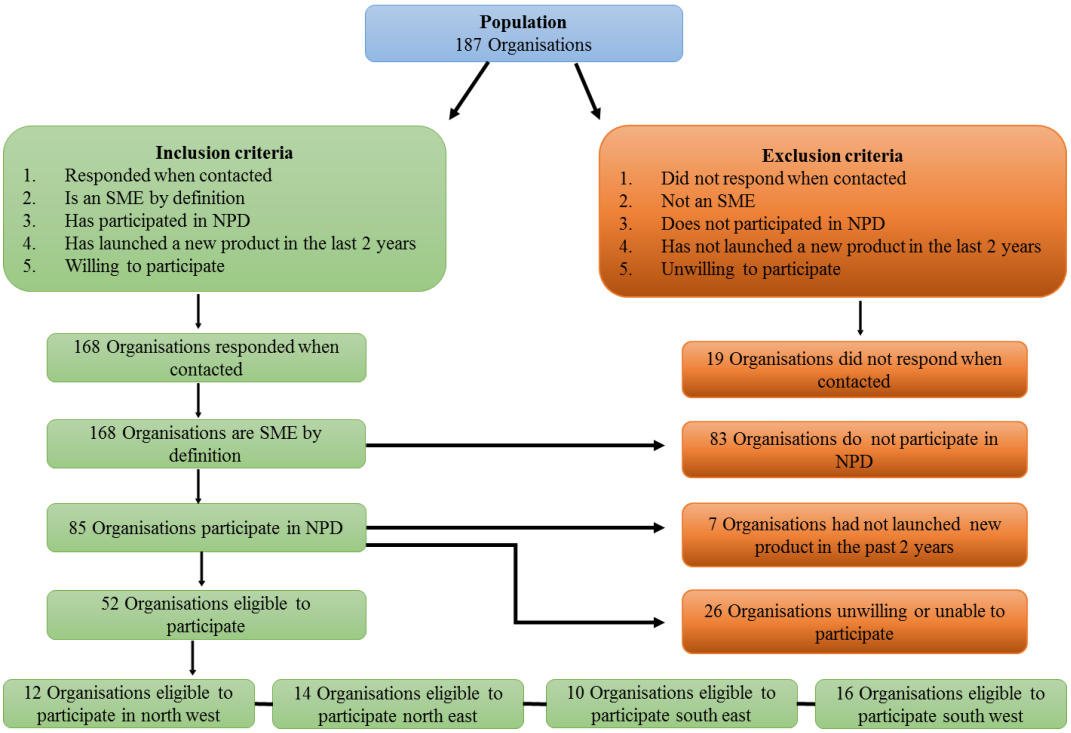


Figure 6.5.1 Sampling process for interviews

Source: Author

All 187 companies were e-mailed and asked if they would be willing to participate and if they partake in NPD activities. In addition, respondents were first asked the question "How many employees has the organisation?" This was to establish whether they were an SME by definition and allowed the researcher to further segment selected organisations into micro, small and medium organisations. Organisations were then asked "Does your organisation partake in seafood related NPD?" All organisations who responded positively to that question were asked "Have you launched a product in the last 2 years?" Finally, if an organisation responded positively to that question, they were asked if they would be willing to participate in the research. Eligible

organisations were then divided geographically in Ireland including North West; North East; South West and South East. Six organisations from each geographical location were then randomly selected through the computer software package Excel 2016. This provided an even geographical distribution in the sample of the population.

The interviews were conducted at various locations from June-August 2016 (see Table 6.5.1), including the premises of the interviewee`s own organisation, Letterkenny Institute of Technology, Letterkenny and Killybegs and other locations deemed appropriate by the interviewee and researcher. The researcher conducted the interviews, which were audio-recorded and lasted on average 45 minutes. Interviewees were asked to sign a consent form and assured that all data collected would be used only for the purposes of this research and any content published in the research would be done with complete anonymity. Interviewees were not paid for their time. However, they were afforded the opportunity to read the transcript of the interview and obtain a copy of the research upon completion. Pilot in-depth interviews were conducted in order to ensure that all questions are clear, that appropriate language was used and that the questions are easy to answer (Easterby-Smith *et al.*, 2015). The interview questions for the interviews were pilot tested on 10% (Connelly, 2008) of suitable participants to ensure that they could be easily understood and answered. Three SMEs participated in pilot studies and based on the results and feedback from the pilot test, changes were made to the wording of some questions and the addition of definitions of specific terms were also added. No interviewee who participated in the interviews were eligible to participate the focus groups, conjoint analysis or sensory acceptability testing.

Table 6.5.1 Research timeline of this study

Research method	Date	Location	Research question
Interviews	June-August 2016	Nationwide	RQ, SRQ1 & SRQ2
Focus group	October- November 2016.	Donegal, Mayo, Limerick, Dublin and Carlow	RQ, SRQ1 & SRQ3
Conjoint analysis	March-May 2017	Donegal, Mayo, Limerick, Dublin and Carlow	RQ & SRQ3
Sensory testing	June 2017	Donegal	RQ & SRQ3

Source: Author

6.5.2 Data analysis of semi-structured interviews

All data collected from the interviews were recorded and transcribed. The data was then analysed through QSR International-NVivo 10, a computer software package**.** Kaplan and Maxwell (2005) suggest that the intention of qualitative research is to establish insight into relevant issues that occur in a specific situation. This cannot be achieved using numbers and needs be conducted through data formed using words. There are four techniques used for the analysis of data; *coding; analytical memos; displays and contextual and narrative analysis* (Kaplan and Maxwell, 2005:41). These techniques may be used in combination or individually, in order to investigate and explore the information presented by the data. The data collected through qualitative research methods is vast and in many cases may be too large to be manipulated and analysed by hand. Therefore, Weitzman and Miles (1995) suggest that computer software can not only facilitate but also speed up the process of analysing qualitative data because it can manage, code and store data (Bazeley and Jackson, 2013; Hall and Hall, 1998). In addition, the software can then make connections for the researcher to analyse the data. Kaefer *et al.* (2015) and Richards and Richards (1991) further suggest that using computer software to analyse qualitative data adds rigour to the research.

Coding is the application of labels to data that has similar properties such as words or themes, this allows for ease of identification of patterns or to make comparisons from the data (Savin-Baden and Howell Major, 2012). The purpose of coding is to provide either description of data or topic coding or analysis of data (Saldaña, 2015). Topic coding is generally not recommended for the coding of interviews, as it focuses more on summarising or providing descriptions of the text. For the purpose of this research, analytical coding was more appropriate, as the researcher could interpret the data by asking a series of questions based on what they believed was going on (Savin-Baden and Howell Major, 2012). The transcriptions were analysed by creating a node tree, which were representative of the perspectives of the interviewees (see Appendix 6). The interviews were then coded and categorised automatically using the software NVivo 10, this allowed the transcriptions to then be analysed. Figure 6.5.2 shows a visual sample of coding in NVivo 10 for one theme and the percentage that is attributed to each interview for that theme is coloured individually. The interview guide questions (see Appendix 1) were used as the themes, and the codes and categorised

data were then grouped into themes of a unified or dominant idea (Savin-Baden and Howell Major, 2012). The demographic questionnaires, which were administered to all participants, were analysed using SPSS v23.

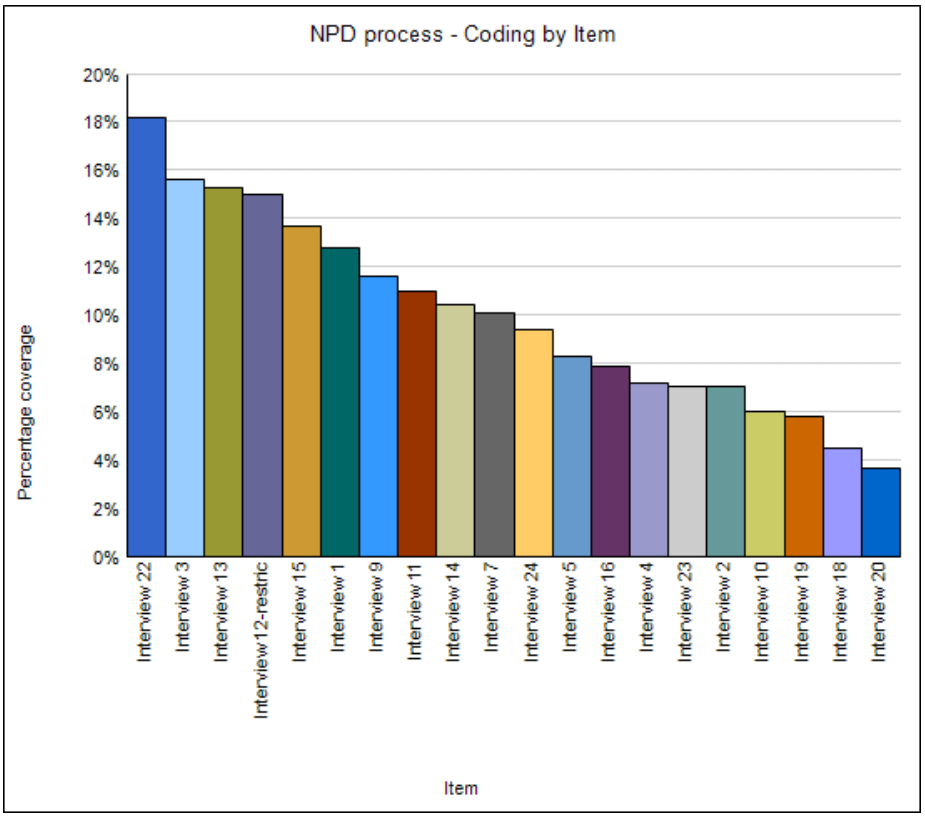


Figure 6.5.2 Sample of coding by item in NVivo 10

Source: Author

6.6 Focus groups

The initial stage in developing a conjoint analysis study is to determine what attributes are to be used and how many levels each attribute will consist of (Alriksson and Öberg, 2008). Green and Krieger (1991) suggest that all relevant attributes and the levels of the attributes used for constructing a conjoint-based analysis are determined through the use of interviews, focus groups or the repertory grid technique. For food products, which are considered to be low involvement products, Lee *et al.* (2000) stated that the use of interviews or focus groups is most appropriate in the identification of the attribute and levels of each attribute that is most important for the consumer. For the purpose of this research, five focus groups were conducted, which consisted of eight participants each. The questions, which can be seen in Appendix 2, allowed the

researcher to determine the attributes that respondents would most likely consider when purchasing a value-added seafood product, including boarfish and the characteristics of that attribute, for example, a seafood product developed by a brand they are familiar with or a new brand. This allows for a true representation of attributes of a product, which a consumer would realistically be likely to face in the marketplace (Hair *et al.*, 2013). In determining the attributes in this way, the development of a consumer driven concept can be achieved.

6.6.1 Data collection for focus groups

The total population of the research determines the required sample size. The population for this research is the number of regular consumers of seafood in Ireland over 18 years of age. According to EUMOFA (2017), approximately 70% of Irish people regularly consume fish and aquaculture products, that is, at least once a month. The census 2016 stated that the Irish population is 4,757,976 (CSO, 2016). Based on the CSO (2016) and EUMOFA, (2017) figures the population size for this study is 2,454,326 people (see Figure 6.6.1). The focus groups conducted as part of this study had a sample size of 40 and therefore cannot be considered to represent the views of the Irish population who consume seafood regularly.

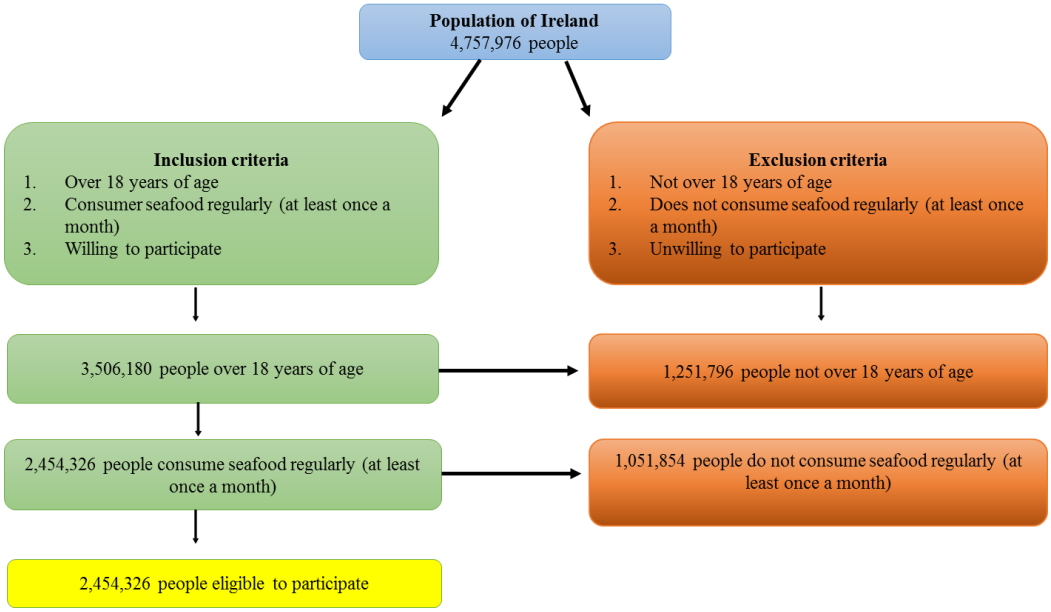


Figure 6.6.1 Sampling process for focus groups
Source: Author

The Gaelic Athletic Association (GAA) is Ireland's largest sporting organisation. The GAA is based on a parish system and is a community based organisation with over 2,100 clubs in Ireland and 1.5 million people being members of a club (see Figure 6.6.2) (GAA, 2016). Therefore, GAA members represent a significant sample of the population of Ireland and there is no evidence to suggest that GAA members eating habits or behaviours are different to the general Irish population. As 70% of Irish people consumer seafood regularly and the GAA has 1.5 million members that means that 1,050,000 million members of the GAA consume seafood regularly. As the population for this study is significant it was not be feasible to conduct probability sampling on the entire Irish population who consume seafood on a regular basis. However, it is possible to conduct probability sampling on a structured organisation such as the GAA. This is the reasoning for focus group and conjoint based questionnaire participants being selected via GAA clubs throughout Ireland.

County	Number of Clubs	County	Number of Clubs
Antrim	**108**	Leitrim	**24**
Armagh	**56**	Limerick	**101**
Carlow	**33**	Longford	**27**
Cavan	**59**	Louth	**42**
Clare	**84**	Mayo	**50**
Cork	**257**	Meath	**59**
Derry	**60**	Monaghan	**50**
Donegal	**63**	Offaly	**61**
Down	**70**	Roscommon	**32**
Dublin	**134**	Sligo	**26**
Fermanagh	**50**	Tipperary	**72**
Galway	**80**	Tyrone	**68**
Kerry	**73**	Waterford	**56**
Kildare	**57**	Westmeath	**47**
Kilkenny	**41**	Wexford	**93**
Laois	**46**	Wicklow	**45**

Figure 6.6.2 GAA clubs in Ireland

Source: Author adapted from Gaelic Games Europe (2016)

For a sample design to be considered probability sampling, each person in the population will have the same chance of being selected (Kumar, 2011). To ensure that probability sampling was conducted correctly the following steps were taken in selecting the clubs and participants for the focus groups. The GAA community is divided by county. Therefore, that was how the population was initially divided. Of

the 32 counties, five were randomly selected using computer software package Excel 2016. Once the five counties had been selected they were then further divided by club, each county having a different number of clubs as the division is not equal geographically as not all counties are the same size (see Figure 6.6.3). Finally, one club from each county was randomly selected using computer software package Excel 2016. The chairperson or secretary of the club was contacted and asked if their club would be willing to participate in the research.

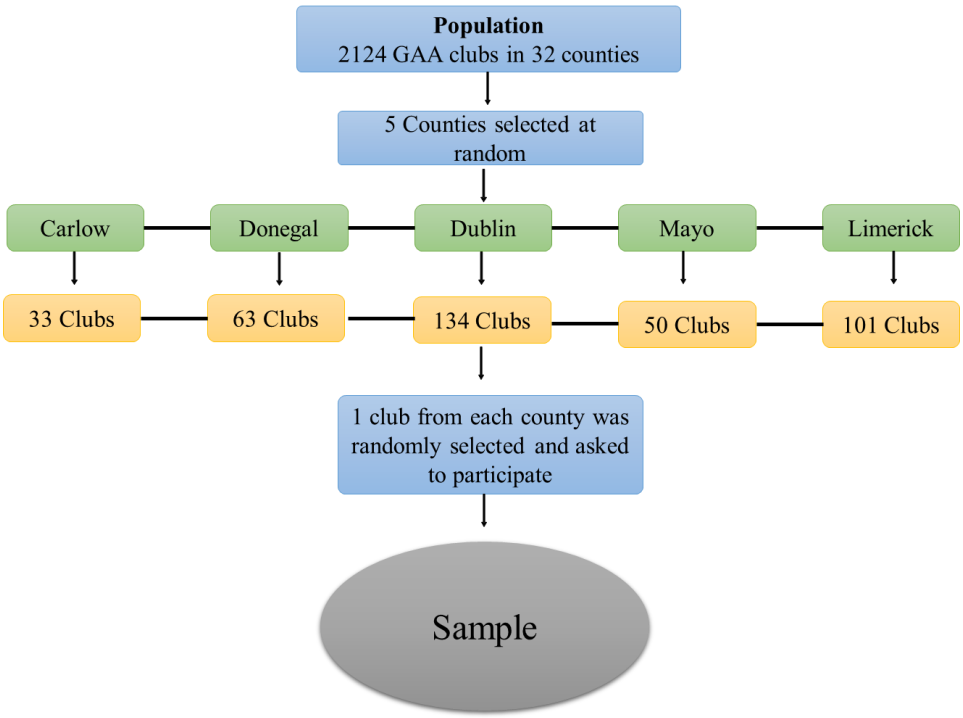


Figure 6.6.3 Sampling process for focus groups

Source: Author

The participants of the focus group were recruited by the following process. The club chairperson or secretary sent an email and/or text message, depending on their chosen method of communication with members, to all members of the club who were over 18 years of age. The text message/email briefly outlined the detail of the research and specifically the details of the focus group along with the screening question "Do your consume seafood at least once a month?" and "Would you be willing to participate in this research?" Of the willing participants, who answered positively to the screening question, eight were randomly selected using computer software package Excel 2016,

from each club, of both genders from a range of age groups, above 18 years of age and socio-economic backgrounds.

The focus groups took place between October and November 2016 (see Table 6.5.1). The focus groups took place at various locations, including the premises of the GAA club. The researcher conducted the focus groups, which were audio recorded and lasted approximately one hour. Interviewees were asked to sign a consent form and assured that all data collected was only used for the purposes of this research and any content published in the research would be done so with complete anonymity. Interviewees were not paid for their time. However, there was a €100 donation offered to the club for their assistance and use of facilities, and the participants were afforded the opportunity to read the transcript of the focus group and obtain a copy of the research upon completion. The focus group questions were pilot tested on 20% of suitable participants to ensure that they could be easily understood and answered, however Connelly (2008) suggests that 10% is appropriate. Eight consumers of seafood participated in a pilot focus group. Eight participants were recruited rather than four, as recommended. As the focus groups for the purposes of data collection for this research had eight participants it was deemed appropriate by the researcher to run a pilot focus group with the full number of participants rather than half. Based on the results and feedback from the pilot test changes were made to the wording of some questions and the addition of definitions of specific terms were also added. There was also the addition of a scenario to give consumer context when answering questions relating to an ingredient with which they were unfamiliar. No interviewee who participated in the focus groups had participated in the interviews or were eligible to participate the conjoint analysis or sensory acceptability testing.

6.6.2 Data analysis of focus groups

All data collected from the focus groups was recorded and transcribed. The data was then analysed through QSR International-NVivo 10, a computer software package in a similar manner to the interviews, as discussed above**.** The transcriptions were analysed by creating a node tree, which was representative of the perspectives of the participants. The focus groups were then coded using the software NVivo 10, this allowed the transcriptions to then be analysed. However, in contrast to the interviews, open coding was used rather than automatic. As the focus groups had a wealth of

information that sometimes covered topics that participants were not asked about or had yet to be asked about but still provided insight, open coding was more appropriate. Open coding allows the research to sort through the data line by line to create categories and themes (Savin-Baden and Howell Major, 2012). Figure 6.6.4 shows a visual sample of coding in NVivo 10 for the nodes compared by number of items coded from all five focus groups. The focus group guide questions (see Appendix 2) were used as the themes, and the codes and categorised data were then grouped into themes of a unified or dominant idea (Savin-Baden and Howell Major, 2012). The demographic questionnaires, which were administered to all participants, were analysed using SPSS v23.

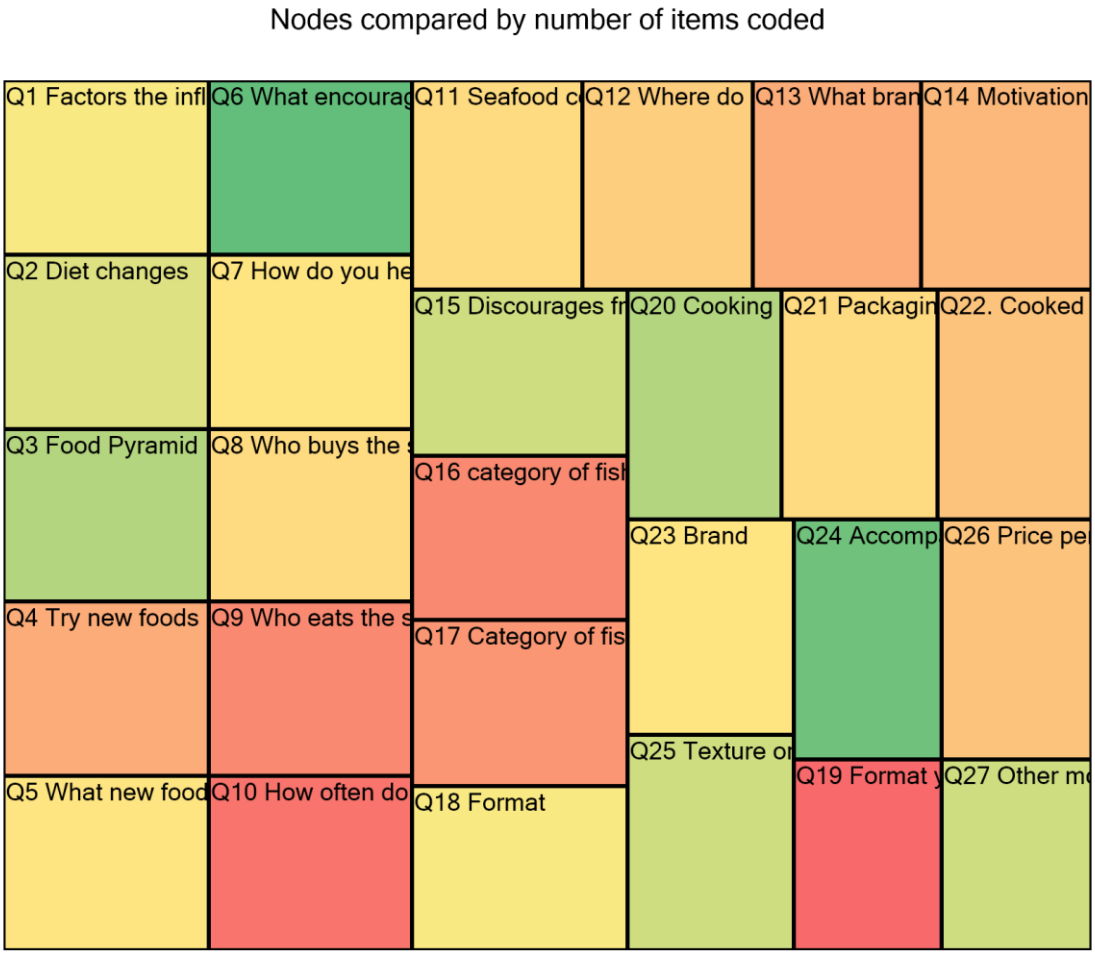


Figure 6.6.4 Nodes compared by number of items coded

Source: Author

6.7 Conjoint analysis

Conjoint analysis is the study of trade-offs. Traditionally conjoint analysis was used for the identification of product descriptions, and the focus was a comparison of product features versus price. In recent times, however, the focus has become the emotional and rational drivers (Moskowitz *et al.*, 2012). The concept of conjoint analysis is a bottom-up one, which empowers the development of concepts by combining multiple components in order to create multiple combinations and variations of a product in the early stages of the NPD process (IBM, 2016; Gustaffson *et al.*, 2013; Bogue *et al.*, 2009; Green *et al.*, 1981). The factors that influence consumers buying decisions are considered. Products have a certain number of attributes such as price, ingredients, packaging and colour. The consumer cannot have the optimum of all the attributes, for example, the lowest price but the best ingredients, therefore the customer will make a trade-off choosing a product from a representative set of attribute combinations. By studying these trade-offs, new products can be created, and the realignment of existing products can be achieved according to the preferences of the consumer (IBM, 2016; Blamey *et al.*, 2002; Green and Srinivasan, 1990a; Green and Wind, 1975; Green and Rao, 1971).

The first uses of conjoint analysis which used a trade-off procedure appeared in the 1950`s. The first stage of conjoint analysis is to create a set of attributes. These attributes then have associated levels, which are used to create a variety of potential products using various combinations of the attributes and associated levels. In each of the subsequent stages of conjoint analysis, product options were presented to respondents, and the preferred option was selected (Moskowitz *et al.*, 2008). The data was collected and analysed to establish the score of each individual attribute and also each set of attributes (Kahn, 2014). The results of the focus groups were used to establish the product attributes and associated levels. The most relevant product attributes and associated levels used in the conjoint based study are presented in Table 6.7.

Table 6.7 Product attributes and levels

Product Attribute	Product Attribute Level
Brand	Familiar brand New brand
Supplementary information available	Health benefits of the product Of Irish origin Simple serving suggestions
Price	€1.40 per 300g (one portion) €1.65 per 300g (one portion) €2.00 per 300g (one portion)
Format	Fresh Frozen
Accompaniment	None Lemon butter Tartar sauce
Packaging	Bake in bag Remove product from box or sleeve and bake in the oven One use oven tray

Source: Author

6.7.1 Types of conjoint analysis model

Rao (2014) identifies six types of conjoint analysis; full profile approach; trade-off matrix method; paired comparison methods; self-explication methods; adaptive methods and hybrid methods. In the case of full profile approach, respondents are asked to rank or rate a profile of attributes. For the purposes of this research, the full profile approach was chosen as it allowed consumers to be presented with credible descriptions of hypothetical seafood concepts. This method is the most appropriate when measuring overall preference judgement (Orme, 2009; Green and Srinivasan, 1990b, 1978). The full profile approach is not appropriate for a large number of attributes as participants face problems in processing a large number of attributes and attribute levels at one time (Orme, 2009; Green and Srinivasan, 1990a). The number of attributes is to be limited to six and attribute levels limited to three to avoid respondent fatigue (Hair *et al.*, 2013; American Marketing Association, 1992). This allowed for a simplified conjoint analysis and allowed participants to focus on certain attribute levels and evaluate them.

The second conjoint analysis method is the trade-off matrix method. This method asks respondents to evaluate concepts and rank all possible combinations, two at a time (IBM, 2016). Another method is the paired comparison method which consists of respondents being presented with a pair of profiles and choosing the preferred profile. For both of the methods, there is a risk of information overload and therefore is not considered a realistic depiction of the purchase decision-making process (Rao, 2014). The third type of conjoint analysis is the self-explication method, which involves the evaluation of each level of each attribute by desirability on a scale of 1 to 10. Respondents then allocate an overall score to each attribute to show the importance of each. While this method allows for ease of administration for a large number of attributes, participants can find it difficult to provide ratings for attribute levels, holding everything else constant. This is particularly true if there is a substantial inter-correlation between attributes (Srinivasan and Netzer, 2011). The fourth conjoint analysis method is the adaptive method, which consists of participants ranking one preference of each level of each attribute and then rating the attribute in the level of importance. The participants then rate sets of paired partial profiles. Following on from there, participants receive a number of profiles composed of, at most, eight attributes to rate preference on a scale (Deutskens *et al.,* 2004). The final of the conjoint analysis methods is the hybrid method, which is appropriate for large numbers of both attributes and attribute levels (Rao, 2014).

In this study the attributes and levels (Table 6.7) could possibly have had a full factorial design of 324 (3^4 X 2^2) hypothetical seafood concepts. By carefully selecting a fraction of the profiles created in a full factorial design, the demands placed on the respondents are reduced significantly (Rao, 2014) by allowing participants to evaluate a small number of products (Gustaffso *et al.,* 2013). The orthogonal design procedure in SPSS v23 allows for the generation of a fractional factorial design by condensing a large number of possible concepts into a limited number of concepts for participants to rate while still maintaining effective evaluation of a food products multi-dimensional attribute (IBM, 2016).

In this research, the fractional factorial design (or octagonal design procedure) in SPSS v23 generated 22 hypothetical seafood concepts, four of which were holdout profiles. The holdouts were rated by participants but not used in the estimations of utility

values. This allowed for the determination of how consistently the conjoint model could predict participant's preferences for a new seafood product that were not evaluated by participants (IBM, 2016). The fractional factorial design procedure in SPSS v23 used an algorithm to generate and sort 22 random hypothetical seafood concepts, which were then presented to participants in that random order. This allows for a reduction in respondent fatigue, which in turn minimises problems in the study relating to reliability, and validity, which can be associated with conjoint models (IBM, 2016).

6.7.2 Determination of product attributes and attribute levels

The first step in a conjoint analysis study is to determine the attributes and levels of each attribute. Blamey *et al.* (2002) maintain that the attributes selected are relevant and most importantly measurable, with the number of attributes being determined by the study itself. However, there is a clear warning to avoid respondent fatigue. The level at which this occurs can be identified through pilot testing and a reduced design. A fractional factorial design can be used rather than a full factorial design, which would include too many possibilities for a respondent to evaluate (Poortinga *et al.*, 2003). This fatigue effect described by Alriksson and Öberg (2008) suggests that if respondents are exposed to excessive numbers of various sets of questions, which they are expected to evaluate, then there is a high chance that the respondent will either not complete the task or not complete the survey in the correct manner.

The researcher has to also consider what specific attributes to use when constructing a conjoint analysis questionnaire. Daniels and Hensher (2000) noted that personal interest from respondents in relation to an attribute tended to be evaluated more appropriate when presented alone rather than when presented in combination with attributes which were distant from respondent`s personal interests. This means that the design stage is of vital importance to avoid such a scenario as presented above. For the purpose of this research as stated above, five focus groups were conducted, which consisted of eight participants each to determine the attributes that respondents would most likely consider when purchasing a value-added seafood product, including boarfish.

6.7.3 Data collection for conjoint analysis

The data collected was done so via the clubs selected for participation in the focus groups and therefore the selection process was only conducted once (see 6.6.1 Data collection for focus groups). In the pelagic-based fish product survey, 300 conjoint based questionnaires were administered to consumers in counties Donegal, Mayo, Limerick, Dublin and Carlow in Ireland between March and May 2017 (see Table 6.5.1). Respondents were recruited via the GAA clubs used for the focus groups using the same criteria. The five GAA clubs allowed the researcher access to its member and probability sampling was used to select 60 members. Face-to-face complete questionnaire with respondents were conducted as it is considered optimal in conjoint based analysis (Bush and Hair, 1985).

The participants of the conjoint analysis were recruited by the following process. The club chairperson or secretary sent an email and/or text message, depending on their chosen method of communication with members, to all members of the club who were over 18 years of age. The text message/email briefly outlined the detail of the research and specifically the details of the conjoint analysis along with the screening question "Do your consume seafood at least once a month?" and "Would you be willing to participate in this research?" Of the willing participants, who answered positively to the screening question, 60 were randomly selected using computer software package Excel 2016, from each club, of both genders from a range of age groups, above 18 years of age and socio-economic backgrounds. No person who participated in the conjoint analyses had participated in the interviews or focus groups or were eligible to participate in the sensory acceptability testing.

A single conjoint based study was distributed to all respondents using a hard copy questionnaire. This conjoint based study investigated respondent's preferences for pelagic-based fish products, a fish cake. The use of a fish cake stemmed from the results of the focus group, which suggested that if consumers were to buy a product with ingredients unfamiliar to them, then they would be more likely to purchase it if the product were in a form they were familiar with, i.e. fish cake.

The questionnaire was broken into two sections. In the first section, respondents were presented with 22 hypothetical pelagic-based fish products to rate on a nine-point

Likert scale, corresponding to their purchase preference. In section two, consumers were asked multiple-choice questions relating to their lifestyle and sociodemographic information (see Appendix 4). The questionnaire used for the conjoint based study and the focus group used a format that was adapted from Sorenson (2006). In order to ensure validity and reliability, while also ensuring the avoidance of respondent fatigue, only the most relevant product attributes deriving from the focus group were selected for the study and a pilot test was conducted. The conjoint analysis was pilot tested on 10% of suitable participants to ensure that they could be easily understood and answered (Connelly, 2008). 30 consumers of seafood participated in a pilot conjoint analysis. Based on the results and feedback from the pilot test changes were made to the wording of some questions and the addition of definitions of specific terms were also added. There was also the addition of a specific set of easy to follow instructions and layout and colour changes to make the conjoint analysis questionnaire as user friendly as possible.

6.7.4 Data analysis of conjoint analysis

The conjoint based questionnaires were analysed using SPSS v23. The individual level conjoint analysis procedure in SPSS calculated individual utilities and correlations. The resulting utility values were used to establish the importance of each attribute. Such values were calculated by establishing the difference between the highest and lowest utilities across the level of the attribute (American Marketing Association, 1992). The Kendall`s tau correlation and also the Pearson`s R correlation associated values, ranging from -1 to +1, were used to assess and ensure the validity of the study. Pearson`s R correlation is valuable to study the relationship strength between two continuous variables (Pallant, 2016). Kendall's tau correlation is the nonparametric alternative to Pearson’s R correlation. It is a non-parametric measure of the direction and strength of association between two variables measured on at least an ordinal scale (De Muth, 2014). For both Kendall’s tau and Pearson`s R, a high positive value shows a strong agreement between the product rating and predicted utilities of the conjoint model.

Consumers of seafood products were then segmented into clusters based on the attribute utility patterns using a K-means cluster analysis in SPSS v23. K-means is a non-hierarchical clustering approach. In order to conduct a K-means cluster analysis,

the researcher determined the specific number of clusters required in the solution, and the centroids (cluster means) for each (Sadesky, 2003). The clustering process starts by randomly assigning objects to a number of clusters. An individual observation was compared with the values of each centroid and assigned to the cluster with which it was most similar. The value was recalculated after each new assignment. This process was conducted until no new reassignments were made. Therefore, the optimal number of clusters was determined by observation of the agglomeration schedule to identify respondents with similar preferences (Sarstedt and Mooi, 2014).

In addition to providing values consumers associate with different seafood products, the data collected for the conjoint analysis, can be used to simulate market share estimations for new products; examine a multi-product strategy; and predict trade-offs consumers would be willing to make between product attributes and within attribute levels using the group level simulation analysis procedure in SPSS (Kupiec and Revell, 2001). Kendall`s tau correlation for the four holdout cards was used to determine how consistently the conjoint model could predict consumer preferences for new seafood concepts that the study could not evaluate (IBM, 2016). Kendall`s tau correlation for the four holdout cards requires a high positive value in order to indicate that there is a strong agreement between the holdout ratings and the model predictions. In this study, Kendall`s tau correlation for the four holdout cards was well within the acceptable range and therefore demonstrated agreement between the holdout ratings and the model predictions. As Kendall`s tau correlation for the four holdout cards was within the acceptable limits, it was possible to analyse consumers preferences for alternative seafood concepts which were not evaluated in the study, through simulation analysis.

The choice simulation models used in this study employed both maximum and probability Bradley, Terry, Luce (BTL) and Logit modelling (Janssens *et al.*, 2008). The BTL and Logit models estimate market share for each product by estimating the value that each participant associated with each hypothetical product included in the simulation analysis. The maximum utility model assumes respondents will only choose a product with the highest predicted utility score (The American Marketing Association, 1992). However, Hair *et al.* (2013) maintained that probability models assumed respondents would not always make decisions using precise notions of utility.

Importantly, Hair *et al.* (2013) argued that the predictive power of probability models was greater than the predictive power of the maximum utility model in repetitive purchasing situations associated with low involvement products such as foods. For the conjoint based study, a group level simulation analysis was conducted across all clusters. The hypothetical pelagic fish products used in the group level simulation analysis across each cluster were generated from analysis of quantitative and qualitative data along with discussions with technical partners. The demographic questionnaires, which were administered to all participants, were analysed using SPSS v23.

6.8 Sensory acceptability testing

The quality of a product will drive consumer acceptability of that product. Therefore there is a need to measure the acceptance of the characteristic of that product in order to meet the expectation of the consumer (Chapman *et al.*, 2001). For the purpose of this research, consumer acceptability testing was conducted. Consumer acceptance and hedonic (degree of liking) tests are the most appropriate in testing the degree of consumer acceptance for a product. Carpenter *et al.* (2012) suggest that sensory analysis is more to do with product quality elements such as description, consumer preferences and discrimination rather than merely the senses alone. Descriptive sensory analysis aims to build a profile of a product on all its possible and perceived characteristics. The characteristics of food can be examined under the following appearance; flavour; aroma; texture; and sound (Lawless and Heymann, 2013). Descriptive sensory is most appropriate in product development, as it requires a certain degree of knowledge about the target market and qualities of the product that are required. This suggests that a high degree of understanding of the characteristics of the product is required by the participants (Carpenter *et al.*, 2012).

While the literature recommends that all products undergoes extensive descriptive sensory analysis before going to market, the aim of this research is not to produce a fully marketable product but to test and develop a concept. Monteleone (2012) suggests that completing all the steps in the product development process is a waste of resources without knowing if the consumer will accept it. As SMEs lack the same level of resources as large organisations (Padukkage *et al.*, 2016; Van de Vrande *et al.*, 2009), in reality, they may not conduct extensive descriptive sensory analysis

before going to market (Frøst *et al.* 2015; Martinsdóttir *et al.* 2009). As this research is based on the assumption that the fish used in the concept is boarfish, which is unfamiliar to consumers, the researcher believed that acceptability testing is required on a prototype to ensure acceptability. If the product were to go past concept or prototype development, then more extensive sensory testing may be required.

