DOCTOR OF PHILOSOPHY

Organisational innovation in food sector SMEs
innovation orientation, types and process

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Award date:
2011

Awarding institution:
Bangor University

PRIFYSGOL
BANGOR
UNIVERSITY

Organisational Innovation in Food Sector SMEs: Innovation Orientation, Types and Process

By

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A thesis submitted in partial fulfilment of the requirement for the degree of Doctor of Philosophy in Management

May 2011

Acknowledgements

To my Parents

I find it important to thank all those who have supported me on this journey, as without them this would not be achievable.

First and foremost, I would like to express my sincere gratitude towards my supervisors; Professors Jenny Rowley and Sally Sambrook. Thanks for your attention, support, guidance and encouragements. Your belief was significant to the fulfilment of this study and what you taught will guide me forever.

I would like to thank BIC Innovation for giving me the opportunity to do this PhD. Dafydd Davies, Chris P. Jones, Huw Watkins and Jenny Rao thanks for your warm welcome and support. Dafydd, thanks for your enthusiasm and valuable suggestions.

I would also like to thank all those who helped me with data collection; food sector SMEs all around the UK who responded to my invitation.

My parents, who have made me who I am today, I truly thank. Without their constant support and encouragement none of this would be possible. I am forever indebted to you both. Also I would like to thank my sister, for being there for me. Mandana, thanks for your constant care and concern.

My deepest thanks go to my dear Iman, whose continuous support and belief over the past four years has made this day possible. Thanks for enduring my highs and lows. Your drive towards the final months of this study has been key to its completion.

Abstract

This study aims to contribute to knowledge on innovation types, orientation and processes. The study was conducted within the context of food sector Small and Medium Sized Enterprises (SMEs) in the United Kingdom. This context was chosen due to the paucity of context specific research on innovation specifically in the case of the food sector and SMEs. In conducting this study a positivist approach has been adopted with an objective view to innovation and a quantitative research method. A survey strategy was adopted and a self-administered questionnaire selected for the purpose of data collection. The questionnaire was distributed to food SME managers online, and in person to food exhibitions and festivals throughout the UK. In total, 221 responses were collected. Different methods such as Principal Component analysis (PCA), multiple regression and chi square test were applied in analyzing the collected data. In this study, an innovation orientation scale was developed with 5 dimensions. Also the nature of, and the relationships between, various strands of innovation were explored. In doing so, the relationship between various types of innovation was examined and a positive association was identified between all types of innovation (product, process, position and paradigm) with an exception for product and paradigm innovation. The relationship between stages of innovation and innovation orientation were studied, and this suggested that the initiation and design stages of innovation contribute significantly to innovation orientation. Furthermore, the roles of organisational characteristics on innovation orientation traits were examined and it was identified that organisational size affects innovation orientation more significantly than organisational age, product category or number of customer channels. In addition to above, innovation patterns of the food sector SMEs within the UK were profiled. Prior to clarifying the concept of innovation, types of innovation and devising the aims of this research a content analysis of the term 'innovation' on the past literature was conducted, which resulted in proposing a multidisciplinary definition of innovation. Additionally on the basis of complexities on the notion of types of innovation, this study has developed an innovation type-mapping tool as a reference model on the basis of past literature. One of the main contributions of this study is adding to the limited research on the concepts of position and paradigm innovation. This study also contributes to the literature by developing an innovation

orientation scale model. Additionally, by identifying a positive relationship between types of innovation this study validates the integrative view of types of innovation within the context of food sector SMEs. This study identifies lack of resources as one of the main factors differentiating micro organisations from small and medium sized organisations. Also the results of this study suggest many SMEs have a low level of engagement with external resources. Such detailed knowledge of innovation patterns among food sector SMEs, provides a platform for policy makers and practitioners to support, devise strategies and raise awareness on the basis of these sector specific characteristics.

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Chapter One - Thesis Introduction

The subject of this thesis has been introduced in this chapter. First, a brief overview of innovation is presented; this is followed by a discussion on various streams of innovation in relation with this study. Thereafter, the aims and objectives of this research are provided along with the motivational aspects of this study and the research methodology. This chapter is concluded with a description of the outline of this thesis.

1.1 The Innovation Imperative

> "Innovation is widely considered as the life blood of corporate survival and growth" (Zahra and Covin 1994, p. 183).

As marketplaces have become more dynamic, the interest in innovation, its processes and management has escalated. Consequently, organisations need to innovate in response to changing customer demands and lifestyles. Also, organisations must capitalize on opportunities offered by technology and changing marketplaces, structures and dynamics. Organisational innovation can be performed in relation to products, services, operations, processes, and people.

As long ago as 1950, Schumpeter argued that organisations should innovate in order to renew the value of their asset endowment. Even before the 1950s, whilst the term innovation may not have been used extensively, processes that are associated with innovation, such as economic or technological change, were perceived as being important (Veblen 1899; Lorenzi et al 1912; Schumpeter 1934). Innovation is recognised to play a central role in creating value and sustaining competitive advantage. Bessant et al (2005) on the role of innovation in renewal and growth emphasised,

> "Innovation represents the core renewal process in any organisation. Unless it changes what it offers the world (product, service innovation) and the way in which it creates and delivers those offerings (process innovation) it risks its survival and growth prospects" (p. 1366).

The significance of innovation is not restricted to business organisations. The USA has a Department for Innovation, and in the UK there has been widespread and ongoing acknowledgement of the importance of innovation. More recently, the UK's

Department for Innovation, Universities and Skills (2008) commented on the wider implications of innovation in the face of globalisation and environmental challenges by highlighting the importance of all types of innovation by creating and maintaining competencies and responding to environmental and demographic restrictions.

Although these various schemes have been undertaken to raise awareness towards innovation, Cottman et al (2001) study illustrates that although most UK companies are aware of the importance of innovation (on gaining competitive advantage), they are not committed to it and also they do not know how to commit to an innovative approach. This implies that organisations have a long route to go to achieve their full capacity of success through innovation.

There is agreement between scholars, policy makers and practitioners that in order to sustain their competitive position and to strengthen it, organisations and economies must innovate and promote innovation within the workforce. Hence, innovation can be perceived as a key policy and strategic issue for all organisations, regions and economies involved.

1.2 Key Themes in Innovation Research

Innovation research has various strands such as different types of innovation, innovation orientation and the innovation process. Additionally, the context within which innovations have been adopted influences the innovation processes such as organisational size category or industrial sector. These are discussed briefly below.

Types of innovation

'Type of innovation' is one of the key concepts of innovation. Innovations can have different end results such as products, processes and markets. The fact that innovation is a complicated topic that leads to new product, service or process introduced within an organisation means various types of innovation have been identified over the years resulting in a plethora of models, frameworks, classifications and definitions of types of innovation.

Consequently, it is difficult to understand the different type definitions used by different researchers and the relationships between the varied proposed types of innovation. For example, an early model by Knight (1967) proposes the following types of innovation: organisational structure, production process, people, and product/service. Various binary models proposed in the 1970s and 1980s discuss administrative and technical, incremental and radical, product and process as types of innovation (e.g. Evan 1966; Daft 1978; Damanpour and Evan 1984; Bantel and Jackson 1989; Damanpour 1991).

More recently, a number of integrative models have been proposed, all of which identify a number of different types of innovation. For example, Oke et al (2007) discuss the following types of innovation: product (including radical and incremental), service, and process (including administrative, service and production); and, Francis and Bessant (2005) discuss position, process, product, and paradigm innovation. In the interests of both building a coherent knowledge base around the concept of innovation to support the practice and execution of innovation in organisations, it is imperative to have a clear framework of the different types of innovation and the relationships between them.

Whilst many models have been developed differentiating between the types of innovation, some scholars have recently questioned the need for such a separation on the basis of the relationship between types of innovation within an organisation. Recent studies suggest interdependencies among innovation types, where implementation and adoption of one type of innovation may require or lead to implementation or adoption of another type (Wischnevsky et al 2011). Such an integrative view of innovation types counters the distinction between different types of innovation in the literature and suggests the need for further research on the interrelationship between types of innovation (Damanpour 2010).

Innovation Orientation

Another key concept within the innovation literature is innovation orientation. Innovation orientation is vital for organisations as it directs organisations towards an innovative culture by adding an innovation element to every aspect of the organisation. Thus, innovation is valued and pursued permanently, becoming a continuous process of development rather than a one-off task. Innovation orientation is not concerned with a specific type of innovation based on the firm's industry at one specific time but on an overall organisational propensity towards innovation (Garcia and Calantone 2002; Siguaw et al 2006).

Despite the fact that the importance of innovation orientation for organisational long-term success has been noted, little in-depth research has been carried out on facets of innovation orientation (Siguaw et al 2006). Moreover, among those studies that do focus on innovation orientation, innovation orientation has often been studied in relation to other strategic concepts such as competitiveness, learning orientation or business performance (Erdil et al 2004). This has resulted in a lack of knowledge on innovation orientation at an organisational level.

In their study of innovativeness and performance, Hult et al (2004) noted that although there exists a positive correlation between innovation and business performance, "little is known about the drivers of innovativeness" (p. 429). Also, conflicting results of past research could be due to weaknesses in the measurement of innovativeness (Subramanian and Nilakanta 1996). This results in a gap in the literature for an innovation orientation scale.

Innovation Process

The process of innovation comprises the steps organisations undertake from idea generation to production. Attempting to identify these stages, scholars have proposed various stage models of innovation. However, the extent of adoption of these process models within various sector and organisational types still needs to be examined (Adam et al 2006). Additionally, although many studies have emphasized the role of new product development processes in successful innovation (Cooper 1999; Cooper and Kleinschmidt 2007) and specifically the importance of the initial stages of such processes (Ernst 2002), the role of the different stages of innovation in relation to innovation orientation has not yet been explored.

Small and Medium Enterprises

SMEs play an important role within the UK economy by creating value due to their role in promoting flexibility, innovation, job creation and employment, and their size within the UK economy (Gray 2006). The importance of SMEs and entrepreneurial firms to economic development has been widely recognised in the UK and there have been many government initiatives focused on encouraging innovation in SMEs (Oke et al, 2007). Additionally, innovation activities in SMEs have received attention from researchers (Keeble 1997; Hoffman et al 1998; McAdam and Armstrong 2001). Nevertheless, literature on innovation among SMEs is fragmented and more research on drivers of innovation is required (Lee and Ging 2007; Oke et al 2007). Hence, to add to the limited research on innovation among SMEs, this research has chosen this specific context.

Food Sector

Given the differences in industry sectors, a sector specific approach in research within innovation has been emphasised repeatedly (Adam et al 2006; Damanpour 2010). For example, while pharmaceutical organisations are technology intensive, the food sector is known to be a low-tech sector; such differences within different sectors highlight the importance of sector specific research on innovation.

In their study of size distribution of firms in the UK, Pavitt et al (1987) noted,

> "Firms with fewer than 1000 employees are particularly important in machinery, instruments and R & D laboratories, where they produced more than 45 per cent of all innovations in the sector; whilst firms with more than 10 employees account for more than 75 per cent of mining, food, chemicals, electrical products and defence" (1987, p. 308).

Therefore, it is crucial to limit the study of innovation to specific sector/sectors. Accordingly, research on innovation among SMEs within the mining, food, chemicals, electrical products and defence is valuable due to the sector size.

Consequently, the food sector has been chosen for this research partly because the sector is important to the economy of rural regions. This sector has demonstrated the capacity to be innovative without necessarily having dedicated research and development resources (Harmsen et al 2000, Morgan et al 2003). Also, there is evidence that the food industry is a sector in which a complex interplay between strategic orientation, ownership types and market characteristics determines innovation behaviours (Traill and Meulenberg 2002). Finally, further research is required within this sector on the process of innovation, types of innovation and examining the role of antecedents of types of innovation within various contexts (Avermaete et al 2003a; Avermaete et al 2004; Fortuin and Omta 2009).

1.3 Research Aims and Objectives

In light of the above, this research aims to contribute to the knowledge on organisational innovation in food sector SMEs. The research questions of this study are presented below. Associated research objectives are listed under each research question:

1. What is innovation and what does it include?
    a. Propose a multidisciplinary definition of innovation.
    b. Develop an innovation types model.
2. What are the patterns of innovation among food SMEs?
    a. Profile innovation among food sector SMEs.
    b. Identify the types of innovation adopted by food SMEs and their relative significance.
    c. Explore the stage activities of the product innovation process, applicable to food SMEs.
3. What is the relationship between types of innovation?
    a. Explore the extent and nature of integration between different types of innovation in SMEs.
4. What are the key components of innovation orientation?
    a. Propose and test an innovation orientation scale model.
    b. Examine the importance of stages of product innovation on innovation orientation.
    c. Explore the relationship between organisational characteristics (e.g. age and size) and innovation orientation.

1.4 Motivation

BIC Innovation a business consultancy in Wales has sponsored this PhD study. Initially, this study was to focus on the New Product Development (NPD) process, however, once the researcher conducted an initial literature review, the study took a new turn on innovation as the concepts of innovation and NPD are intertwined. To clarify the complex notion of innovation, it was decided to conduct a thorough literature review on the definition of innovation. This resulted in development of a multidisciplinary definition of innovation and identification of various types of innovation. This in turn led to another study on various types of innovation and development of an innovation type-mapping tool.

At this point, after conducting a literature review on innovation and NPD, the researcher decided to focus mainly on innovation as NPD is among one of the various types of innovation, and there is paucity for research within various strands of innovation. This decision was also influenced by the researcher's interest in the concept of innovation and in exploration of the big picture (innovation) rather than its objects (NPD). A range of contradictory findings with various concepts of innovation, i.e. the role of organisational size on innovation, motivated the researcher to compare and contrast these concepts in one study to achieve a solid understanding of innovation within the selected context. In addition, studying the various concepts of innovation was deemed beneficial to the sponsors of this study (BIC Innovation).

1.5 Research Methodology

In exploring the concept of innovation this study conducted a content analysis of 'innovation', with the aim of clarifying the ambiguities associated with the term innovation and leading to the proposal of a generic multidisciplinary definition of innovation, this is presented in Chapter 2. Additionally, the existing typologies of innovation were reviewed to map the different terms used to describe types of innovation onto Francis and Bessant's (2005) model, this is presented in chapter 3, section 3.3.

This study has adopted a positivist approach with an objective stance to social actors. Subsequently, to generalise the innovation process among food SMEs a considerable data set is required; accordingly survey questionnaires were designed and distributed to managers of food SMEs across the UK. The questionnaire was designed to identify the extent of respondents' engagement with types of innovation, innovation orientation and stages of innovation. The innovation orientation and types sections were adapted from Siguaw et al (2006) and Francis and Bessant's (2005) studies.

The questionnaire was distributed through two different channels; they were online and face-to-face distribution in food exhibitions and festivals throughout the UK. The following statistical tests were carried out:

- Descriptive statistics were carried out to identify the patterns of innovation among food SMEs.
- Principal Component Analysis (PCA) test was conducted in producing an innovation orientation scale.
- Multiple Regression analysis was used in identifying:
    - the association between types of innovation
    - the importance of the stage activities of product innovation in innovation orientation
- Chi-square test was conducted in examining the impact of organisational characteristics on innovation traits.

1.6 Structure of the Thesis

A preliminary phase in the review of the literature, focussed on gaining a better understanding of what actually constitutes the term 'innovation' and the development of a definition of the concept innovation. This phase involved a content analysis on the basis of a variety of different definitions of innovation from different disciplines resulting in the proposal of a multidisciplinary definition of innovation. The results of this study have been published in *Management Decision* (Baregheh et al 2009) and details of the study are presented in the next chapter (abstract available in Appendix 1.1).

Chapter three, literature review, presents the previous research on various concepts of innovation, starting with an overview of innovation and its measurement techniques followed by a discussion on types of innovation and presentation of the innovation-type mapping tool developed in this study. Thereafter, the concepts of innovation orientation, innovation process, and antecedents of innovation, SMEs, and the food sector are discussed.

Chapter four, methodology, begins with an overview of the various concepts of research philosophy, methodology and the methodological stance of this study. This is followed by a description of the research method, questionnaire design, and pilot and data collection. The limitations of this study and ethical considerations are also discussed in this chapter. Chapter five, findings, provides a detailed description of the findings of this study on the basis of the statistical tests. To provide an overview of the collected data, initially the descriptive statistics of the data are presented. The findings on the relationship between types of innovation and the developed innovation orientation scale follow this. Finally, the specific role of stages of innovation and the antecedents of innovation on innovation orientation is discussed.

Chapter six, discussion, analyses the findings on the basis of the objectives of this study. This chapter compares the findings of this study with the previous research and highlights the specific contributions of this study. This is followed by chapter seven, conclusion, where the key findings of this study valuable to literature are presented, areas for further research are highlighted and recommendations for practitioners are provided.

Chapter Two - Defining Innovation

2.1 Introduction

Innovation is tightly coupled to change, as organizations use innovation as a tool in order to influence an environment or due to their changing environments (Damanpour 1991). However, innovation may involve a wide range of different types of change depending on the organization's resources, capabilities, strategies, and requirements. Common types of innovation relate to new products, materials, new processes, new services, and new organizational forms (Ettlie and Reza 1992). These different forms of innovation draw to varying extents on different teams, departments, and professional disciplines.

Innovation is of interest to practitioners and researchers across a range of business and management disciplines, and has been discussed variously in, for example, the literature on human resource management, operations management, entrepreneurship, research and development, information technology, engineering and product design, and marketing and strategy. Each of these different disciplines proposes definitions for innovation that align with the dominant paradigm of the discipline. As Damanpour and Schneider (2006) state: "Innovation is studied in many disciplines and has been defined from different perspectives" (p. 216).

Whilst there is some overlap between the various definitions of innovation, overall the number and diversity of definitions leads to a situation in which there is no clear and authoritative definition of innovation. As early as 1984, Ettlie et al commented on the problems for research and practice of innovation arising from this disciplinary void. More recently, both Zairi (1994) and Cooper (1998) have suggested that one of the challenges of innovation is the lack of a common definition that undermines understanding of the nature of innovation. A general definition adaptable to different disciplines and covering different aspects of innovation would be beneficial as "the term 'innovation' is notoriously ambiguous and lacks either a single definition or measure" (Adams et al 2006, p. 22).

This chapter draws on the work of Kahn et al who highlight the requirements for clarification of defining innovation "beyond just the typical extremes of incremental and radical innovation?" (2003, p. 197). So, what are the key definitions of innovation? How do these vary between different disciplines? What are the similarities and differences? Is it possible and helpful to construct a universal definition? Addressing these research questions, the aim of this chapter is to identify one multi-disciplinary definition of innovation. Such multi-disciplinary definition not only provides a better understanding of the notion of innovation for the diverse range of practitioners within organisations, but also enables researchers to collaborate more closely to more holistically investigate this complex concept. Therefore this chapter,

- Identifies the recurring attributes of 'innovation' that are included in diverse definitions of innovation.
- Proposes both a diagrammatic model and a simple textual definition which together act as a basis for summarizing the essence of 'innovation'.

In developing the concept of innovation and proposing a common definition of innovation across various disciplines a content analysis of the term innovation on the basis of 60 scholarly definition of innovation was undertaken. This started with a short literature review, reflecting on some of the previous definitions of innovation in order to illustrate the similarities and differences. The next section explains the methodology associated with the collection of the definitions, and the content analysis of the 60 distinct definitions that have been identified. This is followed by reporting the findings of the content analysis, which demonstrates the key attributes of the innovation definitions and the frequency of occurrence of descriptors to describe those attributes. On this basis, a model for the definition of innovation, together with a succinct textual definition of innovation is proposed; this definition is holistic and grounded in perspectives from different disciplines.

2.2. Literature on Definitions of Innovation

To demonstrate the diversity of the definitions of innovation and to press the case for the development of an integrative definition, a few examples of definitions of organizational innovation are presented; some of these emphasize different aspects of innovation and others are dedicated to a discipline. Thompson's (1965) early and straightforward definition simply states,

> "Innovation is the generation, acceptance and implementation of new ideas, processes products or services" (p. 2).

A similar definition of innovation was proposed more recently by West and Anderson (1996) and quoted as recently as 2008 by Wong et al (2009):

> "Innovation can be defined as the effective application of processes and products new to the organization and designed to benefit it and its stakeholders" (p. 2).

Kimberly (1981) defines innovation from a different perspective that embraces different forms of innovation:

> "There are 3 stages of innovation: innovation as a process, innovation as a discrete item including, products, programs or services; and innovation as an attribute of organizations"(p. 108).

Some scholars place emphasis on the degree of newness. For instance, referring to Van de Ven (1986), Jayanthi and Kingshuk (1998) state that,

> "As long as the idea is perceived as new to the people involved, it is an 'innovation' even though it may appear to others to be an 'imitation' of something that exists elsewhere"(p. 472).

Newness is also associated with change. Damanpour (1996) provides a detailed definition of innovation that is much quoted:

> "Innovation is conceived as a means of changing an organization, either as a response to changes in the external environment or as a pre-emptive action to influence the environment. Hence, innovation is here broadly defined to encompass a range of types, including new product or service, new process technology, new organization structure or administrative systems, or new plans or program pertaining to organization members" (p. 694).

Other variations in the definition of innovation arise from different disciplinary perspectives. For example in knowledge management, the focus is on knowledge being vital for innovation or even a type of innovation. As Plessis (2007) notes,

> "Innovation as the creation of new knowledge and ideas to facilitate new business outcomes, aimed at improving internal business processes and structures and to create market driven products and services. Innovation encompasses both radical and incremental innovation" (p. 21).

In technologically related definitions, the main focus is on innovation being a product related to new technology (Nord and Tucker 1987).

2.3. Content Analysis

In this section the details of the literature review for gathering definitions of innovation and the content analysis is discussed.

2.3.1 Gathering definitions

The first stage in the research was to collect as many definitions as possible of the term 'innovation'. In this process, it was important to achieve representation over time and across disciplines. The definitions were gathered through a thorough literature review of articles on innovation, and innovation types and processes, using online databases, journals and books. In addition, as the number of definitions identified in some disciplines is far less than in others, the relevant journals for those specific areas were further reviewed and the text of each article on innovation was examined to see whether they proposed a new definition. For example, in the area of organization studies, key journals such as *Management Science*, *Journal of Management Studies*, *Organization Science* and *Administrative Science Quarterly* were reviewed. However, in general, articles in these journals refer to definitions of innovation proposed elsewhere rather than offering their own definition.

Ultimately some 60 definitions of innovation were collected from the various disciplinary literatures, as shown below:

- Business and Management; 18 definitions from 1966 to 2007
- Economics; 9 definitions from 1934 to 2004
- Organization Studies; 6 definitions from 1953 to 2008
- Innovation and Entrepreneurship; 9 definitions from 1953 to 2007
- Technology, Science and Engineering; 13 definitions from 1969 to 2005
- Knowledge Management: 3 definitions from 1999 to 2007
- Marketing: 2 definitions from 1994 to 2004

Appendix 2.1 presents the authors, the year and the discipline of the gathered definitions. Full citations of each of these papers are listed in the references section.

2.3.2 Analysis

A content analysis was conducted of the collected definitions in order to surface the key attributes mentioned in these definitions considering the disciplinary variations, and to profile the descriptors used in relation to each attribute.

Content analysis is defined as "a research technique for the objective, systematic and quantitative description of the manifest content of communication" (Berelson 1952, p. 8), or "any technique for making inferences by objectively and systematically identifying specified characteristics of messages" (Holsti 1969, p. 14). This study considered the definitions of innovation to be forms of communication and messages seeking to identify the specified characteristics or attributes of these. Various phenomena can be counted in a content analysis, including, for example, actors, words or themes. The words were being countered, rather than authors or disciplines in this study.

Content analysis was selected as the most appropriate as it "is an approach to the analysis of documents and texts ... that seeks to quantify content in terms of predetermined categories and in a systematic and replicable manner" (Bryman 2001, p. 177). Definitions of innovation are considered as sections of text, which are amenable to deconstruction into component attributes that can be categorized and counted. However, from the conducted literature review it was clear that there were no predetermined categories available. Therefore, a modified approach to content analysis that enabled the construction of categories was adopted. This is similar to qualitative or ethnographic content analysis (Altheide 1996; Bryman 2001), where there is an emphasis on allowing categories to emerge out of the text. However, the categories emerged through transparent quantification (as demonstrated below) rather than the researchers simply generating these. In addition, care was taken with coding (to ensure discrete dimensions and mutually exclusive categories) and interpretation of meaning to ensure consistency, reliability and validity.

To be more precise, the following steps have been taken in the content analysis:

1. Classification of definitions of innovation by their disciplinary orientation
2. Cleaning the text in order to simplify the word frequency count process. For example, the word "process" has been used as two different concepts: process

as a type of innovation; and, process as procedures or set of routines (process of innovation). To resolve this complication in the content analysis, "process" as a type of innovation remained the same but "process" as routine was changed to "procedure". Another example is the words "technological" and "technical", both essentially referring to the same type of innovation; they have been used interchangeably and hence occurrences of these two terms have been merged and in the proposed definition the preferred term is "technical".

3. Counting of word frequencies - The number of times words appeared in each set of definitions (disciplinary group) was counted using the word frequency query option of NVIVO8 software.
4. Grouping of words with the same stem (e.g. implement, implementing, and implementation) in the word frequency results.
5. Elimination of the words that appeared only once or twice in their set of definitions, or words that are of no value, such as pronouns. It should be mentioned that for those disciplines that have fewer definitions such as knowledge management or marketing, the elimination process was performed more flexibly and cautiously. For example if the word "product" (that has been repeated frequently in the other disciplines) was represented in knowledge management definitions only once, it was not eliminated because its lack of repetition is a result of the few number of definitions in this discipline.
6. Identification of the innovation attributes from the word frequency counts. This process commenced with the definitions of innovation in business-management and economics disciplines as they have the greatest number of definitions in this study.
7. Clustering of the descriptors used in connection with each attribute for each discipline as shown in Appendix 2.2.
8. Cross-disciplinary analysis of the descriptors used for each attribute. For each attribute those words that have been used in common between a number of disciplines (suggesting similarity) were selected, and are highlighted in bold in Appendix 2.2, and extracted and displayed in Table 2.1.
9. The proposal of a diagrammatic and text definition of innovation.

Attribute	Word frequency count
Nature of innovation	New, 76
	Change, 10
	Improve, 6
Type of innovation	Product, 40
	Service, 25
	Process, 23
	Technical, 10
Aim of innovation	Competition, 7
	Success, 6
	Economy, 6
	Superiority, 5
	Differentiation, 3
	Advantage, 2
	Value, 2
Social context	Organization, 29
	Firm, 11
	Customer, 4
	Group, 3
	Unit, 2
	Developer, 2
	Employee, 2
	External environment 2
	Social system, 2
	Workforce, 1
	Consumer, 1
	Internal environment, 1

Attribute	Word frequency count
Means of innovation	Idea, 22
	Invention, 12
	Technology, 12
	Market, 11
	Creativity, 10
Stages of innovation	Adoption, 13
	Development, 13
	Creation, 9
	Implementation, 6
	Commercialization, 7

Summary of attributes frequency
Type of innovation, 98
Nature of innovation,, 92
Means of innovation, 69
Innovation and people, 60
Stages of innovation, 48
Aim of innovation, 31

Table 2.1. Summary of word frequencies grouped by attributes

It should be noted in Table 2.1, the counts for some descriptors exceed the total number of definitions; for example "new" has been repeated 76 times where there are only 60 definitions of innovation. This is due to the fact that the word "new" has appeared in some definitions more than once, for example:

> "Innovation concerns processes of learning and discovery about *new* products, *new* production processes and *new* forms of economic organization, about which, ex ante, economic actors often possess only rather unstructured beliefs on some unexploited opportunities, and which, ex post, are generally checked

> and selected, in non centrally planned economies, by some competitive interactions, of whatever form in product market"(Dosi 1990, p. 299).

Hence, out of the 76 times the term 'new' has been used, on 34 occasions there has been repetition of the word in the same definition. Similarly, the term "organization" has been repeated more than once in some of the definitions, for instance:

> "Innovation is a process that follows invention, being separated from invention in time. Invention is the creative act, while innovation is the first or early employment of an idea by one *organization* or a set of *organizations* with similar goals" (Becker and Whisler 1967, p. 463).

Table 2.2 summarises the total number of occurrences of words in the database of definitions, relative to the total number of definitions in which that word appears.

	Total number of occurrences	Number of occurrences in distinct definitions		Total number of occurrences	Number of occurrences in distinct definitions
New	76	42	Market	11	9
Organization	29	15	Creativity	10	8
Product	40	33	Change	10	9
Firm	11	4	Implement	6	5
Service	25	21	Group	3	2
Idea	22	18	Development	13	12
Invention	12	8	Commercialization	7	6
Superior	5	2	Technology	12	11
Improve	6	4	Value	2	1
Process	23	21	Economic	6	5
Technical	10	8	Success	6	5

Table 2.2. Total word frequency versus number of times words has appeared by definition

2.4. Findings and Discussion

Table 2.1 show the attributes of innovation definitions that have been identified through the content analysis. These six attributes form the basis for an integrative definition of innovation, since they have been surfaced from key definitions drawn from different disciplinary areas. It is important to note that these attributes are all in strong evidence not merely in discursive expositions on innovation management, but also in the definitions of the basic concept of innovation. These attributes are defined as follows:

- *Nature of innovation* refers to the form of innovation as in something new or improved.
- *Type of innovation* refers to the kind of innovation as in the type of output or the result of innovation, e.g. product or service.
- *Stages of innovation* refer to all the steps taken during an innovation process that usually start from idea generation and end with commercialization.
- *Social context* refers to any social entity, system or group of people involved in the innovation process or environmental factors affecting it.
- *Means of innovation* refers to the necessary resources (e.g. technical, creative, financial) that need to be in place for innovation.
- *Aim of innovation* is the overall result that the organizations want to achieve through innovation.

In arriving at this final list of attributes two issues have been taken into consideration:

1. One of the attributes of innovation that only occurs in three of definitions relates to the time of innovation implementation or adoption in the context of specific industries. In this analysis, there are two definitions which have paid attention to time of innovation by mentioning first or early use of innovation and there is one definition that highlights the first use of innovation by the organization adopting it. For example, Rothwell (1992) quotes Freeman as,

   > "The technical, design, manufacturing, management and commercial activities involved in the marketing of a new (or improved) product or the first use of a new (or improved) manufacturing process or equipment" (p. 221).

   Due to the limited number of definitions considering the time of innovation, this attribute has been excluded from the definition proposed in this study.
2. Another term, which occurs quite frequently, is the word "process" (as in process of innovation not process a types of innovation) which during the content analysis was replaced by "procedure" for simplification. Usage of this word was an indication of the fact that innovation is a process not a discrete act.

3. Analysis of Table 2.1 demonstrates that in defining innovation, scholars have paid more attention to type, means, social context and stages of innovation and have made relatively limited reference to the aim of innovation. This may potentially be evidence of a serious disconnection between the rhetoric of innovation and its strategic context. On the other hand, most research reports and articles on innovation start by explaining the strategic importance of innovation. So, thus perhaps this is simply an oversight in the definitions or a taken-for-granted assumption.

On the basis of the key attributes of definitions of innovation and the descriptors used by those definitions to characterise the attributes, a diagrammatic definition of 'innovation' is proposed in Figure 2.1.