While descriptive sensory analysis is highly scientific, preference and acceptability testing are more concerned with the consumer's ability to differentiate products from competing products and if they perceive improvements and/or acceptability of a product. The target participants for this will be members of the target population, and they do not need to understand the characteristic of the product and the concept of sensory analysis (Singh-Ackbarali and Rohanie, 2014). O`Sullivan, (2016) suggests that sensory acceptability testing is appropriate for SMEs to conduct small panels, usually 25-75 regular consumers of the product or a similar product, in a cost-effective manner. Brody and Lord, (2007) state that these tests are not a replacement for or suitable as market research for an organisation and are to be conducted in conjunction with other market research. As acceptability testing is appropriate for SMEs and as it was conducted in combination with multiple other methods of market research, it is therefore, appropriate for this study.

There are two methods of conducting a consumer acceptance test, that is, measuring acceptance and measuring preference (Jellinek, 1964). Acceptance testing can be further broken into a consumer having a positive attitude towards the food and/or a consumer utilising, that is actually buying or eating the food (Stone *et al.,* 2012). For acceptance testing, the most common and appropriate method of data collection is through a nine-point hedonic scale. The main difference is that acceptance can be determined by any number of products and with no comparison required by asking "how much do you like this product?" or "how acceptable do you find the product?" (Stone *et al.,* 2012; Meilgaard *et al.,* 2006). Acceptance of a food product usually indicates actual use, that is, purchase and eating of the product (Singh-Ackbarali and Rohanie, 2014).

6.8.1 Data collection for sensory acceptability testing

Within the food industry, there is a need to have a distinct understanding of the sensory aspects of foods (Tuorila and Monteleone, 2009). Monteleone (2012) suggested that developing, producing, distributing and marketing a food product is futile without an approximation of the consumer's acceptability of its sensory quality. For the purpose of this research, there was a prototype product developed using boarfish as a key ingredient and consumer's acceptability testing was conducted to ensure boarfish is a viable product for inclusion in production. The prototype was produced in Letterkenny Institute of Technology, Killybegs in coordination with students in year 4 Bachelor of Arts (Hons) in Culinary Arts as part of the Artisan Food Products-Design and Development module. Over an eight week period, a prototype fish cake was developed with boarfish as a key ingredient. A fish cake was selected as the data from the focus groups indicated that participants, if choosing a product containing a fish with which they were unfamiliar, would be more likely to purchase that item if it was in a form with which they were familiar, i.e. fish cake/ fish pie/ fish finger (see Figure 10.2).

The type of sensory testing used was acceptability tests, and the aim was to establish the acceptability of a new consumer product (boarfish) on the Irish market. The purpose of the sensory testing did not require the in-depth analysis that would be provided by descriptive statistical analysis. The sensory test took place with 50 participants. As part of the Artisan Food Products-Design and Development module, a showcase took place in June 2017 in Letterkenny Institute of Technology, Killybegs. This showcase was open to staff and student of Letterkenny Institute of Technology and the public. Participant selection was convenience sampling. Respondents were selected based on a positive response to the question "Do you eat fish at least one a month?" Positive respondents tasted the product and scored it on the sensory sheet for acceptance (see Appendices 5). Participants were asked to complete a demographics questionnaire and sign a consent form and assured that all data collected would only be used for the purposes of this research and any content published in the research will be done so with complete anonymity. Participants were not paid for their time. However, they were afforded the opportunity to obtain a copy of the research. Pilot tests were conducted on 10% of suitable participants to ensure that they could be easily understood and answered (Connelly, 2008). Based on the results and feedback from

the pilot test no changes were made to the study as participants believed the questions to be clear and easy to follow. No person who participated in the sensory acceptability testing had participated in the interviews, focus groups or conjoint analyses.

6.8.2 Data analysis of sensory acceptability testing

The type of sensory analysis conducted will determine the statistical tests which are to be carried out (Aramouni and Deschened, 2014; Noble and Lesschaeve, 2006). Exploratory statistics are used to analyse a variety of product attributes based on the values consumers associate with them. The values for an individual attribute given by each panellist are summarised by calculating the measure of the centre location and the measure of the spread. The mean and median provide the centre location and the standard deviation, and interquartile range provide the measure of the spread. The most appropriate methods of viewing this are in a box and whisker diagram (Velleman and Hoaglin, 1981). The importance of measurement of sensory testing through descriptive statistics cannot be understated (Stone *et al.,* 2012). The mean of each attribute determines whether each individual sensory attribute is acceptable to the consumer (O'Sullivan, 2016).

The 50 sensory questionnaires were analysed using SPSS v23. For each sensory attribute, descriptive analysis was conducted on the data. Descriptive statistics summaries allow researchers to describe and understand what is happening in a certain situation via the data. The use of averages the mean, mode and median allow for the summarisation of the characteristics of a population (Remenyi *et al.,* 2011). The mean for each sensory attribute was established along with the mean for the overall product. The frequency of each score on the nine-point hedonic scale was also established, which allowed for the establishment of what the level of acceptability there was by what percent of the sample.

The demographic questionnaires, which were administered to all participants, were analysed using SPSS v23. An ANOVA test was a conducted on all seven variables assessed in the sensory acceptability test against the demographic details of participants. The ANOVA was used to establish if there were any statistically significant differences between the means of the seven groups and the independent

demographic variable. If a variable is p= <0.05 this is an indication that there is a significant relationship between those two variables.

A correlational relationship simply says that two things perform in a synchronized manner. Correlations are one of the easiest descriptive statistics to understand and possibly one of the most widely used. A correlational coefficient is used to represent a relationship. A correlational coefficient typically ranges between –1.0 and +1.0 and provides two pieces of information that are vital in regards to the relationship, that is, intensity and direction. There are limits to correlations such as a correlation is not and cannot be taken to imply causation. Even if there is a very strong association between two variables we cannot assume that one causes the other. In addition, correlations do not allow us to go beyond the data that is given (Trochim, 2006). Correlations were used to establish if there was a relationship between any of the sensory variable tested.

6.9 Summary

This chapter presented the methodology used in the research. Interviews were used to gain an understanding of the seafood industry's approach to NPD. The interviews were chosen with the specific aim of establishing the importance of the NPD process, what exactly that NPD process was in SMEs and what stakeholders had an input into that process. This methodology allowed for a comparison of reality to the literature relating to the NPD process. The focus groups, conjoint analysis and sensory acceptability testing provided an understanding of the consumer's attitude, preference and acceptability of pelagic-based products made from fish that are unfamiliar to the consumer. The sequential exploratory research design strategy, which was adopted for this research, includes both qualitative and quantitative methods of data collection and analysis, in order to develop consumer driven concepts for pelagic-based new fish products.

Part 5 will present the results and analysis of the study. The results presented in Chapter 7, 8, 9 and 10 all link to answer the research questions and address the knowledge gaps. Firstly, the interviews allowed for the identification of the current NPD process of seafood related SMEs and the barriers for SMEs during this process. This information in relation to the process and barriers was key in informing the appropriate consumer integration techniques that were adopted and tested in this study

i.e. the focus groups, the conjoint analysis and the sensory acceptability testing. These methodologies were chosen as they were both appropriate for seafood related SMEs as consumer integration techniques in the NPD process including the development of products with unfamiliar ingredients and also allowed the researcher to identify the specific wants and needs of the consumer and consumer groups. Finally, there was a need to ensure consumer acceptability of an unfamiliar product in a manner appropriate to the resources of SMEs. While all four chapters are linked and contribute to answer the research questions and addressing the knowledge gaps the results also provide insights as individual chapters. For example, Chapter 9 could provide the basis for the marketing strategies of an organisation or Chapter 10, which may provide justification for the adoption of boarfish into the NPD activities of an organisation. Therefore, the results chapters are laid out based on methodological tool as opposed to research question or another form. The linking of all of these results and how they all contribute to answer the research objective and research questions will be demonstrated in Chapter 11.

Part 5: Results and Analysis

Chapter 7: Results: In-depth Interviews

7.1 Introduction

The aim of this study was to examine the use of consumer insights in the development by SMEs, of more sustainable and value-added, new seafood product concepts. Including products with unfamiliar ingredients, this process aims to increase consumer acceptance. In order to achieve this, interviews were required to assess the NPD activities of seafood related SMEs in Ireland and identify the amount of value-added activity. Secondly, to identify the steps in the NPD process of Irish seafood related SMEs. The interviews were also used to assess the importance of individual steps in the NPD process, as seen by the SMEs. The third objective of the interviews was to identify which stakeholders have an input into the NPD process and what consumer integration techniques were being employed by Irish seafood related SMEs. This chapter will address the above areas and present the results of the in-depth interview.

7.2 General background information

All organisations who participated in this research were SMEs by definition. Of the 24 organisations interviewed, nine were micro organisations, that is, having less than ten employees. Nine were small enterprises with fewer than 50 employees but more than ten employees. Finally, there were six medium-sized enterprises that employed over 50 and less than 249 people (see Table 7.2). The interviewees played different roles within the organisation they were representing. A large amount, particularly in the micro and small organisations, where the business owner and the manager.

The management structure of these organisations varied, however, patterns were seen in the different sized organisations. Micro-organisations had a very flat management structure with a business owner/ manager taking responsibility for the complete running of the organisation. In the small and medium organisation, there was much more of a hierarchical structure with managers in specific areas of the organisation working under a general manager, e.g. processing manager/ marketing manager. A micro organisation with four employees, in County Galway, described their management structure as:

"The management structure… would be myself and my husband who does the secretarial work… and that's it" Organisation 1.

Table 7.2 Background information on interviewed organisations

Organisation	Micro/Small/ Medium	Employees	Location	Interviewee Title[1]
1	Micro	4	North West	Business Owner/ Manager
2	Micro	3	South West	Business Owner/ Manager
3	Micro	9	North West	Business Owner/ Manager
4	Micro	9	South East	Business Owner/ Manager
5	Micro	5	North East	Business Owner/ Manager
6	Micro	5	North East	General Manager
7	Micro	9	South East	General Manager
8	Micro	5	South West	CEO/ Managing Director
9	Micro	1	South West	Business Owner/ Manager
10	Small	20	North West	Business Owner/ Manager
11	Small	22	South East	Managing Director
12	Small	40	North East	Technical Manager
13	Small	40	South East	Sales Manager
14	Small	35	North West	Company Director
15	Small	25	North West	Development Chef
16	Small	21	South West	Head of Operations
17	Small	12	North East	Business Owner/ Manager
18	Small	25	South West	Managing Director
19	Medium	50	South East	Key Account Executive and Concept Developer
20	Medium	170	North West	Group Director Business Development
21	Medium	85	South West	R&D Manager
22	Medium	70	North East	Quality / Technical Manager
23	Medium	130	South East	Company Director
24	Medium	50	North East	Production Manager

Source: Author

The more employees that an organisation had generally seen an increase in the hierarchical management structure of organisations. One small organisation with 40 employees, in County Dublin, described their management structure as:

"There is a general manager, an operations manager, a production manager, quality assurance, and administration. So it's very lean." Organisation 12.

[1] Interviewee titles as defined by themselves

Medium organisations with fifty or more employees generally had a more extensive hierarchy management structure with a definite chain of command. A medium size organisation with 50 employees in County Dublin described their management structure as:

> *"The management structure, first there is the owner … then you have the middle management... then there would be… managers and supervisors, and then under them are, is just general operatives and filters."* Organisation 24.

7.2.1 Species of fish used by SMEs

While all enterprises in the sample studied operated in the seafood sector, there was a variety of different species used by the organisations. The most common type of fish used in product development was salmon and white fish. There was a significant amount of pelagic and shellfish also being used by organisations. The majority of organisations decided on the type of fish they used in product development based on what they believed the consumer wanted. Furthermore, they aimed to utilise the type of fish they were most familiar with. Many organisations agreed that they would be open to using species of fish that they do not currently use or species of fish that is not currently available on the Irish market. The reason they would be willing to make these changes varied. Some suggested that if they could have a product that was unique, then they would be encouraged to try different species of fish. Others suggested if the fish were sustainable, they would consider it. Sustainability of fish, including sourcing, was highlighted by many organisations. Multiple SMEs referred to the overfishing of 'orange roughy' in the past and suggested it to be unacceptable to overfish particular species. In relation to overfishing, respondents indicated that even though some fish species are in abundance, they would not like to see overfishing occurring again.

Price fluctuations of fish in general and an increase in price for certain popular fish in Ireland such as salmon and cod would be a factor in encouraging SMEs to try an alternative fish in their NPD activities. An additional advantage would be that they could vary their offering to the consumer. However, it was recognised by multiple respondents that the introduction of a new fish into the organisation's operations would have to fit with the current systems in place within that organisation and be amenable

to their consumers tastes. A small organisation in County Waterford with 40 employees and a small organisation in County Galway with 35 employees expressed their views on using a new species of fish as follows:

> *"Yeah absolutely [the organisation would you be open to using new species of fish], it is something that's being discussed. There is a long way to go I think before we really know what can be done with boarfish or blue whiting. They're mainly used for mincing, so yeah absolutely there's potential for them."* Organisation 13.

> *"Well provided it could fit within the portfolio and the brand profile the answer to that is yes [the organisation would you be open to using new species of fish] … if there is sustainable fish are out there, then we may want to use them."* Organisation 14.

7.3 NPD activities in the organisation

This section will begin by presenting what the respondents defined as new products and will then provide details of the level of product development undertaken by the respondents on an annual basis. Before the research began, it was confirmed that the primary function of the organisation was generally the processing and sale of seafood products including whole fresh fish, filleted fish, value-added products and prepared consumer foods. It was also confirmed that all organisations participated in NPD in some capacity and all launched at least one new product in the past two years, with some organisations launching multiple products each year.

There was no consensus among organisations as to what the term 'new product' meant. There were some organisations, particularly the small and medium organisations, who believed that the term 'new' could be applied, even with the smallest changes such as the colour of the packaging or a change to the label put on the packaging. Some organisations suggested that they launch new products multiple times a year as they were releasing prepared consumer foods in the shops owned by the organisation. Generally, most organisations suggested that they launched one or two new products a year. This lack of consistency or lack of a definition of the term 'new' meant that what one organisation may consider 'new' another would not. A medium size

organisation with 50 employees in County Dublin described their new product output as happening weekly:

> *"You've got a request from a customer, for example, they want less salmon in their chowder. We change the mix. We change the composition of the chowder, and that is a form of product development…It [product development] happens on a regular basis."* Organisation 24.

Another organisation based in County Dublin with 40 employees and a medium-sized organisation in County Cork with 85 employees considered the following as a new product:

> *"There could be a new label, but the core product is the very same and that's a new product too [if it has a new label on it]."* Organisation 12.

> *"We count new packaging [as a new product]."* Organisation 21.

In relation to the types of products that organisations were aiming to produce in their NPD activities, value-added prepared consumer foods were the most common. Many organisations believed that there were many more opportunities to increase profit margins and boost sales through prepared consumer foods than there was in selling whole or filleted fish without the addition of other ingredients or convenient packaging. Most of the organisations wanted to produce products that would take the 'fear factor' out of purchasing seafood products and in turn increase overall sales. A medium sized organisation in County Cork with 85 employees described the type of product they aim to produce as:

> *"We do try and take the scary [away], just the regular person who maybe isn't used to handling seafood, to introduce them to seafood and to try and get people eating more fish… We try to use farmed salmon, and cod, hake and wild mackerel, and then we would add value further in the forms of marinades, flavoured butter, ready meals as well."* Organisation 21.

Multiple organisations aimed their product development activities at utilising a waste material that they could add value to rather than paying for its removal. SMEs faced the same recurring problem, that is, they use the fish or shellfish for a product and

were left with meat/shell/bones/skin, which they had to pay for as a waste material. 13 of the SMEs were investigating ways of utilising the whole fish or shellfish. They wanted to utilise current waste and therefore increase profits. A micro organisation from County Clare with five employees, a small organisation from County Galway with 35 employees and a medium organisation in County Wexford all echoed the same sentiments in relation to waste products:

> *"We're only aiming at one product at the moment, one single product, and it really derives from a waste product that we have from another product. It is not complicated, we deal with a lot of crab. We process crab, and in the processing of crab we have leftover shell which means there's still a lot of crab left on it, so we're going to try and turn that into a crab product."* Organisation 8.

> *"We have waste we need to utilise. It's costing us money to get rid of, and it's a perfectly good product, but we want to use that waste rather than wasting it."* Organisation 14.

> *"There is so much waste, so we actually decided that we would smoke that [the carcass], and then scrape off the mince…and use that. We put the mince in the formatting machine and batter it, bread it, and it comes out as a new product. That [the meat left on the carcass], was actually a waste product that we were paying to get rid of, and now we are using it and selling it as a product."* Organisation 19.

For the purposes of this research, all interviewees were presented with six categories of new products; new-to-the-world; new category entries; addition to product lines; product improvement; repositioning; and cost reductions (see Appendix 1). Interviewees were asked to determine which NPD categories they were involved in overall and which they were most involved in. Three organisations stated that they were involved in all six categories either currently or sometime in the past. Four organisations suggested that they aimed to develop new-to-the-world products in addition to other categories. The top three categories that organisations were both involved in currently and aimed to be involved in in the future were new category entries; addition to product lines; and product improvement. Only a third (eight) of

organisations claimed to be involved in some form of cost reduction. A small organisation with 40 employees in County Dublin and a small organisation in County Limerick with 25 employees suggested their involvement in the following categories:

> *"At different stages, we've been involved in all of them. This year we are involved in a new to the world product. Last year it was a me-too product. The year before was cost reduction because we had new machinery and then the year before that you could say it was repositioning because we went into fixed weight slices."* Organisation 12.

> *"We [want to be developing] new innovations, new to the world products. That is the aim. It's not fully there yet, but we will get there."* Organisation 18.

All organisations wanted to produce value-added products. There was a belief amongst all organisations that the production of successful value-added products would in turn lead to higher profit margins. However, as with the term 'new product,' there was no one definition of what 'value-added' was. Due to this, some organisations claimed they were producing value-added products because they were changing the packaging of a product. Other organisations did not view such an activity as adding value to a product and believed that there had to be the addition of ingredients to the basic product in order for it to be a value-added product. Table 7.3 highlights the types of innovation in all the Irish seafood SMEs interviewed. In addition, the following quotes describe what a value-added product is, from the perspective of a small organisation in County Galway with 20 employees; a small sized organisation in County Kilkenny with 22 employees; a micro organisation in Waterford with nine employees and finally a small organisation in County Donegal with 25 employees:

> *"To me, it [a value-added product] would be an improvement, like an ingredient addition. It is improving your basic core ingredient and adding something to it."* Organisation 10.

> *"Anything that you would take in that's a natural ingredient, and then you add a sauce to it, or I enhance it in any way, and then to have it just ready for the person to eat very quickly, whether it be reheat or just to open up if it`s pate."* Organisation 11.

Table 7.3 Types of innovation in Irish seafood SMEs

SME	Size	Number of new products launched annually	Type of innovation the organisation has taken part in either in the past or currently					
			1	2	3	4	5	6
1	Micro	2						
2	Micro	2						
3	Micro	5						
4	Micro	1						
5	Micro	2						
6	Micro	5						
7	Micro	3						
8	Micro	1						
9	Micro	1						
10	Small	2						
11	Small	1						
12	Small	1						
13	Small	1						
14	Small	1						
15	Small	1						
16	Small	1						
17	Small	1						
18	Small	12						
19	Medium	3						
20	Medium	3						
21	Medium	40						
22	Medium	1						
23	Medium	3						
24	Medium	10						

1= New to the world 2= New category entries

3= Addition to product lines 4= Product improvement

5= Repositioning 6= Cost reduction

Involved in = Not involved in =

Source: Author

"[We consider value addition] anything beyond the whole fish. A fillet that we produce. We also go further, and we take the thin bones out. It's a completely boneless fillet." Organisation 7.

> *"We count our packaging as added value because we feel it does add value to the product, so we would say just vacuum skin packed plain natural fish."* Organisation 15.

To ensure all organisations had the same definition for value-added, the researcher presented interviewees with the definition used in this research *"the improvement of the qualitative content of a product, therefore, improving the product's overall worthiness"* (Mwinyihija and Quisenberry, 2013:2). Working from the above definition all organisations were asked "Would you consider your product development to be value adding?" All organisations stated that their product development was value adding. The percentage of the organisation`s activities that were value-added according to each individual organisation varied from 5% to 100%. However, almost all organisations had an aim of increasing their value-added products to a higher percentage. A small organisation with 40 employees in County Dublin and a small organisation in County Donegal with 25 employees described the amount of value addition their organisation undertook as:

> *"All value-added because everything we do adds value to the salmon."* Organisation 12.

> *"Two, two-and-a-half years ago we were doing 85% non-value-add, and now we're definitely 50/50."* Organisation 15.

7.4 Attitude towards NPD of seafood related SMEs

All organisations who participated in the interviews believed that there were many benefits to engaging in NPD and were clear that in order for the growth and survival of their organisation, continuous participation in NPD, even in small quantities, was vital. Organisations observed many specific benefits to NPD including; brand +establishment, recognition and growth; meeting customer needs; attracting new customer; staff engagement; keeping up to date with and setting trends; utilising waste products; increased revenue; increase profit margins; growth of the organisation; expanding the product range; enter new markets; increases potential for exports; maintaining competitive advantage; increase consumers consumption of seafood; and faster movement of stock. The specific benefits of the SMEs interviewed have been categorised and summarised in Figure 7.4.

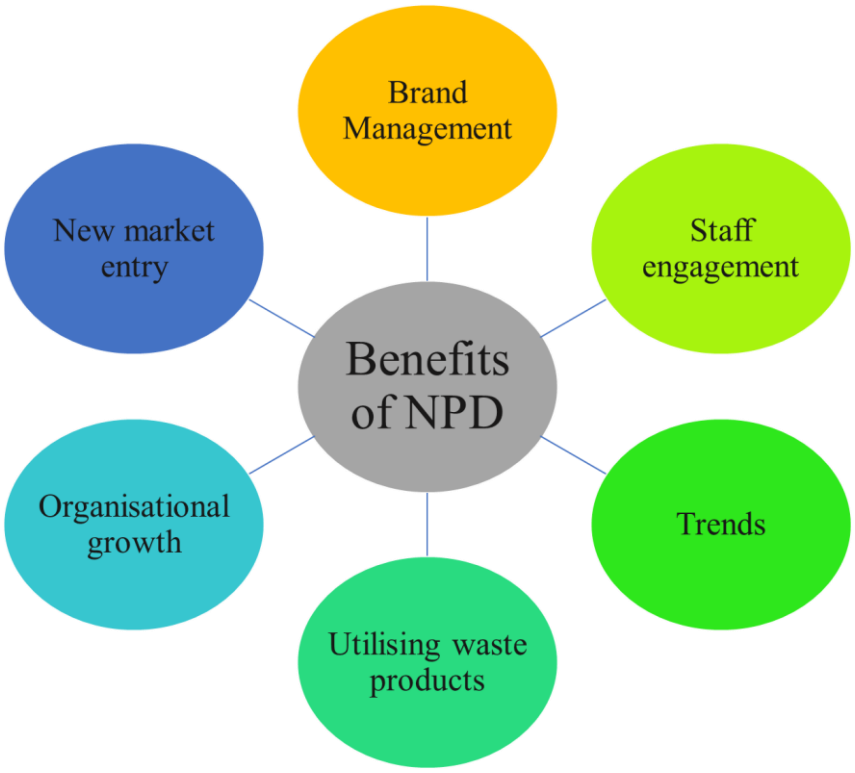


Figure 7.4 Benefits of NPD to seafood SMEs

Source: Author

The smallest organisation interviewed, a micro organisation with one employee in County Limerick, stated that before they began the process of NPD, their brand was unrecognisable to most consumers. Once they began to participate in NPD and developed more and more products, then consumers wanted to know about the products and where they came from, as well as the story and the people behind it. Micro-organisations stated that they saw particular benefits in the way of the brand establishment, recognition and development. The following quotes are from micro organisations in County Limerick with one employee and County Louth with five employees, that believed brand establishment and development was a key benefit of NPD:

> *"Beforehand [engagement with NPD] no one knew that we existed and once you have a product out there they [the consumer] wants to know where it came from, the people behind it and all that stuff and that's the interesting part. They [the consumer] want to know the source of it."* Organisation 9.

"The benefit [of NPD] is to get the brand out there." Organisation 6.

Almost all organisations, when speaking about their reasons for participating in NPD, mentioned either increasing revenue or profits. Some organisations felt this was achievable through developing new products from scratch, however, other organisation believed that their waste product was costing the organisation money in disposing of it and believed that if they invested in utilising that waste, while it may cost money to invest in initially, then they would increase revenue or profits in the long term. There were multiple organisations who believed that the utilisation of waste would make a significant contribution to the bottom line because the raw material is actually costing the organisation nothing apart from the extra ingredients, and if it fits in with the existing process; existing distribution network; and there is a market for it then it can only be beneficial. A small organisation in County Kilkenny with 22 employees and a medium-sized organisation in County Wexford with 130 employees describe their concerns about waste:

> *"Of course it's [making profits] all about waste management. The profit is [coming] in the door and going out in the bin."* Organisation 11.

> *"We have done a bit with Teagasc in the past… in relation to alternative uses for waste…. [By utilising waste] you are adding more value, and you are increasing your revenue, hopefully increasing your profit margins."* Organisation 23

While all organisations acknowledged the benefits of NPD, there were also many negative aspects that interviewees highlighted. SMEs suggested that they faced barriers in the NPD process. All sized organisation believed that the initial cost and investment was a significant barrier for them. An example of this is described below by a micro organisation in County Limerick with one employee; a small organisation in County Waterford with 40 employees; and a medium-sized organisation in County Dublin with 50 employees:

> *"There are a lot of barriers, I think for small or micro organisations as I am it's basically money and resources. If you start making a new product you need investment for things like lab testing."* Organisation 9.

"You are developing a new product, and you want something different which means a different packaging range. You have to buy in certain amount, a quantity, as many of these packaging companies have minimum size orders. There is no guarantee it is going to be successful in the marketplace, so that is a challenge. Of course, if you hit the bullseye and the customer loves it, of course, there are benefits there… but there are challenges, and packaging would be a massive one." Organisation 13.

"There's also always that element of fear of failure and risk, and I think the element of it's going to cost money [so we can't afford to fail]." Organisation 24.

Support from government and non-government organisations was highlighted as another area that organisations believed could be stronger, specifically in relation to SMEs. While most organisations recognised that there was support available and that certain organisations were very active in encouraging and assisting with the development of new products, there could be more assistance specifically for SMEs. BIM, Bord Bia, Enterprise Ireland, Teagasc and local and county councils were some of the supportive organisation mentioned by interviewees. BIM`s facility, the Seafood Development Centre (SDC), was suggested to be a valuable resource for SMEs during the NPD process, assisting in certain aspects of product development such as sensory testing. However, is inaccessible to many organisations, particularly those located outside the south west of Ireland. Bord Bia was noted as providing insightful research on topics such as consumer trends. However, organisations which did not export their product believe that this was not a very supportive organisation. A number of organisations had benefited from grants from Enterprise Ireland and utilised them, but again many of these grants had to be used in association with research institutes, and some organisations found them more beneficial than others. Many organisations believed that they were almost falling through the cracks in relation to the support they received as a small organisation with 20 employees in County Dublin; a micro organisation in County Clare with five employees; and a micro organisation in Limerick with one employee describes:

"Now I know BIM have their SDC, in Cork and… for me to go down to Cork and spend two or three days or a week there costs me money." Organisation 17.

"I think because of our size, and I think because we don't export, the IDA and Enterprise Ireland… Now Enterprise Ireland did grant aid to a small extent, but they are not interested in you unless you are an exporter. They are not interested in the indigenous market." Organisation 8.

"Moneywise there was an innovation voucher, and that's it. That was from Enterprise Ireland, which I used with BIM, but I do not know what I got for my money really in the end. There was no transparency. There was no feedback in the interim. There was no receipt saying your five thousand euros was used for xxx or this was how much it was for this service." Organisation 9.

This was not the consensus of all organisations, there were a number of organisations that believed if they engaged with the agencies and supports that were available to them, they could benefit greatly from those supports. A small organisation with 25 employees in County Donegal and two medium-sized organisation, the first in County Wexford with 50 employees and the second, the largest organisation interviewed, in Donegal with 170 employees described the benefits that they received by engaging with agencies and supports:

"Bord Bia is actually helping us with rebranding. BIM is there for… anything to do with the seafood industry that is where you go. They are there if you need supplies, even if you need research from them. They are there. If you need marketing. If you need technology. If you need packaging equipment. If you need a breading line, or if you need to try a specific pressure cooker, they've got it or will get it for you to help you, so they're huge." Organisation 15.

"BIM is good especially with the sensory analysis, and also with giving me contact details for the buyers because they would have that information and market research in particular. Bord Bia is great for again helping us with the export, but like the logistics of it, who would be a haulier or courier to bring the fish out. What would be the logistics of selling it out there [in Europe],

costs, taxes, things like that. Bord Bia would be very good that way because they're more international than BIM." Organisation 19.

"I would say the feed in from Bord Bia is helpful to us. Those consumer insight studies we just find them fantastic. If anything they reassure what we're thinking is right." Organisation 20.

Most organisations, from micro to medium suggest that regulation and legalisation, in some form makes product development more difficult. While all organisations stated they believed that it was necessary to have an industry that is regulated, they also believed that it is making the day-to-day running of their organisation very difficult. For example, many organisations mentioned the amount of information that was required by food labelling regulations. Regulation (EU) No. 1169/2011 (FIC) sets out the general principles and obligations regarding the provision of food information, which includes at least 12 items of information. Many organisations believe this is too complex and continuously becoming more and more complex. A small organisation in County Kerry with 21 employees and a micro-sized organisation in County Clare with five organisations described their issues with such regulations:

"It is no doubt about the fact that regulation is making a small to medium sized organisation struggle enormously. We've got more and more hoops to jump through." Organisation 16.

"Labelling is crazy. I just don't understand why we need to baby the customer so much." Organisation 8.

7.5 The NPD process and framework employed by seafood related SMEs

Of the organisations who participated in this research, 20 had no defined step-by-step process, roadmap or specific structure to the organisation`s NPD activities (see Table 7.5). A small number of organisations in the past had tried to structure their processes on an established model such as the Stage Gate process (see Figure 2.7.1). However, all suggested that such models were designed for more technology-based organisations and these models did not fit well into food related organisations. They also suggested that even if such models did fit well in food organisations that they definitely did not fit into the SME style of business. Other organisations, in a bid to establish structure

in their own NPD process, hired consultants, to assist in the development of a specific process for their organisation. These methods were limited to just a few organisation, and all of those organisations were of medium size. Below is a description from a medium-sized organisation with 70 employees in County Louth and a small sized organisation in County Donegal with 25 employees, of the NPD process employed by their organisation:

> *"We have a plan. We have our 'create' session, and then we had our plan. Our idea generation was when we had our create session. Then we did our market analysis, what are the best selling products and target market we are going to aim for. Then we put a critical control path in place. Then we went through the actual product development. Product development and the design stage of packaging and if you are going for a sleeve label or whatever, feasibility, product testing for your shelf life analysis, nutritional value, first production run, product launch and then post-launch evaluation."* Organisation 22.

> *"There are about 35 steps in it.. It all begins with an idea… then the research to see if it's viable… it moves onto development or initial development… I make some prototypes, test them on a small audience like at work… the next would be the financing side of things and the cost… and are the resources there… The secondary development… we would actually develop the product… run focus groups, run sensory panels… Next, you're into, packaging, labelling, all that… After that you're looking at developing a full-on prototype. If everything fits, if the finance fits, if the packaging fits, and if you've got good feedback, you're into developing a full-on prototype, and actually test marketing it on a larger scale… Then full development and I guess production, and then after that, it's a matter of just checking to see that it's doing what it's supposed to be doing."* Organisation 15.

Generally, the format that the organisations follow is idea generation; develop a prototype; shelf life testing; costing; sensory testing; packaging and sales. This is not the process in all organisations, some organisation had extra stages such as assessing if it fits in the production schedule, and other organisation did not complete all steps. Below are descriptions from two micro-sized organisation both based in County

Galway the first with four employees and the second with nine employees, of the NPD process employed by their organisations:

> *"It's really just me and `S` banging heads together saying okay there's nothing out there like this. `S` does a lot of research… and on my end, it is the food so I see there is a niche there for something that we could actually fill with the stuff."* Organisation 1.

Table 7.5 Structured NPD in Irish seafood SMEs

SME	Size	Employees	New products launched in the last 2 years	Has a step by step NPD process
1	Micro	4	2	
2	Micro	3	2	
3	Micro	9	5	
4	Micro	9	1	
5	Micro	5	2	
6	Micro	5	5	
7	Micro	9	3	
8	Micro	5	1	
9	Micro	1	1	
10	Small	20	2	
11	Small	22	1	
12	Small	40	1	
13	Small	40	1	
14	Small	35	1	
15	Small	25	1	
16	Small	21	1	
17	Small	12	1	
18	Small	25	12	
19	Medium	50	3	
20	Medium	170	3	
21	Medium	85	40	
22	Medium	70	1	
23	Medium	130	3	
24	Medium	50	10	

Has a structured NPD process = Does not have structured NPD process=

Source: Author

> *"With us, it`s trial and error, so first maybe a customer would come up with an idea, or we'll come up with an idea. Then we have to work out what kind of fish has to go into it, and then what kind of other ingredients we would add to*

it, and then we go through the process of making it. After that, we will try it ourselves for a few weeks to see if it is good, to see if we like it, and then we will put it out on our shelves, give samples to customers, and see if they like it. Get their feedback, and then based on that we would kind of workout a process of making more for production then." Organisation 3.

For the organisations who followed a plan or structure for their NPD the reason for selecting such a plan was that they had worked in other industries that used it or had employees dedicated to the NPD process who developed the process over time. The majority of organisations suggested that the reason for their chosen process was generally that it had evolved over time through trial and error. A micro-sized organisation with five employees in County Louth; a small organisation with 12 employees; and a medium-sized organisation with 50 employees both based in County Dublin suggest different reasons for why they chose the process they currently use for NPD:

"We didn't start with a model. It's probably just the way we started at the start." Organisation 6.

"That's our process because we think it's the best way to go. We have no idea. There probably is a better process." Organisation 17.

"We are working off experience, we are working off what we have done for years because it's common sense." Organisation 24.

Also, most organisations suggested that one of the main ways in which they could improve their NPD process was through having a structure or step-by-step roadmap to follow. However, most organisations suggested that such a structure would require resources and capital investment from the organisation and this was not always possible as suggested by a small organisation based in County Kerry with 21 employees and a micro organisation in County Mayo with three employees:

"The process [we use] definitely needs structuring." Organisation 16.

"[We could improve our process by] putting structures on it. Completely and absolutely. But that means more money." Organisation 2.

In addition to not having a defined structure on the NPD process, most organisations did not have a product development strategy beyond an aim for how many products they wanted to produce a year and those who did were medium sized. Also, only a very small number of organisations had a budget associated with NPD, no micro organisation had a budget for NPD, three small and two medium sized organisations had a budget for NPD. Finally, two micro, three small and three medium sized organisation had a dedicated employees for the NPD process, however in all cases the role of that employee was not exclusively to the development of new products (see Table 7.5.1). In many cases the organisations who had no strategy, budget or dedicated employees believed that they were too small to require such resources the sentiment of which as can be seen from this quote of one small business with 12 employees based in County Dublin:

> *"It [NPD strategy] would be all very haphazard, and we are doing it on a shoestring budget. So we would not allocate money towards it [NPD]."* Organisation 17.

The idea generation in most organisation came from a variety of sources. While most organisations did not encourage innovation and idea generation from employees through formal processes, many suggested that if an employee had an idea about product development, they were listened to. A small sized organisation with 40 employees in County Waterford describes a complete lack of idea generation from employees, while a micro organisation with nine employees in County Waterford suggested that they encouraged idea generation, however, had no formal facilities to capture those ideas:

> *"We do not do anything like that brainstorm, or reward systems. I suppose the only thing really we do involve staff in is probably sensory analysis…But no, we would not have idea generation, formal meetings with staff or anything like that. No, we wouldn't."* Organisation 13.

> *"We do encourage people to come up with ideas, but no, we don't do it formally."* Organisation 7.

In almost all organisations, the ideas for new products come from management. Employees were either not encouraged to be innovative, or there were no facilities to

capture any potential innovations.

Table 7.5.1 Strategy, budget and employees associated with NPD

SME	Size	Employees	Has a NPD process	Has a NPD strategy	Has a NPD budget	Has a NPD employee
1	Micro	4				
2	Micro	3				
3	Micro	9				
4	Micro	9				
5	Micro	5				
6	Micro	5				
7	Micro	9				
8	Micro	5				
9	Micro	1				
10	Small	20				
11	Small	22				
12	Small	40				
13	Small	40				
14	Small	35				
15	Small	25				
16	Small	21				
17	Small	12				
18	Small	25				
19	Medium	50				
20	Medium	170				
21	Medium	85				
22	Medium	70				
23	Medium	130				
24	Medium	50				

Responded 'yes' to the question = Responded 'no' to the question =

Source: Author

7.6 Role of stakeholders in the NPD process by seafood related SMEs

All organisations agreed that the consumer played a vital role in the NPD process and some organisations point to the consumer as being their source for idea generation. However, no organisation formally included the consumer in the early stages of product development, in fact, almost all organisations suggested that they would not consult the consumer about NPD until there was a prototype developed and ready for tasting and some organisations did not involve the consumer at all. Even at that point of consultation with the consumer in relation to a prototype, the feedback that

organisations received from consumers was very informal. The following are quotes from a small organisation in County Waterford with 40 employees and a micro firm in Limerick with one employee as they describe the extent to which the consumers were included in their NPD process:

> *"We would do everything internally, but we would involve a lot of the staff. We would consider them consumers as such. I suppose we do not see much value in that. I think we probably know more about fish… maybe that's arrogance."* Organisation 13.

> *"[For talking to the consumer] market stalls are a wonderful springboard like once I have enough product developed to the point that it has been shelf-life tested, I can use the markets where I give tasters all the time."* Organisation 9.

All interviewees were asked why they did not include their consumers in the early stages of the NPD process. Most did not see the value in including the consumer and had never thought that it would be appropriate to ask the consumer prior to product development. Almost all organisations believed that consulting the consumer before a prototype was developed for them to taste was a waste of resources. Most organisations also suggested that they did not have the resources to conduct market analysis or research with the consumer. Other organisations believed that they knew and understood what the customer wanted and needed better than the consumer understood those wants and needs. A medium organisation with 50 employees in County Wexford and a micro organisation with nine employees in County Galway saw no value in including the consumer prior to sensory analysis of a prototype:

> *"I don't know if people would be interested, and I don't even know how, I don't think we have the money or know how to do it [conduct market research]. I know you could do Survey Monkey and stuff like that, but they do not taste the product. That's why I think it's better for people to do sensory analysis like the Seafood Development Centre offers us, but it's very hard to kind of talk to someone about a taste through an online questionnaire."* Organisation 19.

> *"No, I wouldn't do focus groups which would probably be the right way to do it… but it would be a waste of time and money without the product [already developed], and we can't afford to waste money."* Organisation 3.

Table 7.5.2 Stakeholders involved in the NPD process of Irish seafood SMEs

SME	Size	A	1	2	B	1	2	C	1	2	D	1	2	E	1	2	F	1	2	Stage of involvement
1	Micro			x																A= Sensory analysis
2	Micro			x																A=Sensory analysis
3	Micro																			NONE
4	Micro			x												x				A= Idea generation and sensory analysis E=Idea generation
5	Micro			x						x										A&C=Sensory analysis
6	Micro			x												x		x		A= Idea generation and sensory analysis E=Idea generation F= Market research
7	Micro			x																A=Sensory analysis
8	Micro			x		x														A&B=Sensory analysis
9	Micro			x														x		A=Sensory analysis F= Packaging
10	Small			x					x											A=Sensory analysis C= Packaging
11	Small			x														x		A=Sensory analysis F= Market research
12	Small			x																A=Sensory analysis
13	Small												x							D= Sensory analysis
14	Small			x																A=Sensory analysis
15	Small			x						x								x		A&C=Sensory analysis F= Market research
16	Small					x				x								x		B&C=Sensory analysis F= Market research
17	Small			x						x										A&C=Sensory analysis
18	Small			x																A=Sensory analysis
19	Medium			x														x		A&F=Sensory analysis F= Market research
20	Medium			x					x									x		A=Sensory analysis C= Packaging F= Market research
21	Medium					x										x		x		B= Sensory analysis B&E=Idea generation F= Market research
22	Medium			x					x							x				A=Sensory analysis C= Packaging E= Idea generation
23	Medium					x			x											B=Idea generation C= Packaging
24	Medium			x						x			x					x		A&C=Sensory analysis C&D=Idea generation F= Market research

A= Consumer **B**=Retailer/Customers **C**= Wholesaler/ Suppliers **D**= Staff **E**=Competitors **F**= Industry partners

1= Collected information through formal methods **2**= Collected information through informal methods

Source: Author

The techniques used by organisations to understand the consumer and stakeholders were a mix of formal and informal (see Table 7.5.2). One organisation used surveys to establish a direct link with their consumers and determine their seafood consumption patterns. A limited number of organisations used research carried out by the agencies to keep them informed. The main resource used was the Bord Bia Consumer Trends Report. A small number of organisations linked and consulted with their suppliers and retailers in relation to what the consumer wants. Similarly, a small number of organisations used food labs in their NPD process. The most common tool used to understand the consumer and other stakeholders was informally talking to consumers during supermarkets or shop tasting sessions, at tradeshows and festivals (see Table 7.5.3). A small organisation with 25 employees based in County Donegal; a micro organisation with five employees in County Louth; and a small organisation with 20 employees in County Galway described the tools they used to gain feedback from consumers:

> *"Again that [feedback] would come back to the likes of food festivals, and so on and so forth, there's great research material at those, and just using the internet, and using BIMs resources. Using Bord Bia and that would be it really."* Organisation 15.

> *"We do barbeques and food tasting a couple of times a year. We do that outside the shop."* Organisation 6.

> *"I think I know what the customer wants. We got a good response from the way we are doing it. Obviously… if people say it's too salty or creamy or too this or that, of course, we will listen."* Organisation 10.

The most formal feedback that organisations aimed to acquire was in the area of sensory analysis. All organisation stated sensory analysis was the area they could benefit most from when speaking to customers. A number of organisations did use food labs and did have formal and scientific sensory testing conducted on their product by outside organisations such as BIM. In almost all cases, however, as with the NPD process, there was no formal strategy for conducting sensory testing. A number of organisations, such as a medium-sized organisation with 130 employees in County Wexford; a small organisation with 22 employees in County Kilkenny; and a micro

organisation with four employees in County Galway, used very informal approached to sensory testing:

> *"We have done some tasting ourselves here, blind tastings, but we don't have a strategy."* Organisation 23.

Table 7.5.3 Consumer integration techniques used by seafood related SMEs

SME	Size	1	2	3	4	5
1	Micro	■		■	■	
2	Micro		■	■		
3	Micro	**None**				
4	Micro		■		■	
5	Micro		■	■		
6	Micro			■		
7	Micro	■		■	■	
8	Micro	■		■	■	
9	Micro	■			■	
10	Small	■				
11	Small		■	■		
12	Small	■		■		
13	Small	**None**				
14	Small	■			■	
15	Small		■	■	■	
16	Small	■		■		
17	Small			■		
18	Small	**None**				
19	Medium	■				
20	Medium	■	■			
21	Medium		■	■	■	
22	Medium			■		■
23	Medium	■		■		
24	Medium	■		■		■

1= Informal feedback (general conversation with consumers and customers)

2= Research conducted by industry partners

3= Informal sensory analysis

4= Formal sensory analysis (out sourced or conducted with industry partners)

5= Surveys (Demographic, eating habits and attitudes to seafood)

Conducted in the past = ■

Source: Author

> *"No, we don't use a formal process. We do it ourselves. It is very simple. We just taste ourselves. We get people, friends and family. We get the public, the consumer to taste and tell us if they like a product or not."* Organisation 11.

> *"The only sensory testing we did was with BIM was for the soup in the beginning."* Organisation 1.

Despite the lack of strategy around sensory testing, all organisation acknowledged the importance of it in the NPD process and most were actively monitoring the sensory aspects of the product throughout the product development process. Most organisations stated that this was the most important step in the NPD process. Of the five senses, the two which organisation placed most emphasis on were the visual aspects and the taste. While overall the taste was considered to be the most important sensory attribute a few organisation believed that visual attributes trumped taste. The reasoning behind this was that they believed that if a product was not visually appealing, then the consumer would never buy it and taste it as a micro organisation with nine employees in County Kilkenny describes:

> *"Our pate for example might not look as visually appealing as our other products but it tastes great. We are not going to compromise on taste to make it look better... If it doesn't taste right I won't sell it and customers won't buy it either."* Organisation 7.

7.7 Summary

This chapter presented the results of the in-depth interview that investigate NPD activities in Irish seafood SMEs. It outlined the general backgrounds on seafood related SMEs in Ireland and the new product activities in those SMEs. It also examined the general attitudes towards NPD and what NPD process and framework was used in seafood related SMEs. Finally, the chapter examined the role that the consumer and other stakeholders play in the NPD process along with how the input of those stakeholders are incorporated into the NPD process. Chapter 8 presents the results of the qualitative study primarily outlining consumers purchase behaviours towards seafood products and their attitudes and perceptions towards existing seafood products and new seafood product concepts.

Chapter 8: Results: Focus Groups

8.1 Introduction

This chapter presents the results of the qualitative study. The aim of this chapter is to establish the purchasing behaviours and motives of consumers generally and specifically when purchasing a seafood product with an ingredient, which is unfamiliar to them. This is addressed in section 8.2, which gives a background on the participants and their general food choices, seafood consumption and purchasing patterns. The chapter also provides an overview of consumer's consumption and purchasing habits in relation to seafood and also their reasons and motives for purchasing and not purchasing seafood.

Once this is addressed, there is also a need to identify what would motivate consumers to purchase a seafood product, which included ingredients that they are unfamiliar with. The last element of the chapter, presents the results of a discussion about the important intrinsic and extrinsic attributes, which influenced purchase decisions specifically in relation to a seafood product, which included ingredients that participants were unfamiliar with. This part was a significant contribution and the basis for the development of the conjoint based questionnaire (Chapter 9).

8.2 General background information on food choice

There were five focus groups conducted in counties Limerick, Mayo, Donegal, Dublin and Carlow. Each focus group had eight participants of both genders over the age of 18 years. The demographics of the focus groups were quite evenly distributed. However, it is important to point out a few minor differences between the groups. Focus group participants of both genders were recruited across different socio-economic groups and age categories to participate in this study (see Table 8.2). The education of the participants in focus group 3, which was based in Donegal, had the least number of participants with a third level education, whereas the Dublin based focus group 4 and Carlow based focus group 5 had the highest proportion of interviewees that had attained their highest level of education at third level. Focus group 4 was characterised by a high proportion of older, married adults with children in comparison to the other groups as seen in Table 8.2.

Table 8.2 Focus group participant's demographic information

Socio-demographic Variables	FG 1	FG 2	FG 3	FG 4	FG 5
Participant Numbers	8	8	8	8	8
Gender					
Male	5	3	4	3	5
Female	3	5	4	5	3
Age Group (years)					
18-24 (Later Adolescence)[2]	3	2	1	1	1
25-34 (Early Adulthood)	0	1	1	1	1
35-44 (Middle Adulthood)	1	2	3	0	1
45-54 (Middle Adulthood)	3	2	3	4	5
55+ (Later Adulthood)	1	1	0	2	0
Marital Status					
Single	4	3	1	1	3
Married	4	5	4	5	4
Separated/Divorced	0	0	0	0	0
Cohabiting	0	0	2	1	1
Widowed	0	0	1	1	0
Education					
Primary Level	0	0	0	0	0
Junior Cert.	0	0	1	0	0
Leaving Cert.	3	3	4	2	2
Third Level	5	5	3	6	6
Occupational status					
Employed	5	6	7	7	7
Unemployed	0	0	0	1	0
Student	3	2	1	1	0
Retired	0	0	0	0	1
Income					
≤€99	3	1	1	0	0
€100-199	0	1	0	1	0
€200-299	0	1	1	2	0
€300-399	1	0	0	0	0
€400-499	2	2	2	2	2
€500-599	1	0	1	1	1
≥€600	1	3	1	2	5
No. of Child Dependants					
0	4	5	3	3	3
1	0	1	1	0	1
2+	4	2	4	5	5
Location	Limerick	Mayo	Donegal	Dublin	Carlow

Source: Author

[2] Definitions adapted from Newman and Newman (2017).

All participants stated that they had never been involved in NPD of any food product as a consumer other than in relation to sensory analysis. Two participant had been involved in testing and trialling products for other industries. No participants, excluding one male in County Mayo had ever been interviewed, participated in focus groups or completed questionnaires relating to any NPD of food products. No participants suggested that they had ever given unsolicited feedback about a product to food producers or retailers. However, participants indicated that if they were asked for their opinion at any stage of the NPD process and they believed their opinion could be of value, then they would be inclined to and interested in giving their opinion. A male in early adulthood in County Carlow and a female in middle adulthood in County Dublin both expressed these sentiments:

> "*As I said, they give you taster in the shops but never say, 'hey what do you think or have you any feedback', you would think they would want to know. Like sometimes I would actually want to say, that too spicy or whatever but I don't because I guess, I figure if they want to know they will ask."* Focus group 5.

> *"I eat at least three meals a day plus snacks, we all do, so of course we have opinions about our food. And not just how it tastes, as someone else said there is more than just taste than influences what we buy, like price, portion size or packaging, stuff like that."* Focus Group 4.

All participants had been involved in informal sensory analysis. This sensory analysis was conducted at trade show, festivals, markets, supermarket or small retailers such as fishmongers. Almost all participants noted that they were only asked if they liked the product or not and were not asked to expand on their opinions as to why they did or did not find the product appealing. A male in later adolescence based in County Limerick and a male in later adulthood based in County Mayo describe their experience of sensory analysis:

> *"I love those little tasters you get in the shops or at the Milk Markets, but you just taste and move on, no one ever asks why you don't buy the product or what you liked or didn't like about it."* Focus group 1.

"I've only every had the free samples they give out in the shop and places like that. One time at a trade show I was at in Dublin they did have a form to fill in about what you like or didn't like about it, like the colour and the taste and that but that was for a yoghurt not fish." Focus group 2.

Almost all participants in all five focus groups reported a change in their diet over the last five years. The reasons for these changes vary from participant to participant. A significant number of participants suggested they had become more conscious and aware of what they are eating and whether their food was healthy or not. A female in middle adulthood, based in County Dublin, a male in later adulthood based in County Mayo and a male in early adulthood in County Carlow all suggested that there is more focus and information available on living a healthy lifestyle than ever before:

"I think in recent years because of Operation Transformation, and it's so much in our faces I think everybody is a lot more self-conscious about what they're eating." Focus Group 4.

"Well, the most change has come about as a result of healthy eating, and all of the advertisements and Safefood Ireland. It's on the television quite regular and whether you like it or not it will influence you." Focus Group 2.

"For playing a sport, even in the last five or six year's food has completely changed sport. Ten years ago you could drink ten pints during the week, and eat whatever you want and then go in and play football or soccer at the weekend but now it's after turning that you have to eat on a Monday and Tuesday for a match on Saturday." Focus Group 5.

In a discussion about the factors, which influence general food choice, healthy eating was a factor that influenced food choices across all focus groups. Financial considerations, along with health was a strong consideration for participants of focus group 3, 4 and 5 in relation to general food choice with many participants suggesting that fish is too expensive to eat multiple times a week. These focus groups were made up of mainly married individual's ages 35-54 years with at least 5 of the 8 participants having 1 or more children dependants and of these participants the income level was a minimum of €400 per week. This indicated that married participants of the family stage with a high income were most conscious of healthy eating at a reasonable price.

A female in middle adulthood based in County Dublin; a male in later adolescence in County Donegal; and a female in County Carlow in middle adulthood with children all suggested that price was a significant issue in relation to purchasing seafood for them:

> *"I would be trying to eat well, and I would be conscious of price too."* Focus Group 4.

> *"Price really is the only thing that would discourage me [from buying seafood]."* Focus group 3.

> *"As a mother cooking for a family… I would be more cost effective really… and as nutritious as possible obviously but I would be looking out for a good deal as well price-wise."* Focus group 5.

Convenience and time saving or at the minimum, not time-consuming, was a significant factor for general food choices, particularly for parents and students. Many participants suggested that a product that required a significant amount of preparation or complicated processes would deter them from purchasing it. In addition, a product that they could begin to cook and then return to was much more appealing than products that had to be constantly monitored during the cooking process especially amongst males 44 years and older and also younger participants who were single with no children. Female respondents did not require such a level of convenience and those who did suggest the need for convenience were under 24 years. A male in middle adulthood in County Donegal and a male in later adolescence in County Limerick noted the following:

> *"I like lobster when I go out, but I would not really know how to handle it at home. If you have to prepare it. If you have to fillet it or cook it. It's impossible."* Focus Group 3.

> *"[Oven cooking is preferred] because I can leave it and go and do something else. You don't have to watch it."* Focus group 1.

Many participants in focus group 4 stated that they rarely tried new foods and would consume what they considered 'traditional Irish foods'. Married males, particularly

those in later adulthood, were used to eating the same foods on a regular basis and were happy to continue eating the types of food with which they were familiar. Three males all in later adulthood based in County Carlow and County Limerick noted the following:

> *"I'm still on the spud I'm afraid anyway."* Focus group 4.

> *"Our house would be spuds as well every day. Spuds, meat and veg every day."* Focus group 4.

> *"[It`s] rare enough I would try new foods. I tend to stick to what I know."* Focus group 1.

Participants in the younger age categories were open to and often sought out new foods to try. Most of the participants under 35 years attributed their want and willingness to try new foods to travel and experiences they had outside Ireland. A male in later adolescence based in County Limerick and a female in early adulthood in County Mayo suggested the following:

> *"I think my tastes changed from travelling. Going to new places and trying new things and then trying to find them at home."* Focus group 1.

> *"When you go away on holidays, you're trying different foods, and a lot of the times too you bring something back with you."* Focus group 2.

8.2.1 Seafood consumption patterns and occasions

The person who purchased the seafood for the household in most cases tended to be a female and 35 year and over. Seafood was consumed by two or more people in the household at a minimum of once a month but more often than that in the majority of cases. The vast majority of participants had noted an increase in their personal consumption of seafood over the past five years. Only one participant, a male in middle adulthood in focus group 3, suggested his consumption had decreased from consuming seafood three times a week to once a week since getting married, as his wife does not eat seafood. Other participants suggested a significant increase in consumption over the past five years. A female in middle adulthood in County

Limerick and a male in early adulthood in County Carlow noted an increase in their consumption of seafood in the last number of years:

> *"I'd buy more now because of the supermarkets that have opened up."* Focus group 1.

> *"Through understand just through education on nutrition [my intake of seafood has increased] since I found out the… health benefits of seafood and fish oils, I would be a lot more inclined to eat it. So over the last couple of years, I'm inclined to eat fish now more than I would have ten years ago."* Focus group 5.

Participants mentioned a variety of places for purchasing seafood product, the most popular of which were supermarkets. All 12 participants under 35 years, across all focus groups, bought exclusively from supermarkets and referred to convenient seafood products that they regularly purchased. Also, all participants of focus group 3 confirmed that they purchased seafood almost exclusively from supermarkets, suggesting that to purchase from a fishmonger was a treat. Some participants purchased directly from factories or farmers market. The main reason for purchasing at supermarkets and factories rather than fishmongers was that participants found fishmongers were too expensive, as was noted by a male in later adolescence and a female in middle adulthood in County Donegal and a female in middle adulthood in County Carlow:

> *"Just the cost point of view and their [supermarkets] selection has improved, but it would be cost really"* Focus group 3.

> *"Sometimes I buy from the specialist fish shops. It's a treat... because it`s [fishmonger] too expensive."* Focus group 3.

> *"Now the supermarkets have the frozen salmon darns, and they're awful convenient compared to going into the fish shop."* Focus group 5.

8.2.2 Motivations for consuming seafood

Focus group participants suggested a variety of reasons to explain their consumption of seafood. Health and nutrition considerations were the most popular stated reason why participants chose seafood over alternative sources of protein and was the most

popular response from males and females who were single with no children with an income of €200 or less a week. This response was also very popular amongst females aged 35 years to 54 years with a high level of dependant children. Participants were very aware of the benefits of consuming fish and a variety of reasons for choosing to consume seafood were mentioned such as lower in fat than meat; general health benefits such as those associated with omega 3 fatty acids; healthy source of protein; less filling than meat; and the general sensory appeal of seafood.

Female participants aged 35 years to 54 years with a high level of dependant children referred to a number of health benefits that they associated with consuming seafood such as reducing the risk of heart attack and stroke, for the development of a foetus during pregnancy and in the assistance to lower cholesterol. A number of participants, in particular females again, were very aware of the benefits of omega 3 fatty acids and the benefits they believed they were gaining from consumption of seafood. A female in middle adulthood in County Donegal and a male in later adulthood in County Mayo suggested their reasons for consuming seafood as:

> *"The oils, the omega 3 and its health benefits [that encourages me to consume seafood]."* Focus group 3.

> *"It`s health that motivates me to buy fish and seafood products."* Focus group 2.

Participants in focus group 1 and 2 mentioned that particularly for playing sport, nutrition had a significant part in their choice of seafood over other protein sources, especially red meat. Young males under 34 years particularly suggested that sports nutrition had developed so much over the past number of years and that they had become more aware that there were different benefits and disadvantage of consuming different sources of protein. While none of these participants were professional athletes, they noted that sport played a large role in their food choices. In addition, as athletes, they knew they should avoid excessive intakes of fat, and that meat was generally higher in saturated fat than seafood. Two males in later adolescence in County Limerick and in County Mayo noted the following:

> *"I've become a bit more educated on nutrition in the last four or five years… so my education is purely based on what I've received from playing football,*

and meeting with nutritionists… I remember when we started playing football first, it was all you eat is carbohydrates, carbohydrates… Now I wouldn't dream of doing that now, [it's more protein]." Focus group 1.

"Especially for people who are training and playing sport… [knowing that] you can get a certain about proteins and [healthy] fats into our body straightaway [after training] is very important." Focus group 2.

While all participants deemed health considerations important, these healthy considerations did not always relate to specific health benefits, but rather to the perceived general healthiness of one source of protein over another. Focus group participants considered seafood a healthier alternative to fresh and processed meats in particular. A number of female participants, 40-50 years suggested that they believed that it was lower in fat than other sources of protein, they felt better physically after eating fish versus meat, and they found it to be a lighter source of protein. A male and female in middle adulthood in counties Donegal and Dublin along with a male in early adulthood in County Carlow suggested the following:

"Lower fat content [is why I choose seafood over meat]." Focus group 3.

"I actually think I feel good after eating it [seafood]." Focus group 4.

"I suppose it's [seafood] fresh and has very little preservatives. So yeah that would motivate me [to eat seafood], and there's very little fat in it [seafood]." Focus group 5.

Sensory appeal played a role for many participants, suggesting that they liked seafood and consume it on a regular basis. Participants discussed the different types of seafood they enjoyed, the seasonality and how some seafood tasted better at certain times of the year and how finding new seafood products that they enjoyed continually increased their consumption of seafood. A few participants caught their own fish and suggested that from a sensory point of view they looked forward to eating what they had caught. A male in middle adulthood in County Mayo and a male in middle adulthood in County Donegal suggested the following:

"I look forward to my first feed of salmon every year, once I've caught it." Focus group 2.

"I started eating chowder there in the last couple of years. So I've kind of found a new love for it now." Focus group 3.

However, a few participants were prevented from eating seafood as regularly as they would like, as the price was a factor. A female in middle adulthood in County Donegal suggested:

"I love it [seafood], but it's [seafood] so expensive… especially if you get scallops or something. It's [seafood] very expensive." Focus group 3.

Numerous participant both male and female across all focus groups mainly in middle adulthood with third level education believed that it was important to reduce their level of meat consumption and increase their level of seafood consumption, as seafood was a more sustainable and environmentally friendly source of protein. The damage which mass agriculture had on the environment, was highlighted as a motivating factor for participants. A female in middle adulthood in County Donegal and a male in later adolescence in County Mayo stated the following:

"I was watching a documentary a few months ago from the USA, and it said that it takes almost five times a much water and feed to produce meat than fish. Also that the manure from the huge beef farms is causing loads of pollution. It's not that bad in Ireland yet, but it's going that way." Focus group 3.

"We all know that the population is growing at a rapid pace, fish and plants seems to be a more sustainable source of protein than meat in the long term." Focus group 2.

8.2.3 Reason for not consuming seafood

Participants cited three main reasons as to why they would be discouraged from purchasing seafood products. The first was price, the second was the lingering smell after cooking, and the final reason was a lack of culinary knowledge or education. The main and most repeated factor was the price. Participants expressed that in general seafood was particularly expensive in comparison to other sources of protein. It was

noted that while it was now more affordable than in the past, it was still too expensive to be consuming seafood as regularly as meat. This was noted as being particularly expensive for parents who were purchasing food for multiple people. Mainly married individual's ages 35-54 years with at least five of the eight participants having one or more children dependants and of these participants the income level was a minimum of €400 per week indicated that the high price was discouraging them from purchasing more seafood. A male and female both in middle adulthood in counties Donegal and Limerick suggested:

> *"I love it [seafood] but if you're buying it [seafood] for four adults [it's too expensive]."* Focus group 3.

> *"As a mother cooking for a family, I'd be more cost aware really, looking for deals [on seafood]… and as nutritious as possible obviously but you would be looking out for a good deal as well price-wise when you're cooking for a family."* Focus group 1.

The smell associated with cooking seafood products was another contributing factor that would discourage participants from purchasing seafood products. A number of participants under the age of 35 years referred specifically to a lingering smell for some time after seafood had been cooked and consumed. In addition, other participants referred to specific fish that they would no longer purchase due to the lingering smell as noted by a middle adulthood female and male in County Limerick and County Donegal:

> *"The only fish that I cannot stand the smell of is mackerel."* Focus group 1.

> *"The lingering smell. I do think that is a big one for me."* Focus group 3.

Lack of knowledge and education in relation to the cooking of seafood was a significant issue for most participants. However, it was not a significantly discouraging issue. The majority of participants said they did not know how to cook seafood to get maximum flavour. Participants also suggested that they were much more confident of their knowledge relating to meat and the cooking of meat than that of seafood. A later adolescence female in County Carlow; a later adulthood male in

County Dublin; and a middle adulthood female in County Mayo all suggested that their culinary knowledge relating to seafood could be improved:

> *"It`s much easier to cook chicken or beef, but with fish, I could make a mess of it. Fish is probably the lack of knowledge, and to know how to cook it properly."* Focus group 5.

> *"Sometimes I think it [seafood] can be quite bland depending on how you cook it [seafood] and maybe I'm not cooking it [seafood] right, but sometimes I think it [seafood] can be quite bland."* Focus group 4.

> *"I wouldn't know how to cook an awful lot of them [fish] to actually make them nice."* Focus group 2.

8.3 The seafood product attributes which influenced purchase decisions

Through the discussions, focus group participants identified multiple attributes that they considered important when choosing whether to purchase a seafood product, which contains a category of fish, with which they are unfamiliar. The attributes included form, format, portion size, price, cooking method and information available about the product. A number of participants suggested that they would consider the packaging, accompaniments and brand if they were considering whether to purchase a seafood product, which contains a category of fish that they were unfamiliar with (see Figure 8.3).

Each of the attributes identified as important to participants when choosing whether to purchase a seafood product, which contains a category of fish, with which they are unfamiliar is discussed in the following section. The reasons that participants seen these attributes to be important to them is discusses. The main purpose of the focus groups was to provide the basis for the conjoint analysis. As the conjoint analysis can only cater to a limited number of attributes and the number of attributes suggested by participant excessed the limit of six, justification for the chosen attributes and the elimination (i.e. form) of other attributes from the conjoint analysis is also highlighted.

Figure 8.3 Attributes influencing purchase decisions of seafood product

Source: Author

8.3.1 The influence of form on seafood purchasing behaviour

The researcher explained to the participants that the new developed fish product could not be purchased filleted and cooked, as for example a fillet of mackerel could be, and would have to be part of a product. All individuals in all focus groups agreed that if they were to buy a product with ingredients unfamiliar to them, then they would be more likely to purchase it if the product were in a form they were familiar with. There were a number of suggestions made in relation to form such as fish pie, chowder and fish cake. A breaded fish cake was the most popular as participants felt they could assess the taste of the fish and its flavours better than if it were in a sauce such as a chowder. This is highlighted by a male in County Limerick in middle adulthood and a female in later adolescent in County Mayo

> *"I think if its going to be a fish I never tasted before and you put it into something I've eaten before I would be more likely to try it. Like I love chowder so if it was in a chowder I would defiantly try a new fish."* Focus group 1.

> *"If you were to ask me to try a new food and it was in a dish or a form that I never seen or tried before, I don't think I would go for it. It's just too much newness in one go, but if you gave it to me in like fish cake or a fish finger I would probably try it to see if I liked it."* Focus group 3.

Therefore, the form was removed as a potential attribute, and it was decided that a fish cake would be the basis of the conjoint analysis, as it was favourable to most participants.

8.3.2 The influence of format on seafood purchasing behaviour

An important attribute, which influenced focus group participants purchasing behaviour, was the format in which it was available. There were a variety of formats, which participants said would encourage or discourage them from buying a seafood product. Focus group 4 had a strong preference for fresh seafood product over frozen, particularly females' ages 35 years to 54 years with dependant children. A significant number of participants suggested that the convenience of frozen and canned foods was

appealing to them. A female in middle adulthood in County Donegal suggested that they could be stored for long periods of time. One male in later adulthood on County Limerick also suggested that the convenience of canned fish was appealing, particularly to people who do not have access to freshly prepared food or cooking facilities at their workplace, i.e. construction workers:

> *"I had scampi frozen. One of mine like frozen scampi so I would always have frozen scampi in the freezer."* Focus group 3.

> *"Last year… we were putting up a shed, and over three or four months there was different contractors… coming in every day and preparing their own bits of meals, and they were opening those cans of John West… and not just one day maybe three or four days a week [they were eating canned fish]."* Focus group 1.

The majority of participants stated that they always have a frozen seafood product in their homes for convenience purposes. However, overall during the last number of years, there was a decline in the amount of frozen seafood they bought and an increase in the amount of fresh. The reason for the decline in participants consumption and purchasing of frozen products was mainly due to price reduction and the increasing availability of fresh seafood products in supermarkets. This was noted by two females in middle adulthood in counties Mayo and Dublin:

> *"We eat fresh mainly now. Up to a couple of years ago, we used an awful lot of that Donegal Catch. Not as much now. Now we are more inclined to buy the fresh fish in Lidl say because it's fresh and it`s competitive price wise."* Focus group 2.

> *"We would have used the Donegal Catch years ago but now I would not really. Not saying never, but usually not."* Focus group 4.

Younger, single participants under 34 years bought the most frozen seafood products or canned fish for convenience purposes. Students and other people living in a share house also were more inclined to buy frozen seafood products over fresh. If their housemate did not like or eat fish, the frozen product was a good alternative to cook as there is considered to be less of a lingering smell from frozen fish over fresh fish.

Purchasing frozen seafood for convenience was mentioned by a female in early adulthood in County Carlow and by a female and male in later adolescence in counties Mayo and Limerick:

> *"We've bags and bags of them [seafood products] in the fridge freezer. You can pull it out then and throw it into the oven."* Focus group 5.

> *"[I buy] convenience frozen."* Focus group 2.

> *"When you were in college you could not be bringing [fresh] fish into the house, smelling the house out. You would get killed."* Focus group 1.

8.3.3 The influence of portion size on seafood purchasing behaviour

The portion and packaging size varied depending on the participant's individual needs. It was the opinion of many participants that fish was lighter than meat and you would need to eat more fish in order to feel full and therefore larger portions were required. While many male participants stressed this was an issue, this was particularly true for any male participant who was involved in sports. By contrast, a number of females saw the lightness of fish as being a benefit rather than a negative. A male in County Limerick in middle adulthood and a male in County Mayo in later adulthood saw this as a negative whereas a female in early adulthood in County Donegal saw the fact that fish is lighter than meat as a positive:

> *"I know a man who had a heart bypass, and he used to eat a lot of fish, and he didn't take this too well because he was going mad because he was always hungry after his dinner the day he had fish."* Focus group 1.

> *"Well, the thing about fish it isn't as filling as meat."* Focus group 2

> *"Fish it just is lighter [than meat] when you're out for a meal I think."* Focus group 3.

Female participants, who generally did the shopping for a family, were more inclined to buy a 'family packet' however, they stated they would also be happy to purchase multiple packets that would serve two or three people. This can be seen in the suggestion below by a female in middle adulthood in county Donegal and a male in

later adulthood in County Dublin. Many participants who purchases fish for just themselves or a family stated that they would not be likely to buy a packet with a single portion. One single female in early adulthood in County Mayo did not like to buy one portion and preferred to purchase two portions and then if necessary freeze the other:

> *"Yeah, I think two [portions] is a quite good one, and you might buy three packets, you know."* Focus group 3.

> *"If it's six [portions] and you open it, and then, your sort of stuck cooking it then as well at the same time when they're all [the family] in at different times. Two portions are good."* Focus group 4.

> *"I normally cook for myself, and I don't like buying meals for one person, it`s better value to buy two portions anyway."* Focus group 2.

There were a number of males in later adolescence and early adulthood in all focus groups who were purchasing just for themselves, some but not all involved in sports, who suggested that they would often eat the two portions in one sitting as the found fish to be less filling than meat:

> *"[I would buy a] family size, for one person."* Focus group 5.

8.3.4 The influence of price on seafood purchasing behaviour

With regard to quality, sensory and nutritional perspective, purchasers of fresh seafood were willing to pay a higher price for a product they considered superior. Purchasers of convenience products, i.e. tinned salmon reportedly made trade-offs between the price, the quality and sensory. While the majority of participants suggested that for buying a seafood product with which they were not familiar, the price promotion would not be the deciding factor, it would encourage them to purchase such a product for the first time particularly in younger participants under 24 years who were students on an income of less than €100 a week. If it transpired that they liked the new product, it was also suggested that they would agree to pay a higher price for the same product when repeat purchasing as described below by a female in early adulthood in county Donegal and one male in middle adulthood on County Limerick:

"What you ideally want is a fresh product at a reasonable price. But that's not always possible, that why the frozen fish is much cheaper. If it tastes good, is healthy and fresh, of course you will be happy to pay a higher price than you would for frozen or tinned fish." Focus group 3.

"I defiantly would be one for trying new things if they are on offer. If I don't like them then I don't buy them again but if I do like them I'm usually happy to pay the full price after that as long as it's not a huge price hike." Focus group 1.

Another factor, which would encourage participants to purchase a seafood product with which they were not familiar was the sensory aspect. Many participants suggested if supermarket tasters along with a promotion, such as 'buy one get one free', were available, they would be more likely to purchase such a product over just a promotion alone. An early adulthood male in County Carlow; a middle adulthood female in County Mayo; and a middle adulthood male in County Donegal suggested the following in relation to factors that would encourage them to buy a seafood product with which they were unfamiliar:

"[I look for] as nutritious as possible obviously but I would be looking out for a good deal as well price-wise." Focus group 5.

"Probably a discounted price [world encourage you to purchase] if you're unsure, to begin with." Focus group 2.

"You know they sometimes do the tasters in the supermarket, so if you get a taste of it first before you buy it." Focus group 3.

8.3.5 The influence of cooking method on seafood purchasing behaviour

There were a variety of cooking methods that participants were open to using for seafood products. The most acceptable method was baked in the oven, however, grilling and pan-frying were also popular. The reason stated for oven cooking being most popular was because it was convenient and participants believed that it required the least amount of skill and monitoring. Pan-frying and grilling were popular amongst participants who believed their culinary skills to be above average. Participants

believed that oven cooking and grilling gave seafood products a similar flavour however pan-frying gave a superior flavour. One of the negative aspects of pan-frying was the lingering smell. This superior flavour was not enough to outweigh the convenience of oven baking and the lingering smell associated with pan-frying for many people. A female in early adulthood in County Mayo and a female in middle adulthood in County Dublin suggested the following would be their preference with regard to the cooking method:

> *"If you can just put it in the oven, and when you take it out it`s ready to eat [that's the best cooking method]."* Focus group 2.

> *"[When cooking a seafood product it's important] that it would maintain its form that every time you cook it [seafood product] if you're not watching it that it doesn't fall apart."* Focus group 4.

Steamed was an acceptable method to some participant. However, other participants believed that steaming seafood would only lead to a lack of flavour and that the method would only be appropriate for specific types of seafood, i.e. fresh fillets and less appropriate for breaded products as noted by a female in middle adulthood in County Limerick:

> *"Just steamed fish is kind of bland and tasteless really. You can mix up herbs and stuff in the tinfoil when you're using the oven, and just pan fried just leaves that nice crispy taste as well so."* Focus group 1.

Everyone was very much opposed to two methods of cooking, deep-frying and microwaving. The reasons for participant's opposition was different for both methods. Deep-frying firstly was perceived to be the unhealthiest method available, and many participants did not see the point in trying to be healthy by eating fish in the first instance and then using an unhealthy method of cookery. This was a sentiment expressed especially by female participant of all age ranges. One female in middle adulthood in County Mayo stated that health was the most important thing when it came to eating and the cooking method played a role in that while another in County Limerick suggested that deep-frying was avoided as much as possible:

"When you are talking about eating fish you are talking about being healthy again. So there's no point in eating fish if it's not going to be cooked in a healthy manner." Focus group 2.

"We try to avoid deep frying." Focus group 1.

Microwave cooking was embedded in the minds of all participants as either being used to cook highly processed foods or to reheat already cooked foods and not for cooking food from scratch as suggested below by a male participant in later adolescence in County Limerick. Another male in County Limerick in later adulthood noted that microwave cookery was actually too easy and that it did not appeal to him for that reason alone:

"The microwave one really kind of puts me off… My minds made up really. I wouldn't even look at it." Focus group 1.

"The Irish culture of food is meant to cook everything with effort. There's isn't enough of a hardship in the microwave." Focus group 1.

Similarly, to the attribute of form, cooking method was removed as a potential attribute and it was decided that oven cooking would be assumed as part of the conjoint analysis as it was favourable to most participants.

8.3.6 The influence of available information on seafood purchasing behaviour

All participants agreed that they would require some form of information on the product that they were purchasing, especially if it was a product or type of fish that they were unfamiliar with. Health benefits and nutritional content or makeup of the product was high on the list of priorities for the vast majority of participants particularly females aged 35-54 years who had dependant children and young males under 35 years. A number of participants who were parents, suggested that they would be conscious, when purchasing any product, of the nutritional content in that product and would try to choose foods which they believed would provide a healthy diet for their families. Participants in focus group 1 in County Limerick, which included five males of a range of ages, involved in sports, and focus group 5 in County Carlow had the highest interest in nutrition and the nutritional information available of all the focus

groups. Most of these participants stated that if the nutritional makeup of the product was what they required for a purpose, e.g. after training for recovery or was encouraged on their sports diet plan, then they would definitely purchase and consume it. The same participants from focus group 5 were very interested in knowing what benefits one seafood product could provide over another or what benefits one protein source could provide over another protein source:

> *"[I would want to know] what would be its [the seafood product] health benefits to you?"* Focus group 1.

> *"If you knew it [the seafood product] was good for you. If you knew it [the seafood product] was going to be good for you and your family [you would be more inclined to purchase the product]."* Focus group 5.

> *"You [want to] know, fats, acids, salts, and all that kind of stuff. How much [is in the seafood product]?"* Focus group 5.

Whether a product was from a sustainable Irish source was another important piece of information for participants, and was mention in focus group 2, 4 and 5. In each focus group once the importance of the product being sustainable and Irish was mentioned by someone, then all other participants agreed and a discussion about this began. Participants ages 45 years and higher were most inclined to show a keen interest in the sustainability of a seafood product. For some participants anywhere in Ireland was an acceptable piece of information and for others, they would be more likely to purchase a product if it had come from their local area. The latter was noted in particular in the focus groups conducted in rural locations, close to the sea or well-known fishing rivers. An example of this is provided below, and this was mentioned specifically by a male in later adulthood in County Mayo. Two middle adulthood females in counties Dublin and Carlow noted how they had been encouraged and reassured in buying other products once they were made aware of the fact that they were Irish and from sustainable sources:

> *"If it was a Mayo company making it [the seafood product], I think it would be one of the things you would look at because you're supporting local businesses but also it's more sustainable to buy local fish."* Focus group 2.

"I would prefer if it [the seafood product] was Irish." Focus group 4.

"[Knowing] where it's [the seafood product] come from and that the new fish is not being overfished or that will deteriorate the stocks. That would be something I would want to know." Focus group 5.