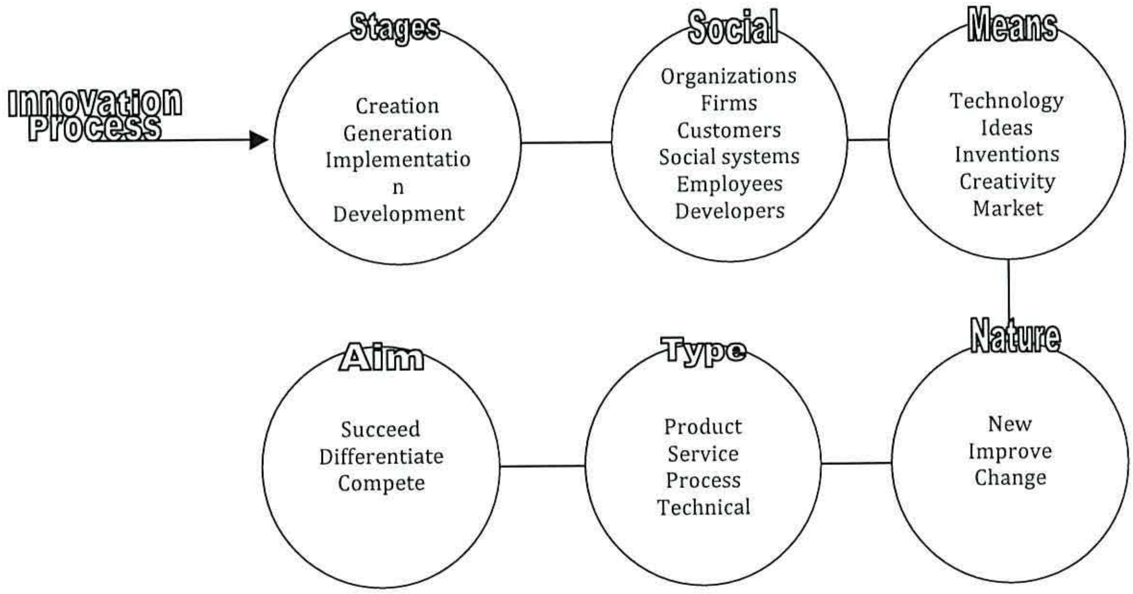


Figure 2.1. A Diagrammatic definition of innovation

The diagram incorporates the six attributes identified as being common to the various disciplinary definitions of innovation. It is not suggested that this is the actual or ideal flow, or that the flow is linear. Also no greater importance is given to 'stages' or 'aim' but simply suggest that these are six common, and therefore important, attributes of innovation. The model seeks to present the 'essence' of innovation, no matter the organizational or disciplinary context. The six components of the model do not only describe the possible flow of the innovation process, they also indicate various starting points within the innovation process. This might be influenced by disciplinary background. For example, engineers might begin with a focus on the technical possibilities of a new product, whereas as marketing specialists might concentrate on identifying potential new markets. Individuals within organisations may choose different starting points on the journey to innovation. The chosen starting point might also have a strong relationship to the way innovation is achieved.

In order to capture and articulate the diagrammatic definition in Figure 2.1 in words by means of interpretation, the following is proposed:

> *Innovation is the multi-stage process whereby organizations transform ideas into new/improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their marketplace.*

This definition begins with the term 'multi stage process' as most of the definitions presented earlier have highlighted that innovation is not a discrete act and is a process. Secondly, the focus is on business organisations in this paper, although it has been explicitly articulated in the textual definition that innovation can occur in various social entities and contexts. Third, as shown in the diagram, many definitions have focused on the means of innovation, that is the ways in which ideas have been transformed into new, improved and changed entities, whether products or services, for example, for new markets. Therefore, a 'multi stage process' together with 'transforming ideas into new/improved products…' not only captures all the stages that different scholars have identified or referred to in their definition of innovation, it also highlights the fact that ideas are used and transformed (together with other means of innovation) to result in 'New/improved products, services or processes', the main types of innovation identified together with the level of change they involve.

Finally, although not often explicitly mentioned in extant definitions, the aim of innovation is included as 'successfully advancing' (referring to process innovations) and 'competing and differentiating' to reflect both the overall strategic aim of innovation and the potentially diverse social and environmental contexts in which innovation occurs. These diagrammatic and textual definitions, which seek to subsume and supersede earlier definitions with their specific disciplinary biases, recognize that an all-embracing definition of innovation needs to encompass a number of aspects of the essence of innovation.

2.5. Summary and Conclusion

Innovation, and how it is managed, is a key strategic issue. It is of interest to both practitioners and researchers across a range of business and management disciplines. Having conducted a comprehensive content analysis, this chapter identifies how different disciplines view innovation from a different standpoint and propose distinct definitions. It could be argued that each discipline requires its own discipline-specific definition. However, as business and research become more inter and multi disciplinary, there is a need for a more generic, integrative definition. This is to enable the development of common meaning and shared understanding of the various dimensions of innovation, identified in this proposed definition. This chapter suggests that the number and diversity of current definitions of innovation creates ambiguity and confusion supported by Lorenz (2010) view that the absence of a consensual definition of innovation is problematic.

To address this, on the basis of a content analysis of existing definitions of innovation, extracted from a number of different disciplines, a succinct and arguably intuitive textual definition of innovation was proposed. The text version of the definition is supplemented by a diagrammatic definition that identifies the descriptors that can be used to provide a more detailed definition. Such a definition should assist in crossing disciplinary boundaries, and act as a basis for more transparent sharing and transfer of knowledge relating to innovation and its processes. There is further empirical work to do to validate the proposed definition in terms of its suitability, usefulness and acceptability across different disciplinary groups and this is a clear agenda for further research.

Chapter Three - Literature Review

3.1 Introduction

This chapter draws on the literature gaps within the concepts of innovation orientation, types, process and the determinants of innovation on the basis of the objectives of this study. Subsequently, the relevant research within the context of this study, the food sector and SMEs, are presented separately.

Initially, due to the confusion on the various concepts of innovation (Damanpour 1991; Garcia and Calantone 2002; Siguaw et al 2006), this chapter defines the constructs relevant to this study; this is followed by an overall review of the research on innovation by highlighting the difficulties researchers face when measuring innovation. Secondly, the various types of innovation are discussed and mapped into an innovation type model (this is one of the objectives of this study); in addition, the relationship between types of innovation is discussed. Thirdly, the existing innovation orientation/innovativeness scales are reviewed and analysed. This is followed by an overview of the literature on the process of innovation (stages of new product development); thereafter, the role of antecedents of innovation is discussed focusing on organisational size and age. Finally, aiming to gain an understanding of innovation processes within food sector SMEs, this chapter draws on the numerous aspects of innovation within these contexts.

3.2 Definitions and Measurement

Innovation is a broad and complex notion that can be viewed differently in various disciplines and industries (Damanpour and Schneider 2006). The thin line between various constructs of innovation: innovation, innovation orientation, innovativeness and new product development (product innovation) means that some of these terms have been used for one another interchangeably (Damanpour 1991; Garcia and Calantone 2002; Siguaw et al 2006). Hence, for the purpose of clarity this section focuses on defining these constructs. Also, an overview of innovation research and the previous applied methods measuring innovation is provided.

3.2.1 Definitions

As proposed in the previous chapter (chapter two), in this study innovation is defined as:

> "The multistage process whereby organisations transform ideas into new / improved products / services or processes, in order to advance, compete and differentiate themselves successfully in their marketplace" (Baregheh et al 2009, p. 1334).

The concepts of 'innovation orientation' and 'innovativeness', as used in the past studies, refer to essentially the same notion and are used interchangeably (e.g. Siguaw et al 2006; Stock and Zacharias 2010). Subsequently, by carrying out an extensive review of the past literature, Siguaw et al (2006) defines innovation orientation as:

> "A multidimensional knowledge structure composed of a learning philosophy, strategic direction, and transfunctional beliefs that, in turn, guide and direct all organizational strategies and actions, including those embedded in the formal and informal systems, behaviours, competencies, and processes of the firm to promote innovative thinking and facilitate successful development, evolution, and execution of innovations" (p. 560).

Furthermore, product innovation and new product development refer to the same term, where product innovation is referred to as any "new products or services introduced to meet an external user or market need" (Damanpour and Gopalakrishnan 2001, p. 47-48). The diverse range of types of innovation is reflected in detail in section 3.3. The following section provides an overall picture of literature gaps within the various dimensions of innovation.

3.2.2 Innovation Research

The vast body of literature on the concepts of innovation means that there are various literature gaps that scholars need to attend to, Singh et al (2008) has identified lack of the following:

- Empirical research on SMEs
- Holistic approach in analysing competitiveness
- Benchmarking frameworks especially in case of SMEs
- Networks and supply chains
- Comprehensive performance models

Furthermore, Lin and Chen (2007) have noted that,

> "examining how companies actually practice innovation may unveil the black box of innovation and help translate it from a mere concept to action and competitiveness (Drejer 2002; Gaynor 2002; Hussey 1997)" (p. 118).

This points to the lack of an understanding of innovation patterns at the organisational level. Additionally, in their study of drivers of successful innovation at the organisational level, Read (2000) noted,

> "Current researchers tend to agree that innovation research at the organisational level, need to be more holistic in approach by examining the multi-dimensional nature of innovation throughout the whole organisation, must recognise the interrelatedness of innovation processes, and recognize the contextual nature of contingency variables" (p. 101).

Accordingly, This study tends to adopt a holistic approach to innovation, considering the whole innovation process, various types and the dimensions of innovation. A more detailed picture of innovation literature gaps is portrayed within each section of this chapter separately.

3.2.3 Measuring Innovation

Within the fragmented body of the current literature on innovation, scholars do not agree on a common measurement technique. Kotabe and Swan (1995) argue that some of the obstacles in understanding innovation are due to such lack of a suitable measurement technique. Accordingly, this has resulted in a pool of studies adopting various techniques creating much controversy and confusion (Avermaete et al 2003a; Ma and McSweeney 2008). Therefore, there is scope for a more generalised measure of innovation focusing on the attributes and process of innovation useful both to academics and practitioners (Cordero 1990; Barclay 1992; Cebon and Newton 1999; Kim and Oh 2002; Adam et al 2006). A review of some of these measures is provided here below.

Input and Output Measures

Over the years innovation has usually been measured on the basis of input and output variables. Table 3.1 reflects on some of these constructs. In doing so, scholars have considered the quantifiable variables in relation to innovation. Accordingly, an example of input variable could be investment in R&D or marketing, while an output variable could be on the basis of the number of new products or sales figures (e.g. Ma and McSweeney 2008; Massa and Testa 2008). A number of scholars, especially in the case of low-tech sector and small and medium enterprises do not consider these measures applicable, for example patents only report inventions not innovation. More importantly these measures do not provide researchers with any insight on organisation's innovation activities (Hansen 1992; Le Bars et al 1998; Kumi-Ampofo and Brooks 2009). In this regards Kumi-Ampofo and Brooks have stated:

> "Innovation is a complicated and multi-faceted phenomenon, and only imperfectly understood, particularly outside the traditional 'hi-tech' industries characterised by R&D and patenting activities. Recent research has highlighted the complexity of innovation, particularly in terms of variations across industrial sectors, calling into question the effectiveness of narrowly-focused policies on innovation such as R&D subsidies or tax breaks (Pavitt 1984; Fagerberg 2005)" (Kumi-Ampofo and Brooks 2009, p. 520)

Output based	Input based
Introduction of new or improved product(s) or process(es)	Research and development
Percentage of sales from new / improved product(s) or process(es)	Acquisition of technology from others (e.g. patents, licences)
Intellectual property statistics (e.g. patents, trade mark and design applications)	Intellectual property statistics
Firm performance (econometric techiniques to relate innovation indicators to firm performance)	Expenditure on tooling up, industrial engineering and manufacturing start-up associated with new products and processes
	Intangible assets
	Marketing expenditures for new products
	Training expenditures for new / changed products and processes
	Managerial and organisational change

Table 3.1. Output and input measures of innovation (Ma and McSweeney 2008 adapted from Rogers 1998, p. 4)

Self-Reporting Survey

Another approach often adopted by scholars is self-reporting surveys. These surveys target organisational managers with an intention to gather information on innovation processes and behaviours (Keeble 1997; Kalantaridis and Pheby 1999; Brewin et al 2009). With regards to surveys, Kalantaridis and Pheby noted that although researchers should be cautious applying this method,

> "self-reporting is a valuable measure of monitoring the management of innovation as well as identifying the main obstacles that prevent the owner/manager from introducing innovation and change" (1999, p. 63).

An example of this approach adopted is by McAdam et al (2004b), studying the effect of organisational size on innovation. In their study, a survey questionnaire was designed comprising various sections on TQM, leadership, product and process innovation etc enquiring about the innovation processes and activities within the organisation in relation to the subject topics.

Current Technology

In addition to survey, enquiring about innovation activities, some other scholars have gathered information on recent technological innovation and advancements within a certain industry and conducted their research on the basis of organisational engagement to these specific innovations (Kamaruddeen et al 2009). An example of adopting such an approach is Damanpour and Gopalakrishnan (2001) study on product and process innovation within the banking industry. It should be highlighted that this technique is not suitable at all times; this is because within certain sectors identification of all recent types of innovation is not practical.

To conclude, although innovation is central to organisational success, it is an elusive concept and this calls for caution when scholars attempt to study and measure innovation. Within this study self-reporting survey has been adopted to collect data as both the input and output measures and survey of the current technology are not suitable within the food sector SMEs. Additionally, reflecting the complexity of measuring innovation, in other sections of this chapter, the shortfalls of the previous literature in measuring innovation is discussed in more details.

3.3 Types of Innovation

One of the key concepts within the innovation literature is that of 'types of innovation'. The act of innovating depends on the process, aims and objectives, which can have different forms and shapes. An organisation might innovate to improve its performance through changing its production system or employee reward system, or they might add a new product or service to their product portfolio.

Subsequently, the reasons to derive innovation may be due to the changes or requirements of the external or the internal environment.

Reviewing the literature on types of innovation a pattern emerges in which innovations are of two types, external/tangible, where customers will see or use the end result straightforward or internal/intangible, where customers will not notice the innovation, they rather might feel the difference in the product or service they receive. In any case, organisational engagement with all these different types of innovation is vital for their survival as each type of innovation influences organisations in a different way and achieves different outcomes and impacts (Siguaw et al 2006).

There are a number of models of types of innovation, including such categories as administrative, technical, incremental, radical, product, technological, process, and service. Moreover, much of the previous research on innovation focuses on one or two types of innovation in specific contexts. Nevertheless, two key questions are derived; the first is the extent to which it is possible to differentiate between different types of innovation and the second is the nature of the relationships between them.

Although many studies classify innovation into various types (e.g. Utterback and Abernathy 1975; Dosi 1988; Teece 1989; Damanpour 1996), some scholars argue that such differentiation should be avoided as distinctions result in fragmenting innovation unnecessarily (Van de Ven 1986; Nohria and Gulati 1996; Johannessen et al 2001). Additionally, in many cases it is difficult to separate various types of innovation from one another as they go hand in hand (Grunert et al 1997). It should also be noted that adoption or implementation of one type of innovation is sometimes joined or followed by the adoption or implementation of another type of innovation (Wischnevsky et al 2011). For example, to improve the performance, an organisation might install a new equipment/machinery or use a new technology which can also be used to add another product to their product range, moreover, in some situations it is difficult to separate these innovations and label them as a distinct type.

This section discusses some of the main types and typologies and classifications of innovations. The discussion is divided into two sub-sections, covering, respectively, foundation models and frameworks, and integrated models and frameworks.

Integrated models are typically based on and developed from foundation models. Aiming to identify the main components of innovation, a mapping model for innovation types is proposed and finally various theories on the relationship between types of innovation are presented in this section.

3.3.1 Foundation Models and Frameworks

One of the early models of types of innovation was that proposed by Knight in 1967. He suggested that there were four different types of innovation:

- Product or service innovation, concerned with the organisation's new product or service offerings,
- Production-process innovation, referring to the changes to organisational operations and production; this is also usually initiated by technological advancements.
- Organisational structure innovation, concerned with the organisation's "authority relations, communication systems, or formal reward systems" (Knight 1967, p. 482).
- People innovation, relating to changes to the people (staff) within an organisation, including changes in staffing levels, personnel, job roles, cultures, and behaviours.

Other early studies of innovation types had a binary focus (pair wise) such as product/process, administrative/technical and radical/incremental as discussed below.

Administrative innovation and technical innovation is a binary model of types of innovation, with technical innovation relating to new products, processes or services, whereas administrative innovation involves changes to the social structure of the organisation (Evan 1966) such as "policies of recruitment, allocation of resources, and the structuring of tasks, authority and reward" (Daft 1978, p. 198).

Technical innovation refers to any type of innovation structured from a technical viewpoint and which lies at the heart of operations; such innovations influence the flow of product or process operations (Damanpour 1991). Technical innovation may take a number of different forms. Bantel and Jackson (1989) suggest:

> "Technical innovations pertain to products and services as well as production processes and operations related to the central activities of the organization (design and delivery of products, services, marketing, and office operations); such innovations are assumed to be originated in the technical core of the organization."(p. 108).

Another widely used term that is often confused with technical innovation is technological innovation; technological innovations are those innovations initiated through the use of technology; they are often associated with the opportunities available to the organisation as a result of advances in technology. Technical innovation, describes more generally innovation that relates to the technical system of the organisation and its primary activities (Damanpour and Evan 1984).

Administrative innovation brings change to the structure or administration of the organisation. Bantel and Jackson (1989) see administrative innovations as pertaining to "change in the organizational structure and the people who populate the organization (staffing, employee survey, strategic planning, compensation system and training programs); these innovations are assumed to originate in the more peripheral, administrative core of the organization" (p. 108)

Product innovation and process innovation is another binary categorization of types of innovation. Although based on Knight's (1967) classification discussed earlier, this categorization is identified separately here because it has received considerable attention in the literature. Within these models or frameworks innovation is either a product innovation or process innovation (Knight 1967; Utterback 1971). Product innovation is concerned with the development of new products and services for the market (customers) while process innovation relates to ways of undertaking production or service operations. Product innovation aims to present a new or improved product or service for the customers and customers see the impact of such innovation in the products or services they receive, whilst process innovations change or improve the way organisations perform.

Radical innovation and incremental innovation is a third binary classification. This classification or framework is based on the degree of change and newness of the innovation. Radical innovation is a "fundamental change" (Dewar and Dutton 1986,

p. 1422) whilst incremental innovation is an add-on to a previous innovation without changing its essential concept (Dewar and Dutton 1986). Incremental innovation could, for example, take the form of changing the materials used to make a product, improving the product through an updated design, or adding additional features or options. There are also other various terms for radical and incremental innovation in various studies such as variation and reorientation (Norman 1971), routine and non routine (Knight 1967).

Radical and incremental terms are used to present the degree of change a new innovation brings to the organisation; however, an innovation may also be differentiated by the level of change it brings to the industry. Discontinuous innovations are those innovations that bring a significant level of change, not just to an organisation, but also to a whole industry. They often appear together with technological changes. Once developed they change the industry and the resources, knowledge and expertise required for success (Anderson and Tushman 1991).

> "Discontinuities are breakthrough innovations that advanced by an order of magnitude the technological state of the art which characterizes as industry. They are based on technology whose technical limits are inherently greater than those of the previous dominant technology, along economically relevant dimensions of merit. " (Anderson and Tushman 1991, p. 26)

In this study, radical and incremental innovations have not been regarded as types of innovation, but rather as an attribute of any of the innovation types. The labels radical and incremental innovation represents the degree of change the innovation brings and, as such, they could be attributes of any of the other types of innovation such as product, process, administrative, or technical.

3.3.2 Integrative models and frameworks

In recognition of the increasing importance for organisations to manage across the range of different types of innovation, recently a number of integrative models of innovation have been proposed on the basis of binary models. This section draws together a number of these models and frameworks and other concepts that have surfaced in recent years such as hybrid innovations.

In 1987, Damanpour further expanded his research on types of innovation by introducing ancillary innovation in addition to technical and administrative innovations. He suggested that, there is a requirement to distinguish ancillary innovations, which are those types of innovation that require the involvement of both the organisation and some of its clients. Accordingly, ancillary innovations are customer dependent innovations such as "customer active programs for product-idea generation and "point-of-purchase" or fashion videos" (Damanpour 1987, p. 678). This study has not considered ancillary innovations further, as classifications of ancillary innovations are based on the degree of involvement of different parties within an innovation.

In 1998, Cooper proposed a multidimensional integrative model of innovation, which drew together the types of innovation embedded in three of the earlier binary classifications, viz, administrative, technical, process, product, radical, and incremental innovation (Figure 3.1). His view is that any one innovation can have some aspects of any of the six types of innovation. On the role of this model, he stated

> "a multidimensional model of innovation means that by defining innovations more narrowly in terms of the attribute combinations they possess (e.g. process-administration-radical), researchers should be more successful in describing relationships between organizational variables and the adoption of innovation"(p. 501).

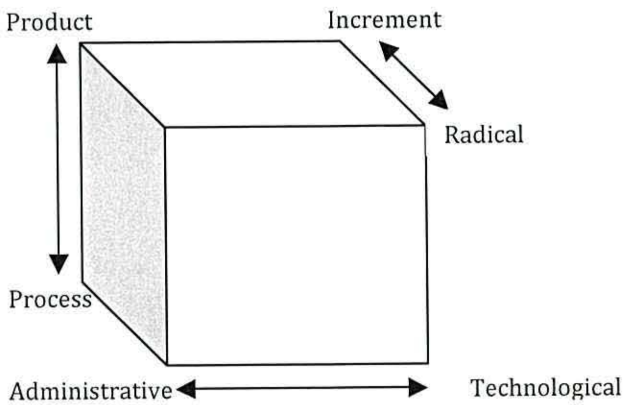


Figure 3.1. Integrative Model of Innovation (Cooper 1998, p. 500)

Other authors, whilst not always seeking to identify and embed all types of innovation in their models and research have, nevertheless, also emphasized the relationships between types of innovation. For example, Boer and During (2001) define innovation as "creation of a new product-market-technology-organization combination" (p. 84). They identified the following types of innovation: product, process, and organisational. They suggested that process innovation is concerned with manufacturing, while organisational innovation is any other change to the way the organisation operates such the introduction of Total Quality Management. Johannessen et al (2001) present yet another model of types of innovation, operating at a more detailed level than most others; they discuss six types of innovative activities: new products, new services, new methods of production, opening new markets, new sources of supply, and new ways of organising.

Hovgaard and Hansen (2004) offer another classification of types of innovation. Their classification includes three types of innovation: product, process, and business systems. Since they view 'business systems' as referring to all of those innovations "that do not fall under product or process" (p. 27), their concept of business system is close to Boer and During's (2001) concept of organisational innovation. Examples of business system innovation could be in marketing or customer orientation. They also seek to align their innovation categories with those used by other authors. They argue that "technical refers to product and process innovation and administrative refers to innovation in business systems or processes". (p. 27)

Trott (2005), recognizing the complexity and diversity of the classifications and typologies of innovation, has brought some of these typologies together. In addition to product, process, and service innovation he also points to the following types of innovation:

- "Organisational innovation is a new venture division, a new internal communication system, introduction of a new accounting procedure
- Management innovation represents systems such as TQM (total quality management), BPR (business process reengineering)
- Production innovation consists of Quality Circles, just-in-time (JIT) manufacturing system, new production planning software such as MRPII

• Commercial/marketing innovation is represented by new financing arrangements; new sales approached as Direct Marketing" (p. 17)

Another type of innovation that could be added to the above mentioned categorization is hybrid products also known as product/service systems. Hybrid products are integrated solutions that are a mix of product and service (Velamuri et al 2008). Such forms of innovation are becoming increasingly important as organisations are recognising the need to innovate in both product and service characteristics. Hybrid products are "the result of an innovation strategy, shifting the business focus from designing and selling physical products to selling a combined system of products and services which are jointly capable of fulfilling specific client demand." (Velamuri et al 2008, p 2, quoting Manzini and Vezzoli 2002). Figure 3.2 illustrates product service systems.

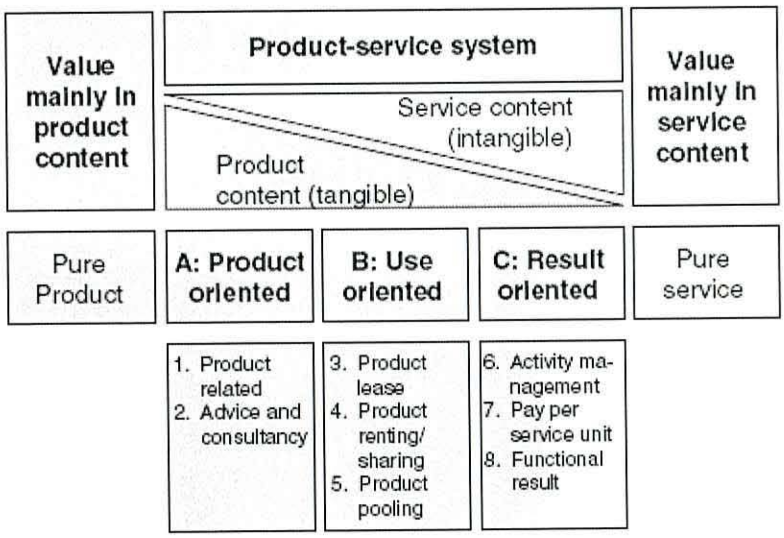


Figure 3.2. Hybrid Innovations, product service systems (Tukker 2004, p. 248)

Two recent integrative models are those proposed recently by Francis and Bessant (2005), and Oke et al (2007). Oke et al (2007) identify three main types of innovation, process, product and service, thus distinguishing between product innovation, and service innovation. They also mention organisation innovation as being firm level innovations initiated by the management. Their framework makes links between these main types of innovation and other types of innovation. For example, they suggest that product innovation results in incremental or radical innovations, whereas service innovation results in improvement in the "delivery of the core product and making it more attractive for customers" (p. 738) and, process innovation deals with production, service or administrative improvements.

Francis and Bessant (2005) view innovation strategically, from the perspective of the change that comes with innovation. On this basis, Bessant and Tidd (2007) propose the following four categories of innovation:

- "Product innovation - changes in the things (products/services) which an organisation offers;
- Process innovation - changes in the way in which things (products/services) are created and delivered;
- Position innovation - changes in the context in which products / services are introduced;
- Paradigm Innovation - changes in the underlying mental models which frame what the organisation does"(p. 13).

The most novel and interesting of these types of innovation are position and paradigm innovation. Position innovation concerns innovation's role in exploiting new customer bases and markets and new ways of offering or introducing the innovation to the potential customer. A position innovation changes the customer's view or understanding of the products (Kim and Mauborgne 1999). Also "positional innovation can change the characteristics of a market or create a market that does not exist" (Francis and Bessant 2005, p. 175). Paradigm innovation occurs when the way of looking at things is reframed. Examples of such innovation would be "low-cost airlines, the provision of online insurance and other financial services, and the repositioning of drinks like coffee and fruit juice as premium 'designer' products" (Tidd et al 2005, p. 11). To summarize, whereas position innovation focuses on the adaptation and development of a product for another market or customer group, paradigm innovation is associated with a significant shift in perceptions or markets. Both of these types of innovation may embed a number of process and product innovations.

There are some parallels between the concepts of paradigm innovation and discontinuous innovation. Other than innovations being recognized by their type, they may also be differentiated by the level of change they bring into the industry. Discontinuous innovations are innovations that bring a significant level of change, not just to an organisation, but also to a whole industry. They often appear together with technological changes. Once developed they change the industry and the resources, knowledge and expertise required for success (Anderson and Tushman 1991).

For many years scholars have attempted to identify the following:

- Various types of innovation
- The level of organisational engagement with these innovation types
- Whether adoption of one type of innovation is more dominant, important or necessary for organisations in relation to performance and productivity

Here few examples of such studies are provided. Lin and Chen's (2007) study of manufacturing and service SMEs within Taiwanese firms showed that organisations are mainly engaged with technological and market innovations, this study also identified that administrative innovations tend to have a positive association with sales. Meanwhile Lee and Kang's (2007) study among Korean manufacturing firms reflected the importance of process innovation for productivity performance. Another study conducted by Damanpour and Gopalakrishnan (2001) within the banking industry identified that the rate and speed of adoption of product innovations is higher than that for process innovations. While a study within libraries, showed that technical innovations are adopted at a faster rate compared to administrative innovations (Damanpour and Evan 1984). The specific findings of various studies on types of innovation are further presented within section 3.7 and 3.8 in relation to SMEs and the food sector.

3.3.3 Mapping innovation types

An early part of this research was to identify various types of innovation; in doing so a framework of innovation types was established in order to draw together the previous literature on innovation types. In proposing an innovation type-mapping tool, the researcher conducted a literature review of the relevant models as presented above, and thereafter analysed these models and proposed an integrative innovation type model as described below. The results of this study were published in *Management Decision* (abstract available in Appendix 3.1).

A diagrammatic overview of many of the frameworks discussed in the above sections is presented in Figure 3.3. By placing simple representations of several of the typologies of innovation together in one diagram, Figure 3.3 makes it easier to understand some of the complexities associated with moving towards an agreed typology or framework of the types of innovation and the relationships between them. Clearly different authors focus on different types of innovation, and have different perspectives on the relationships between the types of innovation.

Figure 3.3 also seeks to show the typologies on a time-line and to show the different focus in the literature at different points in time. Most importantly is the shift from the focus on binary frameworks of the 1970's and 1980's towards twenty first century frameworks that both recognise a wider range of types of innovation, and also emphasise the need to manage a range of different types of innovation in parallel. The integrative models were developed from the binary models, influenced by each scholar's own interpretations or perceptions; some parameters were changed, added or excluded from one model to another. Hence, models have some parameters in common; for example, product innovation, process innovation, and administrative innovation feature in several models.

Trott (2005) introduces marketing innovation, and Francis and Bessant (2005) propose the related concept of position innovation. On the other hand, some types of innovation that are distinct in some models are merged in others; for example, whilst some frameworks distinguish between product innovation and service innovation, others subsume them both under product innovation. There is also the difficulty in mapping the types of innovation identified by one author with those suggested by another author, on account of the inconsistencies in the use of terminology; for example, the terms organization innovation, administrative innovation, and business system innovation used in different typologies have a considerable degree of shared meaning. Finally, it is important to note that even earlier frameworks continue to be widely used and the emergence of later topologies has not replaced usage of others.