Information on how to cook the product was key to all participants. All participants, excluding one, who was a chef by profession, said that if they were buying a product that they had never purchased before and were unfamiliar with it, would then want cooking instructions. Following on from this some participants stated that they would like to know what to serve the product with or have the accompaniment sold with the product, sentiments echoed by a male and female in middle adulthood in County Donegal and a later adolescent in County Mayo:

"Knowing what to do with it [the seafood product] as well. How would you cook it [the seafood product]? How long would you cook it [the seafood product]? So if it [the seafood product] came with the instructions." Focus group 3.

"Basically with a new product you want to know how to cook it and what goes with it." Focus group 2.

"How can you prepare it [the seafood product]? What goes best with it [the seafood product]? Yeah and accompaniments" Focus group 3.

8.3.7 The influence of packaging on seafood purchasing behaviour

Convenience was a significant attribute in relation to packaging for young single students under the age of 35 years or those who are cooking for one. Those participants found the most convenient packaging to be 'bake in the bag' and 'one cook oven trays'. The 'bake in the bag' was perceived as being packaging that was easy to use. The 'one cook oven tray' was particularly appealing to young single people under the age of 24 years as they felt you could just remove the lid, put it in the oven and return once it was cooked. The other positive of both the 'bake in the bag' and 'one use oven tray' that was noted was washing dishes and cleaning after cooking. Two males in

later adolescence in County Limerick and a female in early adulthood in County Donegal suggested that convenience was important to them:

> *"I have done them [bake in the bag]… They [bake in the bag] are handy if you are cooking for one… You throw them [bake in the bag] in the oven…you have nothing to do with them. There is no preparation. Open the bag."* Focus group 1.

> *"Well, I use them [one cook oven trays] all the time for everything... You buy the dinner whatever chicken they are all made up. So I would have no issue using them for fish."* Focus group 1.

> *"Yeah, well I would be cooking for myself so if I can just open something up and put it in the oven, and then come back it`s handy."* Focus group 3.

On the other hand, particularly females in the 45 years and above category with dependent children did not like the use of 'bake in the bag' or 'one use oven tray'. This group of participants perceived the use of such convenience packaging to be too easy. The females in focus group 2 and 3 was particularly opposed to using 'bake in the bag' or 'one use oven tray' and also expressed concerns about the use of cooking with plastic and how that could affect your health in the long term:

> *"Using plastic, it's a little bit lazy, and there is nothing wrong with having to wash up a dish."* Focus group 2.

> *"To cook in those trays then, I don't really like them either."* Focus group 3.

The focus groups highlighted that consumers of seafood had preferences for certain types of packaging over another and the information that is displayed on packaging is also of importance to participants. Some participants placed an importance on the environmental implications of packaging as is demonstrated by a male in later adolescence in County Limerick and a female in middle adulthood in County Mayo:

> *"Well you'd have concerns about… plastic and using too much of it, it's not good for the environment."* Focus Group 4.

> *"And I don't like anything with a lot of wasteful package in all that."* Focus Group 4.

Other participants expressed that the packaging maybe the one thing that distinguishes each of the products from one another or makes one product stand out from the crowd during the purchasing process. The quote below by a male in County Limerick summarises this sentiment:

> *"Attractive packaging of course is very important. It would catch your eye alone. When you look into a fridge in the shop, there might be fifty different things there, so you don't know how much that [packaging] can influence you."* Focus group 1.

8.3.8 The influence of accompaniments on seafood purchasing behaviour

Numerous participants suggested that they would like to know what to serve the product with or have the accompaniment sold with the product. As this discussion developed in each focus group, there was a consensus that a sauce of some kind, served with the seafood product but not on top of the product would be the most preferred. One male participant in County Carlow in middle adulthood said that his preference would be to see the product served with a vegetable and carbohydrates along with the sauce. However, this was a single respondent's opinion, as the others believed this to be a 'ready meal'. The most popular accompaniment that participants would like to see was tartar sauce. One male in later adolescence in County Limerick noted that this was a familiar sauce that they regularly ate with other seafood products. Lemon, butter or a flavoured butter were also a popular choice for participants, and it was suggested that such accompaniments would not disguise the flavour of the actual fish itself if served together. Other suggestions included tarragon, chilli sauce, garlic, tomato sauce, Cajun, dill, and thyme as participants had eaten those ingredients with fish previously:

> *"[I would like] a packet of tartar sauce because I know it goes well with fish."* Focus group 5.

> *"Lemon and tartar are good."* Focus group 1.

"A small bit of real butter with it [seafood]." Focus group 4.

While there were numerous calls for an accompaniment to be sold with the product, there were also participants who would be more inclined to buy a product without accompaniments or noted that if a product were sold with accompaniments, then they would most likely just not use it. A middle adulthood male and early adulthood female in County Mayo and a later adulthood male from County Limerick believed that if the product was served with a sauce than it could detract from the actual seafood and they would prefer to taste the flavour of the seafood so they could determine if they liked the product:

"I just like my fish plain so I can taste it." Focus group 2.

"I'd like that [lemon butter] with it but separate." Focus group 2.

"If it's [the sauce] on the side it`s fine but if it [the sauce] was over the top of it [the seafood], then no [I wouldn't buy it]." Focus group 1.

8.3.9 The influence of brand on seafood purchasing behaviour

The majority of focus group participants described very low levels of brand loyalty for seafood products. By contrast, one female in later adolescence based in County Mayo suggested that she only buys one brand of seafood because she believed it to taste the best. Numerous other participants had brand preferences, however, would not consider themselves brand loyal. If a competitor came out with a similar product for a lower price, they would be happy to purchase that product. A female in middle adulthood in County Mayo and a male in early adulthood in County Carlow suggested that brands are no longer as important to themselves and other people they knew, as supermarkets are stocking an increased amount of own brand products:

"[In relation to brands] people are beginning to cop on as well that there isn't a factory somewhere making peas and beans for Lidl, or tea bags in a Dunnes Stores box and it's the same for seafood products." Focus group 2.

"You can get lunch for work…It's [a seafood product] €1.50 or something in Aldi. I said yeah sure why not because usually, the branded product could be €3.00 or more for the exact same as the Aldi own brand." Focus group 4.

However, in relation to a new product that they were unfamiliar with almost all participant stated that they would be more likely to buy a brand they were familiar with than one they were unfamiliar with. Across all focus groups, there were numerous suggested occasions that participants would be happy to buy a brand they were unfamiliar with such as on a recommendation from family, friend and celebrity chef or if a product was on promotion:

> *"Say if you were trying it [a new product] for the first time you probably would maybe try the one [brand] you know."* Focus group 1.

> *"The only way you'd buy it [a new product] is if… someone you know had bought that new product, and recommended it [a new product] to you… and then you'd buy it [a new product] … but if you're going in not knowing you're always going to go with the brand name, the stronger name. It is like a buying a car or buying a tractor. You are not going to buy a brand new tractor that has no reputation. You're going to stick with your John Deere or you Toyota or whatever."* Focus group 5.

Concerning a new food product, the few participants who were more adventurous with food, such as a female in early adulthood in County Donegal, also suggested that brand was of no importance, they would want to try it regardless:

> *"You would give it a chance especially if it was a new food."* Focus group 3.

8.4 Summary

In this chapter, the results of the five focus groups are presented. The qualitative data identifies the most important attributes that influence purchasing preferences for seafood products in general and for products including unfamiliar ingredients. An insight into the general motives, which drive consumption of seafood are highlighted. This chapter establishes the main attributes that would affect purchasing decision in relation to a seafood product, which includes a type of fish that the consumer is unfamiliar with. This information was the basis for the conjoint based study. Chapter 9 presents the results of the quantitative study investigating consumer's preferences for seafood products based on the results of the focus group.

Chapter 9: Results: Conjoint Based Study

9.1 Introduction

This chapter presents the results and analysis of a quantitative study investigating customer`s preferences for seafood products. The aim of this element of the study is to demonstrate the use of consumer insights and input during the idea generation stage of the NPD process is beneficial to an organisation. This includes food products, which contain an ingredient that the consumer is unfamiliar with. The conjoint analysis can generate specific concepts for specific target markets while also predicting trade-offs consumers are willing to make in relation to new seafood concepts.

The results in this chapter are divided into four main sections the first of which is the participant profile. This section details the participant's socio-demographic profile. The individual level conjoint analysis shows the average attribute importance of the individual level based on survey responses. This will identify the importance placed on each attribute and the importance placed on the levels within that attribute by consumers when purchasing a seafood product with which they are unfamiliar.

The third section is the individual level k-means cluster analysis. The K-means cluster analysis determined the number of clusters of consumers of comparable preferences for seafood products. This allows the participant to be placed into groups or clusters by identifying relationships that exist between cluster membership and numerous variables, which for further segmentation assists in distinguishing between clusters, specifically the demographic profile for each cluster. Finally, the group level simulation analysis predict consumer's preference for seafood concepts, which were not evaluated within the survey.

9.2 Participants profile

300 consumers of seafood completed the conjoint based survey. The participant's profile is outlined in Table 9.2.1. An analysis of the socio-demographic variables of the survey sample revealed that 38% were male and 62% were female. The age of respondents ranged from 18 years to over 75 years. However, the majority of respondents (70%) were under the age of 45 years.

Table 9.2.1 Conjoint survey participants demographic information

Socio-demographic Variables	(N)	(%)	Socio-demographic Variables	(N)	(%)
Gender			**Area of Residence**		
Male	113	37.7	City (centre)	37	12.3
Female	187	62.3	City (suburban)	60	20.0
			Rural	203	67.7
Age Group *(years)*			**Income (weekly)**		
18-24	75	25.0	≤€99	8	2.7
25-29	39	13.0	€100-199	37	12.3
30-34	21	7.0	€200-299	18	6.0
35-39	35	11.7	€300-399	30	10.0
40-44	41	13.7	€400-499	29	9.7
45-49	23	7.7	€500-599	32	10.7
50-54	26	8.7	€600-699	20	6.7
55-59	16	5.3	€700-799	18	6.0
60-64	14	4.7	€800-899	16	5.3
65-69	5	1.7	€900-999	15	5.0
70-74	2	0.7	≥€1000	30	10.0
75+	3	1.0	Decline to answer	47	15.7
Education			**Marital**		
No formal education	4	1.3	Single	125	41.7
Primary level	6	2.0	Married	115	38.3
Intermediate/Junior Cert	18	6.0	Separated/Divorced	24	8.0
Leaving Cert	38	12.7	Cohabiting	25	8.3
Pursuing further education	90	30.0	Widowed	11	3.7
Completed further education	144	48.0			
Occupational status			**Income per house**		
Employed (fulltime)	146	48.7	Single income	131	43.7
Employed (part-time)	62	20.7	Dual income	130	43.3
Self-employed	16	5.3	Multiple incomes	39	13.0
Unemployed	8	2.7	**No. of children ≥17**		
Disability allowance	4	1.3	None	223	74.3
Training scheme	5	1.7	1 Child	25	8.3
Unpaid at home	7	2.3	2 Children	22	7.3
Student	12	4.0	≤ 2 Children	30	10.0
Retired	36	12.0			
Other	4	1.3			
Surveys Administered			**No. of children ≤17**		
Mayo	60	20	None	193	64.3
Donegal	60	20	1 Child	30	10.0
Limerick	60	20	2 Children	44	14.7
Dublin	60	20	≤ 2 Children	33	11.0
Carlow	60	20			
Total	**300**	**100**			

Source: Author

78% of respondents were pursuing or had completed further education. Unmarried respondents had the highest response rate (50%), followed by married at (38%). The

remainder of respondents were separated/divorced or widowed. The majority of respondents were in some form of employment (75%) with 49% of participants being in fulltime employment. Most participants were at the pre-family lifestyle stage, that is, having no children. Almost half of the participants (44%) lived in a single income household with the remaining participants having two or more incomes in the household. Again almost half of the participants (44%) had an income of over €500 weekly and of the remaining participants 16% declined to divulge their income. Rural residents accounted for 68% of the overall responses, with surveys being represented equally by Mayo; Donegal; Limerick; Dublin; and Carlow.

9.3 Individual level conjoint analysis

The conjoint analysis results indicate that consumers of seafood products were most influenced by the accompaniments that come with a product. Accompaniments recorded an average attribute importance value of 23.6 (out of 100), followed by format, either 'fresh' or 'frozen' (18.66 out of 100) and type of packaging (18.56 out of 100) respectively. Consumers also considered the price (14.89 out of 100) and additional information about the product (14.13 out of 100) important attributes. This study indicated that brand is the least important attribute to consumers (10.16 out of 100) (See Figure 9.3.1).

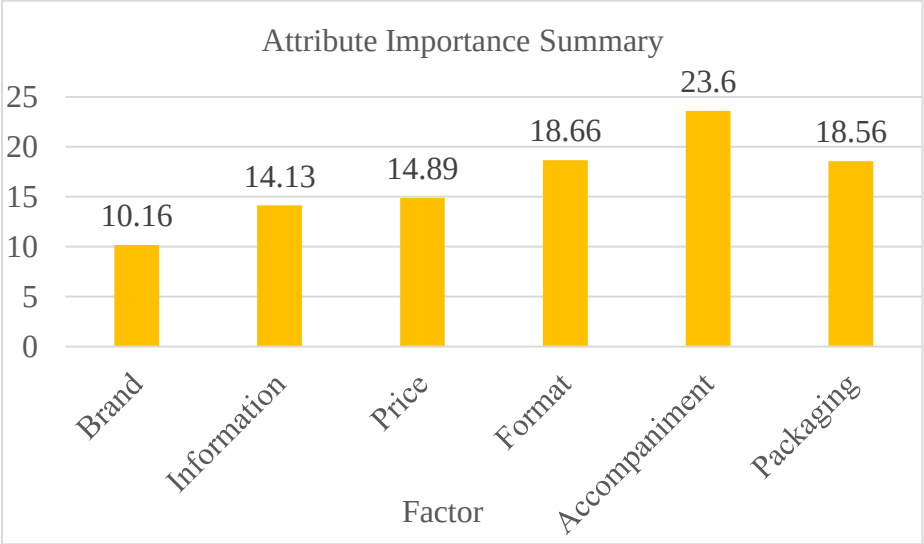


Figure 9.3.1 Average attribute importance of the individual level

Source: Author

The Pearson`s R and Kendall`s tau values are used in the assessment of the validity of the conjoint analysis model, both individual and collective levels, to establish the strength of the relationship between the product rating score and the utilities stemming from the conjoint model. Coefficients may only take on values from –1 to +1 with 0 indicating no relationship at all. The Pearson`s R and Kendall`s tau values would suggest a strong relationship. Pearson`s R (0.996) and Kendall`s tau (0.944) values were high and suggested a strong agreement between the average product rating and the predicted utilities from the conjoint analysis model. An analysis of the summary utilities show the consumers preferences for alternatives within attributes (Table 9.3.1).

Table 9.3.1 Summary of the attribute individual level utilities

Average importance	Attribute	Attribute Level	Utility[3]
10.16	Brand	Familiar Unfamiliar	**0.093** *-0.093*
14.13	Information	Health benefits Serving suggestions Of Irish origin	0.015 *-0.115* **0.099**
14.89	Price	€1.40 €1.65 €2.00	**0.140** 0.020 *-0.160*
18.66	Format	Fresh Frozen	**0.476** *-0.476*
23.60	Accompaniment	Tartar sauce Lemon butter None	*-0.271* 0.114 **0.156**
18.56	Packaging	One cook oven tray Bake in bag Removable	0.094 *-0.205* **0.110**

Constant = 5.787

Pearson's R = 0.996 Significance = 0.000

Kendall's tau = 0.944 Significance = 0.000

Kendall's tau = 0.667 for four holdouts Significance = 0.087

Source: Author

[3] In table 9.3.1 the highest utility values are in **bold** and the lowest utility value are in *italics*

9.3.1 The averaged utilities of the individual level conjoint analysis

Overall, in relation to accompaniments, 'none' and 'lemon butter' produced a positive utility value of 0.156 and 0.114 respectively. The 'tartar sauce' yielded a negative value of -0.271. It is evident that for this product more value was placed on a product with no accompaniment 'none' over a product that had an accompaniment. Consumers considered the format of the product important when purchasing a seafood product. The utility values for format suggested that more value was placed on products which were 'fresh' (0.476) rather than 'frozen' (-0.47). Packaging was of nearly equal importance to the format of the product, with 'bake in the bag' negatively perceived by consumers (-0.205), while 'removal of the product from the packaging and then bake' (removable) had the most positive utility value (0.110). Price was the fourth most important attribute to consumers when purchasing a seafood product. Overall, the lowest price (€1.40 per portion) and the medium priced (€1.65 per portion) seafood products indicated a positive utility value of 0.140 and 0.020 respectively. The highest price (€2.00 per portion) level elicited a negative utility value of -0.160.

The information supplied about the product was almost as important (14.13) to consumers as price. The 'health benefits' (0.015) and information relating to whether the product was Irish (0.099) both had positive utility values, whereas the 'serving suggestions' yielded negative utility values (-0.115). This suggests that consumers place more value on the product being 'of Irish origin' over 'health benefits' and 'serving suggestions'. The least important attribute to consumers was brand. However, consumers were inclined to favour a brand they were 'familiar' (0.093) with over one they were 'unfamiliar' with. Generally, the SPSS individual level conjoint analysis suggest that accompaniments, packaging, format and price are the most important attributes which influence consumer's preferences for new seafood products.

9.4 Individual level K-means cluster analysis

K-means cluster analysis determined that there were three clusters of consumers of comparable preferences for seafood products (see Table 9.4.1). Significant relationships exist between cluster membership and numerous variables, which for further segmentation assists in distinguishing between clusters, specifically the demographic profile for each cluster, which can be seen in Table 9.4.2; Table 9.4.3

and Table 9.4.4. All three clusters were more likely to purchase brands that they were 'familiar' with as opposed to trying an 'unfamiliar' brand. Two of the three clusters that is Cluster 2 and Cluster 3 placed high importance on knowing that the product was 'of Irish origin' over knowing the 'health benefits' or 'serving suggestions'. Whereas Cluster 1 placed more value on having 'serving suggestion' available. Again two (Cluster 2 and Cluster 3) of the three clusters preferred low priced (€1.40 per portion) seafood products, with Cluster 1 opting for medium priced (€1.65 per portion) products.

Table 9.4.1 Averages attribute utility level by cluster

Attribute	Attribute Level	Cluster 1 (Utility[4])	Cluster 2 (Utility)	Cluster 3 (Utility)
Brand	Familiar	**0.035**	**0.074**	**0.127**
	Unfamiliar	*-0.035*	*-0.074*	*-0.127*
Information	Health benefits	*-0.054*	0.051	0.007
	Serving suggestions	**.0059**	*-0.131*	*-0.156*
	Of Irish origin	-0.005	**0.080**	**0.150**
Price	€1.40	0.025	**0.169**	**0.151**
	€1.65	**0.071**	0.043	-0.016
	€2.00	*-0.096*	*-0.212*	*-0.136*
Format	Fresh	**0.447**	**0.456**	**0.503**
	Frozen	*-0.447*	*-0.456*	*-0.503*
Accompaniment	Tartar sauce	*-0.244*	*-0.332*	*-0.225*
	Lemon butter	-0.043	0.041	**0.230**
	None	**0.287**	**0.291**	-0.004
Packaging	One cook oven tray	0.063	0.081	**0.116**
	Bake in bag	*-0.244*	*-0.310*	*-0.099*
	Removable	**0.181**	**0.229**	-0.017
Cluster size		44	120	136

Source: Author

Cluster 2 was the most price sensitive across the three based on utility values assigned to the respective price attribute levels. Across all three clusters, 'fresh' products over 'frozen' were preferred for seafood products and this was the highest utility value given by all three clusters. This would indicate that all purchasers of seafood are conscious of ensuring the products they buy are fresh. Cluster 1 and Cluster 2 both preferred the seafood product to be sold without any accompaniment and Cluster 3

[4] In Table 9.4.1 the highest utility values are in **bold** and the lowest utility value are in *italics*

preferred ‘lemon butter’. Interestingly all three clusters had a negative perception of ‘tartar sauce’, even though it has a strong association with fish. For the preferred type of packaging Cluster 1 and Cluster 2, both indicated that they would like a product that they could completely remove from the package and cook. While all three clusters had a positive perception of ‘one cook oven trays’, Cluster 3 indicated it to be their preferred type of packaging. All three clusters had a negative perception of the ‘bake in the bag’ packaging.

9.4.1 Attribute preferences and typology for Cluster 1 (Middle or later adulthood/ post family life stage/ married/ single income)

Cluster 1 is the smallest cluster with 44 purchasers of seafood products. Membership in Cluster 1 is skewed towards female (70.5%) consumers of seafood products, compared to males at (29.5%) (see Table 9.4.2). The age profile of this cluster ranges from 40 to 75+ years of age. However, membership of this cluster mainly consisted of consumers between the age of 50 and 69 years with a combined 79.7% of the cluster. This is the highest proportion of seafood purchasers for this age category across all clusters. This cluster with a preference for fresh and medium priced products had the lowest level of education. Cluster 1 contained the only respondents with no formal education (9.1%), it contained the highest percentage of the respondent with primary level only (11.4%) and Intermediate/Junior certificate only (31.8%) across all three clusters.

Cluster 1 also contained the lowest levels of respondents pursuing further education (9.1%) and completed further education (22.7%) across all three clusters. The majority of members were married (54.5%) with only 2.3% of the membership being single. This cluster also contained the only retired respondents (27.3%) across all three clusters. This cluster also contained the highest percentage of Disability allowance (4.5%), Employment/ training scheme (2.3%) and Unpaid work at home (6.8) of all three cluster. It was also the only cluster to have no unemployment. The majority of the respondents were in a single income (59.1%) household with no children under 17 years (84.1%). A significant number of respondents has one or more children over 17 years (86.4%), and 77.3% of respondents resided in rural areas.

Table 9.4.2 Socio-demographic participant information of Cluster 1 (Middle or later adulthood/ post family life stage/ married/ single income)

Socio-demographic Variables	Sample (%)	Socio-demographic Variables	Sample (%)
Gender		**Area of Residence**	
Male	29.5%	City (centre)	13.6%
Female	70.5%	City (suburban)	9.1%
		Rural	77.3%
Age Group *(years)*		**Income (weekly)**	
18-24	-	≤€99	2.3%
25-29	-	€100-199	6.8%
30-34	-	€200-299	6.8%
35-39	-	€300-399	15.9%
40-44	2.3%	€400-499	11.4%
45-49	6.8%	€500-599	18.2%
50-54	20.5%	€600-699	9.1%
55-59	20.5%	€700-799	2.3%
60-64	27.3%	€800-899	9.1%
65-69	11.4%	€900-999	-
70-74	4.5%	≥€1000	2.3%
75+	6.8%	Decline to answer	15.9%
Education		**No. of children ≥17**	
No formal education	9.1%	None	84.1%
Primary level	11.4%	1 Child	9.1%
Intermediate/Junior Cert	31.8%	2 Children	4.5%
Leaving Cert	15.9%	≤ 2 Children	2.3%
Pursuing further education	9.1%		
Completed further education	22.7%		
Occupational status		**No. of children ≤17**	
Employed (fulltime)	31.8%	None	13.6%
Employed (part-time)	18.2%	1 Child	9.1%
Self-employed	2.3%	2 Children	25.0%
Unemployed	-	≤ 2 Children	52.3%
Disability allowance	4.5%		
Training scheme	2.3%	**Income per house**	
Unpaid at home	6.7%	Single income	59.1%
Student	27.3%	Dual income	38.6%
Retired	2.3%	Multiple incomes	2.3%
Other	4.5%		
Marital			
Single	2.3%		
Married	54.5%		
Separated/Divorced	22.7%		
Cohabiting	-		
Widowed	20.5%		

Source: Author

This cluster gave its highest utility value for the fresh or frozen format, this indicated that this cluster is driven by fresh produce in terms of purchasing preference. However, as it had the lowest utility value of the three clusters it places less importance on this attribute than the other two clusters. This cluster had the highest preference for a seafood product that had no accompaniment served with it and had a negative perception of any type of accompaniment being served with a seafood product. Cluster 1 preferred a seafood product that they could completely remove from the package and cooked, despite this Cluster 1 also had a positive perception of the use of a 'one cook oven tray'. As with the other two clusters, there was a negative perception of 'bake in the bag' products with that negative perception being less than that of Cluster 2 but greater than that of Cluster 3. The price attribute was not as important to this cluster as it was to the other two clusters. Purchasers of seafood products in Cluster 1 gave a positive utility value for both the low (€1.40 per portion) price and the medium (€1.65 per portion) price, with the medium price being the preferred.

While this cluster had a negative perception of the higher price (€2.00), it must be noted the negative perception of the high price by Cluster 1 was not as strong as the other two clusters. A negative utility value was given to both 'health benefits' and 'of Irish origin' in relation to information. 'Serving suggestions' had a positive utility value. However, Cluster 1 placed less importance on this attribute than the other two clusters. The brand was the least important attribute to Cluster 1. This cluster gave the lowest utility value for the brand across all clusters, and in a similar fashion, Cluster 1 was also less negative towards 'unfamiliar' brands than the other two clusters.

9.4.2 Attribute preferences and typology for Cluster 2 (Middle adulthood/ family life stage/ married/ dual income)

Cluster 2 contained 120 purchasers of seafood products. Membership in Cluster 2 was skewed towards female (65.8%) consumers of seafood products, compared to males at (34.2%) (see Table 9.4.3). The age profile of this cluster ranged from 18 to 64 years of age. However, membership of this cluster mainly consisted of consumers between the age of 35 and 50 years with a combined 65% of the cluster. This is the highest proportion of seafood consumers for this age category across all clusters. This cluster had a preference for fresh and low priced products and had the highest level of education. Cluster 2 contained a low percentage of respondent with primary level

(0.8%) and Intermediate/Junior cert (1.7%). Cluster 2 also contained the highest levels of completed further education (60.0%) across all three clusters. The majority of members were married (66.7%).

This cluster also contained the highest levels of employment (full time, part time and self-employed) (88.3%) across all three clusters, with the highest percentage of full-time employment (62.5%) and self-employed (10%). The majority of the respondents were in a dual income (65.8%) household with no children over 17 years (71.7%). A significant number of respondents has one or more children under 17 years (78.4%). The highest proportion of respondents (81.7%) resided in rural areas.

Like all of the other clusters, this cluster gave its highest utility value for the fresh over frozen format, as previously discussed this indicated that this cluster is driven by fresh produce in terms of purchasing preference. However, it had a lower utility value than Cluster 3, it places less importance on this attribute than Clusters 3 but more importance than Cluster 1. Similarly, to Cluster 1 this cluster most preferred a seafood product that had no accompaniment served with it however, had a positive perception of 'lemon butter'. Cluster 2 had the most negative perception of 'tartar sauce' of all clusters. Cluster 2 preferred a seafood product that they could completely remove from the packaging and cooked, however also had a positive perception of the use of a 'one cook oven tray'. As with the other two cluster, there was a negative perception of 'bake in the bag' products, with that negative perception being strongest in Cluster 2. The price attribute was more important to this cluster than it was to the other two clusters. Purchasers of seafood products in Cluster 1 gave a positive utility value for the low (€1.40 per portion) price and the medium (€1.65 per portion) price, with the low price being the preferred. This cluster had a negative perception of the higher price (€2.00).

In addition, the negative perception of the high price was stronger than the other two clusters. A negative utility value was given for 'serving suggestions' in relation to information. Both 'of Irish origin' and 'health benefits' had a positive utility value, with 'of Irish origin' being the most important of the two. The brand was the least important attribute to Cluster 2. This cluster was less negative towards 'unfamiliar' brands than Cluster 3 but not as receptive towards 'unfamiliar' brands as Cluster 1.

Table 9.4.3 Socio-demographic participant information of Cluster 2 (Middle adulthood/ family life stage/ married/ dual income)

Socio-demographic Variables	Sample (%)	Socio-demographic Variables	Sample (%)
Gender		**Area of Residence**	
Male	34.2%	City (centre)	1.7%
Female	65.8%	City (suburban)	16.7%
		Rural	81.7%
Age Group *(years)*		**Income (weekly)**	
18-24	3.3%	≤€99	-
25-29	4.2%	€100-199	1.7%
30-34	8.3%	€200-299	.8%
35-39	22.5%	€300-399	4.2%
40-44	27.5%	€400-499	3.3%
45-49	15%	€500-599	9.2%
50-54	11.7%	€600-699	10%
55-59	5.8%	€700-799	11.7%
60-64	1.7%	€800-899	7.5%
65-69	-	€900-999	10%
70-74	-	≥€1000	20%
75+	-	Decline to answer	21.7%
Education		**No. of children ≥17**	
No formal education	-	None	71.7%
Primary level	0.8%	1 Child	15%
Intermediate/Junior Cert	1.7%	2 Children	7.5%
Leaving Cert	17.5%	≤ 2 Children	5.8%
Pursuing further education	20.0%		
Completed further education	60.0%		
Occupational status		**No. of children ≤17**	
Employed (fulltime)	62.5%	None	21.7%
Employed (part-time)	15.8%	1 Child	17.5%
Self-employed	10%	2 Children	34.2%
Unemployed	1.7%	≤ 2 Children	26.7%
Disability allowance	1.7%		
Training scheme	1.7%	**Income per house**	
Unpaid at home	3.3%	Single income	24.2%
Student	-	Dual income	65.8%
Retired	2.5%	Multiple incomes	10.0%
Other	0.8%		
Marital			
Single	10%		
Married	66.7%		
Separated/Divorced	10%		
Cohabiting	11.7%		
Widowed	1.7%		

Source: Author

9.4.3 Attribute preferences and typology for Cluster 3 (Later adolescence or early adulthood/ pre family life stage/ single/ single income)

Cluster 3 was the largest of the clusters and contained 136 consumers of seafood products. Both females and males were well represented in Cluster 3 although a slightly higher percentage (56.6%) of the cluster were female compared to males at (43.4%) (see Table 9.4.4). The age profile of this cluster ranged from 18 to 54 years of age. However, membership of this cluster mainly consisted of purchasers between the age of 18 and 34 years with a combined 85.3% of the cluster. This is the highest proportion of seafood consumers for this age category across all clusters. This cluster, with a preference for fresh and low priced products and had a high level of education. Cluster 3 contained a low percentage of respondents with Intermediate/Junior cert (1.5%) and leaving cert (4.4). Cluster 3 also contained the highest levels of pursuing further education (45.6%) across all three clusters and an equal quantity of respondents completed further education (45.6%). The majority of members were single (82.4%).

This cluster also contained the highest number of students (23.5%) and respondents who held part-time employment (25.7%). Over half of the respondents were in a single income (55.9%) household and had the highest percentage of multiple incomes per household (19.1%). The vast majority had no children under 17 years (95.6%) or over 17 years (96.3%). Both city and rural residents were well represented in Cluster 3 although a slightly higher percentage (52.2%) of the cluster were rural compared to the city at (47.8%).

This cluster gave its highest utility value for the format, as previously discussed this indicated that this cluster is driven be fresh produce in terms of purchasing preference. It had the highest utility value of all three clusters, it places the most importance on this attribute. This cluster most preferred a seafood product with an accompaniment of ‘lemon butter’ and has a negative perception of both ‘tartar sauce’ and no accompaniment. The price attribute was more important to this cluster than Cluster 1 but less important than Cluster 2. Consumers of seafood products in Cluster 3 gave a positive utility value for the low price (€1.40 per portion). This cluster had a negative perception of the higher price (€2.00 per portion) and the medium price (€1.65 per portion), with the higher price being the strongest.

Table 9.4.4 Socio-demographic participant information of Cluster 3 (Later adolescence or early adulthood/ pre family life stage/ single/ single income)

Socio-demographic Variables	Sample (%)	Socio-demographic Variables	Sample (%)
Gender		**Area of Residence**	
Male	43.4%	City (centre)	21.3%
Female	56.6%	City (suburban)	26.5%
		Rural	52.2%
Age Group *(years)*		**Income (weekly)**	
18-24	52.2%	≤€99	5.1%
25-29	25%	€100-199	23.5%
30-34	8.1%	€200-299	10.3%
35-39	5.9%	€300-399	13.2%
40-44	5.1%	€400-499	14.7%
45-49	1.5%	€500-599	9.6%
50-54	2.2%	€600-699	2.9%
55-59	-	€700-799	2.2%
60-64	-	€800-899	2.2%
65-69	-	€900-999	2.2%
70-74	-	≥€1000	3.7%
75+	-	Decline to answer	10.3%
Education		**No. of children ≥17**	
No formal education	-	None	96.3%
Primary level	-	1 Child	2.2%
Intermediate/Junior Cert	1.5%	2 Children	1.5%
Leaving Cert	7.4%	≤ 2 Children	-
Pursuing further education	45.6%		
Completed further education	45.6%		
Occupational status		**No. of children ≤17**	
Employed (fulltime)	41.9%	None	95.6%
Employed (part-time)	25.7%	1 Child	3.7%
Self-employed	2.2%	2 Children	.7%
Unemployed	4.4%	≤ 2 Children	-
Disability allowance	-		
Training scheme	1.5%	**Income per house**	
Unpaid at home	-	Single income	55.9%
Student	-	Dual income	25%
Retired	23.5%	Multiple incomes	19.1%
Other	0.7%		
Marital			
Single	82.4%		
Married	8.1%		
Separated/Divorced	1.5%		
Cohabiting	8.1%		
Widowed	-		

Source: Author

A negative utility value was given for ‘serving suggestions’ in relation to information. ‘Of Irish origin’ and ‘health benefits’ had a positive utility value, with ‘of Irish origin’ being the most important of the two. The brand was more important to this cluster than the other two clusters. Information was the least important attribute to Cluster 3. Cluster 3 prefers a seafood product that used the ‘one cook oven tray’. There was a negative perception of ‘bake in the bag’ products and completely remove from the package and cook. The negative perception of ‘bake in the bag’ was not as strong as it was in Cluster 1 and Cluster 2.

9.5 Group level simulation analysis

The group level simulation analysis procedure in SPSS was used to predict consumer’s preference for seafood concepts that was not evaluated within the survey. A strong correlation (Kendall's tau $\tau = 0.667$) was found between the predicted model and the holdout set, which gives strong agreement between the holdout ratings and the model predictions (see Table 9.3.1). Therefore, it was possible to analyse consumer’s preferences for alternative seafood concepts using choice simulators, both maximum and probability (BTL and Logit) modelling, across clusters. The models were used to establish the market share of the clusters associated with each hypothetical product including the simulation analyses. The optimum product design (NuSfC (New Seafood Concept) 1-3) predicted by the conjoint model for each cluster can be seen in Table 9.5.

There were also ten hypothetical new seafood concepts generated for each cluster stemming from the literature, quantitative data analysis, qualitative data analysis and discussions with technical partners (Table 9.5.1; Table 9.5.2; Table 9.5.3). This allowed the researcher to determine the trade-offs consumers were willing to make within each cluster. All ten additional profiles are variations of NuSfC 1-3, respectively.

Table 9.5 Optimum product design by cluster

	NuSfC 1	NuSfC 2	NuSfC 3
Attribute	**Cluster 1**	**Cluster 2**	**Cluster 3**
Brand	Familiar	Familiar	Familiar
Information	Serving suggestions	Of Irish origin	Of Irish origin
Price	€1.65	€1.40	€1.40
Format	Fresh	Fresh	Fresh
Accompaniment	None	None	Lemon butter
Packaging	Removable	Removable	One cook oven tray
Pref. Score	7.0	7.1	7.0

Source: Author

9.5.1 Simulation profile and preference for Cluster 1 (Middle or later adulthood/ post family life stage/ married/ single income)

The simulation profile and preference analysis within each cluster allowed for the identification of new seafood concepts that could be developed for each individual cluster in a market-oriented manner. Table 9.5.1 shows the highest preference in bold and lowest in italic. The conjoint model predicted that the most preferred new seafood concept in Cluster 1 would be NuSfC 1 (mean 7.0 out of 9) (see Table 9.5.1). The seafood product was described as a 'familiar' brand, in a 'fresh' format with no accompaniment and 'serving suggestions'. NuSfC 1 would have all packaging removed for the cooking process and costs €1.65 per portion. While the preferred product, NuSfC 1, is €1.65 per portion, to make the seafood product more commercially feasible there is a high predicted preference even when there is a price increase to €2.00 per portion in NuSfC 8 (mean 6.8 out of 9). The simulation analysis revealed that a move from a product that could be removed from the packaging to a product that would be 'bake in the bag' (NuSfC 13) would yield a lower preference score (mean 6.5 out of 9). This market segment would be considered least brand loyal as there is a high preference score for 'unfamiliar' brands (mean 6.9 out of 9). The conjoint model revealed this market segment of seafood consumers would least like the frozen product NuSfC 9 (mean 6.1 out of 9).

Table 9.5.1 Simulation profile and preference score Cluster 1 (Middle or later adulthood/ post family life stage/ married/ single income)

Attribute	NuSfC 1	NuSfC 4	NuSfC 5	NuSfC 6	NuSfC 7	NuSfC 8	NuSfC 9	NuSfC 10	NuSfC 11	NuSfC 12	NuSfC 13
Brand	Familiar	Unfamiliar	Familiar	Familiar	Familiar	Familiar	Familiar	Familiar	Familiar	Familiar	Familiar
Information	Serving suggestion	Serving suggestion	Health benefits	Of Irish origin	Serving suggestion	Serving suggestion	Serving suggestion	Serving suggestion	Serving suggestion	Serving suggestion	Serving suggestion
Price	€1.65	€1.65	€1.65	€1.65	€1.40	€2.00	€1.65	€1.65	€1.65	€1.65	€1.65
Format	Fresh	Fresh	Fresh	Fresh	Fresh	Fresh	Frozen	Fresh	Fresh	Fresh	Fresh
Accompaniment	None	None	None	None	None	None	None	Tartar sauce	Lemon butter	None	None
Packaging	Remove	Remove	Remove	Remove	Remove	Remove	Remove	Remove	Remove	One cook tray	Bake in bag
Pref. Score	**7.0**	6.9	6.8	6.9	6.9	6.8	*6.1*	6.4	6.6	6.8	6.5
Max Utility	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BTL	9.4%	9.4%	9.3%	9.3%	9.4%	9.2%	8.3%	8.8%	9.1%	9.2%	8.8%
Logit	8.2%	9.2%	7.9%	9.1%	9.2%	9.6%	6.8%	10.1%	12.9%	9%	8.1%

Source: Author

9.5.2 Simulation profile and preference for Cluster 2 (Middle adulthood/ family life stage/ married/ dual income)

The simulation profile and preference analysis within each cluster allowed for the identification of new seafood concepts that could be developed for each individual cluster in a market-oriented manner. Table 9.5.2 shows the highest preference in bold and lowest in italic. The conjoint model predicted that the most preferred new seafood concept in Cluster 2 would be NuSfC 2 (mean 7.1 out of 9) (see Table 9.5.2). The seafood product was described as a 'familiar' brand, in a 'fresh' format with no accompaniment and 'of Irish origin'. NuSfC 2 would have all packaging removed from the cooking process and costs €1.40 per portion. Cluster 2 would be considered to be the most price sensitive market segment with a lower preference score for products with an increase in price NuSfC 17 (mean 7 out of 9) and NuSfC 18 (and mean 6.7 out of 9). The simulation analysis revealed that a move from a product that could be removed from the packaging to a product that would be 'bake in the bag' (NuSfC 23) would yield a lower preference score (mean 6.5 out of 9) however 'one cook oven trays' (NuSfC 22) did not yield a preference score as low (mean 6.9 out of 9). The simulation analysis revealed that a product served with 'tartar sauce' (NuSfC 20) would yield a lower preference score (mean 6.5 out of 9) however served with 'lemon butter' (NuSfC 21) did not yield a preference score as low (mean 6.9 out of 9). Similarly to Cluster 1, the conjoint model revealed this market segment of seafood consumers would least like the frozen product NuSfC 19 (mean 6.2 out of 9).

Table 9.5.2 Simulation profile and preference score Cluster 2 (Middle adulthood/ family life stage/ married/ dual income)

Attribute	NuSfC 2	NuSfC 14	NuSfC 15	NuSfC 16	NuSfC 17	NuSfC 18	NuSfC 19	NuSfC 20	NuSfC 21	NuSfC 22	NuSfC 23
Brand	Familiar	Unfamiliar	Familiar	Familiar	Familiar	Familiar	Familiar	Familiar	Familiar	Familiar	Familiar
Information	Of Irish origin	Of Irish origin	Serving suggestion	Health benefits	Of Irish origin	Of Irish origin	Of Irish origin	Of Irish origin	Of Irish origin	Of Irish origin	Of Irish origin
Price	€1.40	€1.40	€1.40	€1.40	€1.65	€2.00	€1.40	€1.40	€1.40	€1.40	€1.40
Format	Fresh	Fresh	Fresh	Fresh	Fresh	Fresh	Frozen	Fresh	Fresh	Fresh	Fresh
Accompaniment	None	None	None	None	None	None	None	Tartar sauce	Lemon butter	None	None
Packaging	Remove	Remove	Remove	Remove	Remove	Remove	Remove	Remove	Remove	One cook tray	Bake in bag
Pref. Score	**7.1**	6.9	6.9	7	7	6.7	*6.2*	6.5	6.8	6.9	6.5
Max Utility	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BTL	9.5%	9.3%	9.2%	9.5%	9.3%	9%	8.4%	8.7%	9.2%	9.3%	8.8%
Logit	8.8%	9%	8.6%	9.8%	8.9%	7.9%	7.7%	9.4%	12.7%	8.9%	8.2%

Source: Author

9.5.3 Simulation profile and preference for Cluster 3 (Later adolescence or early adulthood/ pre family life stage/ single/ single income)

The simulation profile and preference analysis within each cluster allowed for the identification of new seafood concepts that could be developed for each individual cluster in a market-oriented manner. Table 9.5.3 shows the highest preference in bold and lowest in italic. The conjoint model predicted that the most preferred new seafood concept in Cluster 3 would be NuSfC 3 (mean 7.0 out of 9) (see Table 9.5.3). The seafood product is described as a 'familiar' brand, in a 'fresh' format with and 'lemon butter' accompaniment and 'of Irish origin'. NuSfC 3 would have all packaging removed for the cooking process and costs €1.40 per portion. In relation to packaging the optimum product design suggests that 'one cook oven tray' was most preferred by this market segment. However, there was an acceptability preference score for both 'removable packaging' (NuSfC 32) (mean 6.9 out of 9) and 'bake in the bag' (NuSfC 32) (mean 6.8 out of 9). This market segment is considered to be the least price sensitive a price increase from €1.40 to €1.65 (NuSfC 27), and €2.00 (NuSfC 28) yielded acceptable preferences score (mean 6.9 out of 9 and mean 6.8 out of 9, respectively). Cluster 3 would be expected to give greater preference to a seafood product with associated 'health benefits' (NuSfC 26) (mean 6.9 out of 9) than to a seafood product with 'serving suggestions' (NuSfC 26) (mean 6.7 out of 9). The conjoint model revealed this market segment of seafood consumers would least like the frozen product NuSfC 29 (mean 6.0 out of 9).

Table 9.5.3 Simulation profile and preference score Cluster 3 (Later adolescence or early adulthood/ pre family life stage/ single/ single income)

Attribute	NuSfC 3	NuSfC 24	NuSfC 25	NuSfC 26	NuSfC 27	NuSfC 28	NuSfC 29	NuSfC 30	NuSfC 31	NuSfC 32	NuSfC 33
Brand	Familiar	Unfamiliar	Familiar	Familiar	Familiar	Familiar	Familiar	Familiar	Familiar	Familiar	Familiar
Information	Of Irish origin	Of Irish origin	Serving suggestion	Health benefits	Of Irish origin	Of Irish origin	Of Irish origin	Of Irish origin	Of Irish origin	Of Irish origin	Of Irish origin
Price	€1.40	€1.40	€1.40	€1.40	€1.65	€2.00	€1.40	€1.40	€1.40	€1.40	€1.40
Format	Fresh	Fresh	Fresh	Fresh	Fresh	Fresh	Frozen	Fresh	Fresh	Fresh	Fresh
Accompaniment	Lemon butter	Lemon butter	Lemon butter	Lemon butter	Lemon butter	Lemon butter	Lemon butter	Tartar sauce	None	Lemon butter	Lemon butter
Packaging	One cook tray	One cook tray	One cook tray	One cook tray	One cook tray	One cook tray	One cook tray	One cook tray	One cook tray	Remove	Bake in bag
Pref. Score	**7.0**	6.8	6.7	6.9	6.9	6.8	*6.0*	6.4	6.6	6.9	6.8
Max Utility	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BTL	9.4%	8.8%	9.0%	9.3%	9.4%	9.1%	8.1%	8.8%	9.3%	9.4%	9.3%
Logit	9.0%	8.3%	8.0%	10.2%	9.4%	7.9%	5.8%	8.2%	10.4%	10.9%	11.9%

Source: Author

9.6 Summary

This chapter presents the results and analysis of a quantitative study investigating customers preferences for seafood products. The results of the individual level conjoint analysis, individual level k-means cluster analysis and the group level simulation analysis were presented, and an overall summary of the key findings arising from this survey were presented. The use of the group level simulation analysis predicted consumer's preference for seafood concepts, which were not evaluated within the survey. The model was used to establish the market share of the clusters associated with each hypothetical product including the simulation analyses. This allows the researcher to determine the trade-offs consumers were willing to make within each cluster in relation to variations on the optimum product design. This research demonstrates that a market-oriented approach to food products with an unfamiliar ingredient can identify market segments and clusters. Chapter 10 presents the results of sensory acceptability testing used to establish the acceptability of a new consumer product, using a fish that is not currently available in the Irish market and unfamiliar to consumers (boarfish).

Chapter 10: Results: Sensory Acceptability Testing

10.1 Introduction

Chapter 10 outlines the results of sensory acceptability testing used to establish the acceptability of a product using a fish which consumers are unfamiliar with and unavailable on the Irish market (boarfish). The literature suggests that completing all the steps in the product development process is time consuming and a waste of resources without knowing if the consumer will accept the product. The acceptability of boarfish cannot be determined through conjoint analysis as it cannot be measured due to the fact that consumers are unfamiliar with the fish.

The use of acceptability testing of a prototype product along with the conjoint analysis allows the researcher to determine the optimal sensory and product design attributes influencing customer's choice motives for new seafood concepts. The chapter begins with the general background and details of the participants in this element of the study. Following on from this, there is an insight into the actual product that the potential consumers evaluated. The chapter also shows the level of acceptability for sensory attributes individually, such as appearance, colour, texture and flavour and the overall acceptability of the prototype. There is also the establishment of the consumer's likelihood to both consume and purchase the prototype if it or a similar product were to become available on the Irish market.

10.2 General background information

Sensory acceptability testing was conducted on a prototype product developed using boarfish as the key ingredient, and consumer's acceptability testing was conducted to ensure boarfish is a viable product for production. Acceptability testing was used to establish the acceptability of a new consumer product (boarfish) on the Irish market. Sensory acceptability testing does not require the in-depth analysis that would be provided by scientific sensory testing. As the results of the interviews indicate acceptance testing is the most common type of sensory testing conducted by Irish seafood related SMEs. Therefore, sensory acceptability testing was conducted on 50 potential consumers.

The demographic profile of participants can be seen in Table 10.2.1. The participants` demographic information demonstrates that a variety of potential consumers from different socioeconomic backgrounds participated in the sensory acceptability testing. Participant skewed towards female (28) compared to males at (22). The age profile of 70% of the participants ranged from 18 to 44 years of age, with the remainder of participants being over 45 years. The participants had a high level of education with 58% having completed higher education. The majority of participants were married (46%) or single (40%). These participants maintained a high level of employment (full time, part time and self-employed) (60%) and with a lower number of students (38%). The majority of the respondents earned over €400 a week (82%) and had one or more children (64%).

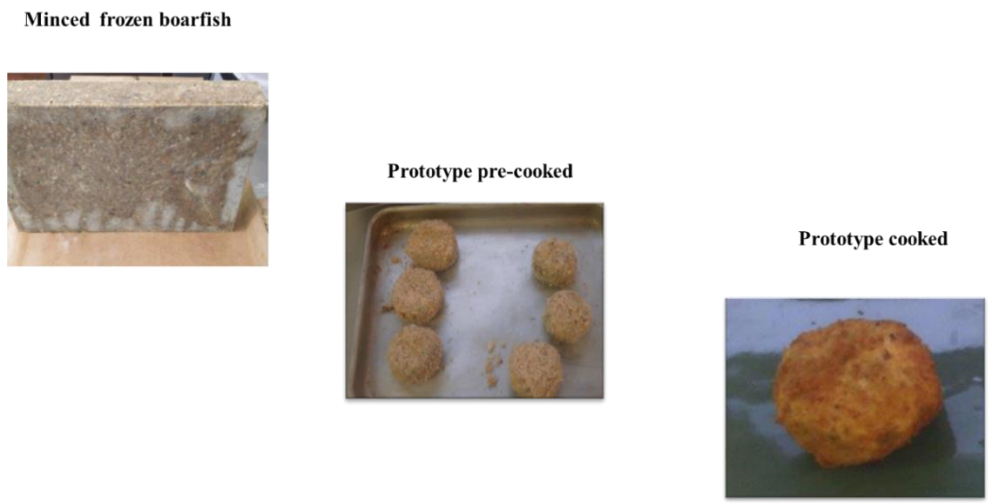
Table 10.2.1 Sensory acceptability test participant's demographic information

Socio-demographic Variables		Socio-demographic Variables	
Participant Numbers	50	**Gender**	
		Male	22
		Female	28
Age Group *(years)*		**Marital status**	
18-24	15	Single	20
25-34	9	Married	23
35-44	11	Separated/Divorced	2
45-54	12	Cohabiting	4
55+	3	Widowed	1
Education		**Occupational status**	
Primary Level	0	Employed	30
Junior Cert.	2	Unemployed	0
Leaving Cert.	20	Student	19
Third Level	28	Retired	1
Income		**No. of Child Dependants**	
≤€99	4	0	18
€100-199	4	1	8
€200-299	1	2+	24
€300-399	0		
€400-499	17		
€500-599	18		
≥€600	6		

Source: Author

Participants were given one prototype sample and rated it on a range of sensory attributes and asked to rate the prototypes acceptability level for each specific attribute. The prototype product was a fish cake which includes 200 g of cooked potatoes, 60 g whiting fish (skin and bone removed), 140 g minced boarfish (soaked), 10 g chives (chopped), ½ red chilli (chopped), and ½ lime (juice and zest). These ingredients were combined, breaded and then cooked. Figure 10.2 shows the prototype before cooking and an image of the final prototype that potential consumers conducted sensory acceptability testing on.

Figure 10.2 Prototype development



Source: Author

10.3 Sensory acceptability testing

The mean of each attribute determined whether each individual sensory attribute was acceptable to the consumer. A mean score of five would have indicated that the product was neither accepted nor unaccepted. A mean score of below five would have indicated that the product is unacceptable to the consumer and a mean score of higher than five would have shown that the product is acceptable to the consumer panel. Scores closer to nine would have indicated a higher level of acceptability. All the sensory attributes were acceptable to the consumer panel (see Table 10.3.1). The score for the degree of skewness in order to be considered symmetric is between -1 and +1.

In all attributes tested the score for the level of skewness was well within the acceptable range, therefore indicating that the data is normally distributed.

Table 10.3.1 Frequency table of sensory acceptability

	Appearance	Colour	Texture	Flavour	Overall acceptability
Dislike extremely	_	_	_	_	_
Dislike	_	_	_	_	_
Moderately dislike	_	_	_	_	_
Mildly dislike	_	_	4%	4%	4%
Neither like nor dislike	4%	6%	10%	20%	8%
Mildly like	12%	16%	14%	18%	22%
Moderately like	42%	30%	26%	20%	18%
Like	30%	40%	34%	20%	46%
Like extremely	12%	8%	12%	18%	2%

Source: Author

The visual appearance was the most acceptable attribute with a mean of 7.36. No participants gave a score of less than a 5 indicating that the appearance of the products was not rejected by anyone (see Table 10.3.2), with 42% of participants scoring an 8 (like) or 9 (extremely like). The standard deviation, which measures the distribution of the data from the mean, of this attribute was 0.94. This was the lowest standard deviation of all the attributes, which indicates that the participant's responses were closer together on this attribute than any other was. The colour was the next most acceptable attribute with a mean of 7.3. No participants gave a score of less than a five, which indicated that the appearance of the products was not rejected by anyone, and 48% of participants strongly accepted the product. The texture was also acceptable to participants with a mean score of 7.14. Only 4% of participants found this attribute unacceptable and scored it a four (mildly dislike). The attribute of texture was acceptable to 86% of participants. The final sensory attribute was flavour with a mean score of 6.88. Only 4% of participants found it unacceptable and scored this attribute a four (mildly dislike). 20% of the participants found the product in terms of flavour to be neither acceptable nor unacceptable.

When examining the product as a whole, panellists accepted the overall sensory attributes of the boarfish product with a mean score of seven. Only 4% of participants rejected this attribute scoring it a four (mildly dislike), with 88% of participants accepting the product overall and 48% strongly accepting the product overall. The range of the standard deviation for all attributes was between 0.98 and 1.5. The aggregated standard deviation for the product overall was 1.24 this shows the difference in consumer responses was relatively low and indicates that there was a general consensus between the consumer in relation to the acceptability of the overall product. This can be seen in Table 10.3.2 and Figure 10.3.1.

Table 10.3.2 Statistical analysis of prototype attributes

	Appearance	Colour	Texture	Flavour	Overall
Standard Deviation	0.98	1.04	1.32	1.49	1.24
Mean	7.36	7.3	7.14	6.88	7.02
Median	7.00	7.50	7.00	7.00	7.00
Count	50	50	50	50	50
Max	9	9	9	9	9
Min	5	5	4	4	4
Interquartile range	4	4	5	5	5
Skewness	-0.26	-0.53	-0.65	-0.093	-0.71

Source: Author

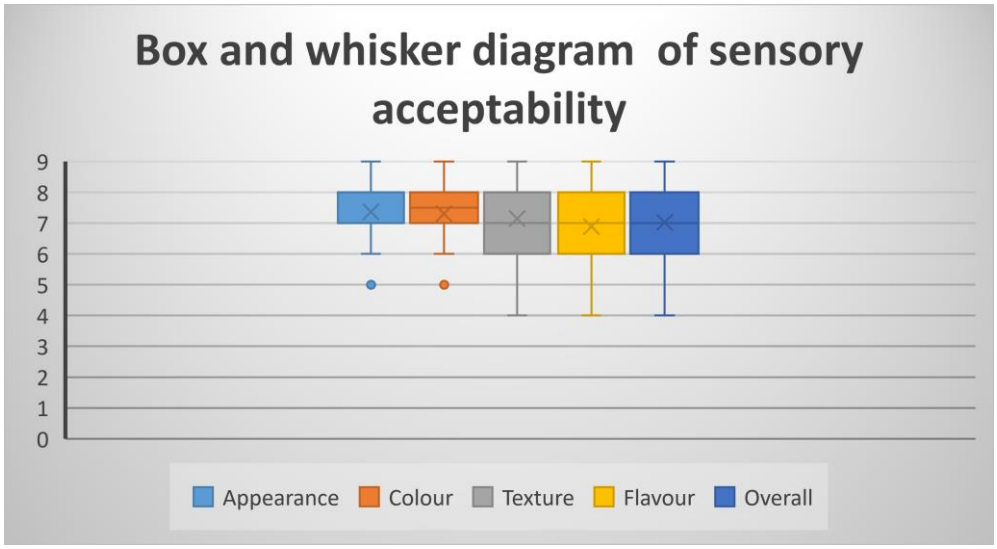


Figure 10.3.1 Box and whisker diagram of sensory acceptability

Source: Author

Panellists were also asked to rate the likelihood of consuming the product in the future and purchasing this or a similar product containing boarfish. The mean of each determines whether each participant would consume/purchase the product or a similar product in future. In the same way as the sensory testing, a mean score of five would have indicated that the product was neither accepted nor unaccepted for consumption/purchase in the future. The closer the score was to the nine the higher the level of acceptability (see Table 10.3.3).

Table 10.3.3 Likelihood of consuming or purchasing the prototype

	Consume	Purchase
Definitely would not	_	_
Very slight possibility	_	2%
Slight possibility	6%	10%
Some possibility	6%	8%
Neither will nor will not	12%	10%
Good possibility	22%	16%
Probable	18%	16%
Very probably	18%	24%
Most defiantly would	18%	14%

Source: Author

The mean score of 6.66 indicates that overall the product or a similar product would be consumed by participants in the future. There was a weak probability of consumption in the future of the product or a similar product from 12% of participants with 76% of participants giving a good/strong indication of future consumption of the product or a similar product. In relation to future purchasing, the mean score of 6.42 indicates that overall the product or a similar product would likely be purchased by participants in the future. There was a weak probability of purchase of the product or a similar product in the future from 20% of participants with 70% of participants giving a good/strong indication of future purchases of the product or a similar product. The standard deviation for likelihood to consume this product in the future is 1.75 and

to purchase this product in the future is 1.98. The standard deviation of 1.98 for the likelihood of future purchase was the largest of all the attributes, indicating that the variance of answers from respondents was greater for this attribute than any other (see Table 10.3.4 and Figure 10.3.2).

Table 10.3.4 Statistical analysis of consuming or purchasing prototype

	Consume	Purchase
Standard Deviation	1.75	1.98
Mean	6.66	6.42
Median	7.00	7.00
Count	50	50
Max	9	9
Min	3	2
Interquartile range	6	7
Skewness	-0.39	-0.52

Source: Author

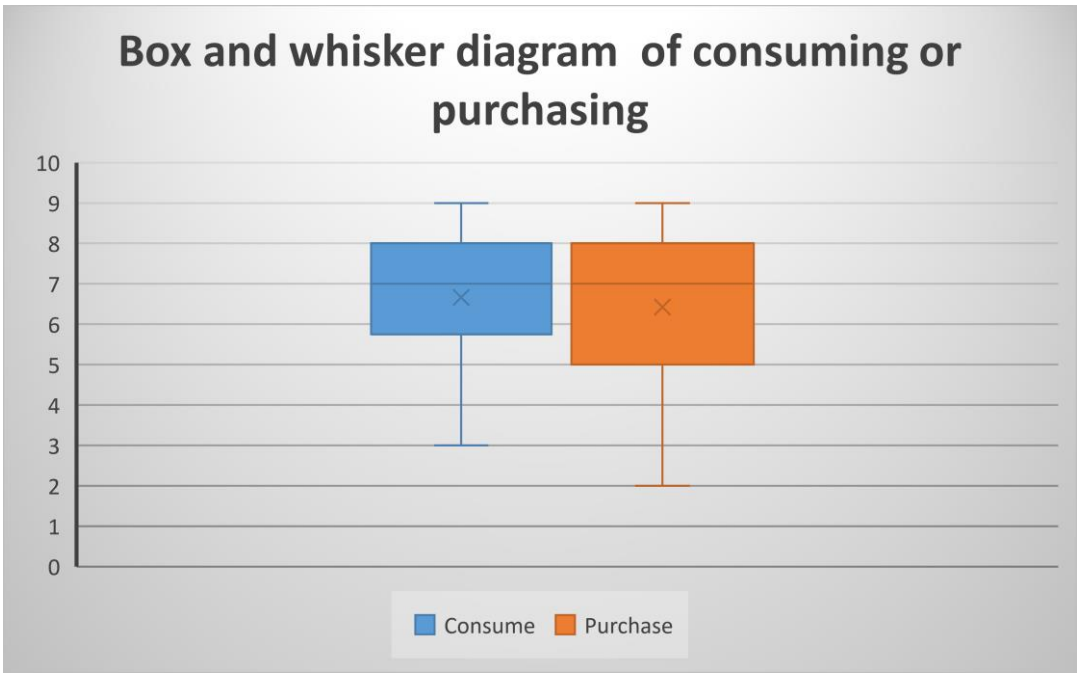


Figure 10.3.2 Box and whisker diagram of consuming or purchasing

Source: Author

An ANOVA test was a conducted on all seven variables assessed in the sensory acceptability test against the demographic details of participants. The ANOVA was used to establish if there were any statistically significant differences between the means of the seven groups and the independent demographic variables. If a variable is p= <0.05 this is an indication that there is a significant relationship between those two variables. In this research, there was a significant relationship between three sets of variables, level of income and likelihood to eat the product in the future, level of income and the overall sensory appeal of the product and the number of dependent children and the overall sensory appeal of the product. This suggests that the higher the income of consumers the more likelihood they are to eat the product in the future. There is also the suggestion that the higher the income and the more children dependents of a consumer the more likely they are to have a positive association with the overall sensory appeal of the product (see Table 10.3.5). There was no significant statistical differences between any of the other sensory attributes or likelihood to consumer/ purchase in the future and any demographic characteristics of the participants.

Table 10.3.5 ANOVA test

ANOVA						
Gender		Sum of Squares	df	Mean Square	F	Sig.
Appearance	Between Groups	1.629	1	1.629	1.715	.197
	Within Groups	45.591	48	.950		
	Total	47.220	49			
Colour	Between Groups	.811	1	.811	.759	.388
	Within Groups	51.269	48	1.068		
	Total	52.080	49			
Texture	Between Groups	1.748	1	1.748	1.004	.321
	Within Groups	83.532	48	1.740		
	Total	85.280	49			
Flavour	Between Groups	.299	1	.299	.129	.722
	Within Groups	111.721	48	2.328		
	Total	112.020	49			
Overall	Between Groups	5.195	1	5.195	3.733	.059
	Within Groups	66.805	48	1.392		
	Total	72.000	49			
Eat	Between Groups	.019	1	.019	.006	.938
	Within Groups	149.201	48	3.108		
	Total	149.220	49			
Buy	Between Groups	.125	1	.125	.031	.861
	Within Groups	192.055	48	4.001		
	Total	192.180	49			

Age		Sum of Squares	df	Mean Square	F	Sig.
Appearance	Between Groups	1.087	4	.272	.265	.899
	Within Groups	46.133	45	1.025		
	Total	47.220	49			
Colour	Between Groups	9.104	4	2.276	2.383	.065
	Within Groups	42.976	45	.955		
	Total	52.080	49			
Texture	Between Groups	9.418	4	2.354	1.397	.250
	Within Groups	75.862	45	1.686		
	Total	85.280	49			
Flavour	Between Groups	1.366	4	.341	.139	.967
	Within Groups	110.654	45	2.459		
	Total	112.020	49			
Overall	Between Groups	6.408	4	1.602	1.099	.369
	Within Groups	65.592	45	1.458		
	Total	72.000	49			
Eat	Between Groups	11.067	4	2.767	.901	.471
	Within Groups	138.153	45	3.070		
	Total	149.220	49			
Buy	Between Groups	10.610	4	2.653	.657	.625
	Within Groups	181.570	45	4.035		
	Total	192.180	49			
Education		Sum of Squares	df	Mean Square	F	Sig.
Appearance	Between Groups	4.291	2	2.146	2.349	.107
	Within Groups	42.929	47	.913		
	Total	47.220	49			
Colour	Between Groups	4.101	2	2.051	2.009	.145
	Within Groups	47.979	47	1.021		
	Total	52.080	49			
Texture	Between Groups	8.473	2	4.236	2.592	.086
	Within Groups	76.807	47	1.634		
	Total	85.280	49			
Flavour	Between Groups	2.356	2	1.178	.505	.607
	Within Groups	109.664	47	2.333		
	Total	112.020	49			
Overall	Between Groups	2.200	2	1.100	.741	.482
	Within Groups	69.800	47	1.485		
	Total	72.000	49			
Eat	Between Groups	3.491	2	1.746	.563	.573
	Within Groups	145.729	47	3.101		
	Total	149.220	49			
Buy	Between Groups	.373	2	.186	.046	.955
	Within Groups	191.807	47	4.081		
	Total	192.180	49			

Income		Sum of Squares	df	Mean Square	F	Sig.
Appearance	Between Groups	4.727	5	.945	.979	.441
	Within Groups	42.493	44	.966		
	Total	47.220	49			
Colour	Between Groups	8.101	5	1.620	1.621	.174
	Within Groups	43.979	44	1.000		
	Total	52.080	49			
Texture	Between Groups	7.388	5	1.478	.835	.532
	Within Groups	77.892	44	1.770		
	Total	85.280	49			
Flavour	Between Groups	21.561	5	4.312	2.097	.084
	Within Groups	90.459	44	2.056		
	Total	112.020	49			
Overall	Between Groups	22.402	5	4.480	3.975	**.005**
	Within Groups	49.598	44	1.127		
	Total	72.000	49			
Eat	Between Groups	32.829	5	6.566	2.482	**.046**
	Within Groups	116.391	44	2.645		
	Total	149.220	49			
Buy	Between Groups	28.603	5	5.721	1.539	.198
	Within Groups	163.577	44	3.718		
	Total	192.180	49			
Marital status		Sum of Squares	df	Mean Square	F	Sig.
Appearance	Between Groups	3.116	4	.779	.795	.535
	Within Groups	44.104	45	.980		
	Total	47.220	49			
Colour	Between Groups	5.323	4	1.331	1.281	.292
	Within Groups	46.757	45	1.039		
	Total	52.080	49			
Texture	Between Groups	5.480	4	1.370	.773	.549
	Within Groups	79.800	45	1.773		
	Total	85.280	49			
Flavour	Between Groups	3.016	4	.754	.311	.869
	Within Groups	109.004	45	2.422		
	Total	112.020	49			
Overall	Between Groups	5.787	4	1.447	.983	.426
	Within Groups	66.213	45	1.471		
	Total	72.000	49			
Eat	Between Groups	7.942	4	1.985	.632	.642
	Within Groups	141.278	45	3.140		
	Total	149.220	49			
Buy	Between Groups	10.654	4	2.663	.660	.623
	Within Groups	181.526	45	4.034		
	Total	192.180	49			

Employment status		Sum of Squares	df	Mean Square	F	Sig.
Appearance	Between Groups	3.116	4	.779	.795	.535
	Within Groups	44.104	45	.980		
	Total	47.220	49			
Colour	Between Groups	5.323	4	1.331	1.281	.292
	Within Groups	46.757	45	1.039		
	Total	52.080	49			
Texture	Between Groups	5.480	4	1.370	.773	.549
	Within Groups	79.800	45	1.773		
	Total	85.280	49			
Flavour	Between Groups	3.016	4	.754	.311	.869
	Within Groups	109.004	45	2.422		
	Total	112.020	49			
Overall	Between Groups	5.787	4	1.447	.983	.426
	Within Groups	66.213	45	1.471		
	Total	72.000	49			
Eat	Between Groups	7.942	4	1.985	.632	.642
	Within Groups	141.278	45	3.140		
	Total	149.220	49			
Buy	Between Groups	10.654	4	2.663	.660	.623
	Within Groups	181.526	45	4.034		
	Total	192.180	49			
Number of dependent children		Sum of Squares	df	Mean Square	F	Sig.
Appearance	Between Groups	.590	2	.295	.297	.744
	Within Groups	46.630	47	.992		
	Total	47.220	49			
Colour	Between Groups	.755	2	.378	.346	.709
	Within Groups	51.325	47	1.092		
	Total	52.080	49			
Texture	Between Groups	1.254	2	.627	.351	.706
	Within Groups	84.026	47	1.788		
	Total	85.280	49			
Flavour	Between Groups	2.479	2	1.240	.532	.591
	Within Groups	109.541	47	2.331		
	Total	112.020	49			
Overall	Between Groups	9.482	2	4.741	3.564	**.036**
	Within Groups	62.518	47	1.330		
	Total	72.000	49			
Eat	Between Groups	13.413	2	6.706	2.321	.109
	Within Groups	135.807	47	2.890		
	Total	149.220	49			
Buy	Between Groups	14.593	2	7.296	1.931	.156
	Within Groups	177.587	47	3.778		
	Total	192.180	49			

Source: Author

A correlational coefficient typically ranges between –1.0 and +1.0. Correlations were used to establish if there was a relationship between any of the sensory variable tested. Table 10.3.6 shows the relationships between each of the sensory variables. There is a significant relationship between many of the attributes, which would be expected. For example, there is a positive relationship between the flavour and the overall appeal of the product, the colour and the overall appeal of the product and the texture the overall appeal of the product. This is logical that if consumers have a positive association with the sensory elements then they would have a positive association with the overall sensory attributes of the porotype product. While there are significant relationships between many of the variables, there is a significant relationship between the overall sensory evaluation of the product and the likelihood of eating and buying the product in the future. The correlation shows that there is a significant relationship between all the sensory variables excluding colour and the likelihood to buy the product in the future.

10.4 Summary

This chapter shows consumers acceptability for all attributes of the boarfish prototype product and the level of likelihood of consuming or purchasing a similar product, were it available on the Irish market. There are also insights into the different attributes and which attributes were more acceptable to the potential consumers than others. Part 6 presents the overall conclusions and recommendations of this study. In Chapter 11 the conclusions, recommendations and suggestions for further research are presented.

Table 10.3.6 Correlations

		Appearance	Colour	Texture	Flavour	Overall	Eat	Buy
Appearance	Pearson Correlation	-						
	Sig. (2-tailed)							
	N	50						
Colour	Pearson Correlation	.610**	-					
	Sig. (2-tailed)	.000						
	N	50	50					
Texture	Pearson Correlation	.567**	.560**	-				
	Sig. (2-tailed)	.000	.000					
	N	50	50	50				
Flavour	Pearson Correlation	.211	.327*	.571**	-			
	Sig. (2-tailed)	.140	.021	.000				
	N	50	50	50	50			
Overall	Pearson Correlation	.206	.327*	.549**	.779**	-		
	Sig. (2-tailed)	.152	.021	.000	.000			
	N	50	50	50	50	50		
Eat	Pearson Correlation	.271	.224	.559**	.763**	.685**	-	
	Sig. (2-tailed)	.057	.118	.000	.000	.000		
	N	50	50	50	50	50	50	
Buy	Pearson Correlation	.292*	.261	.566**	.688**	.646**	.922**	-
	Sig. (2-tailed)	.039	.067	.000	.000	.000	.000	
	N	50	50	50	50	50	50	50
**Correlation is significant at the 0.01 level (2-tailed).								
*Correlation is significant at the 0.05 level (2-tailed).								

Source: Author

Part 6: Research Discussion, Conclusions and Recommendations

Chapter 11: Research Discussions, Conclusions and Recommendations

11.1 Introduction

This chapter presents the conclusions and recommendations of the research. The key conclusions derived from both the qualitative and quantitative elements of the research are discussed. The qualitative research elements included interviews as well as focus groups and the quantitative research elements encompassed a conjoint based questionnaire and sensory acceptability testing. The contribution to knowledge that this research makes is highlighted. Included in this chapter are also recommendations made by the researcher based on the results of the qualitative and quantitative research conducted.

11.2 Research questions and sub-questions

The aim of this study was to examine the use of consumer insights in the development by SMEs, of more sustainable and value-added, new seafood product concepts. Including products with unfamiliar ingredients, this process aims to increase consumer acceptance. This was achieved through examination and answering of the research questions. The overall research question that guided this study was *"What role can consumer integration techniques play in small and medium enterprises, in the Irish seafood sector, in understanding consumer's demands for seafood products?"* The main research question is broken down into three specific sub-questions:

Research sub-question 1 (RSQ1): *To what extent do small and medium enterprises in the Irish seafood sector currently engage in market-oriented new product development?*

Research sub-question 2 (RSQ2): *What are the current frameworks being used in the new product development process of the small and medium Irish seafood enterprises?*

Research sub-question 3 (RSQ3): *What product attributes drive consumer preferences for seafood products using a fish that is unfamiliar to the consumer?*

11.3 Research discussion

NPD is a vital strategic activity that SMEs need to engage in to remain competitive in the marketplace. SMEs account for a significant proportion of the Irish seafood industry. Previous research conducted and governmental strategies for the Irish seafood industry indicate there is a need for organisations to invest time and resources into NPD, specifically value-added NPD, in order to enhance competitiveness (Shelman, 2016; DAFM, 2015a; Adams *et al.*, 2006). The value-added seafood sector in Ireland is a significant emerging market. This new market offers Irish SMEs excellent opportunities for growth, which can be achieved through investment in NPD. Despite the fact that there is a high failure rate in new food product development worldwide, there remains a need for NPD in order to grow Irish seafood organisations.

To address this failure rate, the literature review identified factors, key to new product success. These factors include: management of organisational innovation within SMEs to create a structured NPD process; adoption and implementation of a market-oriented NPD strategy; and determining what the market and consumer demands are.

For seafood related SMEs, establishing and maintaining a formal and flexible NPD process, which allows for the development of market-oriented products is required for successful NPD activities. Despite this fact, this study has clearly identified a gap in the knowledge base with regard to best practice in the SME NPD process. There is a need for SMEs to develop a process that identifies a clear and realistic target, which aligns the NPD process with the strategic direction of the organisation. Using a multi-disciplinary approach, this SME NPD process also needs to be able to detect problems associated with concepts in the early stages. The use of a successful NPD process requires many organisational elements working in sync. One of the first element`s is the establishment of an innovative and market-oriented organisational culture.

This research examined the process of exploring and managing consumer insights at the early stages of the NPD process. It also looked at applying those consumer insights to the development of new seafood concepts, with a particular focus on seafood concepts that use a fish that is currently unavailable on the Irish market and unfamiliar to most consumers. The concept was explored using consumer integration techniques in the form of in-depth interviews; focus groups; conjoint analysis and sensory

acceptability testing. This subject was investigated in a two-prong approach, from the perspective of the seafood related SMEs and the perspective of the consumer.

In-depth interviews identified the actual practices within the NPD process of Irish seafood SMEs. It explored to what extent market orientation really plays a role in the development of added value products for SMEs in the Irish seafood industry. The research of Martinsdóttir *et al.* (2009) suggests that in order to create new products that meet the actual needs or wants of the consumers, the inclusion of consumers during early or concept stages of the NPD process could provide clarity for product developers. This was substantiated by this research. The study of the participation of customers during the initial stages of the concept development stage of the NPD process, through the quantitative and qualitative elements of the research, delivered consumer insights such as their perceptions of and wants from new seafood concepts. The wants and needs of the consumer that were established in the focus groups were built on by the conjoint analysis. This analysis provided a clear understanding of customer`s motivation for purchasing and potential trade-offs participants would make in relation to seafood products containing an ingredient which they are unfamiliar with. Finally, the sensory acceptability testing ensured that the product would be accepted by the consumer before resources are used in the later stages of the NPD process.

The research discussions will now be guided by the research objectives.

i. Assess the current NPD activities of seafood related SMEs in Ireland.

The literature suggests that the NPD activities of food businesses is more often than not incremental rather than radical (Johannessen *et al.,* 2001; Tidd *et al.,* 2005; Damanpour, 1996; Mole and Elliot, 1987). The food and beverage industry unlike other industries such as technological industries are extremely slow to innovate and participate in NPD (Bruhn, 2008). The food and beverage industry is more inclined to participate in small and continuous improvements rather than major innovations. The reasoning for this, as established in the literature, is that minor innovations bring consistent competitive advantage (Bhaskaran, 2006) and incurs very little risk of product failure (Dijksterhuis, 2016; Little *et al.,* 2015; Brody and Lord, 2007). Kuratko (2016) also notes that SMEs generally are averse to taking major risks as they are cautious and in turn expect steady development, growth and revenue. Bhaskaran

(2006) suggests that incremental development and risk averse innovations are actually a management strategy adopted in many seafood related SMEs. The findings of this research are consistent with that of Bhaskaran (2006) and the literature in general. The seafood related SMEs in this research suggested that a fear of failure and the risk associated with NPD meant that they would not partake in any innovations, which were not minor changes. The results indicated that the two most popular types of NPD in seafood related SMEs were firstly additions to product lines and secondly product improvements. Both types of NPD are low risk and incremental innovation rather than radical or major innovation. This type of innovation is also considered an important strategic tool for SMEs and specifically seafood organisations (Bhaskaran, 2006). Resources such as money and time were limited in all of the SMEs interviewed and many managers believed that the risk of radical innovation was not worth the potential benefits.

The food and beverage industry is known more for cost reductions and ingredient substitutions than they are for innovation. Even when innovation occurs, it is more often than not focused on areas such as new packaging or new processes rather than new products (Costa *et al.,* 2016). This style of innovation is consistent with the results of this research. 33% of SMEs interviewed were or had been involved in cost reducing innovations at the time the research was conducted. The seafood related SMEs interviewed in this research suggested that the innovations, which they participated in, were often focused on incremental innovations such as changes to packaging or ingredient substitution. The data gathered from the Irish seafood related SMEs was consistent with the previous and current literature on the type of innovation in SMEs generally and specifically seafood related SMEs.

ii. Identify the steps in the NPD process of Irish seafood related SMEs.