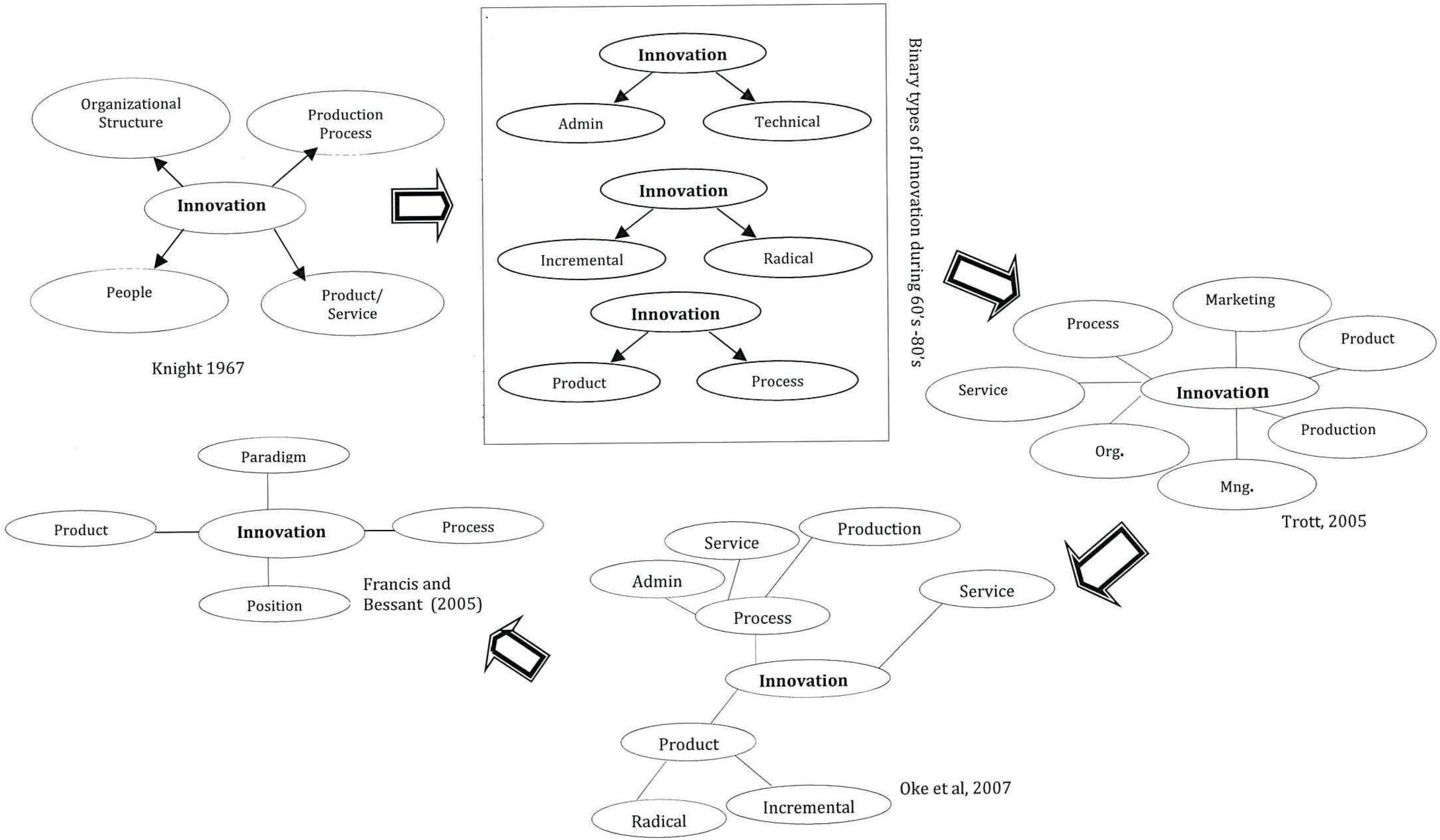


Figure 3.3. Innovation Types Development

Figure 3.4 demonstrates the proposed development of Francis and Bessant (2005) classification of types of innovation by this study. In developing the innovation-type mapping tool the aim has been to distil and integrate the key types of innovation identified by previous scholars and researchers. Specifically, the main types of innovation identified in previous frameworks have been identified as:

Product, service, hybrid, technical, administrative, organisational structure, organisational, management, production, businesses system and commercial/marketing. These types have then been mapped onto Francis and Bessant's framework by matching the definitions offered by previous authors and the definitions offered by Francis and Bessant (2005). Therefore, the enhanced framework in Figure 3.4 can be used as a mapping tool for types of innovation.

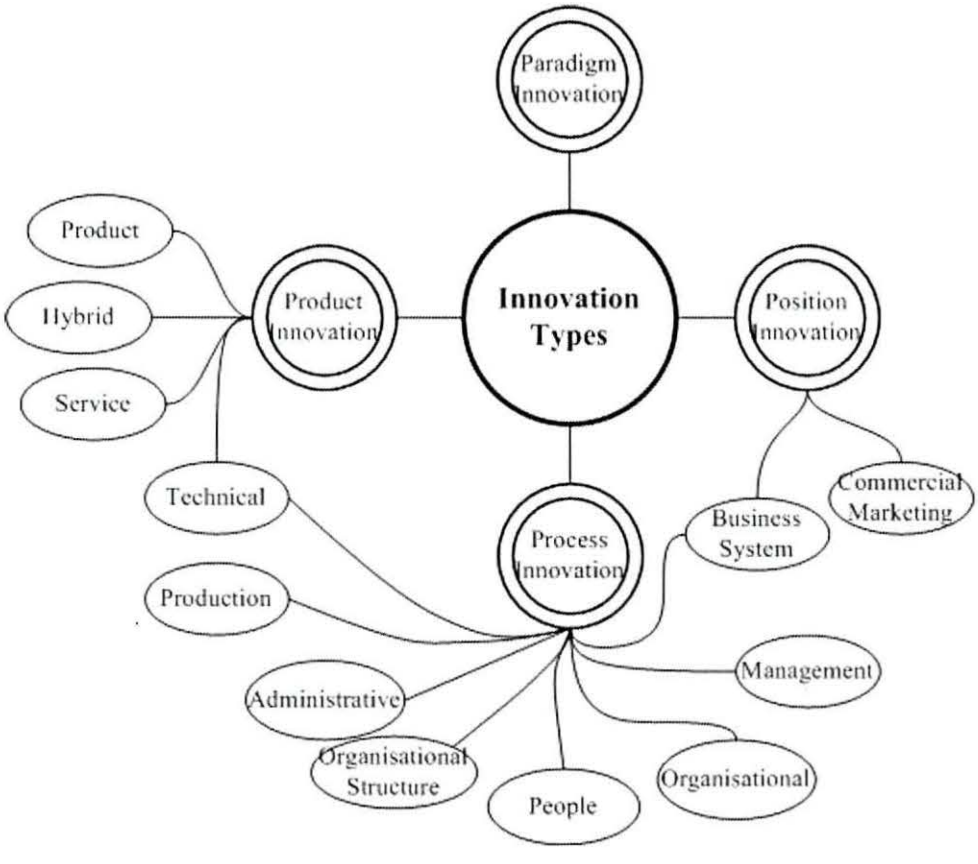


Figure 3.4. Innovation type mapping tool

In Figure 3.4 the double lined circles refer to the four main innovation types defined by Francis and Bessant (2005) and the ovals represent the other terms used to describe innovation types in various other studies. Moreover, this model reveals:

- Product innovations: Product, service and hybrid innovations can be grouped together under product innovation, and there is an obvious overlap between them as a hybrid innovation is a mix between service and product innovation.
- Process innovation:
    - Innovations in this category seem to be of two distinct natures: technical, or organisational (administrative based).
    - There are many different terms for process innovation, including administrative, technical, production, organisational, management, and business system.
    - There is an overlap between administrative, organisational, management and business system innovations, as they all refer to innovations within the administration and management side of organisational operations.
    - Also technical and production innovations overlap, as they are both concerned with the technical side of operations.
- Position Innovation: Position innovation has otherwise been described as commercial or marketing innovation and to some extent business system innovation. There is an overlap between these two categories when business systems innovation is concerned with both administrative and marketing side of the operations.
- Paradigm Innovation: As it can be noted, apart from the discussion around the concept of discontinuous innovation, there has been no previous focus on paradigm innovation, which arguably is likely to generate further product, position, and process innovations. Accordingly, there has been little occasion for the introduction of variant terms to describe this type of innovation. Paradigm innovation, in common with position innovation, would therefore, benefit from further study.

As reflected in the figure, not only is there an obvious overlap between different types of innovation such as administrative, organisational structure, and people, there is also no clear distinction between the wider categories of innovation e.g. product and process, as a product innovation may involve a number of process innovations, or a position innovation might lead into product innovations.

Finally, it should be highlighted that although the integrative models of innovation have adopted the binary models of innovation as a point of departure and have further added to them on the basis of the complexities within types of innovation, nevertheless, most studies are still conducted on the basis of product and process innovations (e.g. Ma and McSweeney 2008; Martínez-Ros and Labeaga 2009; Damanpour 2010).

3.3.4 Innovation Type Relationship

Although innovation has different types, a number of studies suggest that there is a close tie between types of innovation where at times it is difficult to distinguish one type of innovation from another. In addition, there is an interrelationship between these types of innovation where adoption of one type of innovation leads to adoption of another type (Ettlie 1988; Damanpour and Gopalakrishnan 2001; Wischnevsky et al 2011).

Previous scholars have examined the adoption patterns of innovation at the industrial level (Abernathy and Utterback 1987; Barras 1986, 1990). However, the pattern of adoption of innovation at the organisational level has been neglected. In this regards Damanpour and Gopalakrishnan (1999) noted,

> "Few theories examine patterns of adoption of innovation types and their influence on an organisation's ability to adapt to environmental change and remain effective" (p. 2).

More recently, Wischnevsky et al (2011) has highlighted such gaps within the literature, arguing that an understanding of the relationship between innovation types is essential as it affects the process of change management within organisations. On the relationship between types of innovation, Wischnevsky et al (2011) have stated,

> "in spite of the expectation that different types of change are related, and thus, should be introduced in tandem in order to generate superior results (Damanpour and Gopalakrishnan 2001; Roberts and Amit 2003), research on patterns of change over time and on the mutual influence among change types remains scant" (p. 4).

Additionally, on the complexities of innovation types Cooper has noted,

> "Research into the structural correlates of each dimension of innovation remains largely inconclusive, giving rise to the question whether to treat various types of innovation as completely different phenomena, or as different dimensions of a more complex process/event" (1998, p. 497).

Furthermore, in his study Cooper (1998) proposes that various types of innovation should be treated as dimensions of innovation.

More recently, Damanpour and Aravind (2006) and Damanpour (2010) have questioned the appropriateness of the distinction between the types of innovation (product and process), suggesting that innovations are complementary and dependent of one another, hence, should not be distinguished. In these studies, it is indicated that there are two views on types of innovation: distinctive view of innovation, and the integrative view of innovation.

The distinctive view of innovation assumes that innovation types are independent of another, hence the "generation and adoption of product and process innovation are assumed to be determined differently by environmental and organizational factors" (Damanpour 2010, p. 996). The integrative view of innovation denotes innovation types complement one another and as a result of these interdependencies, innovation types jointly affect organisations. Therefore, within an integrative view, generation and adoption of innovation types should not be considered in isolation from one another and their interrelationship should be factored in.

Damanpour (2010) calls for further research on the relationship between types of innovation and he further argues that although the distinctive view has been the basis for the past literature, yet it has not been examined. Subsequently, their study examines the role of organisational size and market competition on product and process innovation. In his study, Damanpour (2010) argues that lack of a significant difference on the effect of size and competition between product and process innovation supports the integrative view of innovation where different effects on product and process innovation due to organisational size, could be evidence of a distinctive view of innovation.

Exploring the relationships between types of innovation dates back to 80's, when Damanpour et al noted that although a number of studies have attempted to identify factors affecting adoption of administrative and technical innovation, the specific relationship between innovation types is unknown. In their study they suggest "innovations of different types influence and often complement each other" (p. 587), subsequently, they have noted that further research on identifying the specific relationship between types of innovation can guide innovation management within organisations.

In identifying the specific relationships between types of innovation scholars have mainly focused on binary models of innovation e.g. administrative and technical, or product and process within specific contexts as discussed below. While Damanpour and Evan (1984) have anticipated that adoption of administrative innovation at one point of time precipitates the adoption of technical innovations, Ettlie (1988) had proposed that organisation should use a synchronous pattern of adoption of administrative and technical innovation within the manufacturing industry in order to compete effectively. Confirming this, Damanpour et al (1989) identified a positive association between administrative and technical innovation within public libraries.

In another study, Damanpour and Gopalakrishnan (2001) have highlighted the lack of literature on the dynamics of adoption of product and process innovations; in their study they have investigated the pattern of adoption of product and process innovation and have identified a positive association between these two types of innovations. Moreover, they have noted a probable product-process pattern of adoption of innovation within the banking industry. Additionally in another study Damanpour and Gopalakrishnan (1999) have reviewed a number of studies on the correlations between the binary innovations, demonstrating that "a positive and significant association between the rate of adoption of pairs of innovation types is common" (p. 22). Damanpour and Gopalakrishnan (1999) study highlights the binary focus (product and process, administrative and technical innovation) of previous studies which conveys a lack of research on other types of innovation i.e. position and paradigm.

The only study that has considered more than two types of innovation is that of Wischnevsky et al (2011), in which it has been identified that product innovations are followed by technological and administrative innovations at the organisational level. Additionally, Wischnevsky et al (2011) notes that the bulk of the past research on types of innovation has been conducted within the manufacturing sector, highlighting the scope for further research within other sectors and contexts.

As noted above most studies on innovation type relationship have investigated the pattern of adoption of innovations between the binary models, and the relationship between other innovation type models (integrative models) or various binary innovations has not been cross analysed. Such an analysis could add to the understanding of the dependencies between the less researched innovation types and ultimately, could result in the acceptance or rejection of the distinctive or integrative views of innovation. In view of this, the specific relationship between types of innovation (product, process, position and paradigm) has been investigated in this study.

3.4 Innovation Orientation

Innovation orientation is important for organisations, as a positive relationship between innovation orientation, organisational performance and success has been recognised (Hult et al 2004; Subramanian and Nilakanta 1996). Subsequently, organisations that maintain an innovation-orientated culture innovate continuously to gain and sustain competitive advantage, as "a key component in the success of industrial firms is the extent of their innovativeness" (Hult et al 2004, p. 429).

It has been agreed by many scholars that in pursuing success organisations need to maintain an innovative culture, a "social and cognitive environment, the shared view of reality, and the collective belief and value systems reflected in a consistent pattern of behaviors among participants'' (Jassawalla and Sashittal 2002, p. 43). Whyte et al (2005) have identified the following factors as drivers of an innovative culture based on the past literature: motivation, availability of slack resources, leadership, direction, self development, enabling tools and resources, communication and information exchange, knowledge management, cross-boundary working, appropriate structure, team working and learning.

While some scholars have focused on innovation culture, some have looked into the relationship between organisational structure and innovation (Zaltman et al 1973). For example, Pierce and Delbecq have noted a positive association between organic organisations and innovation at the adoption and initiation phase of an innovation. However, this relationship reverses in favour of formalized and centralized organisations during the adoption phase (1997). Hence, in pursuing success, competitive advantage and improved performance, organisations need to reconsider their overall strategy, structure and culture to form an orientation towards innovation. It should be noted that an innovation orientation framework does not dictate the organisational structure per se; however it influences the overall strategy and culture.

Nevertheless, although there is a vast pool of literature on innovation, innovation orientation has only gained attention from researchers since the 1990s (Manu 1992; Hurley and Hult 1998; Tang 1998). In the literature on innovativeness and innovation orientation, while a handful of scale models have been developed, scholars often measure innovation orientation or innovativeness in the context of its relationship to other strategic organizational characteristics such as competitiveness, learning orientation, and business performance. In their study of innovation orientation's definition and constructs, Siguaw et al (2006) points out the requirements for a scale model to be developed. Furthermore, Bouncken and Koch (2007) draw attention to the lack of research on the relationship among types of innovation and innovation orientation, and in their study they examine the relationship between innovation orientation and product innovation.

As mentioned above, although there are a number of studies in which scholars have attempted to measure or frame innovation orientation, these studies have adopted a specific perspective to innovation. This could be due to the various views that scholars adopt in studying innovation. In this regards Salavou (2004) has suggested that there are three conceptual approaches to innovation as,

- Technology related: innovative firms possess a willingness to adopt new technology
- Behaviour related: innovative firms are receptive to new ideas
- Product related: innovative firms tends to buy new products and services

Accordingly, most of the previous studies have adopted one of these specific approaches in capturing innovation orientation, for example by measuring innovation orientation from a marketing or product view-point (e.g. Tang 1998; Bouncken et al 2007). Similar to other strands of innovation as noted in section 3.2.3, innovation orientation has repeatedly been measured on the basis of organisation's new product development such as number of new products, patents or R&D expenditure (e.g. Damanpour and Evan 1990; Subramanian and Nilakanta 1996; Jin et al 2004; Salavou 2004; Laforet and Tann 2006) or on the basis of one-dimensional scales or frameworks with a limited number of items. These measures are not adequate in capturing various dimensions of innovation orientation as innovation orientation is an organisation's overall propensity towards innovation which means innovation orientated organisations should be eager to development/adopt of all types of innovation (Siguaw et al 2006). In this regards Kelley and Littman (2006) state that:

> "A great product can be one important element in the formula for business success, but companies that want to succeed in today's competitive environment need much more, they need innovation at every point of the compass, in all aspects of the business and among every team member. Building an environment fully engaged in positive change, and a culture rich in creativity and renewal, means creating a company with 360 degrees of innovation"(p. 6).

There are only a few studies that have developed measurement tools that focus on organisational characteristics in determining a firm's innovation orientation. Furthermore, most of these tools study innovation orientation in measuring another variable or phenomena. Some of these various studies are discussed next.

Manu (1992) investigated the association between environment, performance levels and innovation orientation, and in doing so, measured innovation orientation by profiling innovation activities such as order of market entry, percentage of new products and R&D expenditure on produces / processes.

Another scale, which has been widely used or cited, is that of Hurley and Hult developed in 1998. In this study it is argued that in addition to learning, elements of innovation need to be embedded in a market orientation as innovation is the primary means to respond to the market requirements. Therefore, both a market and learning orientation need to be considered within innovation orientation. In this regards Hurley and Hult (1998) stated,

> "Market orientation, learning orientation, innovativeness, and innovation capacity are organizational properties that affect the innovation process. A market- and learning- oriented culture, along with other factors, promotes a receptivity to new ideas and innovation as part of an organization's culture (innovativeness)" (p. 45).

In measuring innovation orientation a scale of five questions was developed focusing on management's openness to new ideas, to determine a positive correlation between innovation orientation and number of successful innovations implemented within firms.

Another study that focuses on the relationship between learning orientation, firm innovativeness and performance was that of Calantone et al (2002), where a simple innovation orientation scale consisting of six statements was developed on the basis of previous scales. Their scale was mainly related to organizational engagement with various types of innovation.

There are two studies that have developed and empirically tested multi-dimensional inventories of innovation orientation or organisational innovativeness. Tang (1999) identified the drivers of innovation in the internal environment from the employee's perspective and generated a scale consisting of nine dimensions: leadership, support, task, behaviour, integration, raising project, doing project, knowledge and skills, and finally information and communication. This model does not cover the organisational strategies towards development/adoption of various types of innovation; it also focuses on organisational innovativeness from the eyes of the employees. Wang and Ahmed (2004) developed a scale of organizational innovativeness with five factors: product, process, market, strategic, and behavioural innovativeness.

Both of these scales have limitations. Tang (1999) focuses on the internal environment. Wang and Ahmed (2004)'s scale, whilst it embraces types of innovation, and innovation strategy, and has been used by other studies (e.g. Leskovar-Špacapan and Bastic 2006; Knowles 2007; Liao and Wu 2009; Hilmi et al 2010), is a scale that invites respondents to benchmark their organisation's innovativeness in relation to competitors. Such an inventory assumes reactivity rather than the proactivity that is more appropriate in dynamic marketplaces, and also assumes that respondents are aware of their competitors' actions and plans. There is evidence to suggest that SMEs have a low level of awareness of the competitive structure of their marketplaces (Jones and Rowley 2009), suggesting that such an inventory might have limited applicability for SMEs.

The only detailed study that focuses on an innovation orientation framework was carried out by Siguaw et al in 2006 in which the importance of innovation orientation for firms' long term success was noted stating that "an organizational innovation system or orientation has yet to be formalized in extant literature, despite the plethora of innovation-research" (p. 557). Figure 3.5 below is an illustration of drivers, actions and outcomes of innovation orientation developed by Siguaw et al (2006). As is shown innovation orientation takes shape within organisational learning philosophy, strategic direction and trans functional acclimation, which in turn affects organisational competencies and firm performance.

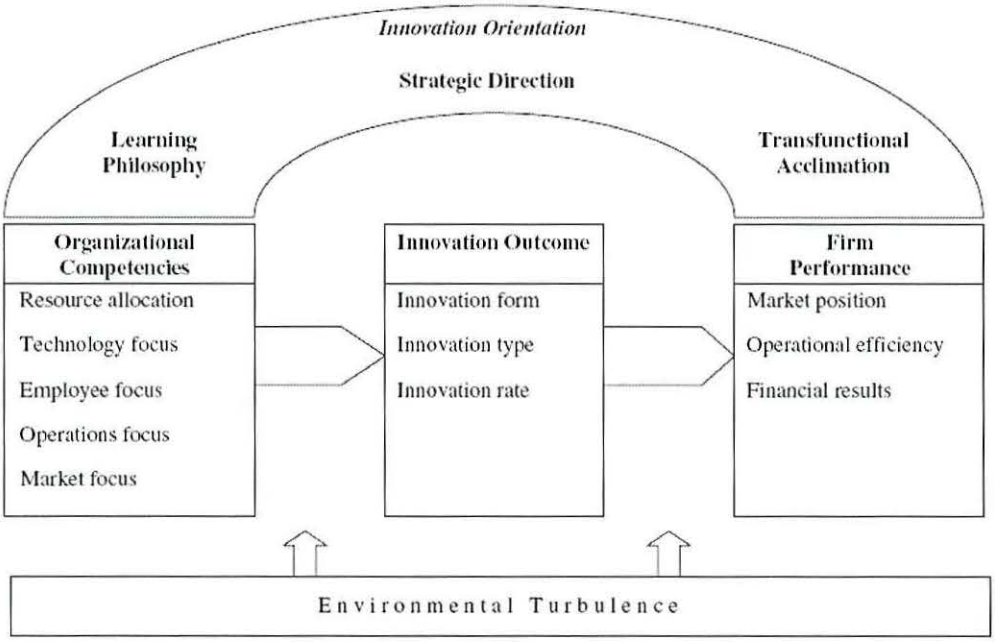


Figure 3.5. Drivers of Innovation Orientation (Siguaw et al 2006, p. 561)

Figure 3.5 reflects on the role of various factors in maintaining an innovation orientation. These are the basis of Siguaw et al (2006) propositions where organisational engagement and resource allocation to all types and degrees (radical and incremental) of innovation, acquisition of market information, attention to employees, technologies and operations are all parts of an innovation orientation.

Another recent study was carried out by Bouncken and Koch (2007) in which a scale model of innovation orientation consisting of six statements was designed focusing on product innovation. This scale considered some other aspects of innovation compared to

Siguaw et al's (2006) model such as their focus on the importance of a cross functional approach.

Putting the previously developed innovation orientation models aside, there are a number of factors that contribute to successful innovations, hence to innovation orientation such as organisational culture, leadership, technology, cooperation, product and process, knowledge and information (Dundon 2002; Humphreys et al 2005; Ma and Mcsweeney 2008; Singh et al 2008). Additionally, the role of employees, new technologies and R&D on innovation has been emphasized upon repeatedly (Grupp 1998; Hurley and Hult 1998; Han et al 2001; Hosseini et al 2003; Humphreys et al 2005). In terms of types of innovation, organisational dedication and allocation of resources to all types of innovation at both incremental and radical level has been highlighted (Henrad and Szymanski 2001; Siguaw et al 2006; Prange and Schlegelmich 2010). Accordingly these elements should be considered in an innovation orientation scale model.

Having reviewed the literature, it is evident that the literature on innovation orientation is focused on specific aspects of organisation/innovation and that there is requirement for an innovation orientation scale that considers various dimensions of organisations and innovations. Consequently, this study develops and tests an innovation orientation scale model in which Siguaw et al (2006) propositions has been adopted as a point of departure as they are based on a thorough review of the past literature.

3.5 Innovation process

In order to develop any type of innovation a number of stages and steps need to be adhered to (Wolfe 1994; Gopalakrishnan and Damanpour 1997; Van de Ven et al 2000). An innovation process is the combination of steps undertaken in the development of an innovation from idea to launch or operationalisation that "can be understood as a process consisting of several stages" (Gopalakrishnan and Damanpour 1997, p. 16). This process could vary on the basis of the type and the nature of innovation developed or adopted, the sector or the external environment.

Repeatedly, scholars have pointed out the importance of the innovation process, for example, in their studies of new product management, Booz, Allen and Hamilton (1982), and Cooper and Kleinschmidt (1995) have noted that the organisational new product process is crucial for the innovation to succeed. On the other hand, as there is no routine within the development of innovation, where processes vary from one to another on the basis of the type of innovation, the organisation, resources, environments and markets, identifying a process applicable to all is challenging "therefore, a rigid framework of concrete steps does not exist, but certain tasks generally need to be addressed in any NPD project" (Song et al 1998, p. 294).

There are different dimensions to the process of innovation, one of which focuses on whether innovation is being generated or adopted by the organisation. Generation is where innovation is being developed within the organisation from idea to use or production. Adoption is the case where innovation is generated elsewhere however it is being implemented and adopted within the subject organisation. It should be noted that each of these concepts and viewpoints are distinct and their process differ from one to another (Gopalakrishnan and Damanpour 1997). In this study the main focus is on generation of innovations.

Another two aspects focus on the actual process: the activities and stages (e.g. idea generation, training, market research); and, the order of the stages and activities. Focusing on the latter, some scholars consider the innovation process as consisting of sequential linear stages (Zaltman et al 1973; Robertson 1974) while more recently, other scholars consider the innovation process as a set of complex, parallel activities (Rogers 1983; Klines 1985; Schroeder et al 1989). Gopalakrishnan and Damanpour (1997) have stated that the first concept is labelled as unitary sequence model and the second is the multiple sequence model as noted by Poole (1981 and 1983).

Focusing on the past literature on the innovation process, although various stage models of innovation applicable to these dimensions (stages of generation and adoption of innovation) have been developed by scholars (Schroeder et al 1989; Wolfe 1994), Damanpour (1996) and Damanpour and Schneider (2006) have noted that research on the process of innovation is mainly on the basis of case studies and there is a lack of empirically tested studies. Moreover, while scholars have developed a number of process models of innovation, however, due to the complexity of the process of innovation, more research is required to gain an understanding of the process of innovation within different industries and structures (Adams et al 2006).

Additionally, the developed models are mainly based on large organisations, and there is a lack of appropriate processes for innovation among SMEs (Karapidis et al 2005; Vorbach and Perl 2007). Those few studies that have focused on innovation process among SMEs, have not adopted a holistic approach and focus on a specific aspect of innovation. For example, Vorbach and Perl (2007) focus on decision-making and Preez and Louw (2008) develop an innovation process model with a technology and engineering perspective.

In order to gain a more detailed insight to the innovation process, this study has further focused on the product innovation process. Here below, the relevant literature is presented in two sections: the literature on the product innovation process and the literature on the specific stages of the product innovation process.

3.5.1 Product Innovation Process

Product innovation or new product development (NPD) is the process of developing a new product in which certain activities should be undertaken formally or informally within organisations such as idea generation, market analysis, testing etc. The importance of a high quality new product process has been identified as key for performance (Cooper 1996; Cooper and Kleinschmidt 2007).

An emphasis on up front framework, sharp early product definition, the voice of the customer; tough go/kill decision points; a focus on quality of execution; and a thorough yet flexible process results in a high quality performance within NPD (Cooper 1996). Although there is a vast body of literature on the NPD process, it has been noted that there is paucity of research in this area within SMEs and on the basis of various sector (Adams et al 2006; Horte et al 2008).

Additionally, while a number of new product process models have been developed in various formats (functional, sequential and multiple functional approaches) still a number of organisations do not follow any processes. In their study of NPD process, Griffin (1997) noted that although previous research has found an association between formal NPD process and success, only 60% of their sample (in 1995) followed a formal process and that firms are slowly moving towards adopting a formal NPD process. In a follow up study to Griffin's (1997), Barczak et al (2009) identifies that this value has changed to 69% (in 2004).

As noted previously there are a number of innovation models in two categories: some focus on how, and other focus on what. Within the first group, the studies aim to identify how the innovation process is undertaken, which comprises a few models: sequential, compression, flexible, integrative, and improvisational. The sequential model is a step-by-step linear model with a technology push pattern (Rothwell 1994; Menrad 2004), while compression is a compressed version of the latter model where some steps are carried out in parallel. The flexible model is an organic approach to product innovation; this model is suitable for high turbulence environments. Within this model there are no sequences and the motto that best represents this model is 'learning by doing'. As for the integrative model, this model emphasises coordination and collaborative work between all involved in the NPD process. Finally the improvisational model is suitable for disturbed and turbulent environments; this model entails minimal structure and has common elements with the flexible model (Cunha and Gomes 2003).

With regards to the second group of product innovation models, the concern is with the undertaken tasks within the innovation process. The models in this category each focus on one aspect of innovation, these models usually have few stages/steps or activities in common. A number of these models are presented in Table 3.2.

Cooper and Kleinschmidt (1986) conducted an extensive study on the stages of new product development; in their study they identified 13 stages (Table 3.2). The authors tested this model by surveying 123 firms and identified that few projects incorporated all the 13 activities (1.9%) where the majority of the sample solely undertook less than nine of these activities. They concluded that the following activities were key to the new product development process: initial screening, preliminary market assessment, detailed market study/market research, business/financial analysis, product development, in-house product taste and market launch. Additionally, their study suggests that preliminary market assessment and formal market launch stage are vital for success.

Another study by Cooper (1996) identified preliminary investigation, detailed investigation, development, testing and validation, full production and market launch as the main stages of product development.

Stages of Product Innovation	
Cooper and Kleinschmidt (1986)	- Initial Screening, - Preliminary market assessment, - Preliminary technical assessment, - Detailed study/market research, - Business/financial analysis, - Product development, - In-house product testing, - Customer tests product, - Test/market trial sell, -Trial production, - Pre-commercialization business analysis, - Production start-up - Market launch
Wheelwright and Clark (1992), and Clark and Wheelwright (1993)	- Project definition - Project organisation and staffing - Project management and leadership - Problem solving, testing, and prototyping - Senior management review and control - Real-time/mid-course corrections.
Crawford (1994)	- Strategic planning, - Concept generation, - Pre-technical evaluation, - Technical development, - Commercialization
Gruner and Homburg (2000)	- Idea generation - Product Concept Development - Project Definition - Engineering - Prototype testing - Market launch

Table 3.2. Innovation Process Models

Wheelwright and Clark (1992), and Clark and Wheelwright (1993) studies on the stages of product development resulted in identification of six crucial elements to the NPD process. Moreover, Crawford (1994) conducts his study of new product management around five phases of the NPD process. Another study by Gruner and Homburg (2000) was derived from previous research and validated in interviews on the basis of large manufacturing companies where a 6-stage model of NPD was identified as depicted in the table 3.2 above.

Another important study on the stages of innovation is that of Van du Ven et al (2000) where four general stages have been identified with the following characteristics, this model is adaptable to all types of innovation:

1. "Idea stage: a problem is recognized, search for a solution is undertaken, alternatives are diagnosed, and a prototype does not exist yet.
2. Design stage: an innovation solution or prototype is developed, adapted or adopted and detailed guidelines for actions are established
3. Implementation stage: the innovation is put into action; scale up operations begins. The innovation maybe evaluated to decide whether to expand, modify or discontinue it.
4. Incorporation, or diffusion, routinization or institutionalization: the innovation is accepted as part of the standard operating procedures and no longer is viewed as an innovation." (Van de Ven et al 2000, p. 63)

From the above-mentioned models of NPD, it is apparent that although some of these models are more detailed than the other, they share certain aspects of the innovation process. For example, in the case of the first stage of innovation process all the models refer to the initiation process, e.g. initial screening, idea stage, project definition and idea generation. In addition to the NPD process, a number of studies focus on specific stages of the NPD process, here below an overview of these studies is provided.