The literature clearly identifies a vast array of difference in how large businesses operate and how SMEs operate (Van de Vrande *et al.,* 2009; Buonanno *et al.,* 2005; Welsh and White, 1981). These differences extend to the NPD process (Laforet, 2013; Nicholas *et al.,* 2011; Gray and Mabey, 2005; Ghobadian and Gallear, 1997). The amount of previous research available on the NPD processes of large organisations is extensive (Ulrich and Eppinger, 2015; Bhuiyan, 2011; Cooper, 2001; Urban and Hauser, 1993; Crawford, 1987; Booz-Allen and Hamilton, 1982) in comparison to that

conducted on SMEs. There is a dearth of research in food related SMEs and their NPD process. This is particularly true of the Irish seafood related SMEs and their NPD. There is currently no other research available which outlines the steps in the NPD process of Irish seafood related SMEs. This research found that the process stages SMEs followed was: idea generation; develop a prototype; shelf life testing; costing; sensory testing; packaging and sales. This was not the process in all organisations, some organisation had extra stages such as assessing if it fits in the production schedule and other organisations did not complete all stages.

Based on the previous research the model, which is most appropriate for seafood related SMEs, is that of Curtin *et al.* (2006) (see Table 2.7.4). This model outlines 11 steps in the NPD process, which encapsulates everything from idea generation, testing through to product launch in the marketplace. However, the literature does not elaborate as to the specific details of the individual steps. While it appears to be more suited to food related companies than other models available, it is more suited to larger organisations and is too complicated and lengthy for SMEs. Table 11.3 identifies the steps in the NPD process of three separate authors and the steps identified by this research to be in the 'NPD process of Irish seafood related SMEs'. The steps in the 'NPD process of Irish seafood related SMEs' was developed using primary and secondary data (see Figure 11.4) and is discussed later in the chapter.

To provide a comparison of previous research with the findings of this research, using a variety of colours, Table 11.3 highlights the differences and similarities of the four process models. Step one for all the models, as highlighted in yellow, is the idea generation stage. For all the process models evaluated in the secondary research, this involves the generation of ideas for potential products to be developed. The SMEs interviewed for this research also identified this as the first step in their process. By contrast, based on the primary research and secondary research, in the development of the model 'NPD process of Irish seafood related SMEs' the first step recommended is "market-oriented idea generation". This "market-oriented idea generation" step will combine what is step 1 and 2 of the other three models. This is consistent with the research of Sorenson and Bogue (2005); Van Kleef *et al.* (2005) and Bogue *et al.* (1999) which suggests that there is a need for a high level of consumer interaction at the initial stages of NPD to allow for appropriate product design. Step 2, highlighted

in blue, of the other previous research models involves conducting market research and assessing the validity of an idea. However, if the idea generation is market-oriented then this will allow SMEs to combine the two steps and base their product development on insights gathered from the consumer.

Step 2 of the 'NPD process of Irish seafood related SMEs' is the development of a prototype. This step is highlighted over the four models in pink. A comparison of the 'NPD process of Irish seafood related SMEs' to the other models shows that it occurs much later in the process. This stage is required at step 2 because the following two steps of the model (seen in grey) cannot be conducted without a prototype. This may not be the case for other products. Step 3 and 4 of the 'NPD process of Irish seafood related SMEs' involves testing a prototype. Sensory testing and consumer acceptability testing, particularly on unfamiliar ingredients, is vital. Monteleone (2012) suggests that completing all the steps in the product development process is a waste of resources without knowing if the consumer will accept it. As the findings of this research indicate and previous research highlights, SMEs lack the same level of resources as large organisations (Padukkage *et al.,* 2016; Van de Vrande *et al.,* 2009). The reality is that they may not conduct extensive descriptive sensory analysis before going to market (Frøst *et al.* 2015; Martinsdóttir *et al.* 2009). Based on the SME's resources, basic descriptive sensory analysis as conducted in this research (see Chapter 10) on 25-75 consumers of seafood is an appropriate method for SMEs. Acceptance of a food product usually indicates actual use, that is, purchase and eating of the product (Jaeger and MacFie, 2010). As a result, once the product prototype is accepted then the remainder of the steps in the 'NPD process of Irish seafood related SMEs' can be conducted with the knowledge that there is less risk of product failure. The need for acceptance of a prototype may not be necessary in the other models as they may not be necessary in other industries. Two models (Kotler and Armstrong, 2012; Cooper, 2001) of the three other models are not food specific models and the third model (Curtin *et al.,* 2006) is not specifically for SMEs. Once step 3 is conducted step 4 will be conducted by a laboratory to establish shelf life and product durability based on the requirements of the specific SME e.g. retail may require 21 days shelf life.

Table 11.3 Comparison of the steps in the NPD process

Process Name	**Product development process (food products)**	**Stage Gate**	**Major Stages in New-Product Development**	**NPD process for seafood related SMEs**
Author	**Curtin *et al.* (2006)**	**Cooper (2001)**	**Kotler and Armstrong (2012)**	**Author (2018)**
Step 1	Concept/ Idea	Discovery stage	Idea generation	Market-oriented idea generation
Step 2	Market research	Scoping	Idea screening	Develop a prototype
Step 3	Product design	Build business case	Concept development and testing	Sensory testing
Step 4	Feasibility	Development	Marketing strategy development	Shelf life testing
Step 5	Develop kitchen samples	Testing and validation	Business analysis	Costing
Step 6	Product testing	Launch	Product development	Packaging
Step 7	Factory trials	Post launch review	Test marketing	Sales and marketing
Step 8	Further product testing and quality controls		Commercialisation	Post launch review
Step 9	First production run			
Step 10	Promotion/Launch			
Step 11	Performance and Monitoring			

Source: Author

Step 5 as highlighted across the models in red is the costing of the product to ensure that it is viable for production at a profit. This step is required and highlighted in the literature as a key element of the NPD process as there may be a need to achieve lower production costs through using less expensive materials or increasing productivity to ensure that the product is profitable (Zhou *et al.,* 2010). This research highlights the importance of achieving complete product utilisation and profitability, which is consistent with Kotler and Armstrong (2012); Curtin *et al.* (2006) and Cooper (2001). As step 3 has already been completed and a prototype developed the costing will be realistic. As the SMEs know what ingredients, equipment, personnel and time will be required for production, the costing stage and results of the costing activity should be a true reflection of reality.

Step 6 is packaging and this stands alone in the 'NPD process of Irish seafood related SMEs'. This research differs from the research conducted by Kotler and Armstrong (2012); Curtin *et al.* (2006) and Cooper (2001) on the NPD process in this specific area of packaging. The significant importance of packaging is not highlighted in those previous models. While it may be considered as a part of one of the steps in other three models, it is a key part of the 'NPD process of Irish seafood related SMEs' model. This is based on the information gathered from the interviews, focus groups and conjoint analysis. From the perspective of the SMEs, it is a key expense in the NPD process and provides value to the end product. Multiple SMEs highlight the packaging as a key consideration for them. The data collected from the focus group gave an insight into the consumer's opinions of packaging. There was an importance placed on packaging as an attribute that consumers would consider when purchasing a seafood product i.e. one use oven trays for convenience purposes. The conjoint analysis also identified packaging to be the third most important attribute that would influence a consumers purchasing decision. The conjoint analysis also highlighted that consumers of seafood had preferences for certain types of packaging over another i.e. a product that consisted of 'bake in the bag' packaging had a negative association for consumers. Furthermore, the conjoint analysis demonstrated that different categories of consumers had different preferences for types of packaging, this would influence their decision as weather to purchase a product or not i.e. Cluster 1, and 2 prefer a package that they can remove and discard whereas Cluster 3 had a preference for packaging that the product could be cooked in. These finding are consistent with the

importance placed on packaging by the consumer as seen in previous studies. Research conducted by O'Sullivan (2011); Tonsor (2011) and Zhou *et al.* (2010) suggest that consumers will look for food product with packaging which provides them with convenient, safe, wholesome and flavourful food product.

Step 7, highlighted across the models in purple, is the sales and marketing of the product. This stage is highlighted in the literature as a step that is required in all NPD processes (West *et al.*, 2015; Kotler and Armstrong, 2012; Curtin *et al.*, 2006; Kotler and Keller, 2006; Cooper, 2001). The primary research conducted is consistent with the literature as the SMEs believed that an awareness of their product by their consumers was required for the product to sell.

The final step is a post launch review. The literature suggested this to be a key element of the NPD process, which does not have enough emphasis placed on it by large organisations or SMEs. This may be because there is currently no best practice for either large or small companies (Nicholas *et al.*, 2011). Despite the fact that numerous authors believe it to be a key dimension of the NPD process (Kahn *et al.*, 2012; Nicholas *et al.*, 2011) this research suggested that Irish seafood related SMEs do not place significant emphasis upon it and in many cases do not currently engage in a post launch review. The organisations that did engage in a post launch review do so in an informal manner.

iii. Identify the strategy and resources associated with the NPD process of Irish seafood related SMEs.

The literature suggested that the appropriate resources needed to be allocated to all stages, in order for NPD process to be successful. Management need to recognise their role in ensuring sufficient resources are allocated to allow for the development of innovations and innovative ideas (Trott, 2008). Setting out the long-term NPD goals and carrying out an analysis of the resources required for all NPD ventures will allow management to decide what activities and resources will be required (Alegre *et al.*, 2013; Christensen, 2013). Limited resources can then be concentrated on ideas that have a stronger chance of success (Grünig and Gaggl, 2013; Bleiel, 2010; Kahn *et al.*, 2006). This can often be seen in the form of market-oriented strategic planning, which involves developing and maintaining organisational goals, skills and resources by

management (West *et al.*, 2015; Wilson and Gilligan, 2012). The Ruekert (1992) definition of market orientation focuses on the business unit instead of the individual market. This perspective allows management to collect and divide the data collected and use it in setting goals and allocating resources.

Contrary to the recommendations of such previous studies, such a style of management, which included strategic planning and appropriate allocation of resources was not prominent in this research. 12.5% of the sample had a strategic plan for NPD. 21% of the sample had a budget associated with NPD. 33% had a dedicated employee (either full or part time) associated with NPD. However, only 8% had a strategic plan, a budget and a dedicated employee associated with the NPD process. This research demonstrated that the Irish seafood related SMEs interviewed do not participate in the style of management, including strategic planning and resource allocation, which the literature and previous research suggests is conducive to a successful NPD process. Research conducted by Davis and Brady (2015) suggested that SMEs in Ireland who lack management commitment and a drive to innovate as well as lack of a clear strategy or policy on NPD, encounter a variety of problems, which often prevents the SMEs from developing. Considering the findings of this research, that Irish seafood related SMEs do not have a style of management that is suggested to be conducive to a successful NPD process, this may be the reason that the Irish seafood industry is comprised of a majority SMEs and minimal number of large organisations.

Along with management styles, the literature suggests that access to funds is a significant problem (Chesbrough, 2010b). The literature further suggests, the cost associated with NPD is constantly increasing and survival can become a priority rather than growth and development (Strobel and Kratzer, 2017). Such costs affecting these small businesses include the continuous increase of energy and labour costs. While these increased costs affect all organisations, due to their financial structures, SMEs are disproportionately affected by increasing fixed costs of compliance with taxes, labour and material costs. In addition, SMEs encounter issues due to economic competition and can be forced to reduce the number of employees they have on staff (Immervoll *et al.*, 2011). Loewe and Dominiquini (2006) identified a lack of resources, such as time, staff and money, as a key barrier to innovation and the NPD process.

These barriers were also highlighted in this research as well as finance and the costs, such as shelf life testing and packaging, involved in the NPD process. These expenditures are made with no guarantee for return on investment and this risk was a significant concern for Irish seafood SMEs. Irish seafood SMEs in numerous cases were actively working towards reducing costs and utilising all parts of the raw material, however such efforts often required initial investment in areas such as equipment and therefore often took a long time to see a return on investment.

The literature does not suggests a step or steps in the NPD process where the most resources or time should be focused or how much resources or time should be allocated to specific steps. The literature stated that sufficient time and resources be applied to each stage to ensure it is completed appropriately before progressing to the next stage of the NPD process (Cooper, 2014; Jarvis, 2000). This research differs from the existing literature to this extent and suggests that Irish seafood SMEs place the most importance and emphasis on the sensory analysis stage of the NPD process. This was echoed by the focus groups. When asked, the only input that any focus group participants had, into the current NPD process of any food product, was during the sensory analysis stage. This sensory analysis stage included the consumer in an informal manner. The focus group highlighted that for the majority of those that had participated in NPD there was no formal means of communicating feedback to the organisations. There was a single participant who had given formal feedback via a questionnaire in relation to sensory analysis of a food product as a consumer.

iv. Establish which stakeholders had an input into the NPD process of Irish seafood related SMEs.

Market orientation involves the generation and dissemination of information from the market (Deshpandé *et al.,* 1999). The incorporation of this information into the NPD process is a prerequisite for user-oriented innovation as an understanding of the users needs is required and then that knowledge is incorporated into the NPD process. A user-oriented approach to innovation is required for food products where the consumer had a significant input into the NPD process (Grunert, 2008). This research is consistent with those conclusions, which indicate that food related organisations do not adopt a user-oriented approach to innovation. The findings of this study show that 79% (see table 7.5.2) of Irish seafood related SMEs include the consumer in their NPD

process however all in an informal manner. However only 8% of SMEs include the consumer at the initial idea generation stage of the NPD process and again it was conducted in an informal manner. Therefore, the Irish seafood related SMEs interviewed could not be considered to have adopted a user-oriented approach to innovation.

The food and beverage industry has in the past been categorised as an industry, in which the consumer lacks interest and involvement when products are being developed (Hjelmar, 2011; Verbeke and Vackier, 2004; Beharrell and Dennison, 1995). However, Jaeger and MacFie (2010) state that to achieve consistent involvement from potential consumers in the development process of food, there needs be an enjoyable experience and the process will capture the interest of the consumer. This interest in the food product will lead to engagement by the consumer in the process and minimise the perceived risk they may have of making a wrong choice at the point of purchase (Hjelmar, 2011). When the consumer has a pleasant experience, the expectation of positive experiences in the future is reinforced, which in turn leads to repeat purchasing and brand loyalty (Bell and Marshall, 2003). As 79% of Irish seafood related SMEs include the consumer in their NPD process and in many instances acquired unsolicited feedback from consumers, this research suggests that consumers have an interest and a want to be involved in seafood product development contrary to suggestions from previous research (Hjelmar, 2011; Verbeke and Vackier, 2004; Beharrell and Dennison, 1995). The focus groups also highlights that consumers have an interest in participating in the development of new products and have insightful contributions to make, not just at the sensory analysis stages of the NPD process, however unless they are asked about their opinions often consumers will not contribute.

The development of a market-oriented NPD process requires the inclusion of multiple stakeholders along with the consumer, within the entire internal and external environment of an organisation (Oden, 1997) such as suppliers and customers (Barczak *et al.,* 2009). Over 70% of organisations interviewed included by formal or informal means at least one stakeholder other than the consumer into the NPD process. The stakeholders, excluding the consumer, who had an input into a variety of stages of the NPD process, were retailer/customers, wholesaler/ suppliers, staff, competitors

and industry partners. Their input ranged from the idea generation, sensory analysis, packaging, and market research (see Table 7.5.2). 17% of organisations interviewed included retailer/customers in the NPD process all via formal process such as product specification, sensory and packaging requirement. This inclusion was generally a retailer or customer telling the organisation what they required and asking the SME to develop an appropriate product. 37.5% of the SMEs interviewed suggested that they included wholesalers/ suppliers in the NPD process. Of the 37% only one micro organisation includes wholesalers/ suppliers and 4 small and 4 medium sized organisations consulted with wholesalers/ suppliers in the NPD process. The micro organisations gathered wholesalers/ suppliers input in the area of sensory analysis. The small and medium organisation had input from wholesalers/ suppliers in three main stages, idea generation, sensory analysis and packaging. Of the 20% of the sample who used the sensory analysis with wholesalers/ suppliers, all did so in an informal way. 17% of the sample included wholesalers/ suppliers in the packaging stage of the NPD process. These wholesalers/ suppliers were generally outsourced packaging organisations who were providing the packaging and consulted with the SMEs on a formal level as part of their service. Staff (not directly NPD related or management) were included in one organisation in the sensory analysis stage and in one organisation at the idea generation stage of the NPD process. In both cases it was on an informal basis. Two micro and two medium organisations viewed competitors' products in an informal manner as part of the idea generation process. 37.5% of organisations linked with industry partners to avail of market research. Two micro, three small and four medium-sized organisations used resources and research conducted by various industry partners such as Bord Bia, BIM, Teagasc and other research firms. This research was on a formal basis as it had been published by the industry partners and was available in the public forum.

One organisation, a micro firm, linked with no stakeholders during the NPD process. 29% of organisations linked with just one stakeholder during the NPD process, three being micro firms and four being small firms. 37.5% of SMEs interviewed linked with two stakeholders during the NPD process, four being micro firms, three being small firms and two being medium firms. 29% of SMEs interviewed linked with three stakeholder during the NPD process, one being a micro firm, two being small firms and three being medium firms. Finally, only one medium sized organisation linked

with four stakeholders in the NPD process. It is clear that medium organisations linked with more stakeholders than small firms did and small firms linked with more stakeholders than micro firms did.

Table 11.3.1 Strategy, budget, employees and stakeholders in the NPD process

SME	Size	Strategy	Budget	Employee	Number of stakeholders in the NPD process
3	Micro				0
1	Micro				1
2	Micro				1
13	Small				1
14	Small				1
18	Small				1
12	Small				1
7	Micro				1
4	Micro				2
5	Micro				2
8	Micro				2
10	Small				2
17	Small				2
9	Micro				2
11	Small				2
19	Medium				2
6	Micro				3
20	Medium				3
23	Medium				3
15	Small				3
16	Small				3
21	Medium				3
22	Medium				3
24	Medium				4

Responded 'yes' to the question = Responded 'no' to the question =

Source: Author

Table 11.3.1 shows that the organisation, which had no links with stakeholders, also had no strategy, budget or employees associated with the NPD process. Seven organisations had one link with stakeholders and of those, one had a budget for NPD and one had an employee associated with NPD. Eight organisations had two links with stakeholders and of those three had a dedicated employee associated with NPD but no strategy or budget. Seven organisations had three links with stakeholders during the

NPD process; one medium organisation, which had a NPD strategy, two small organisations, had a budget and employee associated with the NPD process and two medium organisations had a strategy, a budget and employee associated with the NPD process. It is clear that organisations that had allocated resources, such as money and employees, or organisations that had a strategy for NPD linked with more industry partners than those who did not and were more market-oriented. This excludes SME number 24, which appears to link with the most stakeholders but claims to have no budget, employee or strategy associated with NPD in the organisation. Excluding organisation number 24 it would appear that this research is consistent with that of Barczak *et al.* (2009); Grunert, (2008) and Oden (1997) as the organisations, which would appear to be adopting some form of market orientation, are those who have the most resources and include the most stakeholders in the process.

v. Establish what consumer integration techniques were being used by Irish seafood related SMEs during the NPD process.

A significant part of market-oriented NPD is developing an understanding of consumer`s preferences to identify opportunities in the marketplace (Cheng and Krumwiede, 2011; Gebauer *et al.,* 2011; Lukas and Ferrel, 2000; Bogue *et al.,* 1999). Sensory analysis, market analysis and eye tracking technologies are some of the approaches used in the development of market-oriented food products (Mitterer-Daltoé *et al.,* 2014; Bogue *et al.,* 1999). Each of these methods provide different types of consumer insights and it is suggested that a multi-functional approach be adopted, as one method alone will not give the level of detail needed to identify the wants and needs of the consumer (Van Kleef *et al.,* 2005; Bogue *et al.,* 1999). In the literature Table 3.8.3 identifies ten methods of gathering consumer insights based on multiple factors, however size of the organisation is not a factor. It is also important to note that, as SMEs tend to possess limited research and technological resources some of the options available to large organisations are a less viable an option for SMEs (Bhuiyan, 2011; Gibb, 2000; Martensen and Dahlgaard, 2000; Cooper and Kleinschmidt, 1995). Most SMEs simply do not have the ability or mechanisms required to access the skill and knowledge that is vital to develop consumer insights (European Technology Platform, 2018). SMEs tend to possess limited research and technological resources, therefore making the use of eye tracking for example a less

viable an option (Bhuiyan, 2011; Gibb, 2000; Martensen and Dahlgaard, 2000; Cooper and Kleinschmidt, 1995). To identify consumer insights, research suggests that cooperation with other similar organisations or industry partners, can reduce the cost of research for SMEs. Moreover, adopting approaches to research from the social sciences such as focus groups and interviews is an appropriate method of formalising feedback as it provides an understanding of consumer behaviour in the food domain for SMEs (European Technology Platform, 2018).

While the literature makes recommendations for appropriate consumer integration techniques for food products, no study identifies the consumer integration techniques actually used in Irish seafood related organisations. This is despite the fact that the literature suggests that gathering consumer insights is based on multiple factors (Van Kleff *et al.* 2005). This research identifies the actual consumer integration technique used by Irish seafood related SMEs (see Table 7.5.3). Of the 24 organisations (one micro and two small) 12.5% used no consumer integration techniques in understanding the wants and needs of the consumer. Four organisations only used one technique to understand the consumers. Ten SMEs combined two techniques to understand the consumer and seven organisations used three techniques to gain consumer insights. The size of the organisation had no bearing on the number of consumer integration techniques used which is consistent with the research of Van Kleef *et al.* (2005). However all organisations favoured informal sensory analysis as their means of consumer integration with informal feedback being the second most popular method of consumer integration. Formal methods such as research conducted by industry partners and formal sensory analysis were less popular with surveys being the least popular method of gaining consumer insights. Furthermore, the organisations, which had resources such as a strategy, budget and/or an employee associated with the NPD process, tended to have a minimum of two consumer integration techniques, which they utilised (see Table 11.3.2). This again suggests that organisations which had resources associated with the NPD process tended to be more market-oriented in their NPD activities. This is consistent with the research of Davis and Brady (2015) which suggests problems such as minimal management and monitoring of innovative activates, and the lack of a strategy or policy on NPD, are all factors that hinder SMEs ability to develop.

Table 11.3.2 Consumer integration techniques and resources in the NPD process

SME	Size	Strategy	Budget	Employee	Number of consumer integration techniques used
3	Micro				0
13	Small				0
18	Small				0
6	Micro				1
10	Small				1
17	Small				1
2	Micro				2
4	Micro				2
5	Micro				2
14	Small				2
20	Medium				2
1	Micro				3
8	Micro				3
24	Medium				3
19	Medium				1
9	Micro				2
11	Small				2
7	Micro				3
12	Small				2
16	Small				2
15	Small				3
23	Medium				2
22	Medium				2
21	Medium				3

Responded 'yes' to the question = Responded 'no' to the question =

Source: Author

Knowledge management is suggested as being key to not only the survival but also the growth of long running organisations (Rhodes *et al.*, 2008; Cooper, 2006; Darroch, 2005). In the context of this research knowledge management in the NPD process requires development, management and exploitation of knowledge for the purposes of innovation (Shankar *et al.*, 2009; Collinson, 2003; Kogut and Zander, 1992). Sorenson and Bogue (2005) highlight the importance in the early stages of the NPD process for controlling knowledge management. This is within the context of both managing the organisation`s capabilities internally and the external factors, particularly the needs of the customer. This research states that the risks associated with food related NPD requires effective knowledge management within the NPD process. In the initial stages of food related NPD, a high level of customer involvement and integration enhances

tacit knowledge management. Models to allow SMEs to manage the knowledge they gain from consumers are available (Desouza and Awazu, 2006; Khaldi *et al.,* 2005; Thorpe *et al.,* 2005; Sparrow, 2001). There is also the case of network development for SMEs to share and manage knowledge and therefore minimise resource spend on knowledge management (Tolstoy, 2009; Kaufmann and Tödtling, 2003). Although previous research into food related organisations highlights the importance of knowledge management, this research suggests that there is a minimal amount of formalised knowledge management taking place in Irish seafood related SMEs. The focus group participants nearly all, excluding one, suggested that they had never participated in any formal method of information deliver to any food organisation. The only insights all participant had given to food related organisations in the past had been via informal methods and all insights given by participants to food related organisations had been in the area of sensory analysis. No focus group participant had, prior to this research, been involved in any form of concept or product development (excluding sensory analysis).

vi. Identify how insights gathered from consumers was managed in Irish seafood related SMEs.

From the perspective of the SMEs interviewed, the majority of insights gathered from consumers was done so in an informal manner and only resided in minds of individuals and was generally tacit knowledge. The collection, arrangement and transfer of this type of knowledge can be challenging and complicated (Spraggon and Bodolicia, 2012; Mowery *et al.,* 1996). Over time, it is possible to convert knowledge from tacit to explicit via articulation however this was not the case in most Irish seafood related SMEs. This type of knowledge was seen in the SMEs interviewed in the form of informal feedback (general conversation with consumers and customers) and informal sensory analysis. The other type of knowledge, explicit, is considered less ‘sticky’ and is fluid as it presents itself in a logical form and can be structured into knowledge resources such as databases or reports. As seen in Table 7.5.3 29% of SMEs interviewed used research conducted by industry partners as consumer integration techniques. 33% of SMEs interviewed used formal sensory analysis (out sourced or conducted with industry partners) and 8% (two organisations) conducted their own research on their specific target market. This research is consistent with the literature,

which suggests that the Irish food industry is generally not market-oriented, and more focus is required on consumer insights from the Irish food industry to enter new markets, specifically beyond the UK market (Bord Bia, 2018). This research is consistent with the findings of Shelman (2016) which suggests that the seafood industry in Ireland lacks a market-oriented approach to its NPD activities.

vii. Identify the consumer integration techniques appropriate for Irish seafood related SMEs.

Research suggests that cooperation with other similar organisation or industry partner in identifying consumer insights can reduce the cost of research for SMEs (European Technology Platform, 2018). An organisations ability to acquire knowledge and uses that knowledge to innovate is dependant on accumulating skills and knowledge through team work; networks and/or alliances (Fuller, 2012; Cooper, 2006; Cavusgil *et al.,* 2003; Mowery *et al.,* 1996). The role of networks in the sharing of knowledge, is key for SMEs and their development (Gretzinger *et al.,* 2011). The Irish seafood industry is not in a position to capitalise on global trends as there are too many SMEs working as individuals and not capitalising on the potential of 'strong ties' or 'weak ties' as suggested to be appropriate by Gretzinger *et al.* (2011). As a result, there is a lack of coordination and cooperation between suppliers and producers and there is a lack of connection with the consumer and customer (Shelman, 2016). This research is consistent with the research of Shelman, (2016). There was no network of Irish seafood related SMEs and their suppliers, consumers etc. This is an area, which could be developed and utilised as a successful knowledge-sharing tool for the industry. Market orientation requires collaboration with external stakeholders such as suppliers and customers (Barczak *et al.,* 2009). One of the key stakeholders in the process, and the most common one utilised by seafood SMEs, was industry partners. These industry partners included BIM, Bord Bia and Teagasc. The resources and research available from these industry partners is a key resource for the industry and should be utilised by all seafood related SMEs in their NPD process. This research suggests that 29% of organisation used research conducted by industry partners in their NPD process.

Adopting approaches to research from the social sciences such as focus groups and interviews is an appropriate method of formalising feedback as it provides an understanding the consumer behaviour in the food domain for SMEs (European

Technology Platform, 2018). This is a key component in the identification of the appropriate consumer integration techniques for Irish seafood related SMEs. The primary and secondary research conducted suggested that a lack of resources including time, money and knowledge of how to collect data, are barriers to the adoption of formalised consumer integration techniques by seafood related SMEs. The use of tools such as focus groups, formal but non-scientific sensory analysis and other methods used in the social sciences and demonstrated in this research can formalise the informal consumer insight techniques seen in Table 7.5.3. Many organisations are gathering insights from consumers and could easily transform those insights into easily interpreted data to base their NPD activities on and organisation could build more consumer integration techniques for the future. This could be achieved through training, networks and industry support (European Technology Platform, 2018).

viii. Use consumer integration techniques, appropriate for SMEs, to determine the optimal product design attributes influencing customer's choice motives for new seafood concepts including an unfamiliar ingredient.

For SMEs, in the development of consumer integration techniques designed to determine the optimal product design attributes influencing customer's choice motives for new seafood concepts including unfamiliar ingredients, both the literature and primary research were considered. The literature (Van Kleff *et al.*, 2005) suggests that when gathering information from the consumer there are different methods appropiate for different types of products. In the case of products which are: product driven; the consumer is unfamiliar with; and there are multiple products to assess, if the consumeres preferences are required, then focus groups, conjoint analysis, laddering and information acceleration are appropiate.

The interviews conducted with Irish seafood related SMEs suggested that they were gathering information and insights from their consumers, often in the form of an informal interview or focus group. There was also a lack of resources in SMEs for the gathering of information and insights. As focus groups were already happening in part, it is only necessary to formalise the process. Therefore, focus groups were chosen as one of the consumer integration techniques appropriate for SMEs to determine the optimal product design attributes influencing customer's choice motives for new seafood concepts. The focus group was also appropriate as a data collection tool for a

conjoint analysis (Lee *et al.*, 2000) therefore, maximising the resources applied to the focus group.

Finally, the results of the interviews suggested that sensory analysis was a key step in the NPD process of Irish seafood related SMEs. As this non-scientific sensory analysis, was the step, which SMEs applied most resources to, non-scientific sensory analysis techniques were applied in this research. As the results of the interviews suggested that, like the focus groups, sensory testing is being conducted in Irish seafood SMEs and may just require formalisation and therefore minimal extra resources would be required.

ix. Establish consumer acceptance of sensory attributes of a new value-added and sustainable seafood concepts including unfamiliar ingredients.

The literature clearly states that completing all the steps in the product development process is a waste of resources without knowing if the consumer will accept the product (Monteleone, 2012). The literature also reveals that sensory acceptability testing is appropriate for SMEs. This testing would be conducted with small panels, usually 25-75 regular consumers of the product or a similar product, in a cost-effective manner (O`Sullivan, 2016). While this sensory testing is not a replacement for, or suitable as, market research, when conducted in association with other methods of market research it is appropriate (Brody and Lord, 2007). Previous research (Curtin *et al.*, 2006) and this study places significant importance on the sensory aspects of product development during the NPD process. The results of this research indicate that there was general acceptance of the sensory attributes of a new value added and sustainable seafood concept including unfamiliar ingredients.

11.4 Research conclusions

Research sub-question 1 (RSQ1): *To what extent do small and medium enterprises in the Irish seafood sector currently engage in market-oriented new product development?*

This research concludes that the Irish seafood related SMEs interviewed do not engage in market-oriented NPD. This conclusion is consistent with and aligned to the conclusions of the research carried out by Shelman (2016) in relation to Irish seafood

organisations. The benefits of adopting a market-oriented approach to NPD and specifically the inclusion of the consumer during or before the idea generation stage are well established (West *et al.*, 2015; Hislop, 2013; Van Kleef *et al.*, 2005; Bogue *et al.* 1999). However, the qualitative element of this research, through interviews with seafood SMEs, revealed that organisations placed little importance on adopting a market-oriented approach to their NPD activities. While the industry stated that they communicated with consumers, took note of suggested wants and needs, it was often unsolicited by the organisation and unmanaged. The interviews conducted, along with the literature review, suggested that the reason for this was due to a lack of resources in many SMEs as is consistent with previous studies. The literature suggests that SMEs resource constraints, can mean that many SMEs tend to manage knowledge at an operative level, and as a result do not place an emphasis on managing the information gathered from consumers (Cyril Eze *et al.*, 2013; Bhuiyan, 2011; Gibb, 2000). The organisations interviewed expressed a similar opinion and suggested that the resources to conduct research, gather information and manage the information collected was not possible due to resource constraints such as money and time.

While existing literature outlines various approaches to market orientation (Van Kleef *et al.*, 2005; Sorenson and Bogue, 2005; Bogue *et al.*, 1999) the reality identified by this research shows that these approaches were not being used. Irish seafood organisations were developing value-added seafood products in a market that has an extremely high failure rate. However, they were not completing the necessary steps in the NPD process, particularly in the early stages, through the use of consumer integration techniques, to ensure that those products were successful. Organisations were taking a haphazard approach to their NPD activities.

The SMEs interviewed suggested that they did not have a culture of innovation. There was very little structured innovation taking place in Irish seafood related SMEs. There were innovative employees and potential intrapreneurs within many of the organisations, however, their capabilities were not being exploited. Idea generation was almost non-existent in a formal setting within the industry. The consumer had very little input into the concept development process and the input that did involve the consumer was informal. This fact was reinforced by consumers in the focus group. It was established in the literature that the formal gathering and management of

consumer knowledge at the initial stages of the NPD process is essential in meeting the needs of the consumer (Van Kleef *et al.*, 2005; Bogue *et al.*, 1999). This consumer knowledge should be used in vital stages of product development, in particular the design stage, through the conversion of tacit information to explicit knowledge. This explicit and actionable knowledge will influence the design of new innovative foods, through a market-oriented methodology (Sorenson and Bogue, 2005).

While there was a significant lack of formal consumer involvement in the early stages of the NPD process of Irish seafood related SMEs, there was more activity in assessing the needs and wants of the consumer via other stakeholders, however in an informal manner. Organisations were informed of the needs and wants of consumers through a variety of sources such as industry partners. The most formal of these were the industry partners who supplied organisations with general market information and specific market information in some cases if requested directly by the organisation. However, the management for such knowledge was not a priority and was often viewed as a casual conversation rather than an insight into the market demands and the consumer's motivations for purchasing specific products. Previous research has shown that knowledge obtained about the market from the consumer and other stakeholders was associated with the success for new food products (Baggio and Cooper, 2010; Stewart-Knox *et al.*, 2003; Hoban, 1998; Kristensen *et al.*, 1998).

Research sub-question 2 (RSQ2): *What are the current frameworks being used in the new product development process of the small and medium Irish seafood enterprises?*

This research concludes that the Irish seafood related SMEs interviewed did not have a standard NPD process that was used across the industry. A significant number of the selected sample had no formalised process for NPD. The NPD process was different in every organisation interviewed, which was expected, as every organisation is different. While there is extensive literature on best practice and appropriate processes for NPD in general, there is a gap in the literature in relation to the best practice for NPD in food related SMEs. There was no established model, roadmap or structure for organisations to follow as there is in other industries. Due to this lack of recognised structure, most organisations that had a process, developed that process over time, through trial and error. Generally, the format that the organisations followed was idea

generation; develop a prototype; shelf life testing; costing; sensory testing; packaging and sales. This is not an exhaustive list, however, this research indicated that these were the steps taken by most organisations in the development of new products. The list is also not in ascending order, some organisations did not conduct their product development in the above order or even as a systematic process, and often steps were conducted in parallel. In addition to a lack of structure for the NPD process, there was almost no strategy or separate budget for NPD in the organisations. The information gathered from the interviews along with the literature suggests a realistic NPD process model for food related SMEs and specifically Irish seafood related SMEs (see Figure 11.4).

Figure 11.4 shows the NPD process of Irish seafood related SMEs. The first step in the process is 'Idea generation'. This step is to be conducted in coordination with consumers and other appropriate stakeholders such as suppliers or retailers in a formal and market-oriented fashion using consumer integrations techniques. This step is generally accepted as the first step in all NPD processes and can be seen in Table 2.7.4. The second step is 'Develop a prototype'. This is the first step which varies from other models as this model is specifically for food related businesses. The interviews and literature highlighted the importance of the development of a prototype early in the NPD process, as food products require testing, such as shelf life testing and sensory acceptability that cannot be conducted without a prototype. If a product does not pass these tests, then it is pointless using resources on other steps in the process. At the end of each step in the process, there should be an assessment of the viability of the product and whether it should proceed to the next step or not, similar to the Stage Gate process (Figure 2.7.1).

Sensory analysis was regarded by SMEs as the most important step in the NPD process. All SMEs suggested it was a key part of their process and that they allocate significant time to this step. There was no defined strategy for sensory testing and this is similar to the SMEs approach to the process as a whole. Of the five senses, the two which organisation placed most emphasis on were the visual aspects and the taste. Overall, the taste was considered to be the most important sensory attribute. A few SMEs believed that visual attributes eclipsed taste. The reasoning behind this was that they believed that if a product was not visually appealing then the consumer would

never buy it and taste it. However, the majority of organisations stated that they would not trade off on taste for optimal visual attributes because if the taste was lacking consumer would not buy the product repeatedly. According to both the interviews with SMEs and the focus groups with consumers, this was also the step in the NPD process in which consumers were most involved. In most cases, this was the first time the consumer had an input into product development.

Figure 11.4 The NPD process of Irish seafood related SMEs

Source: Author

The interviews revealed that sensory testing in the SMEs was carried out in both a formal and informal manner. The informal method involved customers, employees and family and friends of management tasting the product and giving their opinions.

This was conducted in factory settings, shops and the homes of management. It was not scientific and the information gathered from these sessions was often mismanaged. Carpenter *et al.* (2012) suggest that sensory analysis is more to do with product quality elements such as description, consumer preferences and discrimination rather than merely the senses alone. By such a definition, the method of sensory analysis described above could be considered to be a form of sensory analysis on an informal level. However, Stone *et al.* (2012) describe sensory analysis as a scientific discipline, which is required in the measurement and interpretation of reactions of the senses (sight, smell, taste, touch and hearing). Based on such as definition it is reasonable to suggest that such a method of sensory analysis as described above are not actually sensory analysis, as it is not scientific enough. The reason that SMEs were using non-scientific methods of sensory analysis was due to resource constraints. The SMEs interviewed suggested that non-scientific sensory analysis was most appropriate for their business.

A number of organisations did use food labs and formal and scientific sensory testing. This sensory testing in all cases was conducted off-site, in association with industry partners or by hired organisations. As this analysis was conducted off-site and the organisation was not directly involved in the sensory testing most organisations did not have a clear understanding of how the analysis was conducted on their product. Many SMEs sent products to be tested with little or no criteria of what attributes they wanted examined or the target market to be tested. However, most believed that the organisation conducting the sensory analysis on their behalf were capable of conducting the appropriate tests and retrieving the results without any guidance.

Research sub-question 3 (RSQ3): *What product attributes drive consumer preferences for seafood products using a fish that is unfamiliar to the consumer?*

This research concludes that the use of consumer integration techniques at the idea generation and concept development stages of NPD can lead to the development of market clusters based on product attribute preferences. The identification of these clusters allows for product development, including seafood products containing unfamiliar fish, based on the wants of specific consumers. The use of a NPD model is not enough to ensure NPD success. An appropriate NPD process must be paired with consumer integration techniques that provide organisations with insights into customer`s choice motives.

The focus groups highlighted that the consumer placed a significant importance on the role that seafood plays in their diet as a 'healthy food'. Customer`s perceptions of seafood were positive, and seafood was deemed to be a healthy option as a source of protein compared to other sources of protein such as red meat. This health awareness led to the only product attributes perceived as healthy being considered acceptable by focus group participants such as oven baking over deep-frying. The focus group discussions revealed that the preferred seafood concepts would be fresh rather than frozen and cooked in a manner participants considered healthy. For example, in the case of the new seafood concept, the inherent benefits associated with seafood seemed to influence customer`s preferences towards a product that for example aided recovery after sports training in young athletes or those participants who wanted to eat lean sources of protein.

While this health consciousness was a significant priority for all participants there was also a want and need for convenience. The need for convenience was echoed through all focus groups, with most participants insisting that when it came to food and cooking, time was always limited and over-complicated processes would deter them from purchasing a product. This convenience was considered to be more of a priority in relation to seafood products than it would be for other sources of protein. This was because most focus group participants had little to no knowledge of how to cook and serve seafood to ensure optimum health benefits and optimum flavour. For example, in the case of this new seafood concept, the packaging and cooking method which allowed for the least amount of effort while not compromising on health was the most preferred by participants, particularly young single participants.

In addition to health concerns, the research of Bord Bia (2014) and Honkanen *et al.* (2006) is consistent with the conclusion of this research, which indicated that there was an increased awareness of the depletion of seafood stocks and the need for the development of products, which were sustainable, and prevented the further depletion of seafood stocks. This research, particularly in the focus groups and conjoint analysis, highlights results that consumers place a significant importance on being made aware, that the seafood products they buy are caught from a sustainable source.

The market-oriented approach to NPD allows for the classification of market segments and therefore the identification of target markets for new seafood products. This

research provides a tool for SMEs to develop products based on specific attributes demanded by the consumer in the seafood market and provides a method to strategically market those products. The majority of focus group participants reportedly experimented with seafood products and were open to trying a new seafood product with which they were unfamiliar. The conjoint and cluster analysis techniques identified a number of clusters that had different preferences for seafood products. All clusters gave a positive utility value for 'fresh' products from a brand with which they were 'familiar'. These were the only two attributes that were consistent in all three clusters. For all clusters, products that had the attribute of 'frozen' rather than 'fresh' was identified as the attribute that clusters were least likely to trade off on. Participants demanded that a seafood product with which they were unfamiliar would be in a form, which was familiar, in this research a fish cake. Another significant demand from participants was that the seafood be from a sustainable source and not depleting valuable stocks of fish. This research identified three clusters, which an organisation could target and consider when developing a new seafood product. The demographic details and attribute preferences of each cluster are outlined in detail in Chapter 9.

The relevance of these clusters to the SME is that each of these clusters provides a potential segment that could be targeted by a new product or a single product could have variations for each cluster. This research can affect the manner in which Irish seafood related SMEs view market-orientation and evaluate the Irish seafood market. This study also identified variables that distinguish market segments such as family lifestyle stage and age. The research also identified the specific elements that were prioritised by consumers and therefore segregated clusters, such as the level of convenience, preparation and cooking of seafood. The consumer integration techniques adopted in this study and particularly the conjoint and cluster analysis allowed for the identification of the ideal product design attributes for a range of seafood concepts, which could then be targeted at specific markets. The resultant clusters identify the potential number of segments and the segment attributes.

The aim of this study (RA) was to examine the use by SMEs, of consumer insights in the development of more sustainable and value-added, new seafood product concepts. Including products with unfamiliar ingredients, this process aims to increase consumer acceptance. The increased level of expected demand will allow new and

innovative seafood products to enter the market successfully, with a particular emphasis on value-added products (BIM, 2013). Any growth in the value-added sector will include increased use of species that will be new to consumers (BIM, 2016a). Acceptance of a new food product usually indicates actual use, that is, purchase and eating of the product (Jaeger and MacFie, 2010). The use of sensory acceptability testing on a prototype product allowed for the evaluation of whether boarfish, which is currently unavailable on the Irish market and unfamiliar to most consumers, was a viable main ingredient for product development by SMEs. The positive results from the sensory acceptability testing suggest that if such a product was available on the Irish market it would be accepted by consumers.

11.4.1 Leveraging a competitive advantage for SMEs

There will be a requirement for increased competitiveness and innovation by seafood related SMEs. This is an opportunity for SMEs as they can capitalise on consumer trends by adding value through placing a focus on market research, innovation and NPD. An example of one such opportunity is seen currently in the Irish seafood industry. The seafood industry in Ireland has seen a shortage in the supply of established and conventional species of fish, this offers an opportunity for Irish seafood SMEs to use less well-established species of fish in the creation of value-added products (Shelman, 2016; Farrelly *et al.*, 2014). Such a move could also provide opportunities for future exportation of these products. The development of new markets will also call for the organisations to not only use underutilised species, but also become innovative and diversify their new product ranges. The literature indicates that the greatest value lies in the pelagic sector (Bord Bia, 2017a). With boarfish having a significantly high market share, there is the potential for Ireland to become a market leader, at both a European and international level, in the development of sustainable value-added pelagic fish products.

The development of a NPD strategy and adoption of a formalised NPD process can provide a platform for organisations to successfully develop new products and avoid the high failure rates as seen in the food industry. In order to protect the innovation process, there is the necessity for business models to provide structures for the success or failure of a product. An organisation that can develop or adopt a model that is

structured and in line with the strategy of the organisation can then ensure products which make it through the process will be successful in the marketplace.

Understanding of the wants and needs of the consumer can be easily achieved through the development of a market-oriented culture. Such a culture, which puts the consumer at the centre of product development and uses consumer integration techniques in the development of products that the consumer will want, creates products that are more likely to be successful in the market. There is an abundance of literature, which highlights the positive association of market orientation and the improved performance of an organisation (Urde *et al.,* 2013; Wang *et al.,* 2012). This research shows that consumers do have opinions in relation to all food products that they consume. In addition, in this instance, they are actively interested in engaging in the development of new seafood concepts prior to the sensory analysis stage of NPD. There are currently informal inputs by consumers in relation to their wants and needs. The steps required to formalise that gathering and analysing of information from consumers can be achieved easily i.e. by hosting focus groups rather than informal gatherings and by using simple thematic analysis to identify themes in the conversation.

Furthermore, the use of a conjoint analysis in the early stages of product development, can aid the development of successful market-oriented products. The concept of conjoint analysis allows for the creation of product concepts, with multiple combinations and variations of a product, in the early stages of the NPD process. This process allows organisations to develop a concept and ultimately a product with attributes that are aimed at a specific market segment or their target market. Developing a product that is market orientated also inspires a culture of experimentation and continuous improvement on systems and processes, allowing an organisation to become distinctive over the long term, resulting in a sustainable competitive advantage.

Finally, the seafood market provides current and future opportunity for growth especially as the sustainable value-added sector grows both nationally and internationally. The literature suggests that organisations who viewed their NPD as a long-term strategy are more adaptable and successful (Jiménez-Jiménez and Sanz-Valle, 2011; Kumar *et al.,* 2011). The use of consumer integration techniques,

including consumer insights throughout the NPD process and in particular at the initial and idea generation and concept development stages, will assist Irish seafood SMEs in their strategic marketing decisions for seafood concepts such as target markets, methods of communication and appropriate pricing.

11.5 Overall conclusions

The overall research question that guided this study was *"What role can consumer integration techniques play in small and medium enterprises, in the Irish seafood sector, in understanding consumer's demands for seafood products?"*

The main conclusion of the research is that the use of consumer integration techniques can be employed by seafood SMEs to become more market-oriented in the development of new products, without a significant strain on resources. Organisations that adopt a model for NPD along with a market-oriented approach to NPD will gain a profound understanding of customers' wants and needs. Consumer integration techniques are the most appropriate way of achieving this. This, in turn, can assist Irish seafood SMEs in the recognition and development of market segmentation and make appropriate marketing and product development decisions. Concept optimisation research techniques such as adopting consumer integration mechanisms can assist organisations in the development of successful value-added products.

This research highlights three key conclusions. The first is that the Irish seafood SMEs in this study are not market-oriented and use limited consumer integration techniques. The second is that for the benefit of these organisations, the consumers need to play a role in the product development process. Finally, consumers and the market generally, have specific demands in relation to seafood products they want.

The interviews conclude that, through their own admission, Irish seafood SMEs do not take a structured and market-oriented approach to NPD. The innovation of SMEs and their ability to launch new products and services is vital to their survival and success. The interviews conducted with Irish seafood related SMEs suggest that innovation and some data collection is occurring, however, it is not being captured and utilised correctly in order to ensure successful product development and ultimately competitive advantage. If this innovation, data and other information gathered is managed correctly, in a formal process such as market orientation, then there is a

significant opportunity for Irish seafood SMEs to capitalise on the value-added market.

The inclusion of consumers during the early stages of the NPD process is necessary in order to overcome any misdirection and allow for the development of a product, which is aimed directly at addressing an actual want or need of the consumer. This research highlights appropriate methods of gathering and managing customer insights during the NPD process, specifically the initial stages. It also examined applying this method via advanced concept optimisation research techniques, to the development of a seafood concept, that uses a species of fish which is currently unavailable on the Irish market and unfamiliar to consumers i.e. boarfish. The lack of a formal process and consumer involvement during the initial stages of NPD contributes to the lack of long-term success of many new products for Irish seafood SMEs.

The final key conclusion is that consumers and the market generally, have specific demands in relation to seafood products they want. It was highlighted in the focus groups that consumers place higher levels of importance on certain attributes or benefits of a product such as sustainable seafood products, health benefits or fresh products. Gathering consumer's preferences, opinions and views in the initial stage of the NPD process via focus groups, allows for the identification of potential product design. During the focus groups discussions, valuable data was collected that would assist with, not only the product design, but also the marketing of such a product. The use of conjoint analysis then further allowed for the analysis of the products attributes and provided an insightful understanding of customer`s choice motives, which assists organisations in the process of market segmentation and new product design of new seafood products.

11.6 Knowledge contribution of the research

The main contribution to knowledge of this research is that it provides Irish seafood SMEs with the specific information required to become a more market-oriented industry. The use of consumer integration techniques can be employed by seafood SMEs to become more market-oriented in the development of sustainable, value-added products, including those containing unfamiliar ingredients, without a significant strain on the resources of SMEs.

The insights gathered through the interviews highlight that there was a need for this research to be conducted, as the seafood industry, like the food industry in Ireland, does not maintain a strong market-oriented focus in relation to NPD. The focus groups, conjoint analysis and sensory acceptability testing provide an example of formal consumer integration techniques that can be adopted by seafood SMEs during their NPD process, that are inexpensive and effective in providing insights into the current market and consumer demands. This study focuses on the use of a sustainable seafood ingredient, boarfish, in producing value-added products. It demonstrated how Irish seafood SMEs can adopt consumer integration techniques to increase consumer acceptance and ultimately improve NPD success rates for SMEs.

The use of boarfish in this research was done so with purpose. The literature, worldwide, is consistent in its predictions that there will be need for the seafood industry to play a significant role in the supply of protein as the population increases. This increase in population will demand the introduction of less well known or unfamiliar species of sustainable fish, such as boarfish.

The knowledge contribution of the research will be established through addressing the knowledge gaps (Figure 4.8 below). A summary knowledge contribution of the research can be seen in the Table 11.6

11.6.1 Research Gap 1

While the literature stresses the importance of NPD and market-oriented NPD for the success and development of all organisations, the research highlights a gap in the literature in relation to the development of new products for food related SMEs. There is no appropriate NPD process or systematic framework for food related SMEs. There is also no current research on the points of engagement with consumers as part of the NPD process, for food related SMEs. Also, the fact that there is an absence of sufficient investment regarding time and resources at certain stages of the NPD process of Irish seafood related SMEs has been identified, but previous research does not elaborate in detail as to the reasoning for the lack of investment.

This research developed an appropriate step by step NDP model for seafood related SMEs (Figure 11.4). This model is a significant contribution to the existing literature on the NPD process of Irish seafood related SMEs. The model is based on previous

research, best practice and the primary research conducted. Such a model does not currently exist for Irish seafood related SMEs and is tailored specifically for the needs of this industry. The model, as it is based on information from 12.5% of the population and best practice, will allow seafood related SMEs to use a realistic and systematic approach to their NPD activities.

This research contributes to the current literature available on market orientation as it identifies the points of engagement of seafood related SMEs with consumers as part of the NPD process. The research highlights that currently, the consumer is not included until the later stages of the NPD process of Irish seafood related SMEs, specifically the sensory analysis stage. No seafood related SME interviewed formally included the consumer into the NPD process at the idea generation stage, as is necessary for an organisation to be considered to be a market-oriented organisation.

This research also contributed to the current bank of literature in relation to the reasoning for the lack of investment by seafood related SMEs in the NPD process. This adds to current literature which is already available on barriers to innovation and product development in food related SMEs. This research is consistent with the literature on multiple barriers such as money and the costs involved in the NPD process. Costs such as shelf life testing and packaging, with no guarantee for return on investment and the financial risk was a significant reason identified for Irish seafood SMEs not investing in their NPD process. A fear of failure and a fear of wasting resources are the reasoning offered for the lack of investment by seafood related SMEs in the NPD process.

11.6.2 Research Gap 2

The literature has extensive detail on the barriers to developing a market-oriented culture and operating as a market-oriented organisation. This research contributed to the literature that already existed in this area and reinforces some of the existing literature. Managements is often viewed as a barrier to creating a market-oriented culture in the literature, such is the case in this research also. The resources such as time and money was considered to be a significant barrier in developing a market orient culture also. However, in the context of this research in Irish seafood related SMEs the most significant barrier, which has not previously been highlighted in the

literature is a lack of education or knowledge on how to become a market-oriented organisation and the benefits to an SME of developing such a culture. This research demonstrated that Irish seafood related SMEs did not know how to become market-oriented and believed that the consumer was of no benefit to their NPD process prior to sensory analysis. This mind-set stemmed from a lack of knowledge on the benefits of market orientation and on how to include the consumer into the NPD process from the initial stages.

A SWOT analysis of Irish aquaculture industry in consultation with stakeholders conducted in 2015 identified that a key weakness in the sustainable development and growth of the industry, was a lack of support services and ancillary industries (DAFM, 2015b). There is also lack of support for the seafood industry, in comparison with other food related industries in Ireland, by the Department of Agriculture, Food and the Marine. The 2018 budget, for example, allocated €74.5 million to animal related R&D programmes while allocating €25 million to seafood related R&D programmes (DBEI, 2018). Deshpandé *et al.*, (1999) suggests that it is vital that money be allocated to the seafood sector for the development of R&D programmes, in order to generate information and insights from the consumer. This was highlighted by this research as an area which required attention, as it was a barrier to Irish seafood related SMEs being more market-oriented. The research, both primary and secondary, acknowledges that support is available to seafood related SMEs from governmental agencies, however there is not enough in the area of R&D. As a result there is a barrier to the generation of consumer insights, a core element of market orientation (Deshpandé *et al.* 1999).

11.6.3 Research Gap 3

This research identified the appropriate consumer integration techniques for seafood related SMEs. This was based on the barriers they face during the NPD process and in the development of products, which include an ingredient, which is unfamiliar to the consumer. In the development of market-oriented products by Irish seafood related SMEs, the main resource constraint was finance. This research contributes to the current bank of literature by identifying and utilising the most appropriate consumer integration techniques for seafood related SMEs. This research used focus groups, conjoint analysis and sensory acceptability testing, to demonstrate that Irish seafood

related SMEs can become more market-oriented and develop market-oriented products without a significant strain on resources. This researches contribution for Irish seafood related SMEs, is evident in its identification and demonstration of how to include the consumer into the NPD process from the initial stages based on the barriers they face.

11.6.4 Research Gap 4

This research, through a review of the literature and primary research, has identified areas of potential growth for SMEs NPD activities based on the actual wants and needs of the consumer and current market trends. Current market trends identify that the greatest potential growth is value-added seafood, using pelagic fish. This research also identified the attributes that consumers preferred when choosing a product concept, using a fish that is unfamiliar to the consumer. This contributes to the current literature available on the market trends in the Irish seafood sector. It also contributes to Irish seafood related SMEs areas of potential opportunity and targeting for NPD and confirms that a product including boarfish is acceptable to consumers in a sensory context.

This research also identifies three market segments based on their shared wants and needs from a seafood product. Cluster 1 (middle or later adulthood/ post family life stage/ married/ single income), Cluster 2 (middle adulthood/ family life stage/ married/ dual income) and Cluster 3 (later adolescence or early adulthood/ pre family life stage/ single/ single income) all had different requirements and preferences from the seafood products they would purchase. This research also identifies the attributes which consumers are less likely to trade off on when purchasing a seafood product. Such insights are an invaluable contribution to the literature available on the Irish seafood industry, as such an investigation had not been conducted in the past. Based on the wants of their target market, the insights also allow Irish seafood SMEs to determine which product attributes to focus on during development. This targeting of consumers, focuses resources on areas such as marketing and increases acceptability and ultimately success rates of NPD.

Research Gap 1: (RQ) (RSQ1) (RSQ2)

An NPD process appropriate for seafood related SMES.

The points of engagement of seafood related SMEs with consumers as part of the NPD process.

The reasoning for the lack of investment by seafood related SMEs in the NPD process

Research Gap 2: (RQ) (RSQ1)

The barriers that prevent seafood related SMEs from being more market-oriented.

Research Gap 3: (RQ) (RSQ1) (RSQ2)

The appropriate consumer integration for seafood related SMEs based on the barriers they face during the NPD process.

The appropriate consumer integration for seafood related SMEs, in the development of products which includes an ingredient, which is unfamiliar to the consumer

Research Gap 4:(RQ) (RSQ3)

The areas of potential growth for seafood related SMEs NPD activities based on the actual wants and needs of the consumer and current market trends.

The identification of the product attribute preferences of multiple market segments for unfamiliar seafood products

Figure 4.8 Knowledge gaps

Source: Author

Table 11.6 Key knowledge contributions

Research Gap	Key conclusion	Academic contribution
Research Gap 1: (RQ) (RSQ1) (RSQ2)		
An NPD process appropriate for seafood related SMES.	There is no appropriate NPD process or systematic framework for food related SMEs.	This research developed an appropriate step by step model for seafood related SMEs
The points of engagement of seafood related SMEs with consumers as part of the NPD process.	There is also no current research on the points of engagement of food related SMEs with consumers as part of the NPD process.	The research highlights that the consumer is not included until the later stages of the NPD process of seafood related SMEs, specifically the sensory analysis stage.
The reasoning for the lack of investment by seafood related SMEs in the NPD process.	A fear of failure and a fear of wasting resources are the reasoning for the lack of investment by seafood related SMEs in the NPD process.	This research contributed to the current bank of literature in relation to the reasoning for the lack of investment by seafood related SMEs in the NPD process.
Research Gap 2 (RQ) (RSQ1)		
The barriers that prevent seafood related SMEs from being more market-oriented.	This research demonstrated that Irish seafood related SMEs did not know how to become market-oriented and believed that the consumer was of no benefit to their NPD process prior to sensory analysis. This mind-set stemmed from a lack of knowledge on the benefits of market orientation and on how to include the consumer into the NPD process from the initial stages.	In Irish seafood related SMEs the most significant barrier, which has not previously been highlighted in the literature is a lack of education or knowledge on how to become a market-oriented organisation.

Research Gap 3: (RQ) (RSQ1) (RSQ2)		
The appropriate consumer integration for seafood related SMEs based on the barriers they face during the NPD process.	The main resources constraints of Irish seafood related SMEs in the development of market-oriented products is money.	This research contributes to the current bank of literature by identifying and utilising the most appropriate consumer integration for seafood related SMEs to develop market-oriented products without a significant strain on resources.
The appropriate consumer integration for seafood related SMEs, in the development of products which includes an ingredient, which is unfamiliar to the consumer	This research uses the focus group, conjoint analysis and sensory acceptability testing to demonstrate that Irish seafood related SMEs can become more market-oriented.	This research contributes to the current bank of literature by identifying and utilising the most appropriate consumer integration for seafood related SMEs to develop market-oriented products with unfamiliar ingredients.
Research Gap 4:(RQ) (RSQ3)		
The areas of potential growth for seafood related SMEs NPD activities based on the actual wants and needs of the consumer and current market trends.	Current market trends identified that greatest potential growth is value-added seafood using pelagic fish.	This contributes to the current literature available on the market trends in the Irish seafood sector.
The identification of the product attribute preferences of multiple market segments for unfamiliar seafood products	This research identified the attributes that consumers preferred when choosing a product concept using a fish that is unfamiliar to the consumer.	This research identifies three market segments based on their shared wants and needs from a seafood product. Such insights are an invaluable contribution to the literature available on the Irish seafood industry as such an investigation had not been conducted in the past.

Source: Author

11.7 Research limitations

A key limitation of the qualitative data collection methods employed by this study was the small sample size. In the case of the interviews, of a total 187 seafood organisations registered, only 24 were interviewed. That equates to a sample of 12.5% of the population available. Therefore, the results of the research are not a representative view of all Irish seafood organisations. Similarly only 40 consumers of seafood participated in the focus groups. Therefore, the results of this research are not a representative view of all Irish consumers of seafood. For the focus groups, conjoint questionnaire and sensory acceptability testing, participant selection was undertaken via non-probability sampling. As the sample was not completely random, there was not sufficient representation of the population of Irish seafood consumers. In addition, the focus groups, conjoint questionnaire and sensory acceptability testing were conducted on consumers of seafood. The screening question "Do you consume fish products at least once a month?" was asked. This question excluded non-consumers of seafood or those who did not consume seafood on a regular basis from the study. Therefore, it could be assumed that the results of this research are not representative of all seafood consumers in Ireland.

11.8 Recommendations to stakeholders in the seafood industry

The findings and results of this research have significant implications and provide a significant opportunity for seafood SMEs in Ireland. One of the main recommendations of this research is to develop and implement a market-oriented approach to the NPD activities of Irish seafood related SMEs. NPD is of the utmost importance for Irish food related SMEs moving forward. The process of NPD has risks associated with it, such as product failure and high costs. These risks can be lessened by adopting a market-oriented approach to the NPD activities and basing the SMEs process on an appropriate model. Market-oriented organisations have effective management of both information and knowledge gathered from the consumer, which results in the development of seafood products that meets the consumer`s needs and also allows for more innovative NPD.

The inclusion of the consumer at the initial stages of the NPD process rather than the latter stages, not only identifies the attributes desired by the consumer but can also

isolate undesirable attributes and product concepts. This early inclusion also allows for problems associated with certain concepts to be quickly identified. As a result organisations can develop a product the consumers actually desire and that offers a genuine market opportunity for the organisation. Market-oriented NPD also enables the segmentation of the market, allowing organisation`s to target a specific product at a specific market segment. Such an approach gives organisations a competitive advantage as they can align their marketing and product positioning strategies appropriately. It is recommended that government agencies provide training or supports for SMEs to run focus groups, conjoint analysis and other methods of data collection that would assist in the development of market-oriented products.

The study concludes that seafood products alone do not leverage enough competitive advantage. As a result, organisation`s must approach NPD with a sustainable and value-added focus, which considers multiple attributes and drives consumer`s choice motives. It is highly recommended that advanced concept optimisation research techniques are adopted as organisation`s will benefit from a deeper understanding of customer`s wants and needs.

This study contributes to the limited research conducted on boarfish acceptability and consumer acceptability of a product with which they are unfamiliar. SMEs, who consider the results of this study in their own product development, will have a more market-oriented seafood concept to begin their development. The research outlines three distinct clusters or target markets for possible product development. These clusters can be targeted specifically by SMEs, through the development of a product based on the preferred attributes of any of the three clusters. In addition, SMEs who use this research as a template, to develop their own products tailored more specifically to their own target market, will have a more successful product. This research also gives SMEs insights into the level of acceptability of unfamiliar species of fish by consumers. This research indicates that consumers have a positive association with boarfish and this may encourage Irish seafood SMEs to begin to introduce such a species into their NPD activities.

While it is argued that adopting a market-oriented approach to the NPD is the appropriate strategy for seafood related SMEs in Ireland, there is also a need to adopt a structured NPD process for these organisations. Organisation`s new product

performance depends mainly on its processes, resources, and strategies, which are vital to the success of product development. This research shows that maintaining a NPD strategy is strongly associated with the execution quality of NPD activities. Through careful strategic planning, seafood SMEs can develop structures specifically for food businesses. The development of NPD strategies, whether formal or informal, will assist SMEs in: planning; identifying problems and solutions; and managing the complexity and uncertainty that is part of all NPD activities. While organisations have a role to play in this, governmental and supportive organisations within this industry will also play a key role in the development of such a process. For policymakers, support mechanisms and assistance will be required to allow organisations to become strategic in their NPD and marketing activities.

11.9 Suggestions for further research

The food and beverage industry is known more for cost reductions and ingredient substitutions than they are for innovation. Within the industry even when innovation occurs, it is, more often than not, focused on areas such as new packaging or new processes rather than new product (Costa *et al.*, 2016). An investigation into the reason why the food industry focuses on incremental innovation rather than radical innovation would contribute to the current bank of information on types of innovation.

Much of the literature about knowledge management is based around: processes; policies and structures within organisations, such as knowledge transfer; organisational culture; absorption capacity; and the taxonomy of knowledge (Spraggon and Bodolica, 2012; Baggio and Cooper, 2010; Zahara and George, 2002). The literature also focuses significantly on larger organisations over SMEs. An in-depth study into knowledge management within SMEs and differencing micro, small and medium sized organisation is required. The identification of the specific challenges faced by SMEs in relation to knowledge management would allow solutions to be developed to ensure SMEs are utilising their consumer insights and resources.

The model ‘NPD process of Irish seafood related SMEs’ (see Figure 11.4) requires testing. An NPD process appropriate for seafood related SMEs which has been tested would make a significant contribution to the academic literature available in the area

of NPD processes for SMEs and specifically food related SMEs. It would contribute to the growing literature on NPD best practice for SMEs.

The research suggests that there is an opportunity to examine the impact that strategic planning has on the NPD process and the product outcomes and the nature of the planning process itself need further research in relation to food SMEs. This research reveals there is a lack of any formal NPD process and NPD strategy in the seafood related SMEs interviewed. There is a significant opportunity for in-depth research into the NPD process adopted by other Irish SMEs in other industries or other food related industries such as the dairy sector. A qualitative comparative study could be undertaken to reveal the differences in the NPD process of Irish seafood related SMEs and another Irish food related SMEs. The use of a comparison would allow Irish seafood related SMEs to identify areas of strength and weakness within their process. One such weakness which was identified, is that a more efficient and tailored process could be developed. A qualitative comparative study between the NPD process of Irish seafood related SMEs and another Irish food related SMEs who has successful NPD, such as the dairy industry, could also be beneficial in the development of a successful and tailored NPD process. The use of best practice could be a useful benchmark for seafood related SMEs in Ireland.

The increase in demand for fish can be seen internationally, with Irish seafood exports to international markets increasing. When this is considered in conjunction with decreasing supplies, this will necessitate new and innovative fish products to enter the market successfully, with a particular emphasis on value-added products. A similar study could be conducted in other countries that organisations are intending on exporting to, with the proposed target markets. Such research would allow Irish companies within the seafood sectors, to build and expand their capabilities outside Ireland, allowing them to be in a position to benefit from opportunities, which emerge internationally in the future. This could be achieved through focusing on continuous market research and data collection about, not only the needs of the target market, but also the capabilities of their competitors in these new markets (Urde *et al.*, 2013).

Research into the development of value-added boarfish products for human consumption will most likely require extensive scientific sensory analysis. Scientific sensory analysis was not a key element of this research, rather a subpart of a larger

research project, which focused on the sensory analysis techniques currently used by SMEs, therefore non-scientific sensory acceptability testing was conducted. There is an opportunity to conduct more in-depth sensory analysis to assist in the development of appropriate and acceptable boarfish products. The way in which an organisation values, measures and defines quality is subjective and this can have an impact into the extent to which sensory analysis is included in the product design (Fuller, 2016; Amerine *et al.*, 2013; Kilcast, 2010).

11.10 Summary

This research examines the role that consumer integration techniques play in SMEs in the Irish seafood sector, in understanding consumers' demands for seafood products. This study demonstrated how consumer insights can be used in the development for SMEs, of more sustainable and value-added new seafood concepts, in order to increase consumer acceptance including products with unfamiliar ingredients. The key conclusions from both the qualitative and quantitative elements of the research were discussed. The contribution to knowledge that this research makes was highlighted in this chapter. There were also recommendations made by the researcher based on the results of the qualitative and quantitative research conducted and suggestions for further research.

This research has uniquely identified the gap between the literature on NPD and the reality in the Irish seafood industry. It has clearly established the growing demand for new innovative products and has highlighted the increasing necessity of using new untried ingredients in these new products. The research makes recommendations to SMEs for NPD that recognises the limited resources available.

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Appendix 1 Interview Guide

Introduction
What is the management structure within the organisation? How many employees are there in the organisation? What is the primary function of this business? If new product development is *"the development of original products, product improvements, product modifications, and new brands through the organisations own R&D efforts"* does your organisation partake in new product development? If a new product is *"a product (either a good or service) new to the organisation marketing it".* When was the last time the organisation launched a new product? What are the types of products you produce? E.g. prepared consumer foods/ value-added
New products
On an annual basis, how many new products do you produce? There are six categorised of *"new products"* (see Definitions), which does this organisation produce most of? Can you tell me about the types of products you aim to produce when developing new products? What do you see as the benefits of new product development? What do you see as the barriers to new product development? How do these barriers affect your organisation particular? What do you consider to be a value-added product? Would you consider your product development to be value adding? Where value-added implies *"the improvement of the qualitative content of a product, therefore, improving the product's overall worthiness"*.
New product development (NPD) process
Can you describe the NPD process which is employed by the organisation? Is there any specific reason who you chose this process? Does the organisation have a budget and dedicated employees specifically associated with the development of new products? What is your current product development strategy? Where, or how, could you improve your product development strategy?

Market orientation
To what extent do you include the consumer in the NPD process? If so why or why not include them? What techniques do you use to understand the consumer or other stakeholders? Do you link with suppliers or other shareholders in relation to the consumer wants and needs? Does the retailer play a role or have an input into the NPD within the organisation? What role do agencies play in the product development process (Bord Bia/BIM)?
Innovation
How do you attain knowledge of product development? Where do your ideas come from? How do you innovate? What sort of market research do you conduct? Prompt: Focus groups/ surveys/sensory etc.?
Product development
What or who is your main target market? E.g. supply to supermarkets/ shops/ fishmongers. What category of fish do you use the most in your current products? What category of fish do you aim to use the most in your new products? What fish have you used in the past and do not currently use? Why do you no longer use those fish? Would you be open to using new species of fish in your products? To what extent does sensory analysis play a role in the NPD process? If so how do you incorporate it? Do your industry partners play a role in your sensory and flavour development? E.g. do you consider research conducted by BIM? What is your strategy for sensory testing? Do you include the consumer? Do you use food labs etc.?

Definitions:
New product development: is the development of original products, product improvements, product modifications, and new brands through the organisations own R&D efforts **New-to-the-world Products:** Products that are innovations "New-to-the-world products revolutionize existing product categories, or define wholly new ones" **New category entries:** Products, not new to the world, that take a firm into a new category. The new category is an imitation of an existing product (me-too") and provides entrance into new markets for a company. Even though the product already exists in the market, if a firm introduces the identical product into the market, it can be considered a new product. **Addition to product lines: Products that are line extensions:** these categories are new items to the firm, but they fit within an existing product line that the firm already produces. These categories are the new products that supplement the firm's established product lines. **Product improvements: A current product made better:** Practically, every product on the market today has been improved. These 'not-so-new" products can be replacements of existing products in a company's product line. However, they provide enhanced performance or greater perceived value over the old product. **Repositioning: Products that are targeted for a new use or a new application:** Repositioning, a new application for existing products, is selecting a new marketplace, solving a new problem and/or serving another market need. Aspirin, for instance, was a standard headache and fever reliever. However, since a new medical benefit was discovered for aspirin, aspirin is now positioned as a headache reliever as well as a preventer of blood clots, strokes and heart attacks. **Cost Reductions: Products that are designed to replace existing products at lower cost:** New products that provide a cost reduction, can replace existing products in the line, but can offer similar benefits and performance at a lower cost. **Value-added:** Value addition is the improvement of the qualitative content of a product or service, therefore, improving the product's overall worthiness

Appendix 2 Focus Group Guide

Introduction
What are the key factors in your life that impact on your food choice? For example, you are trying to maintain a healthy lifestyle or your partner cooks all your meals. Has your diet changed in the last number of years? If so, can you share some examples of those dietary changes and the reasons why you made those changes? Participants are shown the food pyramid and it is explained. Comparing your diet to the food pyramid, would you consider your diet to be health-focused and balanced? Why? In general, would you be open to trying new foods? What new foods have you purchased/consumed recently? What would encourage you to buy a new food product? Where, or by what means, would you be most likely to hear about a new food product? Have you ever been involved in any form of food product development as a consumer before? E.g. sensory analysis or focus groups?
Seafood consumption
For the purposes of this focus group seafood is any product that has fish or shellfish as the main component. This can be fresh, frozen or par-cooked in any form, for example, frozen fish fingers or a fresh darn of salmon. Who purchases/consumes seafood in your household? How often do you consume seafood products? Has your consumption of seafood changed in recent years? In what way? Did you always eat/ buy fish? Has the amount of seafood you eat increased or decreased? If yes, then why the increase or decrease? Where do you buy fish/ seafood products? What brands of seafood products do you buy? What motivates you to purchase seafood products? What discourages you from purchasing seafood products?
What categories of fish do you consume/ purchase (white/ oily/ shellfish)? Is there any category of fish you avoid purchasing and why? What format of seafood products do you normally purchase (filleted fish, convenient products, fresh, frozen)? Is there any format of seafood product you avoid purchasing and why?

Product Concept
A small seafood company in Ireland called "Sea Breeze" is considering launching a new seafood product into the Irish market. The company has decided that they would like to conduct some research before they decide on the type of product that they will launch. However, the management of Sea Breeze has decided that the category of fish used in the end product will be one which is not available in the Irish market currently. Sea Breeze has asked me, through discussion with you, to determine the product attributes that would be important to you and would impact your decision on whether or not to purchase the new product.
Is the method of cooking important to you? What would be the most appealing cooking method for you? Why is that the most appealing cooking method for you? Would the packaging play a role in your decision to purchase a seafood product? What type of packaging would you most like, for example, microwavable/ one use oven trays/ "cook in the bag"? Would you take into account whether the product is cooked or uncooked at the time of purchase? Would the brand be a factor you would consider? Do you always purchase the same brand or would you buy any brand once the product was what you required? In relation to what we call sensory appeal, how would the taste of a product impact your choice? Would you accept or want extra flavours in the form of an accompaniment e.g. a sauce/ butter? What flavours would you want or expect to experience? What would be your preferred accompaniment? Again, in relation to the sensory appeal, is there any visual attributes that would encourage you in the purchasing of a product? Would the texture of a product have an impact e.g. a crumb coating? Would smell influence your decision as to whether to purchase a product or not? Is there such a thing as a "too fishy smell"?
What portion size would most appeal to you and why? e.g. 1 or 2 people or family size. What prices would you expect, or be willing to pay per portion? Is there any additional element or attribute that would encourage you to spend more? Are there any other attributes that we have not discussed that would be of importance to you in deciding whether or not to purchase a seafood product that you are unfamiliar with?


How to use the Pyramid
The recommended number of servings for children (from 5 years of age*) and adults is highlighted beside each shelf. For example, to get at least 4 servings from the Fruit and Veg shelf you could have:
1/2 a glass of fruit juice = 1
3 dessertspoons of veg= 1
1 apple = 1
1 banana = 1
TOTAL = 4
Use the
FOOD PYRAMID
to Plan Your Healthy Food Choices
For serving sizes and daily eating plan see over
choose very small amounts
Choose oils, margarine or low fat spreads labelled 'High in Polyunsaturates' or 'high in Monounsaturates' which are healthier for your heart. Use sparingly. Limit fried foods to 1-2 times a week.
choose any 2
MEAT, FISH, EGGS, BEANS & PEAS
Choose lean meats or trim off fat.
Choose 3 servings during pregnancy.
choose any 3
MILK, CHEESE & YOGURT
Choose Low Fat choices frequently, except for young children. Choose 5 servings for teenagers or if pregnant or breast feeding.
choose any 4+
FRUIT & VEGETABLES
Choose green leafy vegetables, citrus fruit and fruit juices frequently.
choose any 6+
BREAD, CEREALS & POTATOES
Choose high fibre cereals and breads frequently. If physical activity is high, up to 12 servings may be necessary.
DRINK WATER REGULARLY - AT LEAST 8 CUPS OF FLUID PER DAY
Folic Acid - An essential ingredient in making a baby. If there is any possibility that you could become pregnant, then you should be taking a folic acid tablet (400 micrograms a day)
* For younger children, start with smaller and fewer servings and increase up to the guidelines recommended, according to the child's own growth and appetite.

Appendix 3 Focus Group and Sensory Acceptability Participants Questionnaire

Socio-Demographic details
Gender: Male □ Female □
Age Group: Please tick the appropriate age group box 18-24yrs □ 25-29yrs □ 30-34yrs □ 35-39yrs □ 40-44yrs □ 45-49yrs □ 50-54yrs □ 55-59yrs □ 60-64yrs □ 65-69yrs □ 70-74yrs □ 75+yrs □
Marital Status: Please tick the appropriate marital status box. Single □ Married □ Separated / Divorced □ Cohabiting □ Widowed □
Education Level: Please tick the appropriate box corresponding to the highest level of education actually completed to date. No Formal Education □ Primary Level □ Intermediate / Junior Cert. □ Leaving Cert. □ Vocational □ Third Level □
Occupational Status: Please tick the appropriate box corresponding to your occupational status Employed □ Seeking Work □ At Home □ Retired □ Unemployed □ Disabled □ Student □
Net Income (Per Week): Tick the appropriate box corresponding to your weekly net income. ≤€99 □ €100-149 □ €150-199 □ €200-249 □ €250-299 □ €300-349 □ €350-399 □ €400-449 □ €450-499 □ €500-549 □ €550-599 □ ≥€600 □ Decline to answer □
Number of Child Dependants (where applicable): _____

Format adapted from Sorenson (2006)

Appendix 4 Conjoint Analysis Questionnaire

Customer questionnaire on seafood products

The purpose of this research

The purpose of this research is to assess the market potential for a range of new seafood products. This research is being undertaken as part of a PhD Thesis. The information you will provide in this questionnaire is completely anonymous and confidential, and will not be divulged to second or third parties. The results of this study will be published in selected academic literature.