3.5.2 Individual Stages of Product Innovation

Within the literature on the NPD process, a number of studies have solely focused on one of the main stages of product innovation. In this regards some studies have highlighted the importance of the initiation stage (e.g. Normann 1971), market assessment and technical expertise (e.g. Verworn et al 2008; Millson and Wilemon 2009), market assessment and launch activities (e.g. Cooper and Kleinschmidt 1986; Mishra et al 1996).

The front end of NPD is essentially another terms for the initiation stage, which comprises of: product strategy formation and communication, opportunity identification and assessment, idea generation, product definition, project planning and executive reviews. It should be noted that the main focus of the past literature on stages of NPD has been on the front-end activities (e.g. Cooper 1996; Khurana and Rosenthal 1998;

Henard and Szymanski 2001; Koen et al's 2001; Zhang and Doll 2001; Kim and Wilemon 2002). An example of this would be Khurana and Rosenthal (1998) study where the focus is the front end of new product development as they believe "the real key to success can be found in the activities that occur before management makes the go/no-go decision for any NPD product" (p. 57). It has been suggested that organisations should formalize their front-end activities in order to succeed consistently (Flint 2002).

Another study by Im et al (2003) on the new product performance among Korean and Japanese firms identified that both initiation and implementation stages are crucial for new product success. It should be clarified that in their study initiation tasks comprise of generation, concept screening and evaluation, where implementation activities are those of prototype design and development, market testing, market introduction and launch. In their study they identify the initiation stage as a critical stage due to its role on the implementation stage. Additionally, a number of other studies focus on the launch stage of product innovation and identify a positive association between product launch proficiency and new product performance (e.g. Langerak et al 2004; O'Dwyer and Ledwith 2009).

Although, a number of studies as depicted above have investigated the role of the initiation stage of innovation, Henard and Szymanski (2001) points out to the lack of studies in this domain. With regards to the design stage of NPD, Millward and Lewis (2005) have identified lack of managers understanding of the importance of product design as a hindrance to product success. Additionally, Millson and Wilemon (2009) identify that while organisational technical performance is an indicator of success, marketing performance has no relevance. This study has identified a literature gap with regard to the role of design stage of innovation from a managerial perspective.

Additionally, although many studies have investigated the relationship between NPD process and new product success or performance (Cooper and Klienschmidt 1995; Cooper 1996; Cooper and Kleinschmidt 2007); the relationship in case of innovation orientation and NPD has not been studied. Chai and Xin (2006) has noted this literature gap, in their study they have identified a link between adoption of NPD tools and innovativeness. An understanding of the specific link between stages of new product development and innovation orientation can help new product development management optimally.

In addition to the above, a number of other studies focus on the stages of innovation/NPD within another context, such as determination of the role of various factors on the stages of innovation process. An example of this would be Song et al (1998) study, where it was attempted to identify the role of cross-functional involvement in NPD process. In doing so five stages of NPD were identified as market opportunity analysis, planning, development, pretesting, and launch. Furthermore, a number of tasks are placed under each stage to measure the variety of each task.

To conclude, this section provided an overview of literature on process of innovation, new product development and various stages of NPD. It was highlighted that further research is required on process of NPD within various sector and SMEs, additionally there is paucity of literature on the role of stages of NPD for an innovation orientation. On the basis of above, this study first identifies the stages of innovation applicable to food SMEs, and then explores the significance of the presence of each of these stages for innovation orientation.

3.6 Antecedents of Innovation

The specific role of organisational characteristics such as size and age on innovation has been investigated within the past literature repeatedly. An understanding of the relationship between organisational characteristics and innovation is important due to its profound implication for policy makers and practitioners. In this regards Ghobadian and O'Regan (2000a) stated:

> "A clearer understanding of the factors that influence the performance of SMEs is important as it can help: a) policy makers develop more relevant policies; b) support agencies design and deliver a more appropriate support package c) education and training establishments design more appropriate and relevant education and training programs, and d) owner/mangers by clarifying, articulating and codifying the key variables. In fact, lack of deep understanding is signalled by some as a major reason for the failure of a number of initiatives designed to make SMEs more competitive" (p. 860).

On the role of antecedents of innovation, Damanpour and Aravind (2006) have indicated that past studies mainly concentrate on product and process innovations; in addition, they call for more research and highlight the need for a multidisciplinary analysis. Another study conducted by Damanpour (2010) further highlights the need for the clarification of the different effects of the antecedents of innovation on product and process innovations as evidence of an integrative relationship between types of innovation as described in section 3.5.4.

Within the domain of the antecedents of innovation, the role of organisational size and age on innovation have been the main focus of investigation, with most attention being directed towards organisational size. It should be highlighted that there is a paucity of research on the role of other organisational characteristics on innovation and answers to questions such as:

- Do organisations with specific product category within one sector (e.g. processed and fresh among the food sector) engage with innovation differently from one another?
- Does the number of different customer channels organisations supply to affect their engagement with innovation?

This leaves many questions unanswered and opens up opportunities for further research. In this section a brief overview of the past literature on the effect of organisational size and age is presented.

3.6.1 Organisational Size

The past literature on organisational characterises demonstrates contradictory results on the role of organisational size (on the basis of the number of employees) on innovation, performance and productivity. In this regards, while some studies have demonstrated a positive association between organisational size and innovation (e.g. Damanpour 1992; Huergo and Jaumandreu 2004; Cefis and Marsili 2005), some other studies have rejected such a relationship (e.g. Wakasugi and Koyata 1997; O'Regan and Ghobadian 2004; Laforet and Tann 2006) and, finally a few other studies have noted a negative association between organisational size and innovative behaviour, efficiency and performance (e.g. Salavou et al 2004; Hoxha 2009).

These contradictory results on the role of organisational size on innovative behaviours could be due to the size-related specific characteristics of the firm. For example, small firms are known to be more flexible and innovative (Acs and Audretsch 1990; Winters and Stam 2007), while larger firms have more resources and capabilities in economies of scale (Winters and Stam 2007). Additionally, organisational size is positively associated with company sales (Lin and Chen 2007). This suggests that organisational size both conveys advantages and disadvantages to innovative behaviour.

On the importance of organisational size for innovation, McAdam et al (2004b) calls for more research focusing on SME innovation within various organisational size categories. Their study suggests that on the basis of the significant role of organisational size on innovation among SMEs, future studies should further distinguish SME size categories. Additionally, De Mel et al (2009) have noted that more research is required on innovative activities among micro and small organisations.

It should be highlighted that most studies that have focused on the role of organisational size have, investigated a specific context of innovation, performance or productivity. Therefore, there is lack of literature on the role of organisational size on multi dimensions of innovation. For example, Wakasugi and Koyata's (1997) study did not find any evidence of organisational size affecting efficiency of innovation activities. Meanwhile, Huergo and Jaumandreu (2004) study suggests that smaller firms have a lower probability of innovation.

Focusing on types of innovation, De Mel et al (2009) have noted that micro organisations have a lower level of engagement with product and process innovation when compared to small organisations. However, Avermaete et al's (2003a) study within food SMEs demonstrated no dependencies between organisational size and types of innovation adopted. Meanwhile, Winters and Stam (2007) confirms the positive effect of organisational age on product innovation. In spite of this, in their study they found no significant relationship between organisational age and process innovation. Additionally, Wagner and Hansen's (2005) study within the wood product industry identified a positive relationship between size and process innovation, however, their study demonstrates no difference between small and larger organisations when considering process, product and business system innovations (position and paradigm innovations) all together.

In addition, Brandyberry (2003) demonstrated that organisational size does not have any association with adoption of Computer-Aided Design systems. However, a number of studies (e.g. Stansfield and Grant 2003; Krake 2005; Fink and Disterer 2006; Laukkanen et al 2007) demonstrate a negative relationship between size and IT or ICT related technologies. Meanwhile, a positive relationship between organisational age, networks with customers and R&D expenditure has been identified (e.g. Avermaete et al 2003a; Cefis et al 2007; Winters and Stam 2007).

3.6.2 Organisational Age

A few studies have investigated the role of organisational age on organisational performance and innovation (e.g. Sorensen and Stuart 2000; Laforet and Tann 2006; Winters and Stam 2007;Coad et al 2010). Nevertheless, overall past literature lacks clarity on the role of organisational age on successful exploration and exploitation (Bierly and Daly 2007).

Similar to the case of organisational size, scholars have reached contradictory results. A number of studies have identified a significant relationship (e.g. Hurley and Hult 1998; Salavou et al 2004; Lee and Ging 2007; Rosenbusch et al 2010), other studies have suggested that organisational age has no effect on organisational performance, value and innovation (e.g. Avermaete et al 2003a; Laforet and Tann 2006; Reino and Vadi 2010), and meanwhile a few other studies suggest a negative relationship (e.g. Hoxha 2009; Rosenbusch et al 2010).

These contradictory results could be due to the joint negative and positive affect of aging on organisations. Older firms gain more experience, set up relationships and have established technical complexities, new product development process and routines, however, aging could also be a disadvantage as older firms are more bureaucratic (Bierly and Daly 2007). Meanwhile, younger firms are more flexible and are more likely to engage in development of radical innovations, however, younger firms need to facilitate their learning process, moreover, they also lack institutional support mechanisms (Bierly and Daly 2007).

Accordingly some scholars have identified a complicated relationship between organisational age and innovation. Sorensen and Stuart (2000) study suggests that aging conveys two contradictory results on innovation; on one hand the older the organisation the higher the rate of innovation, on the other hand the older the organisation the lower its innovative output. In addition, they find evidence for their initial proposition claiming that organisational age is positively associated with the rate of new products. Another recent study by Coad et al (2010) reflects on the complexity of the effect of organisational age on innovation noting that although age improves firm's productivity, size, and profile, it also deteriorates organisational performance.

Additionally, Huergo and Jaumandreu's (2004) study suggests that young firms achieve their productivity from their innovative processes and learning, they further state "entrant firms tend to present the highest probability of innovation while the oldest firms tend to show lower innovative probabilities" (p. 548). Meanwhile, Brouwer et al (2005) suggests that productivity of young firms is lower than average; however as firms get older, age has no influence on productivity. In relation to innovativeness, although Hurley and Hult (1998), Salavou et al (2004) and Rosenbusch et al (2010) have noted a negative association between organisational age and innovative behaviour, Lee and Ging (2007) have noted that younger firms are more likely to innovate.

Regarding types of innovation, while Cefis and Marsili's (2005) study suggests that organisational age is positively associated with organisational survival, their study rejects any relationship between age and incremental and radical innovations. Subsequently, Avermaete et al (2003a) and Cefis et al (2007) have identified that organisational age does not affect product and process innovations and resources. Meanwhile, Balasubramanian and Lee's (2008) study suggests a negative relationship between organisational age, incremental innovations and technology.

On the basis of above it can be assumed that past literature associates different patterns of innovation on the basis of organisational characteristics such as size (e.g. Voss et al 1998; Brown and Kaewkitipong 2009). However, this body of literature is extremely fragmented and lacks consistency. Therefore, an investigation on the role of antecedents of innovation on innovation orientation traits would be useful. This would provide scholars with a platform to compare and contrast the role of size and age on innovation orientation activities. Additionally identification of any significant differences on the role of organisational size would confirm McAdam et al (2004b) on the requirements for size specific research among SMEs. Hence this study explores the relationship between organisational characteristics and innovation orientation.

3.7 Small and Medium Sized Enterprises

Small and Medium sized enterprises are all those companies with a certain number of employees or turnover. Some scholars regard SMEs as organisation with less than 250 employee while this value changes to 500 in case of other studies. This study refers to SMEs as those organisations with an employee limit of 250 in accordance with both the European Union and use of this category by similar past studies (e.g. McAdam et al 2004b).

SMEs play an important role within the UK economy. In the beginning of 2009, the UK had an estimated number of 4.8 million SMEs, this has created employment for 22.8 million people with an annual turnover of £3,200 billion. This in total, counts for 99.9% of all enterprises in UK and 59% of employment (BIS 2010). Subsequently the importance of SMEs and entrepreneurial firms to economic development has been widely recognised (Kumi-Ampofo and Brooks 2009). In the UK alone, there have been many government initiatives focused on encouraging innovation in SMEs (Oke et al 2007). Furthermore, innovation activities in SMEs have received attention from researchers (e.g. Keeble 1997; Hoffman et al 1998; McAdam and Armstrong 2001). Although it has been noted that innovation is essential for SMEs and it should be embedded in organisational strategies and processes (Bessant and Francis 1998; McAdam 2000), nevertheless, there has been little research on innovation within SMEs (Lee and Ging 2007; Oke et al 2007).

Even though there is a general acknowledgement that SMEs are important to economic growth, as early as 1942, some scholars related organisational innovative activities solely to large organisations (e.g. Schumpeter 1942; Galbraith 1956). In 1980's some studies highlighted SMEs contribution to the innovation process and output (Rothwell and Zegveld 1982; Bound et al 1984; Pavitt et al 1987; Kalantaridis and Pheby 1999). There is an ongoing debate on the extent of innovation among SMEs due to its characteristics, and while many scholars see SMEs as more innovative and flexible than larger organisations (Rothwell 1994; Afuah 1998; Hoffman et al 1998), others observe that not all SMEs innovate (Scozzi et al 2005).

In this regard, Hoffman et al (1998) suggest that there are some common features to innovation in SMEs. Such innovation is: more likely to involve product innovation than process innovation; focused on products for niche markets; organised formally in larger SMEs but more ad hoc or project driven in smaller SMEs; likely to generate both radical and incremental innovation; often informed by external networking; and, typically associated with growth in output, turnover and employment. Nevertheless, a number of authors suggest that there is considerable scope for further work on innovation in SMEs. For example, Edwards et al (2005) argues that insufficient is understood about the process of innovation within SMEs.

Taking this further, Salavou et al (2004) argues for the importance of understanding the link between strategic orientation, and competitive structure (of the marketplace) and innovation, whilst Harmsen et al (2000) argue for an approach that views innovation in terms of orientation, competencies and behaviours. Most relevant to this research, Oke et al (2007) points to the paucity of research on types of innovation in small firms, with previous studies tending to focus only on product innovations. Meanwhile in their study of implementation of innovation among SMEs, Humphreys et al (2005) notes more research on implementation of innovation is required "covering a broad approach to innovation" (p. 284).

SMEs and Large Organisations

Although it is common knowledge that there are differences in innovation patterns of SMEs and large organisations, e.g. in his study of innovation within EU SMEs, Veugelers noted that 40% of small and 63% of medium companies introduce a new product or service within the manufacturing industry this value changes for 80% in case of large organisations (2008). Yet, the specific relationship between firm size and innovation is still vague where no positive or negative relationship has been identified (Acs and Audretsch 1987; Cohen and Levin 1989; Veugelers 2008). Nevertheless, due to the difference in the nature of small and large organisations, not only different strategies and processes should be adopted depending on organisational size (Acs and

Audretsch 1988), but also innovation studies for SMEs should be on the basis of SMEs rather than adaptations from models for large firms (McAdam 2000).

Some of the common differences between SMEs and large firms that have been identified and are presented below:

- SMEs have greater financial constraints compared to large organisations, moreover, large firms have better access to external finance (McAdam et al 2004b; Veugelers 2008; Pullen et al 2009).
- SMEs are weak on valuable human resources (Pullen et al 2009).
- SMEs do not have cash cows to maintain the cash flow while they are facing difficulty with sales of and profit from a specific product (Pullen et al 2009).
- SMEs are less bureaucratic and management motivates through effective internal communications (Pullen et al 2009; Batterink et al 2010).
- Innovation processes within SMEs lead to a low innovation performance (Pullen et al 2009).
- Large firms exhibit a stronger link between R&D and innovation, as they dedicate more resources to R&D, this does however also apply to high tech small firms (Le Bars et al 1998; Veugelers 2008).
- Large firms are capable of scale and scope economies, they also can manage a number of projects at a time (Veugelers 2008).
- SMEs are more flexible and capable of exhibiting a speedier response to customer needs (Acs and Audretsch 1990; Dodgson 1993; McAdam et al 2004b; Singh et al 2008; Madrid-Guijarro et al 2009).

It is apparent from the above facts that the innovation process and behaviour is distinctly different among large firms and SMEs. Additionally, techniques used to measure innovation within large firms should not be applied to SMEs. Usually in understanding the innovation process, economist focus on the R&D activities within organisations and such approach is not relevant (suitable) in case of SMEs (Le Bars et al 1998). Research within the context of low tech SMEs is irrelevant to R&D. Moreover, some scholars argue that measuring innovation should not be based on R&D as not only it is solely on the basis of input to the innovation without any consideration for the output, also many organisations do not report their true R&D expenditure (Hansen 1992).

SMEs Research Streams

Moving towards the various streams of literature on SMEs, it is apparent that with a diverse range of research on this topic, each study focuses on a certain aspect of innovation. In this regards Laforet and Tann (2006) have noted "innovation studies in SMEs are diverse….research in this area is fragmented" (p. 365). The research streams of some of the studies on innovation within SMEs are:

1. Governmental policies (e.g. Motohashi 2001)
2. Technological and entrepreneurial firms or research and development (e.g. Acs and Audretsch 1998; Mole et al 2001; Romijin and Albu 2001; Masurel et al 2003; Rolfo and Calabrese 2003)
3. The relationship between innovation and organisational performance and growth (e.g. Lin and Chen 2007)
4. Internationalisation, networks and regions (e.g. White 1998; Mitra 2000; McAdam et al 2004a; O'Cass and Weerawardena 2009)
5. Innovation Types, innovativeness, organisational strategies and their success factors (e.g. Heunks 1998; Salavou et al 2004; Laforet and Tann 2007; Oke et al 2006; Oke 2007)

Furthermore, in his study of innovation within SMEs Brown (1998) have identified three research streams among SMEs focusing on: Economy, Organisation and Project. The first group, reflects on the importance of SMEs within the economy and often compares them with large firms. The second group focuses on organisational strategies and management of innovations in improving firm's performance, and the final group highlights the importance of customers for SME innovation. Within the organisation research stream McAdam (2004b) has stated, "Although there is some literature on innovation incorporation within organisational levels and activities (e.g. Vossen 1999), there is a lack of direct studies on this issue with a reliance on related but indirect studies such as reengineering and new product development in SMEs" (p. 148).

Additionally, in their study of types of innovation within SMEs Oke (2007) notes that the main body of literature on SMEs has two streams, "firstly, innovation in SMEs linked with performance and economic growth, and secondly, SMEs and innovation types" (p. 736) additionally on the research gap within this field they have highlighted lack of research on types of innovation within SMEs (Oke et al 2007; Oke 2007).

Identifying the current status of the literature on innovation among SMEs, sections below provides an overview of research on SMEs on the basis of strands of innovation literature relevant to this study:

Innovation Process within SMEs

In terms of the innovation process, although its common knowledge that the innovation process is different between large organisations and SMEs, where SMEs are more accustomed to an ad hoc approach to innovation while large organisations follow a stage gate development. However, it has been noted that unlike the case of large organisations, not much research has been carried out in this field focusing on SMEs (Hoffman et al 1998; Millward and Lewis 2005; Mosey 2005).

Type of Innovation within SMEs

With regards to types of innovation within SMEs there are a range of contradictory results from various studies (Laforet and Tann 2006). Lin and Chen's (2007) study of Taiwanese SMEs within the manufacturing and service sectors, revealed that technological and marketing innovation were the major types of innovation adopted within firms. Furthermore, their study identified that administrative innovation has a positive association with sales.

However, Oke et al's (2007) study revealed that SMEs not only develop more incremental innovations as opposed to radical innovation, they are more dedicated to product innovation in comparison with process and service innovations. Meanwhile, Massa and Testa (2008) noted that SMEs play an important role in developing radical innovations in contrast with previous findings and Laforet and Tann's (2006) study within the manufacturing sector identified that SMEs are more engaged in process innovations as opposed to product innovations.

Additionally, most of these studies solely focus on one or two types of innovation and do not provide a general overview of innovation types within SMEs (e.g. Karlsson and Olsson 1998; Freel 2000; Avermaete et al 2004; Mosey 2005; Wolff and Pett 2006). In their review of the past literature, Laforet and Tann have noted, "new product development and process innovation were often explored in isolation" (2006, p. 365), meanwhile, Wagner and Hansen (2005) highlight the literature gap on business systems innovation.

Innovation Orientation within SMEs

Although not many studies have been carried out focusing on innovation orientation, however, past literature identifies that size, age and flatter hierarchies influence the company innovativeness (Laforet and Tann 2006) where the basis for company innovativeness has been innovation success e.g. number of new products. Laforet and Tann (2006) further argue that the reason for these shortfalls is threefold:

> "First, in so far, there is no standard definition of innovation. Second, there is no specific guidance on what constitutes company innovativeness or world-class performance – neither standard measures of company innovativeness nor measures of company performance were found in the literature. Third, there is no guidance on factors contributing to successful innovation and innovation management for a specific industry within SMES" (p. 367).

In their study of innovativeness, Laforet and Tann (2006) measure innovation orientation on the basis of organisational facts and figures, and they identify culture, process, leadership and company strategic direction as the main drivers of innovative companies. Another study on the basis of software firms identified entrepreneurs and the firm-professionals relationship as vital for innovative capability (Raffa and Zollo1994).

Furthermore, Keizer et al's study (2002) on the innovative effort among SMEs highlighted innovation subsidies, link with knowledge centres, and R&D expenditure to have a significant impact on organisational innovativeness. Additionally, they identified "innovativeness is the result of a deliberately chosen and pursued policy" (p. 1) and Appiah-Adu and Singh's (1998) study within SMEs suggests a positive association between customer and innovation orientation.

This section has reflected on the fragmented body of literature on SMEs where many findings are contradictory, reflecting the need for sector specific research in the case of SMEs as it may only be possible to generalize their innovative behaviours on the basis of their industry. Additionally, further research on SME engagement with all types of innovation can assist scholars in comparing and contrasting various dimensions of innovation and SMEs innovative capabilities.

3.8 Food Sector

The food sector is the largest manufacturing sector within the EU and is one of the main drivers of the EU economy in terms of a high economic output and a major role in employment (Traill 1998; Avermaete 2002; CIAA 2002; Menrad 2004). In this regards Menrad (2004) states,

> "In recent years, the food industry has been facing far-reaching technical and economic changes in the production and processing of food, as well as in society, which will have significant impacts on the entire processing chain of the agricultural production, and food processing up to the distribution of food to end consumes" (p. 845).

Although the food industry has been regarded as low tech and less innovative in comparison with other sectors (Christensen et al 1996; Fontana and Guerzoni 2008; Ortega-Argilés and Brandsma 2010), this sector has been driven by product, process and service innovations (Avermaete 2002; Menrad 2004). Subsequently, innovation is deemed as one of the most important factors in enhancing the competitiveness within this sector (Grunert et al 1997; Rama and Von Tunzelmann 2008; Capitanio et al 2010). Similar to other sectors, this sector is widely recognised to be characterised by a high level of innovation driven by the changing environments and customer demands (Fortuin and Omta 2009).

Traill and Meulenberg (2002) indentify the following as the driver of firms to research and development within the food sector,

> "biotechnology revolution, pressures arising from globalization for firms to maintain better process control and exploit economies of scale, the need to ensure food safety, nutritional quality and provide a new generation of functional foods, and consumers' demand for convenience, variety, and quality" (p. 1).

Additionally, it has been recognised that internationalisation, food retailers, political environment and consumers play a key role in shaping the food sector (Avermaete 2002).

Literature on the Food Sector

Focusing on the literature in this context, Earle emphasises the importance of the "entire food systems when considering innovation strategies" (1997, p. 169). Menrad (2004) confirms this by pointing out that organisations do not innovate in isolation from one another and the entire innovation system should be considered when studying innovation. Such viewpoints have resulted in many studies on networks and supply chains to the detriment of studies on the individual players in food innovation systems. In this regards Fortuin and Otma (2009) stated,

> "in the emerging literature on innovation in this sector, the focus is either on the food industry as a whole (e.g. Batterink et al 2006), or on success factors at the level of individual innovation projects (e.g. Fortuin et al 2007), the question what factors form the drivers and barriers to innovation at the company level is still largely unexplored" (p. 840).

Furthermore, Avermaete et al (2003a, 2004) calls for more research on measuring innovation within sectors with a low R&D intensity together with research in various EU regions.

The well-established body of research on innovation in the food sector is fragmented and focused on certain topics such as the roles of alliances and networks, and supply chains, with a gap on drivers of innovation, types of innovation and innovation orientation within the food sector. Table 3.3 has brought together some of these studies on food SMEs grouped on the basis of their focus. Innovation within the food sectors usually has been devised with two different patterns:

1. Technology-push: innovation is a process of development (Grunert et al 1997), which can be realised through R&D activities (Capitanio et al 2010)
2. Demand-pull: organisational innovation has a direct link with markets and customer needs where "innovation is correlated to the market orientation of the firms and its marketing activity. In the food sector this approach to innovation is particularly important as it deals with the adoption of new technologies that allow firms to respond

to higher quality standards, with new ways to present more traditional products...." (Capitanio et al 2010, p. 505)

Capitanio et al (2010) suggests firm's innovativeness is derived by organisational model and strategies, R&D activity and market orientated activity. Furthermore, innovations should be studied by focusing on the firm innovativeness rather than solely studying technological innovations. Meanwhile, in their study of innovation Le Bars et al has noted that R&D should not be considered in case of the food sector (1998). Confirming Le Bars, in their study of innovation within food sector Traill and Meulenberg (2002) identifies that only few of their sample firms have engaged with R&D and they conclude that innovation within this sector is more complex than a technology push and demand pull paradigm. They (Traill and Meulenberg (2002)) further suggest that "firms have a dominant product, process or market orientation that determines the company culture, the types of innovation accorded most importance, and the way in which innovation are organised and brought to fruition" (p. 15)

Not only many studies on the food sector innovation within SMEs has been carried out on the basis of R&D expenditure (innovation input), a range of other studies measures innovation in terms of organisational facts and figures, such as number of new products or patents (output) as noted previously. However specific to the case of food SMEs, past literature suggests that "traditional measures of the number of new product introduced or share of revenue from new products are woefully inadequate particularly because they fail to differentiate the degree of novelty of the innovations" (Traill and Meulenberg 2002). This highlights the requirement for research within the food SMEs on the basis of the innovation activities and processes at the organisational level.

Although there are a number of studies that focus on various aspects of innovation within the food sector (table 3.3) Avermaete et al (2004) has pointed the requirement for further empirically tested studies. Considering all the above, it can be argued that empirical evidence on food firms at the organisational level is a necessity prior to proceeding with innovation studies within the entire food system, these constructs needs to be empirically tested and quantified to open opportunities for further research on networks (Traill and Meulenberg 2002).

In terms of organisational size, as reflected in the previous section on small medium sized enterprises, although in general, SMEs are seen as important to the development of the economy, with entrepreneurship often being coupled with innovation, yet SMEs have received limited attention in the innovation literature (Edwards et al 2005). Table 3.3 below reflects on some of the research streams on innovation within the food SMEs. Additionally the 'organisational size' column of Table 3.3 shows that there is no one size category commonly applied among various studies, some studies are on the basis of small firms, some other on SMEs and finally there are a few with vague limitations. This also adds to the complexity of literature on SMEs.

Focus	Source	Organisational Size
R&D Focus	Bougheas 2004 Avermaete 2002	Small Small
Networks, Cooperation, Supply Chain	Freel 2003 Freel and Harrison 2006 Avermaete et al 2003b Gellynck and Kűhne, 2008 Gellynck and Vermeire 2009 Aylward and Glynn 2006	Small Small Small SME SME and Large SME
Product and Process Innovation	Avermaete et al 2004 De Jong and Vermeulen 2006 Ma and McSweeney 2008 Capitanio et al 2009 Salavou and Lioukas 2003	Small Small SME More than 10 employees SME
Product specific e.g. Dairy, Speciality Food	Brito et al 2010 Massa et al 2007 Stræte 2008	SME SME Small
Technological	Bigliardi and Dormio 2009 Thomas et al 2002	Small and Medium SME

Table 3.3. Food sector research

It should be highlighted that while some studies within this context are specific to a product category (Brito et al 2010; Massa et al 2007; Stræte 2008), few studies have compared and contrasted organisational engagement within various product categories. One recent study that has investigated the role of product categories suggested that organisational engagement with position innovation is sector related among food SMEs, and that processed food producers are low in their product innovations, this changes in case of beverage producers (which are high in their product innovations) (Avermaete et al 2003). Another study by Hsiao et al (2011) suggest that sub categories of the food sector perform differently in their engagement with outsourcing and development of product innovations.

Here below the position of the food literature in terms of types of innovation and innovation orientation is presented. Focusing on the actual innovation process, the researcher was faced with a lack of studies custom to food SMEs; this confirms Adams et al's (2006) study identifying the lack of literature on innovation process within various industries.

Types of Innovation within the Food Sector

Not only research on types of innovation within the food sector is limited to product and process innovation (as reflected in Table 3.3) where the extent of firm's engagement within other types of innovation is yet to be investigated, also, there are various contradictory findings on product and process focus of the food sector. This might be due to the specific context of such studies.

In their study of product and process innovation within Italian food firms, Capitanio et al (2010) noted that food firms develop more process innovations, where the majority of product innovations are incremental. Furthermore, they identified that organisational quality of human capital and market relationships favour product innovations while firm's financial structure and capital intensity favours process innovations. Avermaete (2002) points that small food firms are mainly engaged with incremental product and process innovations with a low rate of radical process innovations.

In this regard Grunert et al (1997) proposes that successful firms have a dominant pattern of innovation adoption as: product orientation, product orientation and market orientation. Furthermore, it is suggested that in addition to the firm's focal orientation, a successful firm also attends to the other orientations too (Traill and Meulenberg 2002). Moreover, Menrad (2004) noted that two third of their sample were engaged in both product and process innovations. Another recent study by Brewin et al (2009) identified an interrelationship between the in house developed product and process innovations in case of those firms that are engaged in development of both types of innovation.

In addition to product innovation, packaging innovation plays an important role within the food sector (Earle 1997; Olsson and Larsson 2009) as products cannot be presented without any packaging. On the role of packaging innovation within the food sector Earle (1997) stated,

> "Packaging innovation have been quickly accepted by food manufacturers, because of the reductions in production costs, and the need for attractiveness on the supermarket shelves. Environmental criticism of packaging are pressuring changes to reduce waste and aid recycling" (Earle 1997, p. 172).

Innovation Orientation within the Food Sector

Although it has been recognised that innovativeness is vital within the food sector (Capitanio et al 2009) as Earle has noted "There are two prerequisites for successful innovation in the food industry: an innovation-orientated company and a positively reactive environment" (1997, p. 166). However not much research has been carried out on identification of the drivers of innovation orientation, where most studies measure innovativeness on the basis organisational input and output such as R&D expenditure and market oriented activities (number of new products) (Capitanio et al 2009). Subsequently, Traill and Meulenberg (2002) call for further research to quantify product, process and innovation orientation, highlighting the importance of these concepts in studying the link between innovation and company performance.