Introduction to the questionnaire

A person who purchases or consumes seafood products at least once per fortnight should only complete this questionnaire. For the purposes of this research, seafood is any product that has fish or shellfish as the main component. This can be fresh, frozen or par-cooked in any form, for example, frozen fish fingers or a fresh darn of salmon

The questionnaire is divided into two distinct sections. **Please answer all questions/tasks, in each section, where applicable.**

Section I: An evaluation of 22 hypothetical seafood products

In this section of the questionnaire, you are presented with 22 sample seafood products (Products 1 to 22) for evaluation. For the purpose of this study, the 22 sample seafood products will be in the form of a fish cake, which is made with a category of fish, which is not available in the Irish market currently. The cooking method for all sample products is oven cooked.

Each hypothetical seafood product is described by 6 attributes. These attributes are:

Brand, supplementary information available, price, format, accompaniment and packaging.

In this survey, **a short description accompanies each attribute** (see example below). By way of example, the sample seafood product shown below is **described** as a seafood brand you are familiar with. The fish cake is frozen and it is “bake in the bag” packaging for convenience. There will also be information available on the “health benefits” of the product. The product will cost a price of €1.65 per 300g (one portion) and be accompanied by a “lemon butter”.

Brand:	A seafood brand you are familiar with
Supplementary information available:	Health benefits of the product
Price:	€1.65 per 300g (one portion)
Format:	Frozen
Accompaniment:	Lemon butter
Packaging:	Bake in the bag

Once you have carefully read the product description, you must then rate (indicate) how likely you are to purchase the hypothetical seafood product. This is done by circling any number between 1 and 9 corresponding to how likely you are to purchase the new seafood product. By way of example, if you disliked the seafood product described above you might circle a low number (e.g. "2" is circled below to indicate a disliking for the seafood product described above).

1 (2) 3 4 5 6 7 8 9

Most definitely will not purchase — **either will nor will not purchase** — **Most definitely will purchase**

Again, by way of example, if you liked the seafood product described previously you might circle a high number (e.g. "9" is circled below to indicate a liking for the seafood product described previously).

1 2 3 4 5 6 7 8 (9)

Most definitely will not purchase — **Neither will nor will not purchase** — **Most definitely will purchase**

You may now begin evaluating sample 1-22

PRODUCT 1

Carefully read the description for Product 1 and rate how likely you are to purchase it.

Brand:	A seafood brand you are familiar with
Supplementary information available:	Of Irish origin
Price:	€1.65 per 300g (one portion)
Format:	Fresh
Accompaniment:	Tartar sauce
Packaging:	Remove product from a box or sleeve and bake in the oven

1 2 3 4 5 6 7 8 9

Most definitely will not purchase **Neither will nor will not purchase** **Most definitely will purchase**

PRODUCT 2

Carefully read the description for Product 2 and rate how likely you are to purchase it.

Brand:	A seafood brand you are familiar with
Supplementary information available:	Simple serving suggestions
Price:	€2.00 per 300g (one portion)
Format:	Fresh
Accompaniment:	None
Packaging:	Remove product from a box or sleeve and bake in the oven

1 2 3 4 5 6 7 8 9

Most definitely will not purchase **Neither will nor will not purchase** **Most definitely will purchase**

PRODUCT 3

Carefully read the description for Product 3 and rate how likely you are to purchase it.

Brand:	A seafood brand you are familiar with
Supplementary information available:	Health benefits of the product
Price:	€1.40 per 300g (one portion)
Format:	Frozen
Accompaniment:	None
Packaging:	Bake in the bag

1	2	3	4	5	6	7	8	9
Most definitely will not purchase			**Neither will nor will not purchase**				**Most definitely will purchase**	

PRODUCT 4

Carefully read the description for Product 4 and rate how likely you are to purchase it.

Brand:	A seafood brand you are unfamiliar with
Supplementary information available:	Of Irish origin
Price:	€1.65 per 300g (one portion)
Format:	Frozen
Accompaniment:	Lemon butter
Packaging:	Bake in the bag

1	2	3	4	5	6	7	8	9
Most definitely will not purchase			**Neither will nor will not purchase**				**Most definitely will purchase**	

PRODUCT 5

Carefully read the description for Product 5 and rate how likely you are to purchase it.

Brand:	A seafood brand you are familiar with
Supplementary information available:	Simple serving suggestions
Price:	€1.65 per 300g (one portion)
Format:	Frozen
Accompaniment:	None
Packaging:	One use oven tray

1	2	3	4	5	6	7	8	9
Most definitely will not purchase			**Neither will nor will not purchase**				**Most definitely will purchase**	

PRODUCT 6

Carefully read the description for Product 6 and rate how likely you are to purchase it.

Brand:	A seafood brand you are unfamiliar with
Supplementary information available:	Health benefits of the product
Price:	€2.00 per 300g (one portion)
Format:	Fresh
Accompaniment:	Tartar sauce
Packaging:	Bake in the bag

1	2	3	4	5	6	7	8	9
Most definitely will not purchase			**Neither will nor will not purchase**				**Most definitely will purchase**	

PRODUCT 7

Carefully read the description for Product 7 and rate how likely you are to purchase it.

Brand:	A seafood brand you are familiar with
Supplementary information available:	Health benefits of the product
Price:	€1.40 per 300g (one portion)
Format:	Fresh
Accompaniment:	Tartar sauce
Packaging:	One use oven tray

1	2	3	4	5	6	7	8	9
Most definitely will not purchase			**Neither will nor will not purchase**				**Most definitely will purchase**	

PRODUCT 8

Carefully read the description for Product 8 and rate how likely you are to purchase it.

Brand:	A seafood brand you are familiar with
Supplementary information available:	Simple serving suggestions
Price:	€1.65 per 300g (one portion)
Format:	Fresh
Accompaniment:	Tartar sauce
Packaging:	Bake in the bag

1	2	3	4	5	6	7	8	9
Most definitely will not purchase			**Neither will nor will not purchase**				**Most definitely will purchase**	

PRODUCT 9

Carefully read the description for Product 9 and rate how likely you are to purchase it.

Brand:	A seafood brand you are familiar with
Supplementary information available:	Of Irish origin
Price:	€2.00 per 300g (one portion)
Format:	Frozen
Accompaniment:	Tartar sauce
Packaging:	One use oven tray

1	2	3	4	5	6	7	8	9
Most definitely will not purchase			**Neither will nor will not purchase**				**Most definitely will purchase**	

PRODUCT 10

Carefully read the description for Product 10 and rate how likely you are to purchase it.

Brand:	A seafood brand you are familiar with
Supplementary information available:	Of Irish origin
Price:	€2.00 per 300g (one portion)
Format:	Fresh
Accompaniment:	None
Packaging:	Bake in the bag

1	2	3	4	5	6	7	8	9
Most definitely will not purchase			**Neither will nor will not purchase**				**Most definitely will purchase**	

PRODUCT 11

Carefully read the description for Product 11 and rate how likely you are to purchase it.

Brand:	A seafood brand you are familiar with
Supplementary information available:	Of Irish origin
Price:	€1.40 per 300g (one portion)
Format:	Fresh
Accompaniment:	Lemon butter
Packaging:	Remove product from a box or sleeve and bake in the oven

1	2	3	4	5	6	7	8	9
Most definitely will not purchase			**Neither will nor will not purchase**				**Most definitely will purchase**	

PRODUCT 12

Carefully read the description for Product 12 and rate how likely you are to purchase it.

Brand:	A seafood brand you are familiar with
Supplementary information available:	Simple serving suggestions
Price:	€1.40 per 300g (one portion)
Format:	Fresh
Accompaniment:	Lemon butter
Packaging:	Bake in the bag

1	2	3	4	5	6	7	8	9
Most definitely will not purchase			**Neither will nor will not purchase**				**Most definitely will purchase**	

PRODUCT 13

Carefully read the description for Product 13 and rate how likely you are to purchase it.

Brand:	A seafood brand you are unfamiliar with
Supplementary information available:	Of Irish origin
Price:	€1.40 per 300g (one portion)
Format:	Fresh
Accompaniment:	None
Packaging:	One use oven tray

1	2	3	4	5	6	7	8	9
Most definitely will not purchase			**Neither will nor will not purchase**				**Most definitely will purchase**	

PRODUCT 14

Carefully read the description for Product 14 and rate how likely you are to purchase it.

Brand:	A seafood brand you are unfamiliar with
Supplementary information available:	Simple serving suggestions
Price:	€2.00 per 300g (one portion)
Format:	Fresh
Accompaniment:	Lemon butter
Packaging:	One use oven tray

1	2	3	4	5	6	7	8	9
Most definitely will not purchase			**Neither will nor will not purchase**				**Most definitely will purchase**	

PRODUCT 15

Carefully read the description for Product 15 and rate how likely you are to purchase it.

Brand:	A seafood brand you are familiar with
Supplementary information available:	Health benefits of the product
Price:	€2.00 per 300g (one portion)
Format:	Frozen
Accompaniment:	Lemon butter
Packaging:	Remove product from a box or sleeve and bake in the oven

1	2	3	4	5	6	7	8	9
Most definitely will not purchase			**Neither will nor will not purchase**				**Most definitely will purchase**	

PRODUCT 16

Carefully read the description for Product 16 and rate how likely you are to purchase it.

Brand:	A seafood brand you are unfamiliar with
Supplementary information available:	Simple serving suggestions
Price:	€1.40 per 300g (one portion)
Format:	Frozen
Accompaniment:	Tartar sauce
Packaging:	Remove product from a box or sleeve and bake in the oven

1	2	3	4	5	6	7	8	9
Most definitely will not purchase			**Neither will nor will not purchase**				**Most definitely will purchase**	

PRODUCT 17

Carefully read the description for Product 17 and rate how likely you are to purchase it.

Brand:	A seafood brand you are unfamiliar with
Supplementary information available:	Health benefits of the product
Price:	€1.65 per 300g (one portion)
Format:	Fresh
Accompaniment:	None
Packaging:	Remove product from a box or sleeve and bake in the oven

1	2	3	4	5	6	7	8	9
Most definitely will not purchase			**Neither will nor will not purchase**				**Most definitely will purchase**	

PRODUCT 18

Carefully read the description for Product 18 and rate how likely you are to purchase it.

Brand:	A seafood brand you are familiar with
Supplementary information available:	Health benefits of the product
Price:	€1.65 per 300g (one portion)
Format:	Fresh
Accompaniment:	Lemon butter
Packaging:	One use oven tray

1	2	3	4	5	6	7	8	9
Most definitely will not purchase			**Neither will nor will not purchase**				**Most definitely will purchase**	

PRODUCT 19

Carefully read the description for Product 19 and rate how likely you are to purchase it.

Brand:	A seafood brand you are unfamiliar with
Supplementary information available:	Health benefits of the product
Price:	€1.65 per 300g (one portion)
Format:	Frozen
Accompaniment:	Lemon butter
Packaging:	Bake in the bag

1	2	3	4	5	6	7	8	9
Most definitely will not purchase			**Neither will nor will not purchase**				**Most definitely will purchase**	

PRODUCT 20

Carefully read the description for Product 20 and rate how likely you are to purchase it.

Brand:	A seafood brand you are familiar with
Supplementary information available:	Of Irish origin
Price:	€2.00 per 300g (one portion)
Format:	Frozen
Accompaniment:	None
Packaging:	Bake in the bag

1	2	3	4	5	6	7	8	9
Most definitely will not purchase			**Neither will nor will not purchase**				**Most definitely will purchase**	

PRODUCT 21

Carefully read the description for Product 21 and rate how likely you are to purchase it.

Brand:	A seafood brand you are unfamiliar with
Supplementary information available:	Of Irish origin
Price:	€1.40 per 300g (one portion)
Format:	Frozen
Accompaniment:	None
Packaging:	Bake in the bag

1	2	3	4	5	6	7	8	9
Most definitely will not purchase			**Neither will nor will not purchase**				**Most definitely will purchase**	

PRODUCT 22

Carefully read the description for Product 22 and rate how likely you are to purchase it.

Brand:	A seafood brand you are unfamiliar with
Supplementary information available:	Health benefits of the product
Price:	€1.65 per 300g (one portion)
Format:	Frozen
Accompaniment:	Tartar sauce
Packaging:	Bake in the bag

1	2	3	4	5	6	7	8	9
Most definitely will not purchase			**Neither will nor will not purchase**				**Most definitely will purchase**	

Section II: Personal information
In this section of the questionnaire, you are presented with 10 questions relating to your sociodemographic background. By way of reminder, the information you will provide in this questionnaire is completely anonymous and confidential, and will not be divulged to second or third parties.
Socio-demographic details
Gender: Male □ Female □
Age Group: Please tick the appropriate age group box 18-24yrs □ 25-29yrs □ 30-34yrs □ 35-39yrs □ 40-44yrs □ 45-49yrs □ 50-54yrs □ 55-59yrs □ 60-64yrs □ 65-69yrs □ 70-74yrs □ 75+yrs □
Marital Status: Please tick the appropriate marital status box. Single □ Married □ Separated / Divorced □ Cohabiting □ Widowed □
Education Level: Please tick the appropriate box corresponding to the highest level of education actually completed to date. No Formal Education □ Primary Level □ Intermediate / Junior Cert. □ Leaving Cert. □ Vocational □ Pursuing further education□ Third Level □
Occupational Status: Please tick the appropriate box corresponding to your occupational status Employed full time□ Seeking Work □ At Home □ Retired □ Employed part-time Self-employed□ Unemployed □ Disabled□ Employment or training scheme □ Student □ Other □
Net Income (Per week per household): Tick the appropriate box corresponding to your weekly net income. ≤€99 □ €100-149 □ €150-199 □ €200-249 □ €250-299 □ €300-349 □ €350-399 □ €400-449 □ €450-499 □ €500-549 □ €550-599 □ ≥€600 □ Decline to answer □
Number of Children under 17 (where applicable): _____
Number of Children over 17 (where applicable): _____
Which part of your county do you live in? (City) Centre □ (City) Suburban □ (County) Rural

Thank you for taking the time to complete this questionnaire

Format adapted from Sorenson (2006)

Appendix 5 Sensory Acceptance Testing

Question 1: How much do you like the appearance?

1	2	3	4	5	6	7	8	9
Dislike extremely				**Neither like nor dislike**				**Like extremely**

Question 2: How much do you like the colour?

1	2	3	4	5	6	7	8	9
Dislike extremely				**Neither like nor dislike**				**Like extremely**

Question 3: How much do you like the texture?

1	2	3	4	5	6	7	8	9
Dislike extremely				**Neither like nor dislike**				**Like extremely**

Question 4: How much do you like the flavour?

1 2 3 4 5 6 7 8 9

Dislike extremely **Neither like nor dislike** **Like extremely**

Question 5: How much do you like the overall product?

1 2 3 4 5 6 7 8 9

Dislike extremely **Neither like nor dislike** **Like extremely**

Question 6: How likely is it you would eat this product if it were available?

11 2 3 4 5 6 7 8 9

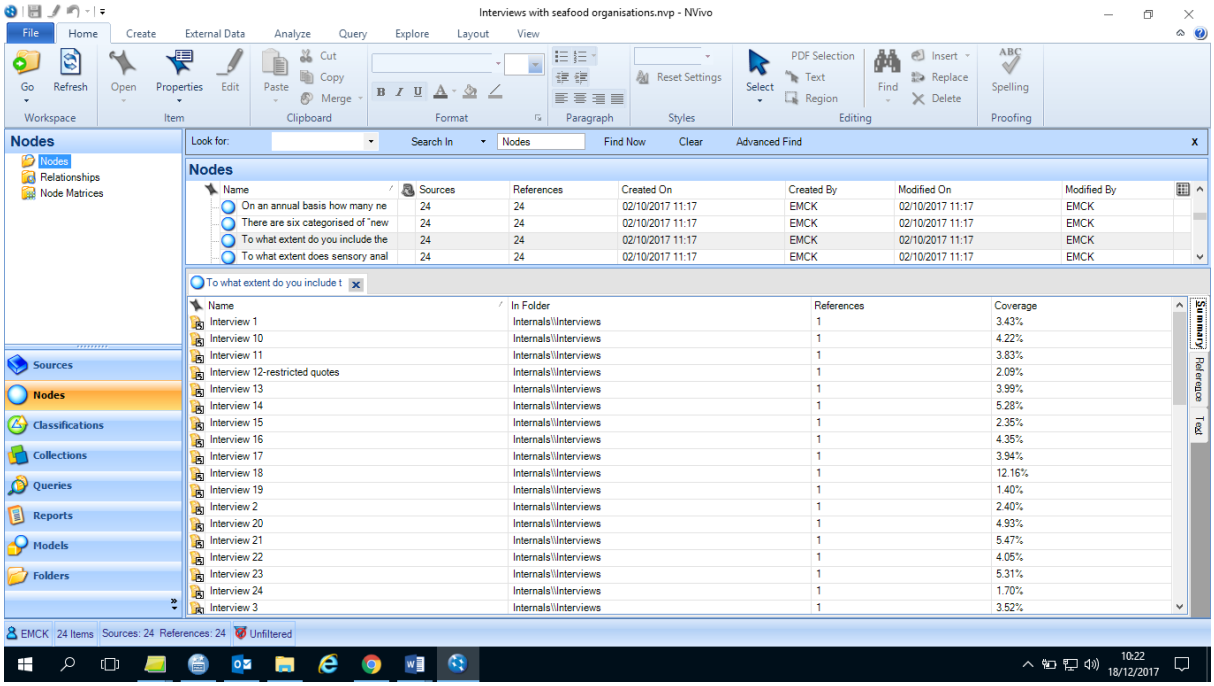
Dislike extremely **Neither like nor dislike** **Like extremely**

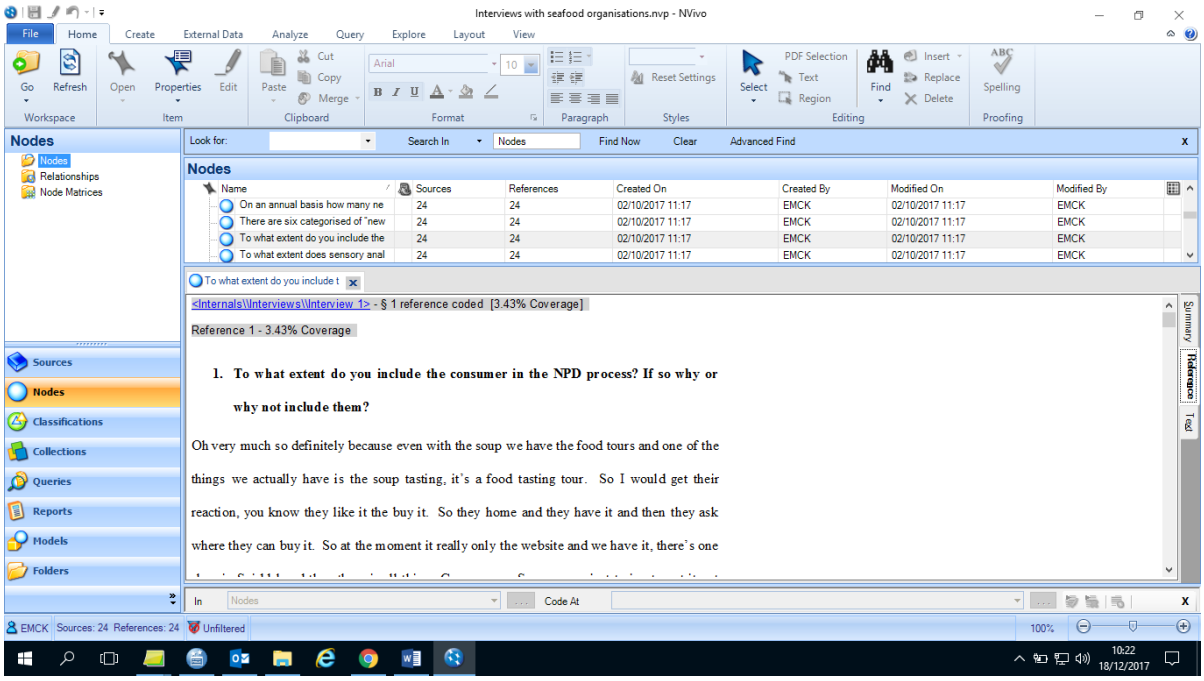
Question 7: How likely is it you would purchase this product if it were available?

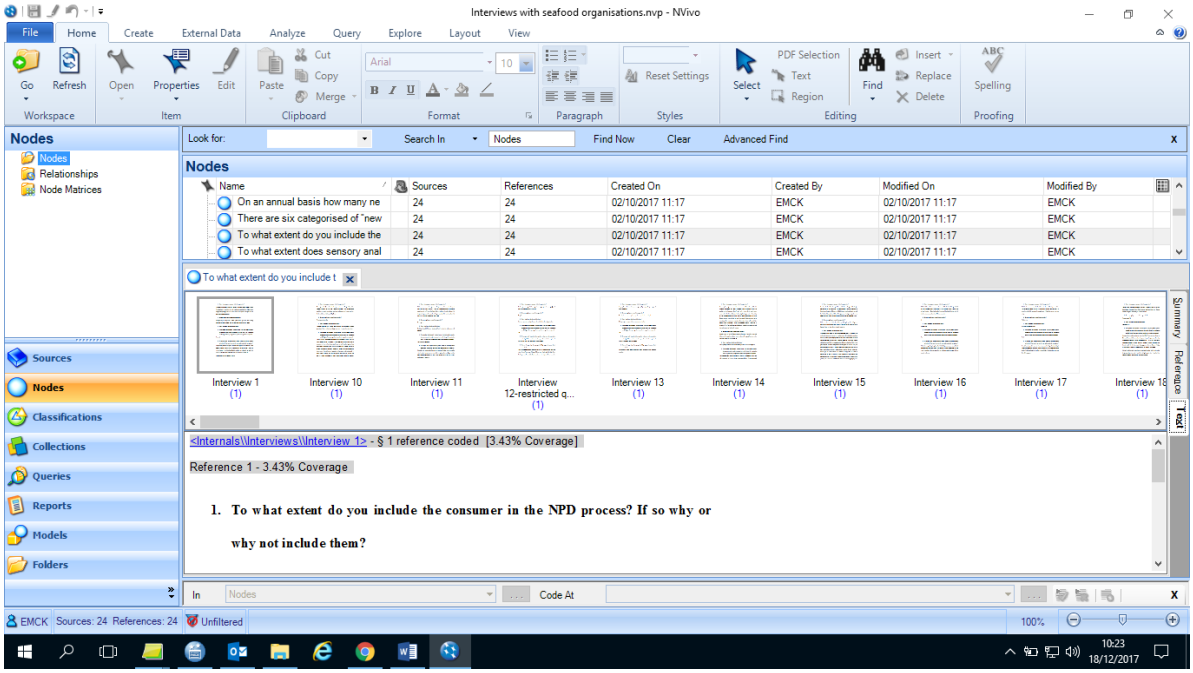
1 2 3 4 5 6 7 8 9

Dislike extremely **Neither like nor dislike** **Like extremely**

Appendix 6 Example of Qualitative Research Analysis Using NVivo 10






Interviews with seafood organisations.nvp - NVivo
Nodes
Relationships
Node Matrices
Sources
Nodes
Classifications
Collections
Queries
Reports
Models
Folders
Name
Sources
References
Created On
Created By
Modified On
Modified By
On an annual basis how many ne
There are six categorised of "new
To what extent do you include the
To what extent does sensory anal
<Internals\\Interviews\\Interview 1> - § 1 reference coded [3.43% Coverage]
Reference 1 - 3.43% Coverage
1. To what extent do you include the consumer in the NPD process? If so why or
why not include them?

Node Summary

Interviews with seafood organisations

18/12/2017 10:29

Source Type	Number of Sources	Number of Coding References	Number of Words Coded	Number of Paragraphs Coded	Duration Coded
Nickname: Nodes\\Interview questions\Can you describe the NPD process which is employed by the organisation~					
Classification:					
Aggregated: No					
Document	24	24	10,444	146	
Nickname: Nodes\\Interview questions\Can you tell me about the types of products you aim to produce when developing new products~					
Classification:					
Aggregated: No					
Document	24	24	3,407	63	
Nickname: Nodes\\Interview questions\Do you link with suppliers or other shareholders in relation to the consumer wants and needs~					
Classification:					
Aggregated: No					
Document	24	24	2,455	59	
Nickname: Nodes\\Interview questions\Do your industry partners play a role in your sensory and flavour development~ E.g. do you consider research conducted by BIM.					
Classification:					
Aggregated: No					
Document	24	24	2,608	73	
Nickname: Nodes\\Interview questions\Does the organisation have a budget and dedicated employees specifically associated with the development of new products~					
Classification:					
Aggregated: No					
Document	24	24	1,552	55	
Nickname: Nodes\\Interview questions\Does the retailer play a role or have an input into the NPD within the organisation~					
Classification:					
Aggregated: No					
Document	24	24	2,656	56	

Source Type	Number of Sources	Number of Coding References	Number of Words Coded	Number of Paragraphs Coded	Duration Coded
Nickname: Nodes\\Interview questions\How do you attain knowledge of product development~					
Classification:					
Aggregated: No					
Document	23	23	3,201	50	
Nickname: Nodes\\Interview questions\How do you innovate~					
Classification:					
Aggregated: No					
Document	24	24	3,321	84	
Nickname: Nodes\\Interview questions\How many employees are there in the organisation~					
Classification:					
Aggregated: No					
Document	24	24	624	50	
Nickname: Nodes\\Interview questions\If a new product is "a product (either a good or service) new to the organisation marketing it". When was the last time the organisation launched a new product~					
Classification:					
Aggregated: No					
Document	24	24	2,729	56	
Nickname: Nodes\\Interview questions\If new product development is "the development of original products, product improvements, product modifications, and new brands through the organisations own R&D efforts" does your organisation partake in new					
Classification:					
Aggregated: No					
Document	24	24	2,615	50	
Nickname: Nodes\\Interview questions\Is there any specific reason who you chose this process~					
Classification:					
Aggregated: No					
Document	24	24	2,689	58	
Nickname: Nodes\\Interview questions\On an annual basis how many new products do you produce~					
Classification:					
Aggregated: No					
Document	24	24	1,301	50	

Source Type	Number of Sources	Number of Coding References	Number of Words Coded	Number of Paragraphs Coded	Duration Coded
Nickname: Nodes\\Interview questions\There are six categorised of "new products" (see definitions), which does this organisation produce most of~					
Classification:					
Aggregated: No					
Document	24	24	5,059	115	
Nickname: Nodes\\Interview questions\To what extent do you include the consumer in the NPD process~ If so why or why not include them~					
Classification:					
Aggregated: No					
Document	24	24	4,229	102	
Nickname: Nodes\\Interview questions\To what extent does sensory analysis play a role in the NPD process~ If so how do you incorporate it~					
Classification:					
Aggregated: No					
Document	24	24	5,327	128	
Nickname: Nodes\\Interview questions\What are the types of products you produce~ E.g. prepared consumer foods~ value added					
Classification:					
Aggregated: No					
Document	24	24	2,298	56	
Nickname: Nodes\\Interview questions\What category of fish do you aim to use the most in your new products~					
Classification:					
Aggregated: No					
Document	24	24	2,850	51	
Nickname: Nodes\\Interview questions\What category of fish do you use the most in your current products~					
Classification:					
Aggregated: No					
Document	24	24	777	50	
Nickname: Nodes\\Interview questions\What do you consider to be a value-added product~					
Classification:					
Aggregated: No					
Document	24	24	2,510	61	

Source Type	Number of Sources	Number of Coding References	Number of Words Coded	Number of Paragraphs Coded	Duration Coded
Nickname: Nodes\\Interview questions\What do you see as the barriers to new product development~ How do these barriers affect your organisation particular~					
Classification:					
Aggregated: No					
Document	24	24	7,634	98	
Nickname: Nodes\\Interview questions\What do you see as the benefits of new product development~					
Classification:					
Aggregated: No					
Document	24	24	3,872	82	
Nickname: Nodes\\Interview questions\What fish have you used in the past and do not currently use~ Why do you no longer use those fish~					
Classification:					
Aggregated: No					
Document	24	24	1,711	52	
Nickname: Nodes\\Interview questions\What is the management structure within the organisation~					
Classification:					
Aggregated: No					
Document	23	23	2,004	51	
Nickname: Nodes\\Interview questions\What is the primary function of this business~					
Classification:					
Aggregated: No					
Document	24	24	1,621	50	
Nickname: Nodes\\Interview questions\What is your current product development strategy~					
Classification:					
Aggregated: No					
Document	24	24	2,740	52	
Nickname: Nodes\\Interview questions\What is your strategy for sensory testing~ Do you include the consumer~ Do you use food labs etc~					
Classification:					
Aggregated: No					
Document	24	24	2,609	102	

Source Type	Number of Sources	Number of Coding References	Number of Words Coded	Number of Paragraphs Coded	Duration Coded
Nickname: Nodes\\Interview questions\What or who is your main target market~ E.g. supply to supermarkets~ shops~ fishmongers.					
Classification:					
Aggregated: No					
Document	24	24	4,517	97	
Nickname: Nodes\\Interview questions\What role do agencies play in the product development process (Bord Bia~BIM)~					
Classification:					
Aggregated: No					
Document	24	24	4,199	71	
Nickname: Nodes\\Interview questions\What sort of market research do you conduct~ Prompt~ Focus groups~ surveys~sensory etc~					
Classification:					
Aggregated: No					
Document	24	24	1,863	62	
Nickname: Nodes\\Interview questions\What techniques do you use to understand the consumer or other stakeholders~					
Classification:					
Aggregated: No					
Document	24	24	3,101	63	
Nickname: Nodes\\Interview questions\Where do your ideas come from~					
Classification:					
Aggregated: No					
Document	24	24	3,262	62	
Nickname: Nodes\\Interview questions\Where, or how, could you improve your product development strategy~					
Classification:					
Aggregated: No					
Document	24	24	4,035	70	
Nickname: Nodes\\Interview questions\Would you be open to using new species of fish in your products~					
Classification:					
Aggregated: No					
Document	24	24	3,312	66	

Source Type	Number of Sources	Number of Coding References	Number of Words Coded	Number of Paragraphs Coded	Duration Coded

Nodes\\Interview questions\Would you consider your product development to be value adding~ Where value added implies "the improvement of the qualitative content of a product, therefore, improving the product's overall worthiness".

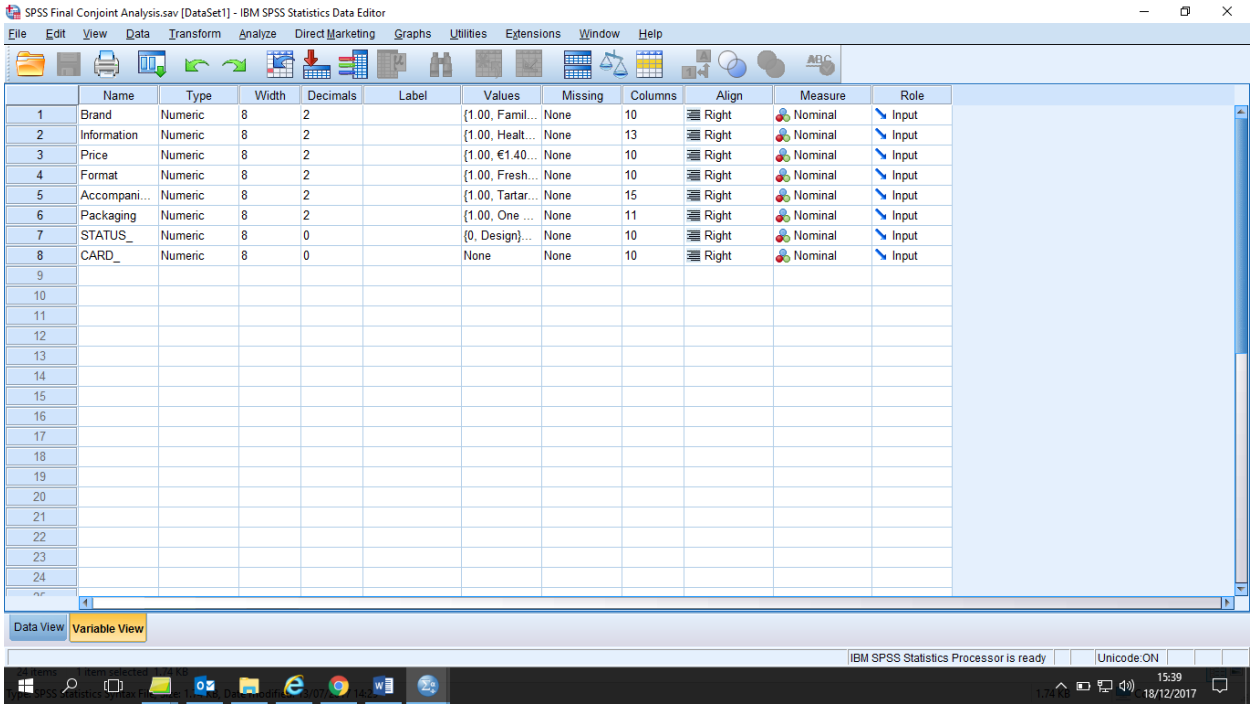
Nickname:

Classification:

Aggregated: No

Document	23	23	2,432	56	

Appendix 7 Example of Quantitative Research Analysis Using SPSS v23



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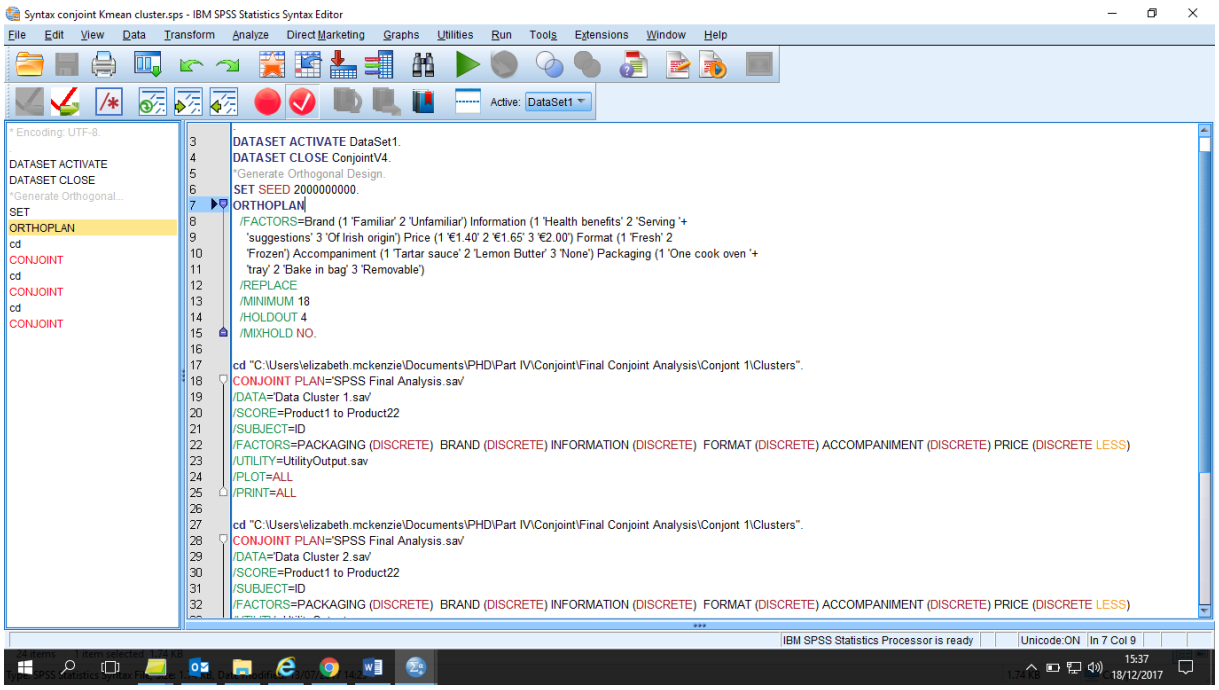
2	Information	Numeric	8	2		{1.00, Healt...	None	13	Right	Nominal	Input
3	Price	Numeric	8	2		{1.00, €1.40...	None	10	Right	Nominal	Input
4	Format	Numeric	8	2		{1.00, Fresh...	None	10	Right	Nominal	Input
5	Accompani...	Numeric	8	2		{1.00, Tartar...	None	15	Right	Nominal	Input
6	Packaging	Numeric	8	2		{1.00, One ...	None	11	Right	Nominal	Input
7	STATUS_	Numeric	8	0		{0, Design}...	None	10	Right	Nominal	Input
8	CARD_	Numeric	8	0		None	None	10	Right	Nominal	Input

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DATASET CLOSE ConjointV4.
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SET SEED 2000000000.
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    'suggestions' 3 'Of Irish origin') Price (1 '€1.40' 2 '€1.65' 3 '€2.00') Format (1 'Fresh' 2
    'Frozen') Accompaniment (1 'Tartar sauce' 2 'Lemon Butter' 3 'None') Packaging (1 'One cook oven '+
    'tray' 2 'Bake in bag' 3 'Removable')
  /REPLACE
  /MINIMUM 18
  /HOLDOUT 4
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DATASET ACTIVATE DataSet1.

DATASET CLOSE ConjointV4.

*Generate Orthogonal Design.

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ORTHOPLAN

 /FACTORS=Brand (1 'Familiar' 2 'Unfamiliar') Information (1 'Health benefits' 2 'Serving '+

  'suggestions' 3 'Of Irish origin') Price (1 '€1.40' 2 '€1.65' 3 '€2.00') Format (1 'Fresh' 2

  'Frozen') Accompaniment (1 'Tartar sauce' 2 'Lemon butter' 3 'None') Packaging (1 'One cook oven '+

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 /REPLACE

 /MINIMUM 18

 /HOLDOUT 4

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Appendix 8 Publications

McKenzie, E., Bogue, J. and Hamlin, R. (2017) *Market-Oriented Design and Strategic Marketing of New Pelagic Fish Products in Irish SMEs*. In Hanrahan, J. (editor) *Tourism and Hospitality Research in Ireland Entrepreneurs Driving Tourism and Hospitality*. Sligo: IT Sligo.

McKenzie, E., Bogue, J. and Hamlin, R. (2017) *Market-Oriented Design and Strategic Marketing of New Pelagic Fish Products in Irish SMEs*. Tourism and Hospitality Research in Ireland, Sligo, June 16th 2017.

McKenzie, E. Bogue, J. and Hamlin, R. (2017) *Market-oriented Design of New Seafood Concepts: An Integrated Methodological Approach*. Western European Fisheries Technology Association Conference, Dublin, 12th October 2017.