To conclude, this section reflected the paucity of literature on innovation among food sector SMEs prompting the need for further research on the process of innovation and organisational engagement with various types of innovation. An understanding of the dimensions of innovation among food SMEs is vital for effective management of these firms and can be used by policy makers for initiation of custom support programs for these firms.

3.9 Summary and Conclusion

Although scholars have considered the concept of innovation for a few decades, there is more to be studied. In this chapter various concepts of innovation were presented, portraying the scholarly findings on innovation types, innovation orientation and processes and the concept of innovation within food SMEs. Additionally the literature gaps were also presented and discussed.

The literature review on innovation reflected the context specific nature of innovation processes and activities, where contradictory results were identified in the case of various organisational sizes and sectors. This highlighted the need for more context specific research on the basis of industrial, environmental and political demands. One neglected sector in terms of innovation is the food sector where there is a lack of literature especially in the case of SMEs.

Furthermore, although the importance of innovation orientation/innovativeness for organisational success has been emphasized, there is a lack of an innovation orientation framework/scale necessary to guide organisations to maintain their innovation abilities. Finally lack of literature on concepts of innovation types and processes within the specific context of this study was highlighted where the patterns of adoption of innovation (level of organisational engagement) are yet to be explored.

On this basis this study focuses on food sector SMEs within the UK and raises the following research questions:

1. What are the patterns of innovation among food SMEs?
2. What is the specific relationship between types of innovation?
3. What are the key components of innovation orientation?

In profiling innovation within this food sector SMEs, this study identifies the extent of food SME engagement with innovation types and stages in the product innovation process. Furthermore, the specific relationship between types of innovation is explored. Also this study develops and tests an innovation orientation scale model. This is followed by investigation of the role of organisational characteristics and innovation process on innovation orientation. In conducting this study, in addition to product and process innovation, the less researched types of innovation, position and paradigm innovation are also embraced.

This chapter started with providing a definition of innovation and an illustration of the importance of innovation among scholars, governments and policy makers. With all the attention given to innovation a section was dedicated to a general identification of innovation research streams and gaps together with innovation measurement techniques.

By this point a general understanding of innovation, its value, gaps and measurement techniques has been presented.

Subsequently, the chapter moved towards a detailed overview of innovation in accordance with the objectives of this study, where various innovation type models were introduced and the pattern of adoption of types of innovation was reflected upon. Thereafter past scholarly work on innovation orientation and process of innovation were introduced identifying the gaps and current models at hand. Finally, this chapter looks at innovation studies within SMEs and the food sector separately focusing on the past literature on innovation orientation, activities and types within these specific contexts and their shortfalls.

Chapter Four - Methodology

4.1 Introduction

A research methodology highlights the routes to the research findings; it is the research plan and provides guidelines on how it should be undertaken. Research methodology starts from the researcher's perspective on knowledge, and social entities and considers ways to achieve the desired knowledge. There are a number of research methodologies and a number of factors that could affect the choice of methodology such as researchers' beliefs on knowledge and its extraction, literature gaps and the feasibility of adopting different methods.

In this study, to generalise the various concepts of innovation within the food sector a positivist approach has been adopted with objectivism towards the social entities. Also, a quantitative research technique has been implemented and data were collected through a survey questionnaire. Additionally, a number of pilot interviews were carried out to gain an understanding of the target sector prior to proceeding with the research strategy. Subsequently, a survey questionnaire was designed and distributed to managers of food SMEs. This questionnaire was designed in four sections in accordance with the research objectives, to:

1. Propose a multidisciplinary definition of innovation.
2. Develop an innovation types model.
3. Identify the types of innovation adopted by food SMEs and their relative significance.
4. Explore the stage activities of the product innovation process, applicable to food SMEs.
5. Understand the extent and nature of integration between different types of innovation in SMEs.
6. Propose and test an innovation orientation scale model.
7. Examine the importance of stages of product innovation on innovation orientation.
8. Explore the relationship between organisational characteristics (e.g. age and size) and innovation orientation traits.

It should be noted that objectives 1 and 2, have already been addressed in chapter two and chapter three, as they were part of an early phase of this study.

This chapter illustrates the methodological stance of this research, beginning with an overview of various research philosophies, followed by presentation of the adopted philosophy and choices of techniques in the case of this study. Thereafter, the design and implementation process of research techniques is discussed, followed by the sampling method and limitations. The ethical considerations are presented at the end as this section discusses the ethical considerations and issues within the research methodology.

4.2 Research Philosophy

Research philosophy reflects a researcher's stance towards what constitutes knowledge; the nature of being and the way knowledge should be obtained; this affects the formation of theories and the choice of research techniques (Easterby-Smith et al 1991). Research philosophy consists of basic beliefs towards the world in form of Ontology, Epistemology and Methodology (Guba and Loncoln 1994). The choice of each of these factors informs and influences the choice of other factors accordingly; also as mentioned previously the researcher's interests and the specific research question shape much of this.

It should be highlighted that there are differences between research method and methodology; research method is part of the research methodology. While research method is concerned with methods and techniques for data collection, statistical methods and accuracy of the data, research methodology goes beyond this and is concerned with "a way to systematically solve the research problem" (Kothari 2004, p. 25). Research methodology deals with the 'whys' and the logic behind the adopted methods; its aim is to ensure that suitable methods and techniques have been adopted for each research question (Kothari 2004).

The factors in relation to research philosophy will be explained below (Ontology, Epistemology and others), this is followed by presentation of this study's adopted approach separately towards the end of this section.

4.2.1 Ontology

Ontology is concerned with the nature of reality, the way the world operates; it focuses on the relationship between social actors and reality which comprises of two main different viewpoints; objectivism and subjectivism (Crotty 1998). Objectivism "portrays the position that social entities exist in reality external to social actors concerned with their existence" (Saunders et al 2007, p. 110) where subjectivism "holds that social phenomena are created from the perceptions and consequent actions of those social actors concerned with their existence" (Saunders et al 2007, p. 110). Within objectivism, reality has objects that are not influenced by social actors. This implies that researchers can gain a general understanding of objects, processes and phenomena, and the same general understandings apply to all objects of the same nature.

Subjectivism accounts for the "the subjective dimension of human action" (Gill and Johnson 2002, p. 167), this indicates that the same rules do not apply to the same entity as differences may arise due to the social actor's perceptions, thoughts and viewpoints. Therefore, in this body of thought analysis should be an in depth extraction of knowledge on thoughts, perceptions and viewpoints which are changing continuously. Meanwhile, in relation to objectivism usually theories or hypothesis are presented based on the objects and validity of these hypothesis will be evaluated and confirmed through extraction of knowledge from a great number of social actors (Glynn 2009).

4.2.2 Epistemology

While ontology focuses the nature of social entities, epistemology is concerned with the constitution of acceptable knowledge in a discipline, questioning whether the social world should be studied similar to natural science. Epistemology has two main positions: positivism and interpretivism (Bryman and Bell 2007).

Positivism applies natural science methods of study to social entities and motions for testing generalization (Pugh 1983). Whereas, interpretivism argues that social entities should not be studied applying the same methods as natural sciences, hence, different processes and procedures should be in place when reflecting on humans with a high regard for human behaviours. Subsequently, interpretivism requires a subjective view on social actions (Bryman and Bell 2007) while positivism is adopted (by some researchers) due to its success within the natural sciences (Smart 1975). Positivists have denied an interpretivist approach due to,

> "the specific unreliability of the interpretation of consciousness, indeed whether by self or by an observer, has always been the principal rationale for the rejection of verstehen by such schools. The intuitive or empathetic grasp of consciousness is regarded by them merely as a possible source of hypotheses of human conduct" (Giddens 1976, p. 19).

Positivism considers the following assumptions:

1. Objective research, where research is free from any bias and researchers' personal and political views. Within social sciences, questionnaires should be designed to keep a distance between the researcher and subjects of the study.
2. Reliability of the data should be ensured; positivists believe that quantitative research methods are most reliable due to their systematic, organized and standardized nature. The reliability of this study is discussed further in this chapter (section 4.5.8).
3. Identifying cause and effect relationships and establishing social laws, research should be conducted in a manner to produce quantitative and statistical data that can be presented in tabular or graphical information (McNeill and Chapman 2005).

Interpretivists reject the positivist approach as they argue,

> "unlike animals or physical objects, human beings are able to attach meaning to the events and phenomena that surround them, and from these interpretations and perceptions select courses of meaningful action which they are able to reflect upon and monitor"(Gill and Johnson 2002, p. 183).

4.2.3 Induction and Deduction

When contemplating the relationship between theory and previous knowledge and research, the concepts of induction and deduction arise. In deductive theory the researcher generates hypothesises on the basis of past studies and theories, which will be tested empirically. This method is associated with quantitative research (Bryman and Bell 2007). On the other hand, inductive theory begins with observations and findings, which result in the formation of theory, and this method is usually associated with qualitative analysis (Bryman and Bell 2007).

Abduction is another concept on the relationship between theory and research that suggests hypothesis testing on the basis of patterns in phenomena. By introducing new ideas, abduction creates explanatory hypothesises (Peirce 1878). Yu (1994) indicates that explanatory data analysis fits well with abduction and provides the following description on these theories,

> "At the stage of abduction, the goal is to explore the data, find a pattern, and suggest a plausible hypothesis; deduction is to refine the hypothesis based upon other plausible premises; an induction is the empirical substantiation" (p. 1).

Abduction proposes hypotheses as a result of exploring data; studying affects and leading to cause where the logic behind it is right reasoning, or in other words logical guessing.

4.2.4 Research Method

Whilst ontology and epistemologies focus on philosophy of the researcher towards knowledge and the nature of reality, research method focuses on the overall approach and actual technique(s) of data collection and can be two-fold: qualitative and quantitative or mixed methods. Quantitative studies are based on measurements and statistical analysis while qualitative studies are more concerned with generating rather than testing theories. Additionally, some writers believe that the difference between these two research methodologies lies within their epistemological foundations (Bryman and Bell 2007). Quantitative studies are associated with a deductive approach, positivism and objectivism, while qualitative studies go hand in hand with an inductive approach, interpretivism and subjectivism (Bryman and Bell 2007).

4.2.5 Discussion

The specific position of this study with regards to research philosophy and methodology is presented below:

- This study has adopted a deductive/abductive stance to theory. Due to a lack of research on innovation and its processes within the food sector SMEs where there is no empirically tested innovation orientation scale, this research conducts explanatory data analysis, exploring the dimensions of innovation orientation and the relationship between organisational characteristics and NPD process on innovation orientation. Hence, it could be argued that this research has adopted an abductive approach, although it does contains strands of deductive research as it takes shapes on the basis of previous theories specifically in identifying the relationships between types of innovation.

- A positivist approach is most suitable to this study where the researcher studies and measures the innovation processes within organisations to generalise the findings to the wider context of this study.
- With regards to ontology, as the aim is to gain a general understanding of innovation and its processes within organisations, an objective viewpoint has been applied. This is justified by the nature of the objectives of this study, as the research questions are concerned with the actual activities undertaken within the organisation and does not evolve around feelings of social entities. This assumes that social entities do not have any perceptions on the processes within their organisations, and their responses are not influenced by these perceptions.
- As a positivist objective viewpoint is the basis for statistical data analysis on the basis of large amounts of data for the purpose of generalisation, a quantitative approach has been adopted.

4.2.6 Axiology

Another aspect of a research methodology that could be discussed here is axiology, which is concerned with the role of researchers' values within the research process. Axiology investigates researchers' bias, which could impact various stages of research such as:

- "choice of research area;
- formulation of research question;
- choice of method;
- formulation of research design and data collection techniques;
- implementation of data collection
- analysis of data
- conclusions" (Bryman and Bell 2007, p. 30)

It has been argued, "Positivists and postpositivists maintain that there is no place for values in the research process" (Ponterotto 2005 p. 131). Accordingly, within this study axiology has had the minimum impact on data collection, analysis of data and conclusion. This is due to the quantitative nature of the study where there has been minimal contact with respondents of the questionnaire, resulting in lack of influence or bias. However, within the choices of research area, this study has been influenced and directed by both the researcher's and BIC Innovation's (sponsors of this study) interest as discussed in section 1.4. Additionally, as BIC Innovation is interested in empirically tested research findings, generalizable and applicable throughout the food sector, the choice of research methodology was also influenced by BIC Innovation.

Although interviews are an interpretive tool, at the start of this study, a number of pilot interviews were carried out, aiming to familiarise the researcher with the target sector and its specific characteristics. This was vital prior to selecting a research strategy ensuring that not only the interests of past research, research questions, BIC Innovation and the researcher are satisfied but also that the adopted research strategy is practically suitable for the target context. Hence interviews were deemed most appropriate to provide the researcher with an understanding of this sector and their specific language. Below the details of this process are discussed in detail.

4.3 Exploratory Research

After undertaking a thorough literature review on innovation, its processes and types, and also deciding on the research focus (food sector SMEs), it was deemed appropriate and necessary to conduct a pilot study to gain insight to the context of this study. Pilot studies are "Small Scale version[s], or trial run[s], done in preparation for a major study" (Polit et al 2001, 467). Also Van Teijlingen et al (2001) state that pilot studies are a form of feasibility study and will provide indications of the study's success or failure and useful methods.

With regards to the significance of pilot studies, Maxwell (1996) indicates that not only are they important for selecting the research technique (design), they are also important especially in understanding the sample's language. Hence, based on these factors, conducting a pilot study at this stage of the project was necessary in order to provide a better understanding of the specific sector and its characteristics towards innovation.

Pilot studies can be carried out through any of the research techniques such as interviews, questionnaires, focus groups, etc. For the purpose of this study, an interview method has been chosen as it enables the researcher to directly engage with respondents to shape an understanding of the context of this study (Silverman, 2006). Structured interviews enable the interviewer to collect responses on specific areas and points of interest (Rugg and Petre, 2006). In addition to this, they enable the researcher to gain some insight and an understanding of how the respondents feel and think about innovations by having a face-to-face contact and conversation, hence, structured interview were deemed most suitable to carry out the pilot study.

Subsequently a structured interview was designed to gain an insight within this sector within the following areas:

- Food sector SMEs' definition of innovation
- The business language used within this context
- Innovation process
- Frameworks and concepts of innovation
- Extent to which organisations innovate
- Level of firm engagement towards different types of innovation
- Tactics to extract information from SMEs in this sector (gain tips and guidance for research technique)

4.3.1 Interview Content

The structured interview was designed to gain an understanding of the notion of innovation together with innovation process and characteristics in food sector SMEs. Interview questions were developed initially based on concepts, theories and models of innovation in three sections as follows:

- Details of the respondent's organisation: aiming to profile the organisational characteristics such as the year of establishment, number of employees, product range, etc.
- Business Innovation profile: this section aims to profile the organisation's innovation activities, initially by exploring the SMEs understanding of innovation and then by gaining specific information on their developed innovations (Oke et al 2007).
- Innovation stages and processes: this section focuses on how subject organisations develop innovations, through which stages and the relationships between types of innovation.

Once the initial draft of the interview questions was prepared the draft schedule was handed out to the sponsors of this study (Business Consultants, BIC Innovation) for their feedback. This resulted in editing the questions to be more understandable and suitable for the target sector. The full questionnaire is presented in Appendix 4.1. Initially the interviews were planned to be carried out during September 2008. However, as the arrangement of interviews was dependent on the sponsors of this study, the process was prolonged and the interviews were arranged during October 2008 to be carried out in November and December 2008.

4.3.2 Interview Process

The candidates for the pilot interviews were selected by BIC innovation (sponsors of this study) based on the following criteria applied to their client database:

- Sector: food
- Size: SME
- Location: North Wales (transportation convenience)

Once a list of suitable candidates was prepared, interviews were arranged directly by BIC Innovation. Initially, six companies were shortlisted, each with a different product range from frozen yogurt and salad to cooked and prepared meat. Finally out of the six companies that agreed to proceed with the interviews, only five set an appointment. It should be mentioned that to ensure that the interviews would reflect the various aspects of the target sector, when devising a short-list the company size was considered so as to have companies with different size ranges (employee number) from medium companies to micro, also from established to newly established companies.

The challenge with the interviews was in booking an hour appointment with the candidate interviewees. This process took longer than expected (around two months), the lengthy booking process might be due to the timing as it was last quarter of the year and close to Christmas which is a busy period for this sector. Candidates were contacted towards the beginning of October 2008, however appointment bookings took a couple of weeks and the interviews were carried out between the start of November till the end of December 2008. Before setting an appointment BIC Innovation emailed the target interviewees with an introduction to this study on behalf of the researcher. This can be found in Appendix 4.2. Interviews were held in the interviewee's work place (office) and took approximately 40 minutes to an hour. Table 4.1 profiles the respondents:

Company line	Role of Interviewee	Company Age/years	Number of Employees
Puddings and bread	Managing Director	3	10
Desert and Salad	Managing Director	22	16
Smoothie and health bars	Manager	25	9
Ice cream	Managing Director	83	120
Cooked meat	Operations and technical director	86	94

Table 4.1. Pilot Interview Respondents Profile

4.3.3 Data Analysis and Finding from Pilot Study

Interviews were recorded after gaining permission from interviewees and were transcribed afterwards. As the pilot interviews were conducted to gain a general preliminary understanding of innovation behaviours in the food sector SMEs to inform the design of the research, a structured thematic analysis was carried out on an interview-by-interview basis. When analysing the interviews, comments were pulled out based on the themes informed by the literature. Thereafter, a cross interview analysis was carried out on the identified comments under each theme to compare the issues raised and identify similarities and differences (Hair et al 2007). At this stage, the mentioned method of analysis suffices as the aim of the pilot interviews was solely for the researcher to become familiar with the sector which would further influence the design of this research. The result of the thematic analysis is presented below.

Innovation Profile

With regards to the first question (respondents' perception of the term innovation) each of the interviewee's definition was different. However, almost all interviewees mentioned product innovation (new product development) and defined innovation from the product and service innovation's point of view, e.g. "Developing new products or new ways of delivering, new ways /forms of product". Only one of the interviewees mentioned process innovation.

When requested to provide figures on their innovations, such as the number of their innovations within the past year, all the interviewees struggled to provide any numbers. For example while one of the interviewees response was "we don't have it, six, I don't know…", another company which had undergone major product, process, position and paradigm innovation at the time of the interview responded "I am not sure, it peaks on major projects happening within the company, you would be lucky to get one or two not even that sometimes". These responses suggest that asking questions which requires facts about innovation will not reflect the actual figures, as the interviewees do not normally 'count' innovations and find it difficult to identify a specific innovation.

It could be argued that what is considered as innovation varies from one organisation to another, one reason is mainly due to the fact that respondents' concept of innovation is with regards to their own business, processes and activities. This highlights the need to ask specific questions on innovation, as each company's view of innovation is different from another. Moreover, when faced with questions about their innovation process, all the interviewees tended to provide answers on the basis of one of their product innovations (for example, enquiring about the number of ideas they analyse before proceeding with one innovation). This suggests that adopting a critical incident approach in asking questions is what interviewees can relate to. Moreover, all interviewees tend to talk about their product innovations (as there is a more identifiable business outcome) rather than their process innovations. This implies that the data collection within this context is rather sensitive, and much care should be given to designing clear questions on the notion of types of innovation.

Finally, in one of the interviews the interviewee contradicted himself, once stating that they innovate based on customer demand and requirements and at another time, mentioning failure in one of their product innovations because customers did not want the change. This might imply the fact that for some organisations not much thought or analysis goes into innovating; alternatively it might also be due to the fact that they had not been asked such questions previously and the respondent has found it difficult to articulate.

Innovation Stages and Processes

In this section respondents were provided with the six stages of product innovation identified by Gurner and Homburg (2000) as Idea generation, Product Concept Development, Project Definition, Engineering, Prototype testing, Market launch on a set of cards (six cards each specifying one of the stages of product innovation). Interviewees were requested to choose the undertaken stages of their product innovation using these cards in an orderly manner.

Analysing the responses, it was identified that the order of the stages of product innovation varied from one respondent to another. Moreover, most of the interviewees did not pick at least one of the stages. The eliminated stage was mainly concept development, engineering or project definition. This implies that either the interviewees were not familiar with these stages and perhaps the methods of presenting these stages (in terms of their label) should change or the model of innovation process adopted in the interviews is not suitable within the food sector SMEs. On the relationship between different innovation types, interviewees confirmed existence of a relationship between product and process innovation where mainly product innovation leads to process innovation. An example of an answer is "Yes this happens a lot, it has both directions, its usually from product to process".

Based on the above factors, it can be concluded that the process of arranging interviews with food sector SME managers is time consuming. Furthermore, acquiring figures with regards to respondents' innovation processes might not reflect the actual figures as SME understanding of innovation varies from one another. Additionally, they do not have any formal processes and procedures with regards to their innovation. This confirms the past literature that measuring innovation on the basis of input and output figures is not suitable in case of food SMEs (Avermaete 2002; Avermaete et al 2003a; Menrad 2004).

Moreover, interviewees found it easier to provide answers to the questions based on their recent product innovation. They also struggled with the concept of process innovation. Lastly, their viewpoint on innovation and what classifies as innovation differs from one to another. To summarise lessons learnt from the pilot interviews informing the main study are:

- Innovation needs to be discussed indirectly as it is a confusing notion.
- Questions entailing facts and figures should be avoided as innovation is not usually measured in this context.
- Regarding types of innovation, clear questions referring to each type separately should be designed, as respondents tend to instantly consider product innovations.
- Stages of innovation should be further researched and a straightforward method of questioning this process should be adopted.
- Respondents confirmed the relationship between types of innovation and this matter should be further investigated.

4.4 Research Strategy and Method

The choice of research technique is very sensitive as it can turn a great research field and question into failure, especially when the aim is to generalise. In this regard, Oppenheim stated,

> "the need for an appropriate research design arises whenever we need to generalise from our findings, either in terms of frequency or prevalence or particular attribute or variable, or about the relationship between them" (1992, p. 5).

Considering the implications of the pilot study and also focusing on the research aim, objectives and their nature, (where an innovation orientation model is to be developed, a general overview of how innovation is performed in food sector SMEs is to be explored together with patterns of organisational engagement and relationships with various innovation types), it is apparent that a holistic approach to research is most suitable at this stage. Hence, this research calls for generalising; therefore a quantitative approach is deemed most appropriate.

When choosing a research strategy a number of options are available such as: experiments, surveys, case studies, grounded theory, ethnography, action research (Saunders et al 2003). A survey strategy was chosen to collect large amounts of data on innovation orientation activities, various types of innovation and process of innovation. This was done to test the applicability of Bessant and Tidd's (2007) innovation type model, to design an innovation orientation model and explore the associations between innovation characteristics. Questionnaires were chosen to collect data as they were deemed suitable for gathering a large amount of data and collecting accurate information, providing that the questionnaire is designed wisely (Saunders et al 2003).

Questionnaires are also the main method of data collection in previous studies (e.g. Subramanian and Nilakanta 1996; Hult et al 2004; Laforet and Tann 2006; Bouncken and Koch 2007; Madrid-Guijarro et al 2009) as a quantitative research method is suitable for measuring phenomena (Hair et al 2007) and enables this study to generalise. It should be noted that one limitation of this approach is its lack of flexibility for consideration of special cases as in organisations with different characteristics or circumstances. Therefore, once this study is conducted, qualitative studies could be conducted for an in depth evaluation of the findings.

4.5 Survey Questionnaire

Survey questionnaires are a means of questioning and recording answers (Lee and Lings 2008). As mentioned before, due to the requirement of an inclusive approach to innovation orientation, types and stages of innovation, it was deemed suitable to conduct a quantitative study analysing a large scale of data (food sector SMEs) in order to measure innovation behaviours, processes, stages and to create a scale. However, due to the fact that questionnaires count as a structured data collection technique as questions and choices for answers are pre-determined by the researcher (Gillham 2000), much effort needs to be dedicated to questionnaire design in order to ensure the quality of the gathered data.

In relation to the questionnaire design, Saunders et al (2003) state that selecting questionnaires for data collection seems like an easy option to some, however, conducting a successful study via questionnaires is harder than it seems as there is no way back once the questionnaires have been distributed. Accordingly the following has been identified to be important for a successful questionnaire design and execution:

- Individual question design
- Clear questionnaire layout
- Clear understanding of questionnaires purpose
- Piloting and
- Planning, executing and administration of the process (Saunders et al 2003).

In his textbook focusing on questionnaires, Gillham (2000) summarised the pros and cons of questionnaires as presented in Table 4.2.

Pros	Cons
- Low cost in time and money - Easy to get information from a lot of people very quickly - Respondents can complete the questionnaires when it suits them - Analysis of answers to closed questions is straight forward - Less pressure for an immediate response - Lack of interviewer bias - Standardisation of questions (but true of structured interviews) - Can provide suggestive data for testing an hypothesis" (2000, 6)	- Problem of data quality (completeness and accuracy) - Typically low response rate unless sample "captive" - Problems of motivating respondents - The need for brevity and relatively simple questions - Misunderstanding can not be corrected - Questionnaire development is often poor - Seeks information just by asking questions - Assumes respondents have answers in an organised fashion - Lack of control over order and context of answering questions - Question wording can have a major effect on answers - Respondent literary problem - People talk more easily than they write - Impossible to check seriousness or honesty of answers - Respondents uncertainty as to what happens to data."

Table 4.2. Questionnaire pros and cons (Gillham 2000, p. 6 - 8)

The researcher has kept these factors (Table 4.2) in mind when designing the questionnaire, ensuring clarity and avoiding any misunderstanding. For example, one of the disadvantages of questionnaires is the lack of motivation for respondents and a low response rate. However, in case of this study as the questionnaire was to be distributed by BIC Innovation or other reputable organisations and holding the assumption that target respondents know the sending organisation, a high response is expected. Also, the questionnaire is to be distributed with a motivating invitation and also promise of providing respondents with an executive summary upon completion. As for the effect of questions' wording (noted as one of the disadvantages of questionnaires), utmost effort has been dedicated to designing the questions without implying any answers; the questions are as neutral as possible.

4.5.1 Questionnaire design

In line with the objectives of this study, a questionnaire was designed to be handed out to managers of the food sector SMEs, as managers hold the knowledge on their firm's strategies, business model, plans and organisation culture, and they should also be aware of their firm's past innovations. On targeting the managers in data collection Bryman and Bell (2007) noted,

"it is fairly common practice in business and management survey research for one respondent, often a senior manager, to be asked to complete a questionnaire or to be interviewed about issues that are related to their organisation or workplace" (p. 197).

The questionnaire comprises four sections:

- Innovation orientation, to develop an innovation orientation scale
- Innovation types, to test Bessant and Tidd's (2007) model and also the relationship between types of innovation
- Innovation stages, to identify the main stage activities of innovation
- Organisational profile, to profile the respondents and explore the relationship with innovation characteristics

The questionnaire's specific approach in enquiring about innovation activities within the organisation was influenced by Zahra and Covin's (1994) and McAdam et al's (2004b) studies where respondents were required to identify their level of engagement with each of the specified activities. In addition, when designing the questionnaire, many of the academic terms were changed into 'practitioner' terms to ensure its suitability for the target sector (lesson learnt from the pilot interviews). For example, instead of the term 'position innovation', the term 'marketing innovation' was used. Also, instead of the term 'paradigm innovation', the term 'business model innovation' was used to avoid complicating the questionnaire for the respondents. The researcher learnt from the pilot study that managers in the target sector do not have the same viewpoint or even a clear understanding of the term 'innovation', so usage of this term within the questionnaire was minimized.

The design process for each of these four sections is presented in detail below.

Innovation Orientation

The aim of this section is to develop and test an innovation orientation scale. In doing so a study on various models and measurement tools of innovation orientation was conducted initially to investigate whether such a generic model exists and thereafter to identify the relevant studies. The result of this study indicated that the available models have a marketing or organisational behaviour context or they simply are only focused on product innovation as presented in the literature review chapter (section 3.4). Therefore, none of these studies have a generic approach to innovation orientation except for Siguaw et al's (2006) propositions, which have not been tested to this date. Siguaw et al (2006) conducted a comprehensive study on innovation orientation, which resulted in the identification of twelve propositions on innovation orientation. Siguaw et al's (2006) propositions are used as the basis for the development of an innovation orientation scale as their study:

- Adopts a holistic approach to innovation
- Is informed and justified by earlier research
- Proposes a framework that has yet to be empirically tested.

In addition, although Bouncken and Koch's (2007) model solely focuses on product innovation orientation and has some common viewpoints on innovation orientation with Siguaw et al's model (2006), however, their model draws on one construct of innovation that has not been addressed by Siguaw et al's (2006) model, this construct is the importance of adoption of a cross functional approach within the organisation.

Hence, Siguaw et al's (2006) propositions together with Bouncken and Koch's model (2007) were employed to develop an innovation orientation scale. It should be noted that out of the 12 propositions developed by Siguaw et al (2006) only 8 propositions focus on innovation orientation and the other 4 statements aim to examine the relationship between performance and innovation characteristics. Twenty-six statements were developed for the innovation orientation scale. Statements 1 - 9 and 11 of the questionnaire are derived and adapted from Siguaw et al 's (2006) study, and statements 1, 2, 9 and 10 are to some extent covered by Bouncken and Koch's question 1 and 5.

It should be highlighted that statement 10 is solely adapted from Bouncken and Koch's (2007) statement 5. In addition to this, statement 11 of the questionnaire is derived from Siguaw et al's (2006) second proposition that highlights the importance of new technologies for innovation orientated firms, hence, innovation orientated organisations develop and deploy new technologies. However, within the questionnaire this question has been placed under the process innovation section as it is also one of the characteristics of process innovations.

The remainder of Siguaw et al's (2006) and Bouncken et al (2007) questions or proposition highlight the importance of the following for an innovation orientation:

- Organisational engagement with types of innovation
- Development of both radical and incremental innovations
- Allocation of resources to innovations

Statements 12 to 26 are dedicated to the identification of the extent of engagement of organisations in each of these activities separately, where one statement is dedicated to each available option. For example, 3 statements focused on process innovation, devoted to identify firms' level of engagement with radical process innovation, incremental process innovation, and allocation of resources to process innovations, and this is applied to all types of innovation (product, paradigm position).

However, in the case of product innovation, packaging innovation has been investigated separately along side product innovation as packaging has a major role within the food sector's new product development process compared to other sectors. In this regard, Sonneveld (2000) has stated that packaging innovation "has become an essential component of the product distribution and marketing system" (p. 19). Additionally, "New products, manufactured with advanced production techniques and packaging systems, have enlarged the assortment of products significantly"(Sonneveld 2000, p. 29). The actual statements can be viewed in the final version of the questionnaire in Appendix 4.3.

In relation to the questionnaire structure, as statements 11 to 26 are also part of the innovation types section of this survey, they have been excluded from the innovation orientation section in the actual survey questionnaire to eliminate repetition for the respondents and once data is collected were be added to the innovation orientation section for analysis. Hence, questions 11 to 26 do not appear in the innovation orientation section of the questionnaire but in the relevant parts of the innovation type section.

Innovation Types

This section aims to identify the extent of firms' engagement with different types of innovation based on Francis and Bessant's (2005) model of types of innovation, as this model is relatively recent and has not been tested to date. Additionally, this section aims to profile the sector and shed light on the relationships between innovation types.

This section is further divided into 4 sub sections as product, process, position and paradigm on the basis of Francis and Bessant's (2005) typology. Considering the fact that innovation types is a confusing topic (another lesson learnt from the pilot study), questions on one innovation type were grouped to make the questionnaire flow easier for respondents. Employing such an approach in designing the questionnaire was inspired by Darroch and Jardine's (2002) study on radical and incremental innovations, where questions relating to incremental and radical innovation were grouped.

In identifying firms' level of engagement with innovation types, not only it is important to understand the extent of the development of each type of innovation but also the degree of development (incremental and radical). Therefore, the first 2 questions under each sub section were dedicated to measuring the extent of engagement with radical or incremental innovation for each innovation type. In doing so, these statements are on the basis of Whyte et al's (2005) representation of radical and incremental innovations for product, process, position and paradigm innovation. As for packaging innovation, the same pattern of other types of innovation was applied and the applicability of this was confirmed by practitioners (BIC Innovation, sponsors of this study).

Firms' level of resource allocation to each type of innovation also reflects firms' engagement with innovations (Siguaw et al 2006). However, when discussing resource allocation to innovations, product innovation and R&D expenditure spring to mind. Therefore, the third question under each innovation type section enquires about firms' resource allocation to each innovation type separately. As mentioned previously, these three statements (on radical and incremental innovations and resource allocation) will also be applied to the innovation orientation scale.

The above questions are followed by a number of 2 to 3 other questions regarding each specific type of innovation to gain more insight into each innovation type and the degree of firm engagement. Francis and Bessant's (2005) introduction of these innovation types and their characteristics is the basis for these questions where firms are required to identify whether they engage with certain activities regarding each type of innovation. For example, in the case of position innovation firms are asked about their attention to branding, or in the case of paradigm innovation, about their consideration of mergers and acquisitions.

Having a number of questions under each innovation type is not only useful to pursue an in depth and overall view on the extent of their involvement to the respective innovation, it also validates organisational engagement with types of innovation and portrays a more reliable picture of innovation patterns among food SMEs. For example, if in their first question they answer that they continuously improve or enhance their products but then for the third questions they indicate that they never allocate any resources to their product development then they are contradicting themselves and this would indicate that they are not that strong in their product development.

Finally, each section is followed by one open question designed on the basis of the critical incident approach as a means of an exemplar of the types of innovation adopted. The open questions invite the respondents to identify and explain an innovation that their business has undertaken recently. This question was added in order to gain an insight on respondent's understanding of each innovation type within their organisation.

Stages of Innovation

The purpose of this section was initially to identify stages of product innovation that SMEs in the food sector undertake and secondly to identify the relationship between stages of innovation and innovation orientation. In designing this section, previous stage models of innovation were reviewed. It was apparent that various stage models of innovation showed that most models have similar stages however, they might label these stages differently (e.g. Gurner and Homburg 2000; Kusar et al 2004) or in some cases one stage model is a general stage model of 3-5 stages (e.g. Song et al 1998; Swedberg 2000; Van de Ven et al 2000) where another stage model is a detailed stage model (e.g. Cooper and Kleinschmidt 1986; Kusar et al 2004).

Additionally, lessons learnt from the pilot study reflected respondents' lack of ease relating to or understanding some of the academic stages of product innovation, especially in the case of SMEs. Most SMEs are micro and micro organisations do not have any formal processes for their new product development, hence cannot relate to these stages. Therefore, considering the fact that conducting another study on stages of innovation and identifying a stage model of innovation would be like previous studies and it would be confusing for the respondents, it was decided to base the study on Van de Ven et al's (2000) general stage model of innovation. Van de Ven et al's model (2000) comprises of the following stages: idea, design, implementation and incorporation stages.

In doing so the aim was to identify the activities under each stage. Adopting such a straightforward approach enables the respondents to select the activities that they engage with. Accordingly, this will enable the researcher to draw a realistic picture of stage activities of innovation within the sector and thereafter, conduct a comparative analysis of the good practice based on innovation orientation. Hence, a list of activities undertaken under each stage was identified based on a number of studies on product innovation stages (e.g. Cooper and

Kleinschmidt 1986; Wolfe, 1994; Kusar et al 2004), and the list of stage activities of innovation can be found in the questionnaire, Appendix 4.3.

Organisational Profile

This section focuses on profiling the responding organisation enquiring about company name, year of establishment, product range, role of respondent (to ensure the respondent holds a managerial role), postcode, and turnover figure for the past three years. In addition, respondents were requested to identify their size based on the number of employees in any of the following categories: less than 10 (micro), 11 to 50 (small) and 51 to 250 (medium). Also on the basis of an industrial questionnaire carried out previously by BIC Innovation within the food SMEs, a few questions were added to this section to provide more insight about the nature of respondents' processes as depicted in Table 4.3:

Question	Options
Company operations	- Discrete manufacturing - Processing - Component manufacturer - Assembly - Services
Customers	- Large retailer - Small/independent retailers - Wholesaler/cash & carry's - Direct to consumer - Other food manufacturer and catering outlet
Product launches during the past three years:	- None - 1 to 5 - 6 to 20 - 21 to 50 - 51+
Products to be launches in the future three years	- none - 1 to 5 - 6 to 20 - 21 to 50 - 51+

Table 4.3. Respondent's profile

Finally, the respondents were requested to note their email address if they wished to be provided with the results of this study. These questions are based on general organisational characteristics, which would then enable this study to provide a more detailed analysis based on organisational size, age and specific product range, etc.

4.5.2 Format of the questions

Within the first three sections of the questionnaire (innovation orientation, innovation types, innovation stages) the extent of applicability of all the statements to each respondent is measured via Likert-style rating scales, with an exception for four statements under innovation types. Likert-style rating is usually used when respondents' agreement or disagreement to a number of statements is being investigated through a 4, 5, 6 or 7 point rating scale (Saunders et al, 2003), producing categorical data. Subsequently, a 5 point Likert-style rating scale has been adopted requesting respondents to identify the level of engagement of their organisation with any of the statements from always to never as: Always (5), Mostly (4), Usually (3), Occasionally (2), Never (1).

The 5-point rating scale provides respondents with the ability to score their organisational approach to different statements. Adding more options to the scale might not only confuse the respondents, but would not add to the research as it would be difficult to differentiate further between these categories. Conversely, providing fewer options on the rating scales might not be suitable for some respondents as they might wish to differentiate, for example, between always and mostly and possibly. In such a case respondents would be confused and frustrated providing answers to a lesser number of points on the rating scales.

Within the innovation types section, the statements are measured in Likert-style rating scales with an exception for one last question under each subsection (product, process, position, and paradigm) which is an open question. This open question provides the respondents with an opportunity to give an example of their recent relevant innovation in their own words. It should be noted that open questions are more suitable for interviews and are off putting in the case of questionnaires as they are time consuming for the respondents (Saunders et al 2003), therefore, in this study the use of open questions is limited to only 4 questions.

Within the last section (organisational profile) the first few questions are open questions with short responses (name, year of establishment, product range, and postcode) where no explanation is required and factual responses are straightforward. This section also entails a number of multiple-choice questions, where respondents are requested to identify the category they belong to (e.g. number of employees). Bearing in mind that respondents do not need to think too much about the questions in this section and the fact that they are quick to complete, this section has been placed last. When reaching this section respondents have provided answers to all the questions that require more thinking and a bit of explaining, at this point they might be tired and facing short and easy questions might encourage them to finish the questionnaire.

4.5.3 Piloting the questionnaire

Pre testing a questionnaire is vital to ensure the suitability of the content, design, accuracy and consistency of the questionnaire (Hair et al 2007). Hence, this questionnaire was piloted in three stages initially by colleagues, secondarily by BIC Innovation (sponsors of this study) and finally by a number of respondents within the target sector. The respondents of the pilot study were requested to go through the questionnaire and provide answers to the following questions to ensure the questionnaire is "relevant, clear worded and unambiguous" (Hair 2007, p. 278) respectively.

1-How long did it take you to complete the questionnaire?

2-Were any questions ambiguous? If so, which one (s) and in what way?

3-Were any questions particularly difficult to answer? If so, which and for what reason(s)?

4-Were any questions too sensitive? If so, which and for what reason(s)?

5-Do you have any other comments that might improve the questionnaire and/or response rates?

Colleagues

The online questionnaire was initially sent to six different University researchers from different disciplines such as Banking, Finance, Business, Management, and Marketing in order to gain their professional viewpoint both on content, format and structure of the questionnaire. The main comments at this stage were on the structure and layout of the questionnaire; hence relevant changes were made to these, such as order of some questions and the font.

BIC Innovation

The questionnaire was emailed to all members of BIC Innovation, their initial reaction to the questionnaire was the following:

1. The language of the questionnaire is too academic for the sector to understand.
2. It is a bit too long.

After receiving the abovementioned comments, the questionnaire was edited to simplify the statements and make it more practical and appropriate for its intended audience. Also the statements were shortened to make the questionnaire seem less lengthy as none of the sections or statements could be eliminated. An example would be the following statement "In our organisation we use Information Technology applications to manage, coordinate and integrate our processes such as inventory management systems" which was edited to "In our organisation we exploit Information Technology to improve our operations".

At this juncture, the questionnaire was forwarded to BIC Innovation for their feedback and comments once more; a number of meetings took place between the researcher and the Managing Director of BIC Innovation whose background is in marketing. This resulted in adding few questions to the respondent's profile section of the questionnaire, as noted earlier within the questionnaire design section of this study (section 4.5.1). In relation to the innovation stages section, the stage activities were sorted based on their relative order within the product development process.

In addition to these, BIC Innovation suggested covering few other elements of innovation on the basis of the characteristics of the food sector SMEs. This resulted in adding two questions to the position innovation section enquiring about firms' exploitation of CRM and firms' innovativeness in their marketing and promotions. The intention was to identify whether SMEs are involved in promotions and CRM. It should be noted that in this process the nature of questions in the first three sections remained intact, questions were simplified and edited to make sense to the respondents. Hence, the main changes were applied to the organisational profile section, where a more detailed profile of the organisation was illustrated and the questions were easier to complete, where the format of some questions was changed to multiple choice where possible.

In addition to BIC Innovation, at this stage, an expert was also presented with the questionnaire. He found it suitable for both the topic and its audience. His only concern was on the financial question.

The final version of the questionnaire can be found in Appendix 4.3.

Food Sector SMEs

At this stage the questionnaire was tested through a number of food SMEs via two different methods: BIC Innovation clients and exhibitors at a food exhibition.

BIC Innovation Clients: Initially five food sector SMEs were contacted and invited to participate in piloting the questionnaire and upon receipt of their agreement the online questionnaire was emailed to them. The respondents were requested to complete the questionnaire and provide answers to the five piloting questions stated at the beginning of this section. It took the respondents 15 minutes to fill out the questionnaire. The only comment was on the question in the organisational profile section enquiring about their finances; 3 out of 5 respondents found this question too sensitive. Moreover, only 1 out of the 5 respondents provided an answer to this question.

Exhibitors: During the piloting session, a hard copy of the questionnaire was distributed to a number of exhibitors at a food exhibition in the Midlands, England, and upon completion of the questionnaire an enquiry was made towards the content of the questionnaire. In line with the previous piloting, the only question that was problematic was the question on their finance. Even if no objection was raised, they said that they do not remember, or do not know, the exact amounts.

Therefore considering the results of these two piloting attempts the question on company finances was eliminated from the questionnaire.

4.5.4 Questionnaire Distribution

There are a number of choices for distributing questionnaires: online, postal, delivery and collection and telephone.

The issue that arises with postal and delivery/collection is the confidence that the right person within the organisation has responded. There is also the possibility of the results being contaminated by consultation of the respondent with others as the respondents are free to answer the questions in their own time and under various circumstances (Saunders et al 2003). As for the telephone interviews not only are they time consuming for the scale of this study, they can also be inconvenient, as the interview could be disrupted or interrupted by the interviewee, due to interviewees busy schedule or their environment (Saunders et al 2003).

With regards to online questionnaires, an extensive study has revealed that access to unique populations and time and cost advantage are among the main benefits of online questionnaire (Wright 2005). Moreover, all the food sector organisations tend to have an email if not a website. Furthermore, managers mostly have their personal email address in the organisations, the distribution of the questionnaire to the right respondents is more straight forward compared to other means of distribution in case of this study. Additionally, the percentage of contamination of distortion of respondents' answers is low with online questionnaires (Saunders et al 2003).

In addition, flexibility with the time of responding to the questionnaire adds an advantage to online questionnaires. Another fact in favour of this technique is that access to contacts is more convenient as various intermediaries such as food innovation centres or food advisory services that hold the potential respondents' contact details were willing to assist the researcher with data collection due to their relation to the sponsors of this study. Nevertheless, neither were these organisations willing to release the contact information of the candidate respondents to any external party (the researcher), nor would they take the responsibility of distribution of the questionnaire in any forms other than via email due to its convenience (click of a button for distribution of the questionnaire).

Hence, initially online questionnaire was the approach selected to carry out this study, as this approach seemed to be the most suitable and reliable format of distribution. However, at some point during data collection, a low response rate obliged this study to complement this approach by handing out questionnaires in person to exhibitors in the food exhibition or festivals throughout UK. It might be argued that adopting two different methods in collecting responses to the questionnaire might result in differences within the data. To ensure that these two methods are compatible, once data were collected, the responses were compared for any significant differences. The mean score of the responses for all the statements under each category were calculated and this reflected on no significant difference as the mean score were close to one another. Appendix 4.4 illustrates these mean scores. To further ensure the consistency of these two sets of data the cronbach alpha value for both these two categories was calculated separately. Cronbach alpha tests the reliability of the collected data, the closer this value to one the more reliable the data (Bryman and Bell 2007). In case of this study, the cronbach alpha test showed that the data collected through both these two channels are reliable as the value in the case online questionnaire was .976 and in the case of exhibitions was .976, both reflecting on an excellent reliability (George and Mallery 2003).

Prior to discussing the content of the questionnaire, it should be noted that an engaging and encouraging invitation to participate was developed for the cover of the questionnaire and also for the email in which the questionnaire link is to be placed. This can be found in Appendix 4.3, and the invitation to participate on the cover of the questionnaire can be found in Appendix 4.5. The details of the questionnaire design, test, sampling and distribution will be discussed below.

4.5.5 Sampling

> "A sampling technique is defined as introducing control into the selection of n out of N sampling units when it increases the probabilities of selection for preferred combinations of units (and decreases the probabilities for non-preferred combinations)" (Goodman and Kish 1950, p.350).

When selecting a sampling method, initially, the population of the study should be identified. In the case of this study the population is organisations and the common element is the size of organisation to be micro, small or medium and their sector was to be food (inclusion criteria). SMEs refer to those organisations with an employee size of up to 250 and food sector refers to all those organisations that produce any type of food, ingredients or drink products including agrifood and manufacturers. In total in the UK there is around 9,375 food sector SMEs (Wetherill 2009). As a census is not realistic for this study due to the impossibility of contacting all SMEs within the food sector, the following sampling approach and steps were taken as defined by Hair et al (2007).

Target Population

The following represent the target population of this study:

- Element: food sector SMEs (less than 250 employees)
- Sampling Unit: the sampling unit of this study consists of any employees within the organisation with a managerial role or director and owners who undertake decision-making tasks. As some SMEs do not have a formal organisational structure and the owner might be responsible for managing all the organisational activities, the sampling unit covers any individual within the organisation who has a managerial role.
- Extent: the extent of this study covers all companies with England, Scotland and Wales.
- Time: July to Nov 2009.

Sampling frame

The sampling frame of this study consists of a network of databases of food sector SMEs held by agencies (BIC Innovation and their partner organisations) in contact with these SMEs together with the exhibitors within the food festivals and exhibitions throughout the UK. Different methods were applied to ensure that the research criteria have been met:

1. Initially it should be noted that the agencies who supported this study with their databases provide specific services (consultancies or regional food support organisations) to food sector SMEs
2. Additionally, within the organisational profile section of the questionnaire, organisations are asked about their product range and size, and where the respondent's organisation did not meet the criteria they would be deleted accordingly.
3. In relation to exhibitions and festivals, the first criterion being a food sector organisation, this was met by default as the researcher only considered the food exhibitions and festivals. As for the size criterion, although most of the

exhibiting organisations in these events are SMEs, before handing out the questionnaire, the researcher, while introducing herself and the research, would enquire about the size of organisation, their specific operations and their location. Once these criteria were met, the researcher would proceed with the candidates.

4. To ensure the managers were the respondents of this study;
   i. Within the online distribution it was ensured that the questionnaire is emailed to a managerial level position within the firm.
   ii. Within the exhibitions and festival, the researcher would ensure this by enquiring whether a managerial level position was available during the exhibitions, if so, the researcher would further ensure this criterion has been met by directly handing out the questionnaire to the target candidate. At times the researcher would attend the same exhibitions for a second day to ensure that the managerial level position is the respondent.
   iii. Additionally, within the organisational profile section, respondents were asked about their role and in case this criterion has not been met, the record would be eliminated from the data analysis.

Sampling method

There are two main categories of sampling method: probability and non-probability. With regard to probability sampling Goodman and Kish (1950) have stated,

> "in probability sampling the essential condition is that each of the N sampling units shall have a specific, known probability of selection and that the probability for none of the units shall be zero. Within this limitation the possibilities are myriad" (Goodman and Kish 1950, p. 350).

Non-probability sampling uses subjective methods with no statistical measurements for the sample and sampling error (Hair et al 2007). However, "non-probability samples are used for many research projects. These samples can be chosen for convenience or on the basis of systematically employed criteria" (Henry 1990, p. 17). The flaw with non-probability sampling is the possible subjectivity in the sample selection that prohibits theoretical framework development (Kalton 1983).

In this study, non-probability sampling has been employed due to limited access to companies, as the sponsors of this study were to provide the sample. Convenience sampling has been adopted in the selection of respondent companies. However, with regards to the selection at food fairs, a purposive sampling approach has been undertaken to ensure the sample is a relative representation of the target population, as within purposive sampling, "sample elements are chosen because the researcher believes they represent the target population" (Hair et al 2007, p. 182).

Initially, in the case of online questionnaires, the researcher targeted databases that would be a close representation of UK food sector SMEs. The database of food allies, (consultants or regional development agencies) of BIC Innovation, (sponsors of this study) was targeted, as they would cover various areas of UK (England and Wales). However, as this method did not receive a high response rate, it was decided to collect responses from food exhibitions and festivals. Purposive sampling was again applied in selecting festival and exhibitions to attend, aiming to collect responses from various areas. The researcher attended exhibitions and festival throughout the UK, from locations such as Anglesey, Birmingham, London, Leicester, Nantwich, Conwy and East Midlands. Additionally, to avoid any distribution bias the researcher would hand out the questionnaire to all exhibitors regardless of any external factors (look, vibe, busyness) once ensuring they are SMEs involved in production, processing or manufacturing of food products from the UK.

Sample Size

The suitable sample size for this study was determined on the basis of:

1. Previous studies within the field of innovation orientation and innovation types: a review of past studies revealed that a sample size of 200 is deemed suitable. (e.g. Ettlie et al 1984, sample size: 147; Bantel and Jackson 1989, sample size: 199; Gopalakrishnan et al 1999, sample size: 101; Damanpour and Gopalakrishnan 2001, sample size: 101; Calantone et al 2002, sample size: 187; Berthon et al 2004, sample size 124; Hult et al 2004, sample size: 181)
2. The suitability of the sample size for the statistical tests to be carried out was determined. For the regression tests of this study a sample size greater than 125

was required. For the PCA analysis a sample size greater than 150 together with a ratio of 5 cases for each variable (5*26 variables for innovation orientation=130) is deemed suitable as presented in the findings chapter, section 5.6 (Pallant 2007).

Subsequently, it was decided to aim for a sample size of 200.

Data collection plan

The questionnaire was distributed via two channels. Initially it was decided to proceed with data collection solely via an online questionnaire on the basis of the client database of sponsors of this study. However, due to the low response rate, it was deemed appropriate to also collect data manually, therefore:

- Online questionnaires on SurveyMonkey were distributed to companies in Wales and England through a) BIC Innovation's databases and b) partner organisations of BIC Innovation;
- Questionnaires were (manually) distributed at a number of food festivals and exhibitions held throughout England and Wales where responses were collected directly.

A letter was written and sent to the organisations inviting them to participate in this study, pointing out the URL link of the questionnaire, which can be found in Appendix 4.5. In the case of face-to-face distribution of the questionnaire, exhibitors would be presented with the invitation verbally to achieve their agreement. As mentioned previously during this process, the researcher would enquire about their size and location to ensure they met the criteria for this study. Upon such confirmation, the researcher would attempt to identify the managerial level position holder to fill out the questionnaire and pursue their agreement to complete the questionnaire. This process at times would take several hours or a day, when the researcher would return to the candidate exhibitor stand to find the suitable candidate.

Table 4.4 below summarises the data distribution and collection channels. Although 249 companies attempted to complete the questionnaire, only 221 of these responses were usable for data analysis, insufficient questions were answered in 28 of the questionnaires. Among these 221 responses, a number of respondents still left some questions blank. However, it was decided to use them as the questionnaire comprises of different sections and these sections at times are analysed separately from one another. Hence, although one respondent might have left one section blank, their responses to the other sections is valuable. Accordingly, the number of responses provided to each question is available in Appendix 4.6; this reflects the variability of the number of responses.

Means of distribution	Number of distributed questionnaires	Number of Collected questionnaires	Characteristic
Online questionnaires	1594	93	- Low response rate (5.8%) - Ability to complete the questionnaire flexibly (no time and location restrictions) - Interference with busy work schedule
Exhibitions, face to face	250	156	- High response rate (62%) - Time and location restrictions - More relaxed as no office duty interference - Face to face contact
Total	1844	249	
Usable		221	

Table 4.4. Channels of data collection

Although, the collection of data through exhibitions was more challenging and time consuming this approach led to a higher response rate. This could be due to the face-to-face contact with the respondents, the opportunity to develop some rapport and possibly the lack of time pressure on exhibitors as they were away from office duties, although a number of exhibitors were too busy during the exhibition to respond immediately. A number of family firms (approximately 20) refused to complete the questionnaire, as they believed it did not apply to them. Also, some small companies, usually with a single product, perceived the research to be of no value to them especially when they noted that this study focuses on innovation and change. For example, an owner of a bakery stated that he has been making the same products for so many years and he is not going to change any operations or products therefore he saw no reason why he could be useful for this study or this study could be useful to him.

4.5.6 Respondents' profile

Table 4.5 illustrates the profile of the respondents to the questionnaire. In the case of size, product category, year of establishment and location, the percentage of the responses to each category has been calculated and presented. However, in the case of customer channels and company operations, the number of responses to each category has been presented as each respondent could belong to a few of the options in each of these two category, hence the percentage of responses is meaningless.

Profile	Criteria	Response
Size (Number of Employees)	Less than 10 11 to 50 51 to 250	71 % 20 % 9 %
Product Group	Beverage Convenience Food Fresh Food	23 % 50 % 27 %
Year of Establishment	Less than 5 6 to 20 21+	35 % 41 % 24 %
Location	England Wales Scotland	78 % 17 % 5 %
Customers Channels	Catering outlets Large retailers Small/independent retailers Wholesalers/cash & carry's Direct to consumers Other food manufacturers	72 63 37 63 28 68
Company Operations	Discrete manufacturing (complete operations) Processing Component manufacture (e.g. food ingredients) Assembly (e.g. sandwich manufacture, catering) Services (e.g. testing lab)	53 70 81 85 90

Table 4.5. Respondents' profiles

Size

The size criterion identifies whether organisations are micro (less than 10 employees), small (11 to 50) or medium (51 to 250 employees). The responses to this section show that the majority of respondents (71%, n=127) are micro, 20% (n=35) are small and 9% are medium (n=15) sized companies. It should be noted that out of the 221 respondents to the questionnaire, 44 respondents did not provide any answers to this question. The size ratio of the respondents compares well with the size distribution of the food manufacturers in the UK, as shown in Table 4.6.

Operation/size	0-4	5-9	10-19	20-49	50-99	100-249
Food	3,295	1,905	1,175	950	490	435
Drink	615	190	125	105	50	40
Total	3,910	2,095	1,300	1,055	540	475

Table 4.6. Size distribution of companies in UK (Wetherill 2009)

Year of Establishment

With regards to organisational age (derived from year of establishment), it can be noted that 35% of companies are new (less than 5 years since their establishment, n=62), 41% are fairly new (between 6 to 20 years since their establishment, n=74) and finally 23% of companies are well established (more than 20 years since their establishment, n=42). However it should be noted that 43 companies did not provide any response to this question.

Accordingly, it is apparent that within this sample there are fewer companies aged 21+ in comparison with the younger firms, this conforms with Hutchinson et al's (2009) study noting that not all start up companies survive in time, hence, the number of companies diminishes by their age. Additionally, this could also be justified by the fact that many food sector start up companies start as micro and expand in time so there is a tie between age and size of companies.

Location

The attribute location (Table 4.5) reflects the location of the company, and as it can be seen 78% of the companies are in England with 16% in Wales. It should be noted that this study broadly represents the UK food sector as 86% of companies within the UK are based in England, 4% based in Wales, 6% in Scotland and 2% in Northern Ireland according to SME statistics for the UK from the Department for Business Innovation and Skills (2009).

Product Category

The responses to the product question was initially categorised into six segments. However, as each category represented a small set of data, the segments were merged to form 3 segments on the basis of Earle's (1997) identification of streams of product innovation within the food sector. Earle (1997) identifies two main streams of product of innovation as follows:

- "for ingredients and formulated foods, production→processing→manufacturing
- for fresh foods, production→distribution" (p. 170)

On this basis, in this study the product categories are divided in three segments as fresh food, convenience and beverage. Although convenience food was the main product category with 50% of respondents who provided an answer to this question belonging to this category, beverage and fresh food also reflect a substantial number of organisations.

Company Operations and Customer Channel

Under company operations and customer channel respondents were requested to identify the specific operations they undertake together with the type of customer they cater for. Responses to this section (Table 4.5), reflect an even distribution between companies involved in various operations and providing services/products to types of customers. This shows that within the company operations category a smaller number of respondents identify themselves to be discrete manufacturers (n=53). Also in the case of customer channels, a smaller number of respondents claim to sell directly to their customers (n=28) and to small/independent retailers (n=37).

Respondents

The respondents of this study are employees at managerial level positions. To ensure this occurred, in addition to the previously mentioned measures, respondents were requested to identify their role and this was further analysed to ensure reliability of the data.

Role of Respondent	
Owner	Managing Director
Sole trader- Business owner	Purchasing Manager
Manager	Brand Manager
Commercial Manager	Sales Exec
Marketing Exec	Partner
Managing Director	Sales and marketing director
Owner	CEO
Business Development	Business Advisor
Director	Production director/manager
Development manager	

Table 4.7. Role of respondents

Table 4.7 given examples of the roles of the respondents. In two cases only, the responses were eliminated where the respondent's roles were company secretary and sales representative. These two cases were eliminated, as the researcher was not sure of the extent of their involvement on organisational operations and decision-making.

4.5.7 Data Analysis

Once data were collected, they were all transferred to Excel, and responses were coded to numbers (always=5, mostly=4, usually=3, rarely=2, never=1); Excel is convenient for formatting. Afterwards, the data were imported to SPSS 16 where variables were coded to identify the missing values (missing value was set to be -9).

At this stage descriptive statistics were conducted such as calculation of the frequencies, minimum, maximum, and mean values to gain an understanding of the data. As this study has adopted an exploratory approach, the mean values between the two ends of the spectrum (always and never) for various statements on the basis of organisational characteristics were compared to identify differences. For example to examine whether there seem to be any differences between organisational engagement with product innovation for fresh food and convenience food firms. This resulted in spotting some variations, which were later, analysed further through chi-square test.

Additionally, correlations between organisational engagement with various types of innovation were inspected to identify any relationships; this resulted in noting positive correlations; some evidence of potential were investigated further using regression analysis. In addition, the following statistical tests were carried out on the data in line with the objectives:

- To develop an innovation orientation scale principal component analysis (PCA) was undertaken to identify the correlation between variables.
- Thematic analysis was carried out on innovation type open questions to identify similarities and differences on respondents' understanding of their innovations.
- Determining the relationship between innovation orientation and stages of innovation regression tests were carried out to identify any linear relationships.

The details of these tests, together with their justification are provided in the findings chapter.

4.5.8 Limitations

The limitations of this study were analysed in terms of their reliability, validity and limitations in relation to the research methodology:

Reliability

Reliability refers to the consistency of the data. Reliability is concerned with stability of the data and the insurance that the same results would be achieved if the tests were carried out repeatedly (Somekh and Lewin 2005). Cronbach's Alpha, a common test, was employed to test the reliability of the questionnaire. This test "essentially calculates the average of all possible split-half reliability coefficients" (Bryman and Bell 2007, 164). The closer the Cronbach's Alpha value to one the more reliable is the data (Bryman and Bell 2007). Undertaking this test on the collected data (innovation orientation, innovation types and innovation stages) resulted in an alpha value of .97. This Alpha value conveys that the questionnaire has an excellent reliability (George and Mallery 2003).

Validity

Validity is concerned with the "issue of whether or not an indicator (or set of indicators) that is devised to gauge a concept really measure that concept" (Bryman and Bell 2007, 165). One way to measure validity of a measure is through face validity which is defined "as the degree that respondents or users judge that the items of an assessment instrument are appropriate to the targeted construct and assessment objectives " (Nevo 1985 in Hardesty and Bearden 2004, page 99). The face validity of the constructs in this study were tested via two means:

- The questionnaire was piloted to practitioners (BIC Innovation), as discussed in section 4.5.3 to confirm the suitability and validity of the questionnaire for the target sector (food SMEs).
- Two conference papers on the basis of this thesis was prepared and presented in the innovation track of the BAM conference; in 2009 this project was presented as a developmental paper (abstract available in Appendix 4.7), and in 2010 the innovation orientation section was presented (abstract available in Appendix 4.8).

Another concern regarding validity is the role of the research method with the validity of the data collected. Although questionnaires increase the validity of the data as they have the least amount of subjective bias, the issue questionnaires impose on the validity of the data is their lack of flexibility for responses, where the researcher sets the limit on possible responses (McNeill and Chapman 2005). This matter has been tackled in this study by providing respondents with various options within the response spectrum including the extreme ends (5 point Likert-style rating scales from 'Always' to 'Never') and (to some extent) the inclusion of open questions.

Some researchers apply triangulation, or multiple methods to ensure the reliability and validity of the collected data by cross checking them. The issue with such triangulation is that it is expensive and time consuming and it also might result in contradictory outcomes (McNeill and Chapman 2005). Additionally, it has been noted that with triangulation one method gets the priority over other methods (Bryman 1988). Triangulation has not been adopted at this stage of the research due to time and cost limitations. However, the researcher intends to conduct a number of case studies to confirm and further enhance the results of this study in the foreseeable future.

Research Methodology

Here blow the limitations of this study with regard to the research methodology are discussed. As this study is based on the perceptions of the SME food managers and although, in designing the questionnaire, effort was directed towards ensuring its simplicity and straightforwardness, the responses might be biased on the basis of respondents' understanding of their products, processes, strategies and markets.

Furthermore, the response rate towards the end of the questionnaire declined probably due to 1) the length of the questionnaire, 2) respondents' resistance in providing answers on their organisational profile. These two factors affected the level of responses resulting into another limitation of this study. The lack of sufficient data on organisational profile when analysing the role of organisational characteristics on innovation orientation has resulted in combining organisational characteristics (merger of small and medium sized organisations into one group). Accordingly, the differences between small and medium sized organisations were not identified and the study was limited to micro and small/medium sized organisations.

Another factor limiting this study was the elimination of financial question from the questionnaire on the basis of the feedback from piloting. This prevented this study from investigating the role of innovation orientation on organisational financial performance. Finally, it should be noted that this study has some limitations in respect of generalization. As the study has been customised to suit SMEs and the food sector, generalizing the findings to any other sector is questionable and needs testing.

4.6 Ethical Issues

Business ethics "is defined as the application of moral principles and/or ethical standards to human actions within the exchange process" (Hair et al 2007, p. 81). Ethical principles within the context of business studies are concerned with the following, based on Bryman and Bell (2007):

- Harm to participants; this study gathers data from managers within the target companies, no sensitive or personal information were collected. Additionally by maintaining confidentiality and anonymity of the responses, any potential damage to company reputation is prevented. Piloting the questionnaire further ensured lack of any harm to participants on the basis of the questions, in spite of this some participants might have felt vulnerable not knowing the answers, nevertheless the piloting did not reflect on this.
- Lack of informed consent; providing respondents with the true information on the nature and purpose of the study was provided through the introduction to the questionnaire (Appendix 4.3 and 4.5); hence, all respondents were aware of aim of the questionnaire, the researcher and the nature of the study. Voluntary completion of the questionnaire was taken as implied consent.
- Invasion of privacy: respondents of this study were all invited to participate in the questionnaire and were not forced to answer any questions. If they found any question to be sensitive, they could skip it. Also, when piloting the questionnaire, a number of respondents noted that they regarded one of the questions on finance to be intensive; and this resulted in eliminating that question. In addition, respondents' confidentiality and anonymity was kept and the collected data

would not be published, identifying any of the participants, and also the data would not be passed to any other organisation.

- Deception; as mentioned before within the introduction section of the questionnaire, respondents were informed of the true nature and purpose of this study, the process was open and transparent.
- Benefits to participants; the participants of the questionnaire were promised an executive summary upon the completion of this study. Accordingly, towards the end of the questionnaire, respondents were requested to leave their email address if interested in the executive summary.

4.7 Summary and Conclusion

This research has adopted a positivist approach in conducting an inclusive study where both the requirement for generalising and the previous research has influenced the nature of this study. In doing so, a survey questionnaire was designed targeting the food sector SMEs in four sections focusing on: innovation orientation, innovation types, stages of innovation, and organisational profile.

A sample size of 200 was deemed suitable on the basis of past studies and statistical requirements. The questionnaire was tested and distributed through online questionnaire and food exhibitions and festivals throughout the UK, this resulted in the collection of 221 responses. Analysing the profile of respondents reflected a balanced collection of data with responses under all categories. Finally, the validity and reliability of the data was ensured and the ethical stance was explained.

The next chapter reflects the findings of this study; this includes the statistical analysis and the representation of the findings.

Chapter Five - Findings

5.1 Introduction

In this chapter findings from the data collected through survey questionnaires from SMEs within the food sector are presented in six different sections as:

- Innovation profile: this section reports on the innovation activities of food sector SMEs by means of descriptive statistics. In doing so, this study explores the extent of organisational engagement with innovation types and stages of NPD.
- Innovation types: this section analyses the open questions on types of innovation. Also, the relationship between types of innovation is investigated through multiple regressions.
- Innovation orientation: Principal Component Analysis is applied in developing an innovation orientation scale.
- Stages of innovation and innovation orientation: multiple regressions are employed in investigating the role of stages of innovation for an innovation orientation.
- Antecedents of innovation: the specific role of organisational characteristics (size, age, product category and number of customer channel) on innovation orientation is determined on the basis of Chi-Square test.

For the purpose of clarity next section explains which part of the collected data have been used in each of the above sections. It should be highlighted that the collected data are based on the respondents' (managers') opinion of innovation within their firms. Accordingly, the findings reflect the respondents' perceptions and understanding of the processes, strategies and customs of their firm. Finally, providing further information on the findings chapter, details of some of the statistical tests (tables, graphs) together with the questionnaire's statement labels (variable names) as used in this thesis are presented in the appendices (Appendix 5.2).

5.2 Data Mapping

The questionnaire has 4 sections (innovation orientation, types of innovation, stages of innovation and organisational profile) and the data under each section at times have been merged or analyzed in relation with one another. For the purpose of clarity, the specific application of each section on the basis of the objectives of this study is mapped in Table 5.1:

Chapter Section	Questionnaire Section
5.3. Descriptive Statistics	All statements within the Innovation orientation, innovation types and stages of innovation
5.4. Innovation Types	Four open questions within the innovation types section
5.5. Innovation Type Relationships	Innovation Types
5.6. Innovation Orientation	Innovation orientation together with a selection of statements from the innovation types section (as discussed in chapter 4)
5.7 Innovation Stages and Innovation Orientation	Innovation stages and the results of innovation orientation scale developed in section 5.6
5.8 Organisational Profile vs. Innovation Orientation	Four statements from organisational profile section together with the results of innovation orientation scale developed in section 5.6

Table 5.1. Data mapping

5.3 Descriptive Statistics

This section presents the descriptive statistics. Its aim is to describe the gathered data and profile the responses. In doing so, this section, profiles innovation among food sector SMEs, explores the extent of organisational engagement with innovation types. It also identifies the level of food SME engagement with stage activities of product innovation. The importance of descriptive statistics is in gaining an understanding of the collected data (Hair et al 2007) and is suitable for:

- Identifying the characteristics of the sample.
- Ensuring that the assumptions for the statistical tests have been satisfied.
- Gaining insight for answering specific research questions (Pallant 2007).

In this study frequencies and mean values have been calculated to reflect the firms' engagement with various innovation processes and activities. Moreover, graphs have been generated on the basis of these statistical analyses, providing this study with an overview of innovation within the food sector. Appendix 5.1 denotes the questionnaire statements highlighting the label (variable name) for each variable; these captions are the key in understanding the graphs and tables in Appendix 5.2.

The innovation patterns within the food sector are represented in four sections focusing on the innovation traits, innovation types, and the degree of innovation and product innovation stage activities. While the findings below provide a succinct description to profile the sector on the basis of the mean score of each variable, Appendix 5.2 presents the full descriptive statistics.

Finally it should be noted that a number of respondents left some questions blank, which means that although 221 questionnaires were completed, most of the questions do not have 221 responses and this value decreases to 159 towards the stage activities of innovation and profile of the respondents. Hence, to overcome this issue, the missing values were defined and coded to -9 in SPSS to be considered in statistical tests. The decline in the responses increases towards the end of the questionnaire, which might be due to the length of the questionnaire or respondents' resistance in providing details of their organisational profile.

5.3.1 Innovation traits

Innovation traits are measured on the basis of ten statements on various innovation orientation aspects derived from studies by Siguaw et al (2006). These statements are the basis of the innovation orientation scale together with the statement on degrees of innovation (incremental and radical) and innovation types that is described in section 5.3.2 and 5.3.3.

These ten statements together with their variable names are depicted in Appendix 5.1. Appendix 5.2 represents the descriptive statistics on these statements with a detailed illustration of the percentages of responses to each option for each question.

To gain an understanding of the respondents' engagement with each of the innovation traits Figure 5.1 was developed on the basis of the mean score of the responses to each of the statements. This shows that firms are positively engaged with all of the innovation traits as the mean scores vary between 3 to 4 which correspond with 'usually' and 'mostly'. However, there are exceptions for 'encourage new ideas' and 'innovative employees' where firms demonstrate a higher level of commitment to innovation.

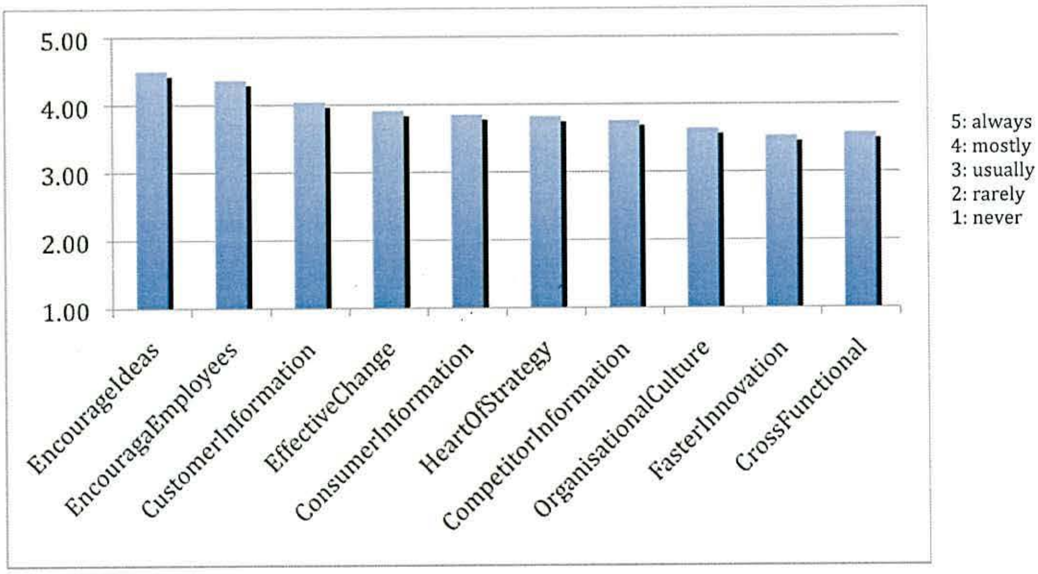


Figure 5.1. Organisational Innovation Characteristics

Figure 5.1 demonstrates that the highest level of involvement is with encouraging new ideas (mean score: 4.5, 88% on 'Always' and 'Mostly') and encouragement and support of innovative employees (81% 'Always' and 'Mostly'). There is also a strong level of commitment to effectively managing change (77% 'always' and 'Mostly') and to placing innovation at the heart of strategic planning. In other words, there is relatively good level of engagement with internal processes associated with innovation. On the other hand, the lowest level of engagement is with 'innovating faster than competitors' (52% on 'Always' and 'Mostly') and 'adoption of a cross functional approach' (53% on 'Always' and 'Mostly').

In terms of market information, respondents almost equally attend to customer information (mean score: 4.0, 73% on 'always' and 'mostly') followed by consumer information (mean score: 3.8, 64% 'always' and 'mostly') and competitor information (mean score 3.7, 62%'always' and 'mostly') with slightly more emphasis on customer information.

Figure 5.1 demonstrates that innovation characteristic items are closely followed by one another; this might imply that the sector is fairly focused on innovation orientation activities. To summarise, firms tend to attend to organisational factors in the following order:

- Encouraging new ideas and innovative employees
- Gathering information on customers followed by consumers and competitors
- Changing effectively and placing innovation at the core of strategy
- Innovating faster than competitors, adopting a cross functional approach and encouraging innovative organisational culture

5.3.2 Degree of innovation

Degree of innovation identifies firms' level of engagement with radical and incremental innovation for each type of innovation: product, process, position and paradigm including packaging innovation. Packaging innovation has been included solely to identify the balance within product and packaging innovation within the target context (this reflects the role of packaging innovation, which may be particularly important in the food sector). As mentioned before, the statements and variable names for degree of innovation is available in Appendix 5.1 under each innovation type. Also the actual descriptive statistics together with a detailed illustration of the percentage of responses to each option is available in Appendix 5.2.

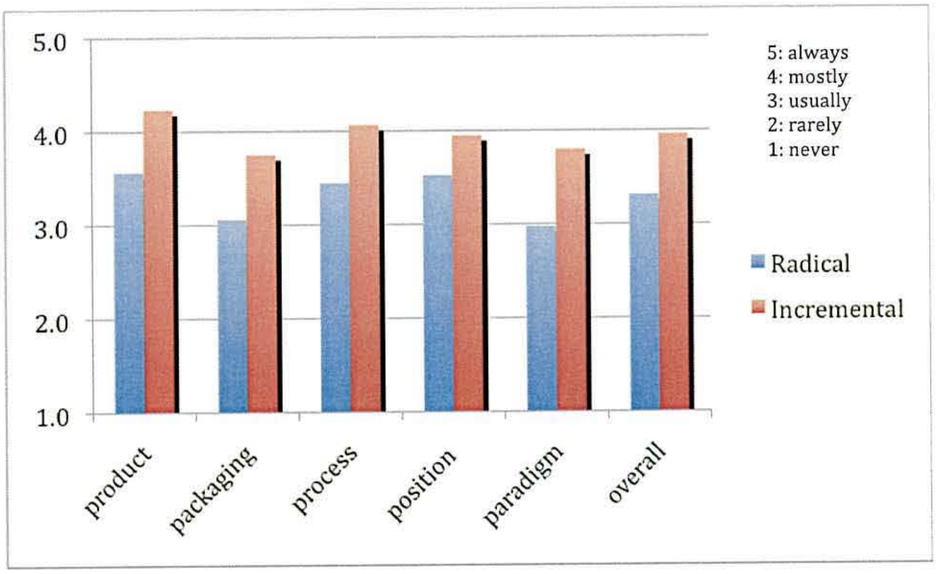


Figure 5.2. Incremental versus radical innovation

Figure 5.2 is an illustration of these statistics on the basis of the mean score of responses; this highlights a higher level of engagement with incremental innovations as opposed to radical innovations.

Firms show a stronger engagement with incremental innovation as opposed to radical innovation, and this is the case for every single innovation type. For example, 74% indicated that they either 'Always' or 'Mostly' engage in incremental process innovation, and only 5% indicated a 'Rarely' or 'Never' engagement. Nevertheless, there was still a relatively high level of commitment to radical process innovation where 48% indicated that they engage 'Always' or 'Mostly' in radical process innovation and, only 28% indicated a 'Rarely' or 'Never' engagement. Focusing on product innovation 77% indicated that they engage 'Always' or 'Mostly' with incremental product innovation and 57% with radical product innovation. This also applies to position and paradigm innovation where the respondents' engagement with incremental position and paradigm innovation is greater than radical innovation.

It should be noted that, focusing solely on incremental innovations, firms reflect a higher level of engagement with product innovation (mean: 4.2) and lowest with paradigm innovation (mean: 3.7). However in the case of radical innovation, firms seem to be equally involved in both product and position innovation. Furthermore, firms tend to be least involved with paradigm innovation (mean: 2.9).

In conclusion, then, these firms show a good level of engagement with both radical and incremental innovation for all types of innovation, nevertheless their level of engagement with incremental innovation is higher than that for radical innovation.

5.3.3 Types of Innovation

This section focuses on firms' engagement with different types of innovation on the basis of innovation type characteristics such as a firm's dedication to radical and incremental innovations, resource allocations and other specific characteristics based on Francis and Bessant's (2005) definitions.

Although the concept of radial and incremental innovation has been discussed in the previous section, responses on degree of innovation have also been incorporated into the analyses presented here to offer a more complete profile of firms' engagement with the different types of innovation. Figure 5.3 illustrate firms' engagement with types of innovation generated based on the mean score of the statements under each innovation type, which is available in Appendix 5.1.

As it can be noted, firms reflect a positive level of engagement with all types of innovation; the mean score varies between 3 and 4. However firms are almost equally involved in product (mean: 3.4), process (mean: 3.3) and position (mean: 3.3) innovation. Interestingly, they also report a surprising level of engagement with paradigm innovation (mean: 3.1). So, although firms reflect a lower level of engagement with paradigm innovation compared to other types of innovation, food sector SMEs seem to be committed to a reasonable extent to all types of innovation.

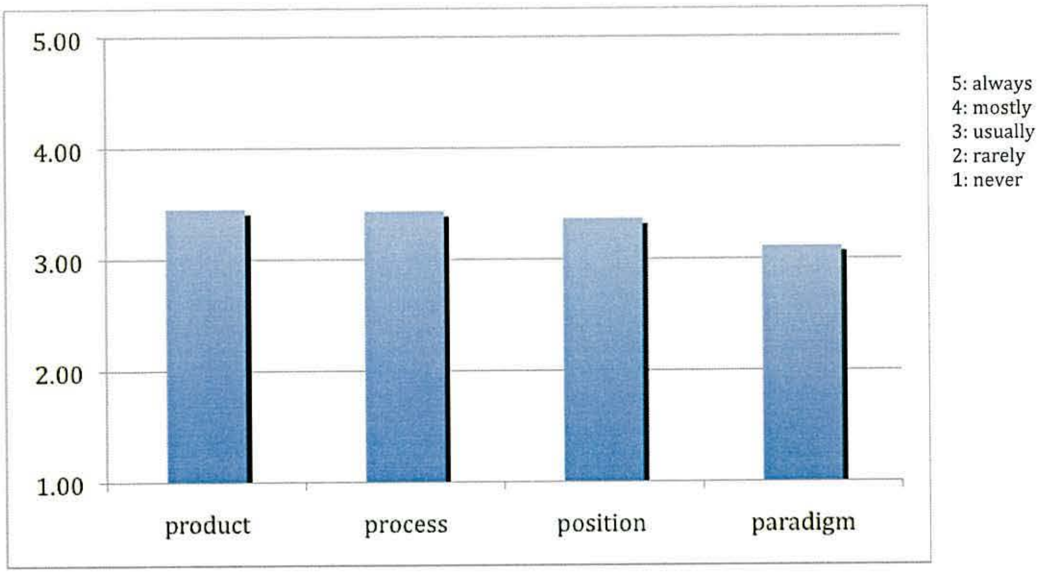


Figure 5.3. Innovation types engagemnet based on innovation type characterstics

A detailed overview of firms' engagement with different types of innovations as reported by the respondents is presented below:

Product Innovation

Measuring firms' dedication to product innovation, respondents were requested to identify their level of engagement with:

- Incremental and radical product and packaging innovation,
- Resource allocation to product and packaging innovations,
- Application of information technologies for product innovation
- Adoption of a new product development process

Figure 5.4 reflects the mean score of the responses to each statement. As mentioned in the methodology chapter (section 4.5.1), packaging innovation has been considered as part of product innovation as within this specific context (food sector) there is a close tie between packaging and product innovations. Therefore, in this section, packaging innovation has been analysed together with product innovation.

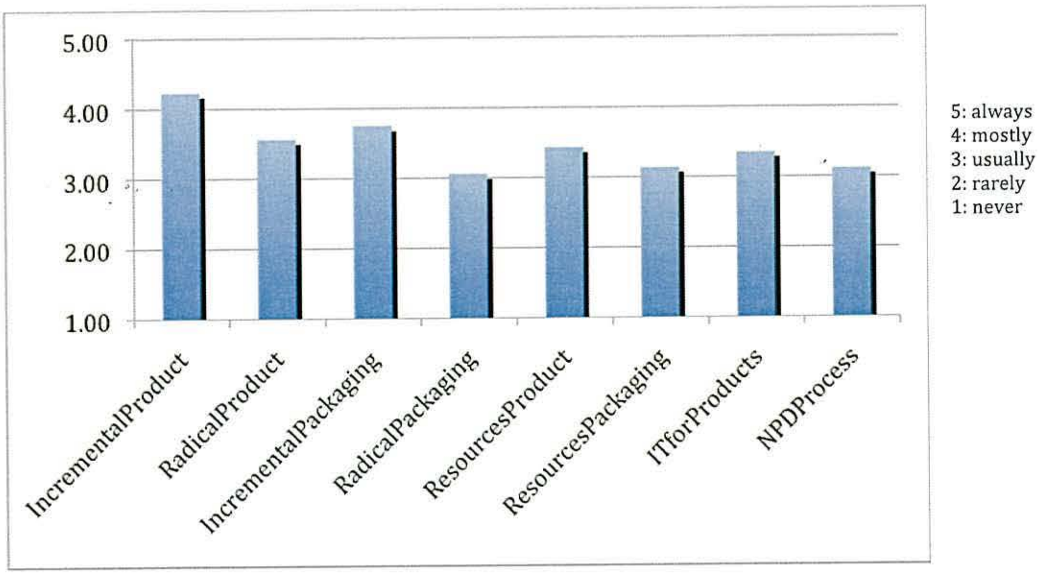


Figure 5.4. Poduct Innovation Characteristics

Figure 5.4 demonstrates a high level of commitment to incremental product innovation (77% on 'Always' and 'Mostly') and, coupled with this, to incremental packaging innovation (61% on 'Always' and 'Mostly'). This confirms the importance of packaging innovation in this sector, and emphasises the need for it to be considered in the innovation research. A similar pattern applies to radical innovation where firms show a high level of engagement with radical product innovations (57% on 'Always' and 'Mostly') followed by radical packaging innovations (42% on 'Always' and 'Mostly').

In terms of resource allocation, firms seem to allocate significant resources to product (49% on 'Always' and 'Mostly') and packaging (40% on 'Always' and 'Mostly') innovation. However, their level of allocation of significant resources falls below their espoused level of engagement with other incremental or radical innovations (although there it is closer to the levels of engagement with radical innovation). Additionally, firms are moderately engaged with usage of information technology to improve product development processes (mean score: 3.3) and the application of a standard new product development (NPD) process (mean score: 3.1). Overall, the evidence suggests that firms are generally engaged with product and packaging innovations.

Process Innovation

With reference to process innovations, respondents were requested to identify their level of engagement with:

- Incremental and radical process innovation,
- Resource allocation to processes,
- Application of information technology for their processes,
- Development and deployment of new technologies and,
- Adoption of performance improvement techniques.

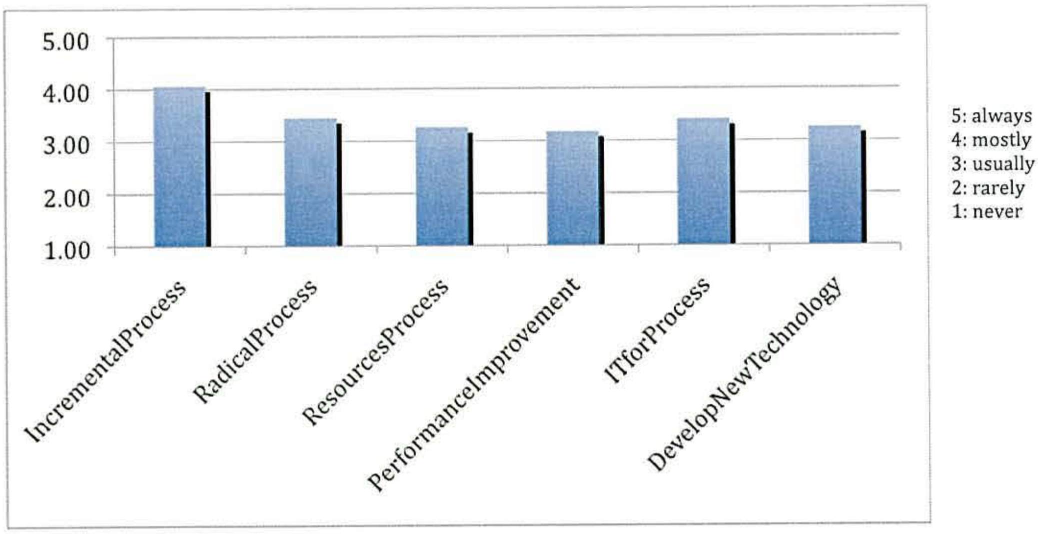


Figure 5.5. Process Innovation Characteristics

Figure 5.5 is generated on the basis of mean score of the responses to process innovation activities for each variable. Firms demonstrate a high level of commitment to incremental process innovation (74% on 'Always' and 'Mostly'), in common with their commitment to incremental product innovation, but they have a lower level of engagement with radical process innovation (48%). Firms seem to have a similar, and moderate, level of engagement with other process innovation characteristics. They 'Usually' allocate significant resources to operational innovations, develop and deploy new technologies, have expertise in performance improvement techniques, and exploit information technology to improve operations. Overall, this implies that although firms are keen on improving and changing their processes, they show a slightly lower level of commitment to allocating resources to process innovation, and to the development and deployment of new technologies.

The details of the innovation process statements and the variable names can be found in Appendix 5.1, and Appendix 5.2 presents the descripive statistics tables.

Position Innovation

To gain an insight to position innovations within the target sector, respondents were requested to idenitfy their level of :

- Engagement with radical and incremental position innovations,
- Resouce allocation to these types of innovation,
- Engagement with branding, promotions
- Exploitation of e-marketing
- Understanding of Customer Relationship Management (CRM)

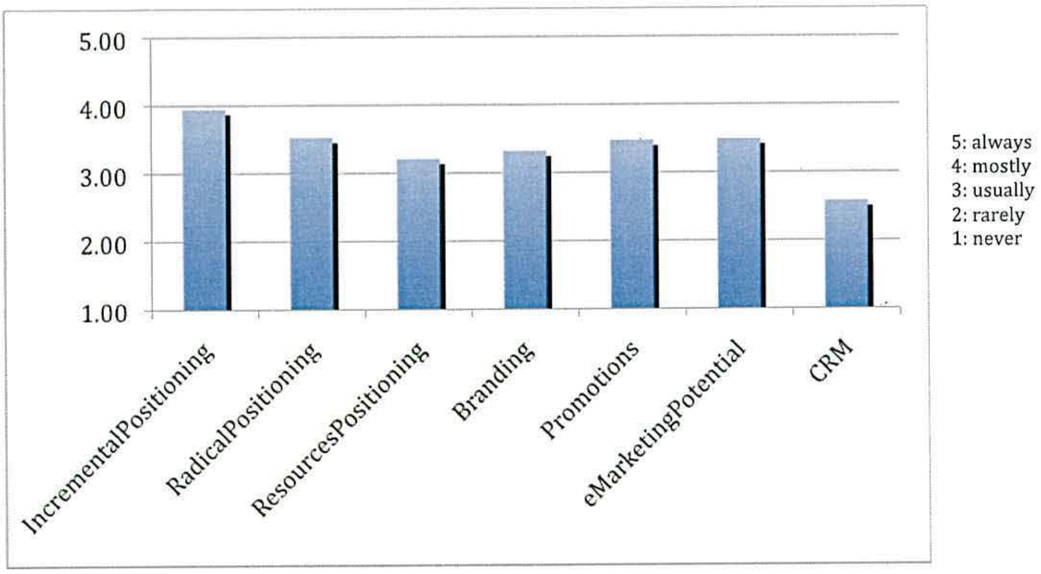


Figure 5.6. Position Innovation Characteristics

Figure 5.6 is generated on the basis of the mean score of the responses to each of these variables to demonstrate an overall picture of position innovation within the target sector. Again, comparing incremental and radical innovation, there is a higher level of engagement with incremental position innovation (69% on 'Always' and 'Mostly') but a high level of commitment to radical position innovation (55% on 'Always' and 'Mostly'). Compared with product and process innovation the commitment to incremental position innovation is slightly lower, whereas the engagement with radical position innovation rests between the values for radical product and position innovation. This is perhaps to be expected, since position innovation is associated with the market, and radical innovations might more often be necessary. On the other hand, this is not consistent with the relatively low level of commitment to investing significant resources into position innovation (41% on 'Always' and 'Mostly').

The remaining questions in this section cover engagement with various marketing-related activities. Firms reflect a reasonably positive commitment to development and exploitation of branding (42% on 'Always' and 'Mostly', and 24% on 'Usually') innovations in marketing and promotion (50% on 'Always' and 'Mostly', and 25% 'Usually'), and to identifying the potential of e-marketing (57% on 'Always' and 'Mostly'). Firms' lowest level of engagement is with Customer Relationship Management (29% on 'Always' and 'Mostly', and 31% on 'Never'). It may be that although food sector SMEs are familiar and engaged with marketing concepts such as branding and promotions, they are not exploiting various more sophisticated opportunities such as CRM systems within their marketing strategies.

Paradigm Innovation

Regarding paradigm innovation, firms were requested to identify their level of engagement with the following:

- Incremental and radical innovations
- Resource allocation
- Partnering, alliances, outsourcing, merger and acquisitions
- Adoption of a business planning process
- Analysis of strategies and business model

Figure 5.7 illustrates the responses on the basis of the mean score of each variable. As mentioned previously Appendix 5.1 entails these statements with their variable names and Appendix 5.2 entails the complete descriptive statistics.

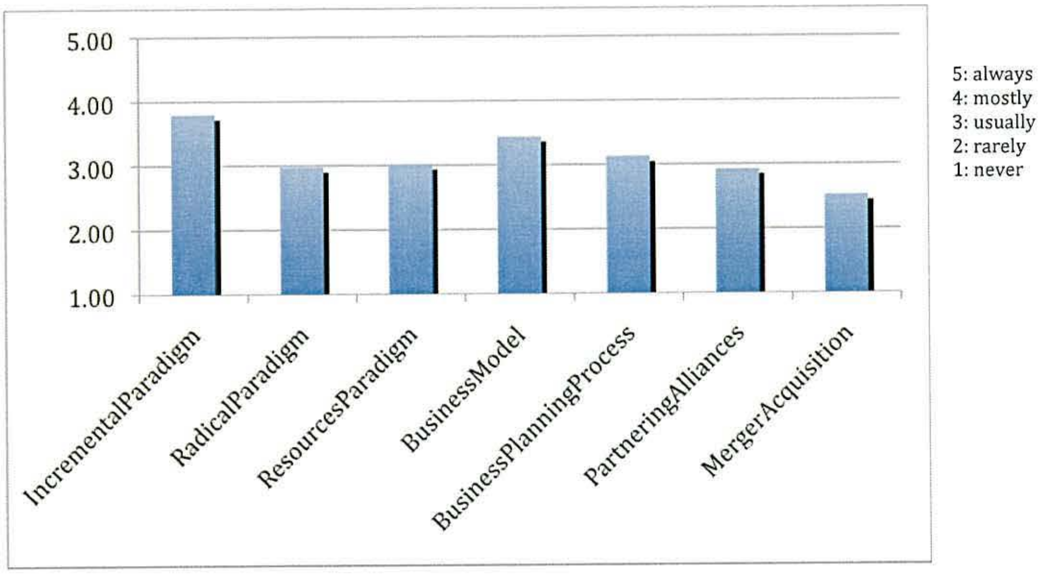


Figure 5.7. Paradigm Innovation Characteristics

Overall, engagement in paradigm innovation has already been shown to be lower than that for other types of innovation. Nevertheless, within paradigm innovation firms have quite a high level of engagement with incremental innovations, in the form of ongoing improvement to strategy and plans (61% on 'Always' and 'Mostly'), yet they report a rather lower engagement with radical paradigm innovations, or radical changes to strategy and business model. This is rather unusual, since there is a general assumption that paradigm innovation is often achieved through radical innovation. This is something that might merit further investigation. It may be associated with the rather low level of engagement with the allocation of significant resources to strategic development (only 34% on either 'Always' or 'Mostly').

In respect of the other aspects of paradigm innovation, respondents are positively engaged with analysing and challenging their existing strategies and business models (50% on 'Always' and 'Mostly'), and in following a formal business planning process (38% on 'Always' and 'Mostly', and 29% on 'Usually'). They are, however, rather less committed to actively engaging in partnering (mean: 2.9), and actively considering outsourcing, mergers or acquisitions (mean: 2.5, only 26% on 'Always' and 'Mostly', and 30% on 'Never'). This indicates that firms are not keen on big changes to their strategies and business model with any interest in radical paradigm innovation and external forces. Also comparing paradigm innovation with other types of innovation, it is apparent that firms' commitment to paradigm innovation is relatively less than any other types of innovation.

Resources Allocation

Although the concept of resource allocation was discussed under each type of innovation in comparison with other innovation type characteristics, it is useful to attend to this topic on its own. This provides a chance to compare organisational resource allocation on the basis of innovation types.

The result of firms' perceptions of their resource allocation to different types of innovation is illustrated in Figure 5.8. This suggests that firms dedicate a high level of resources to product innovation (mean score: 3.4), closely followed by process (mean score: 3.2), position (mean score: 3.2), packaging (mean score: 3.1) innovation, and paradigm innovation (mean score: 3.0).

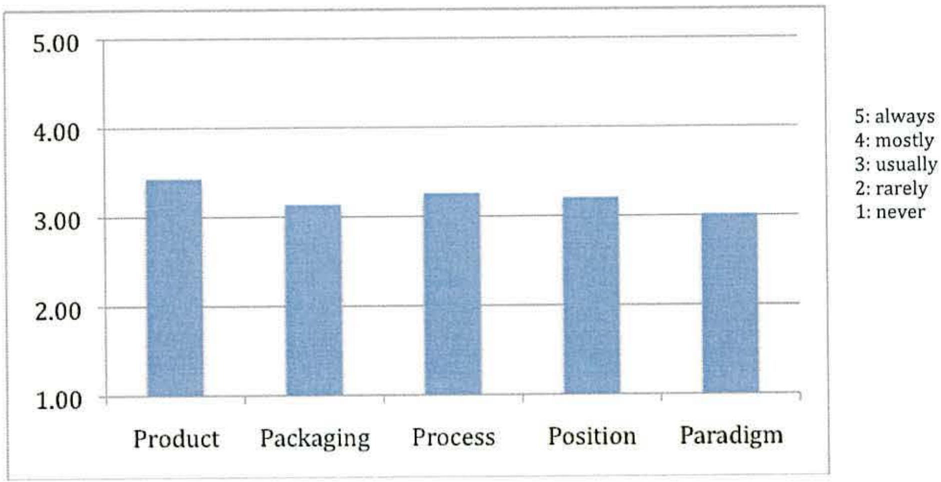


Figure 5.8. Resource Allocation to different types of innovation

Focusing on the responses in detail, it is evident that packaging innovation and paradigm innovation come last where paradigm innovation has received 34% on 'Always' and 'Mostly', and a 32% peak on 'Rarely'. This value peaks on 'Usually' with 28% for position innovation, 26% for packaging innovation and 28% for process innovation, and changes to a peak on 'Mostly' for product innovation with 28%. However, the mean score ranging between 3-3.5, implies that firms do allocate resources to all types of innovation with product innovation receiving more attention.

This section demonstrated the level of organisational engagement with product, process, position and paradigm innovation. This implies that Francis and Bessant's (2005) innovation type model is applicable to food SMEs as the sample organisations reported a positive level of engagement with all of these types of innovation.

5.3.4 Stage Activities of Product Innovation

In order to gain an insight to product innovation (New Product Development process), respondents to the survey questionnaire were requested to identify their level of engagement with various stage activities of product innovation. These activities each belong to one of the four main NPD stages of initiation, design, implementation and launch and post launch. The details of the descriptive statistics on the different stage activities of innovation can be found in Appendix 5.2, Table 5.21.

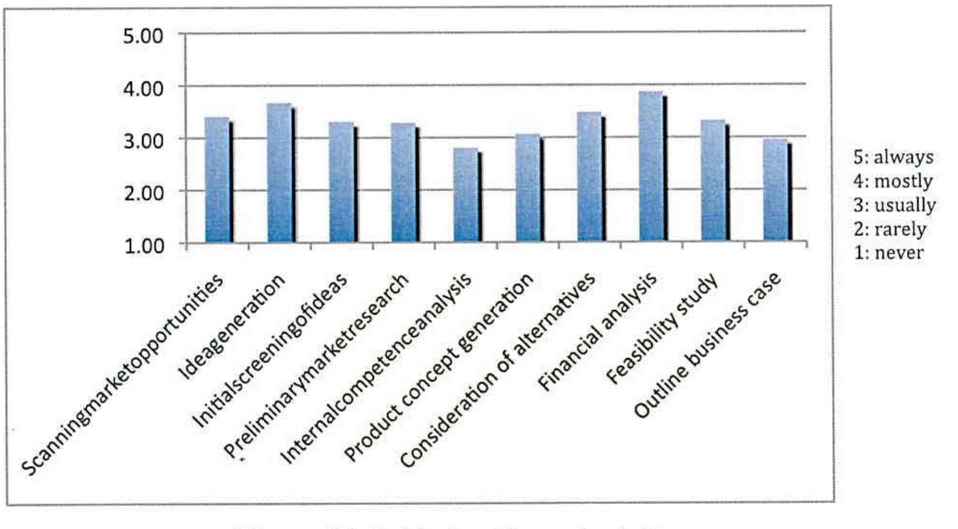


Figure 5.9. Initiation Stage Activities

Figure 5.9 illustrates the firms' level of engagement with initiation stage activities based on the mean score of each variable. This reflects the firms' regular engagement with initiation stage activities as the mean scores vary between 3 and 3.9, with an exception for outline business case (mean score: 3.0, 30% on 'Never') and internal competence analysis (mean score: 2.8, 31% on 'Never'). Firms seem to be highly engaged with financial analysis at this stage (mean score: 3.9, 67% on 'Always' and 'Mostly') and idea generation (mean score 3.7, 59% on 'Always' and 'Mostly').

Figure 5.10 illustrates the firms' engagement with build (design) stage activities and demonstrates the unbalanced commitment to this stage. Accordingly, a high level of engagement with in-house tasting (mean score: 4.1, 61% on 'Always') and product development (mean score: 3.8, 63% on 'Always' and 'Mostly') and a low level of commitment to preparation of project definition (mean score: 3, 27% on 'Never'), usage of external expertise (mean score: 2.9, 32% on 'Rarely') and detailed market research (mean score: 2.8, 26% on 'Never') suggests a lack of balance at this stage.

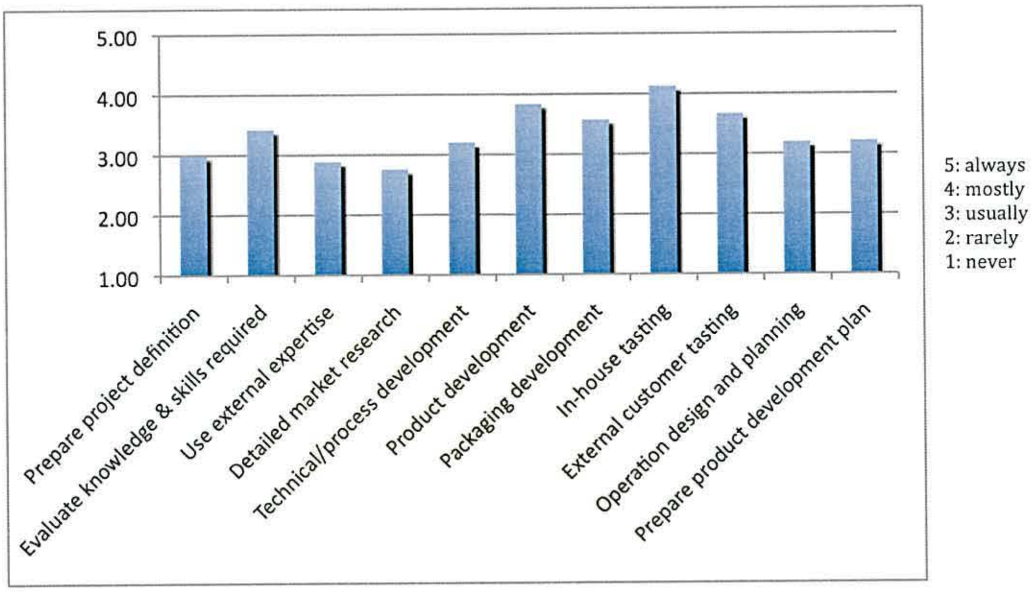


Figure 5.10. Design stage activities

Figure 5.11 illustrates the firm's engagement with implementation and launch stage activities. This demonstrates a relatively equal engagement with all stage activities with higher level of commitment towards trial production (mean score: 3.8, 64% on 'Always' and 'Mostly'), training staff (mean score: 3.7, 60% on 'Always' and 'Mostly') and sales and marketing plan (mean score: 3.7, 62% on 'Always' and 'Mostly').

However, there is an exception in the case of partnering (mean score: 2.6, 22% on 'Never'), which firms seem to have a low level of engagement with. This confirms the descriptive statistics in terms of paradigm innovation (section 5.3.3), where firms exhibited a low level of commitment to external resources (e.g. partnering and alliances).

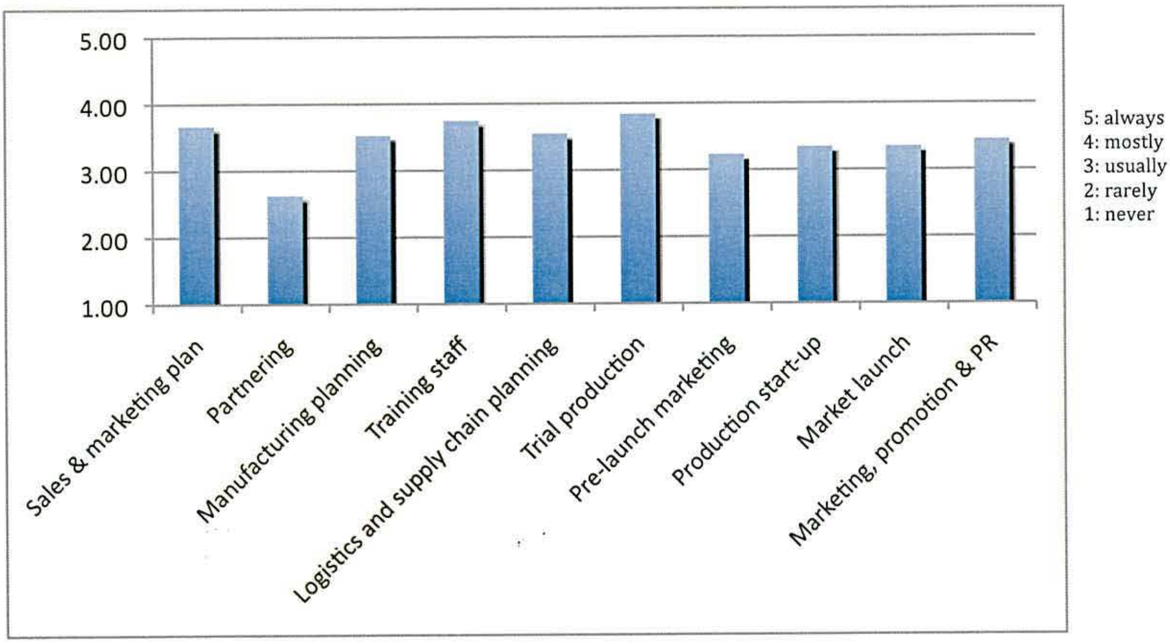


Figure 5.11. Implementation and launch stage activities

Finally, Figure 5.12 is generated on the basis of firm's engagement with post launch activities (mean score). Firms seem to have a high level of engagement with post launch stage activities with a mean score of 4.0 in the case of ongoing review and monitoring and a mean score of 3.3 in the case of establishing mainstream production. This suggests that firms' have a high level of commitment to post launch stage activities.

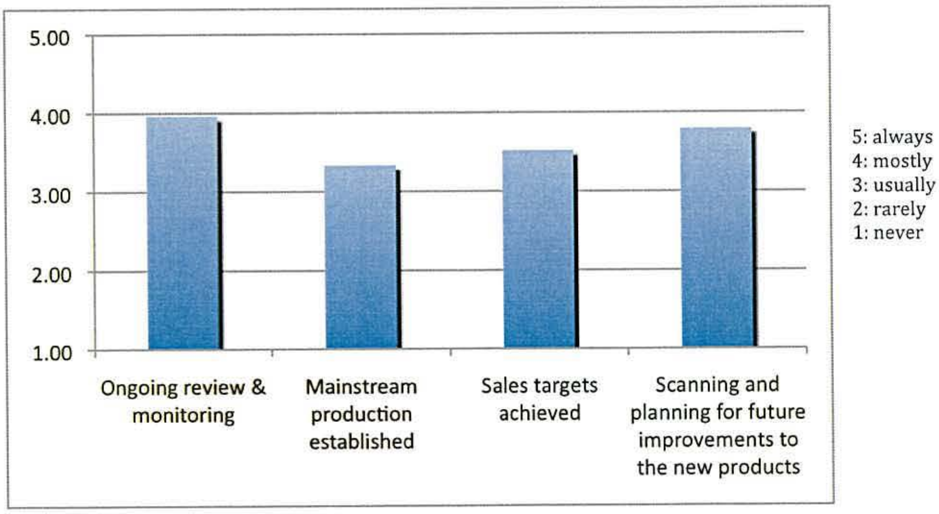


Figure 5.12. post launch stage activities

It can be concluded that conducting a descriptive analysis on the collected data has resulted in the identification of stage activities of innovation that firms are positively committed to. The following are the stage activities of product innovation to which respondents have shown a low level of commitment (mean score below 3):

- Within the initiation stage: Internal competence analysis, and Outlining business case
- Within the design stage: Prepare project definition, Using external expertise, and Detailed market research
- Within Implementation and Launch: Partnering

Lack of an engagement with external expertise and partnering suggests that food SMEs are not aware of the values and advantages of external resources or that they have not been presented with such opportunities. Moreover, lack of an engagement with preparation of project definition and outlining a business case is evidence of food SMEs informal processes and procedures.

5.4 Innovation Types

In order to gain an insight into respondents' understanding of their innovation activities, and their engagement with types of innovation, an open question was placed under each innovation type section, inviting the respondents to provide an example of their recent innovations. These open questions were left blank by most of the respondents. However, some did provide answers as presented and discussed below. The list of all the responses to these open questions is provided in Appendix 5.3.

Product Innovation

Respondents were requested to provide examples of their recent product innovations, and out of the 221 respondents, 139 provided answers to this question. The responses ranged from a short description of their new product or a detailed version of what they have achieved. Some direct answers to the question included "100% Peanut Butter", "Salad dressing", "Cider brandy mince meat", "Gin, Vodka based fruit liquers" and "David's chilli oil". Whereas, some other firms have provided more insightful answers such as, "We launched our chilli chocolate onto the market this year, all our products have similar design so nothing special was done, extensive taste tests were carried out",

"As you know we sell olives and one of the recent innovations is that we mixed olives and marinated with different things and we found very tasty olives and everybody likes it" or

"Diamonds of the Sea- giant sea salt crystals used for garnishing foods".

The responses provided above had a pure focus on their new products; the following patterns emerged from some of the other responses:

- A number of responses were on the basis of packaging innovations, i.e. "Muffins, seethrough wrapping", "repackaged two orphan whisky brands sheep dip and pigs nose", "Designed a bespoke 500ml mini Goliath bottle to make our products stand out from others on the shelf" and "searching for compostable or recycled and recyclable packaging".
- Some other respondents provided answers on the basis of a mixture of innovation types such as product innovations that are the result of a position innovation or a mix of a product and packaging innovation i.e. "Relaunched products in new packaging to make the product a more 'artisan' one", "Ongoing cycle of product and packaging innovation", "we recently started selling mixed meat boxes and credit crunch boxes to meet consumer needs as they change" or "to cater our ice-fudge cider for the younger crowd".
- Some answers leaned towards organisations' strategic direction working with Universities as part of their NPD process, examples of these are: "we are about to work with Business Link and Leeds Metropolitan University re NPD and packaging" or "we work closely with Exeter University"
- Furthermore there were a number of respondents who reflected no interest on innovation claiming they have had no product innovations recently. An example of this is a meat company established in 2000 responding "We haven't had one" or a cheese producer working since 1986 mentioning they have no new products launched over the past 10 years.

Hence, it can be concluded that respondents have provided a good mix of answers. Some respondents have given simple descriptions of their new products, other respondents have reflected on the overlap between various innovation types, where development of one involves development of other types of innovation inevitably. Finally few responses reflected the close links between product and packaging innovation.

Process Innovation

The respondents were requested to provide an example of a recent process innovation; from the 221 responses only 91 answered this open question. Analysing the responses to this section it is apparent that firms' process innovation is either concerned with their production and packaging or marketing as depicted below:

- Production
    - "Using ozonated water to cut down on the amount of chemicals used for sterilizing equipment etc"
    - "Introduction of our new Robot onto the production line"
    - "Employing interim staff to help with product efficiency"
    - "Use Kaizen in our apple pressing operation"
- Packaging
    - "New packaging line"
    - "Change of packaging to reduce costs and introduction of lightweight glass"
- Marketing and Sales
    - "Just been on the BBC national news to promote our perry"
    - "New e commerce website"
    - "More staff going out with samples to new markets"

Responses to these open questions exhibits the complexity of innovation and the close relationship between innovation types where differentiating one type of innovation from one another can be complex. It is apparent that for some respondents there is a close tie between packaging and process innovations. Furthermore, in some other respondents' viewpoint, marketing and sales strategies fall under process innovations.

Position Innovation

From the 221 collected questionnaires only 79 respondents attempted to provide this study with a recent example of their position innovation. Some of the respondents reflected on their attempts to reach online markets and customers, examples of these include the following:

- "Virtual farmers market"
- "move to e marketing/sales"
- "we have launched a new website which is dedicated to a popular food products"
- "we have used PR +blog +twitter (750k last year)"
- "new website"
- "Using the farmers market in the online game world"
- "Second Life"
- "E-bay shop" and "Monthly e-newsletter to customers", this reflects on organisational awareness of various ways of reaching customers online.

In addition to awareness of online communities a company has expressed their involvement in a trade show in Germany (reaching other markets) and another firm mentions appointing an event/marketing manager. Consequently, some companies take note of their promotional activities, e.g. "provide free samples of new products to wholesalers for distribution to their retailers who do not currently buy them" while another company noted targeting new markets with a new product as "targeting Muslim communities as see gap in the market for halal baby food". It should also be highlighted that there were a number of responses that indicated new packaging and products, while another company noted, "sacking an incompetent web hosting company" as their recent position innovation. This again illustrates the diversity of market and position related activities within food SMEs.

Paradigm Innovation

As for paradigm innovation only 48 respondents reflected on a recent paradigm innovation. A lower level of response rate to paradigm innovation confirms the findings within the descriptive statistics section, noting that organisational engagement with paradigm innovation lags behind other types of innovation.

Most of the responses in this section included a strategic decision involving external parties such as:

- "outsourced some production to new partner to cope with increased product demand"
- "Considering joint ventures with other companies"
- "Arranged strategic alliance with a new partner"
- "In depth analysis of operations by an external source"
- "Co-partnering with local/larger cider producer to help in development of new products/brands as part of reciprocal sales/distribution strategy"

Some other responses were based on strategic decisions with regards to their products, packaging, services and processes such as:

- "On constant look out for new drink recipes"
- "we employed a bookkeeper"
- "going into the discounter market"
- "growth of shops and new production"
- "move into fresh, ready to eat avocado"
- "sold off part of non core business"

On the basis of the above, it can be suggested that not only do organisations have different understanding and perspectives towards types of innovation; also the nature of innovations adopted among these firms is extremely diverse. For example, while one might consider a new packaging as part of product innovation within another firm a new packaging might be the result of strategic changes to the organisational offering. Another example is the case of the organisation that has noted the addition of a second van as their paradigm innovation, while this might not be significant for a company with 10+ vans, for the company in question adding a second van is deemed important in perhaps changing organisational direction and suggesting commitment to expansion. Hence, to conclude, the open responses on types of innovation shed light on the complexity of innovation types within organisations.

5.5 Innovation Type Relationship

In order to identify the interrelationship between types of innovation, the questionnaire was designed to determine the level of firms' engagement with each of the innovation types based on the basis of Bessant and Tidd (2007) and Francis and Bessant (2005) typology. Hence, for each of the innovation types (product, process, position and paradigm model) respondents were requested to identify their level of engagement with the following as depicted in section 5.3:

- Radical development
- Incremental development
- Resource allocation
- Innovation specific questions such as dedication to branding and promotion (in case of position innovation) or consideration of partnering and alliances (in case of Paradigm Innovation)

To identify the significant relationship(s) between each of these types of innovation regression tests were carried out on the mean score of the statements related to any one type of innovation, since "The purpose of regression analysis is to test the degree of linear relationship between two variables" (Kerr et al 2002, p. 163). Multiple regressions were deemed suitable, as they are "appropriate for research questions where the relationship between two or more independent variables and one dependent variable is of interest. Multiple regression allows the researcher to make predictions of the dependent variable based on several independent variables" (Kerr et al 2002, p 179). Accordingly, multiple regression tests were carried out for all types of innovation in relation with other types of innovation, for example product innovation as dependent variable and process, position and paradigm innovation as independent variables. It should be highlighted that packaging innovation has been included in product innovation as within the specific context of this study (food sector) packaging and product innovation have a close relationship and are coupled.

There are various theories on the required sample size suitable for multiple regressions; Tabachnick and Fidell (1996) recommend the sample size to be at least 50+8k, where k is the number of independent variables. In case of this study, the number of independent variables is 3 and the sample size is $221>50+8(3) = 74$, thus suitable for multiple regression.

Prior to conducting multiple regressions the suitability of the data should be ensured on the basis of outliers, multicollinearity and normality (Foster et al 2006). Subsequently, the regression variables have been checked to be clear from outliers, however, as the variables are the mean scores of the innovation type statements and as these variables were categorical data ranging from 1 to 5 the likelihood of any outliers is slim. With regards to multicollinearity, this has been tested within each test separately and is presented within each section separately below. The normality of the data was tested through the normality plots and histograms. Also plots of *ZREDSID against *SPRED were checked to ensure heteroscedasticity (linearity of the data). These plots all satisfied the requirement, where the plots were normal, linear and evenly distributed; these can be found in Appendix 5.4. Details of these tests are provided below.

5.5.1 Product Relationship

An investigation into the relationship between product innovation and other innovation types has been carried out where product innovation has been inputted to SPSS 16.0 as the dependent variable and the other three of types of innovation (process, position and paradigm) as independent variables.

Multicollinearity occurs when the regression variables are highly correlated. To ensure this is not the case, the correlations between variables should be less than .9 (Field 2009). Table 5.2 below exhibits the correlations between innovation type parameters and as noted the condition is satisfied.

		Product Innovation	Process Innovation	Position Innovation	Paradigm Innovation
Pearson Correlation	Product Innovation	1.000	.673	.688	.593
	Process Innovation	.673	1.000	.643	.652
	Position Innovation	.688	.643	1.000	.666
	Paradigm Innovation	.593	.652	.666	1.000

Table 5.2. Correlations with product innovation

The generated R square value (56%) provides information on the dependent variable's variance explained by the regression test, hence, 56% of variance in product innovation has been explained by the independent variables. The adjusted R square value (56%)

adjusts the R Square assuming it is based on a small sample to a large sample. Ideally these two values should be close, true to this test, meaning that the sample is a true representation of the reality. The Durbin-Watson value (1.9) is also worth noting, this value checks the assumption of tenable independent error (Field 2009). This value is deemed suitable when between 1.0 and 3.0. This test has generated a sig value of .0, which is less than 0.05, reflecting a statistically significant result.

Finally in conducting the regression test there is the coefficient table (Table 5.3) providing information on the collinearity of the data; the collinearity requirements are satisfied where tolerance ("an indicator of how much of the variability of the specified independent is not explained by the other independent variables in the model" (Pallant 2007, p. 156)) is less than 1 and VIF (Variance Inflation Factor on multicollinearity) is less than 10. As shown in Table 5.3, both conditions are satisfied. Moreover the sig value in Table 5.3 presents the independent variables with a significant contribution (less than 0.05) to product innovation, in this case process and position innovation (highlighted in bold). The Beta value is an indicator of each independent variable's contribution to the dependant variable, which is useful for comparison. As it can be noted, position innovation (beta: 0.39) has a greater contribution to product innovation in comparison with process innovation (beta: 0.35).

	Standardized Coefficients		Correlations	Collinearity Statistics	
Model	Beta	Sig.	Part	Tolerance	VIF
Process Innovation	.35	**.00**	.25	.49	2.01
Position Innovation	.39	**.00**	.27	.48	2.08
Paradigm Innovation	.10	.15	.06	.47	2.12

Table 5.3. Innovation type relationship with product innovation

The relationships between these constructs are demonstrated in Figure 5.13. A significant relationship between innovation types is shown through the arrow; the absence of an arrow between paradigm and product innovations illustrates that there is not a significant relationship between these two constructs.

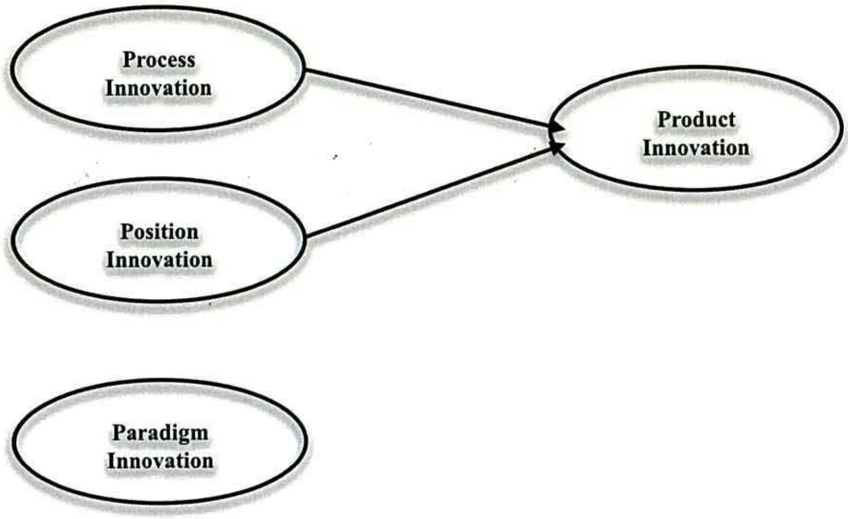


Figure 5.13. Product innovation relationship with other innovation types

5.5.2 Process Relationship

In this section the relationship between process innovation and other types of innovation will be investigated through a regression test where the dependent variable is process innovation and the independent variables are product, position and paradigm innovation. Table 5.4 presents the correlation between these variables, which shows satisfactory results with no indications of any multicollinearity (correlation less than .9 (Field 2009)).

		Process Innovation	Position Innovation	Paradigm Innovation	Product Innovation
Pearson Correlation	Process Innovation	1.000	.643	.652	.673
	Position Innovation	.643	1.000	.666	.688
	Paradigm Innovation	.652	.666	1.000	.593
	Product Innovation	.673	.688	.593	1.000

Table 5.4. Correlations with process innovation

The R square value and Adjusted R Square values indicate that 56% of the variance of is explained by the independent predictors. Also the Durbin-Watson value (2.2) is satisfactory indicating that the independent error is tenable. A generated sig value of .00 notes a significant association (less than .05) between process innovation and the independent variables.

Moreover the VIF and Tolerance values (Table 5.5) once more ensure that there is no evidence of multicollinearity. All of the independent variables demonstrate a significant sig. value (less than 0.05) and this indicates that all the independent variables make a significant contribution to process innovation.

Model		Standardized Coefficients		Correlations	Collinearity Statistics	
		Beta	Sig.	Part	Tolerance	VIF
	Position Innovation	.188	**.011**	.122	.424	2.357
	Paradigm Innovation	.315	**.000**	.227	.522	1.918
	Product Innovation	.357	**.000**	.251	.495	2.022

Table 5.5. Innovation type relationship with process innovation

The beta value in Table 5.5 together with the Sig value exhibit the extent of the relationship between innovation type constructs. Paradigm and product innovation seem to have a stronger contribution to process innovation when compared to position innovation. Figure 5.14 reflects these significant relationships, illustrating that all innovation types have a significant correlation with process innovation.

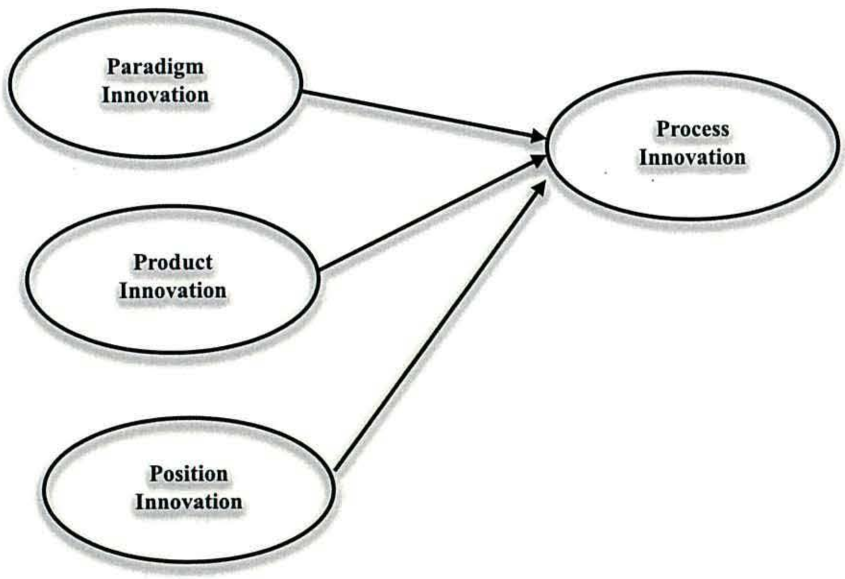


Figure 5.14. The relationship between process and other types of innovation

5.5.3 Position Relationship

In this section the relationship between position and other innovation types is measured through the regression test. Similarly to the previous two sections the correlations presented in Table 5.6 were considered to ensure no multicollinearity (satisfying with correlation below .9 (Field 2009)).

		Position Innovation	Paradigm Innovation	Product Innovation	Process Innovation
Pearson Correlation	Position Innovation	1.000	.666	.688	.643
	Paradigm Innovation	.666	1.000	.593	.652
	Product Innovation	.688	.593	1.000	.673
	Process Innovation	.643	.652	.673	1.000

Table 5.6. Correlations with position innovation

The adjusted R square, 58%, reflects on position innovation's variance explained by the independent variables, as noted this value is close to the R square value, 59%, which is suitable suggesting the result from this sample size are true to large sample sizes. Moreover the Durbin-Watson value is a suitable 1.9. This test has generated a sig value of .0, which reflects a statistically significant result (less than .05).

Model		Standardized Coefficients	Sig.	Correlations	Collinearity Statistics	
		Beta		Part	Tolerance	VIF
	Paradigm Innovation	.330	.000	.240	.531	1.881
	Product Innovation	.372	.000	.265	.505	1.979
	Process Innovation	.178	.011	.119	.448	2.231

Table 5.7. Innovation type relationship with position innovation

The coefficients table above (Table 5.7) suggests no multicollinearity based on the VIF and Tolerance values, suitable tolerance <1 and VIF<10. Moreover, all the independent variables demonstrate a significant sig. value (less than 0.05) therefore, a significant contribution to position innovation. The Beta and Sig value demonstrate the extent of the contribution to position innovation. This shows that product innovation (Beta: .37) has a greater contribution to position innovation in comparison with process (Beta: .17) and paradigm (Beta: .33) innovation. Figure 5.15 illustrates the significant relationships between these constructs.

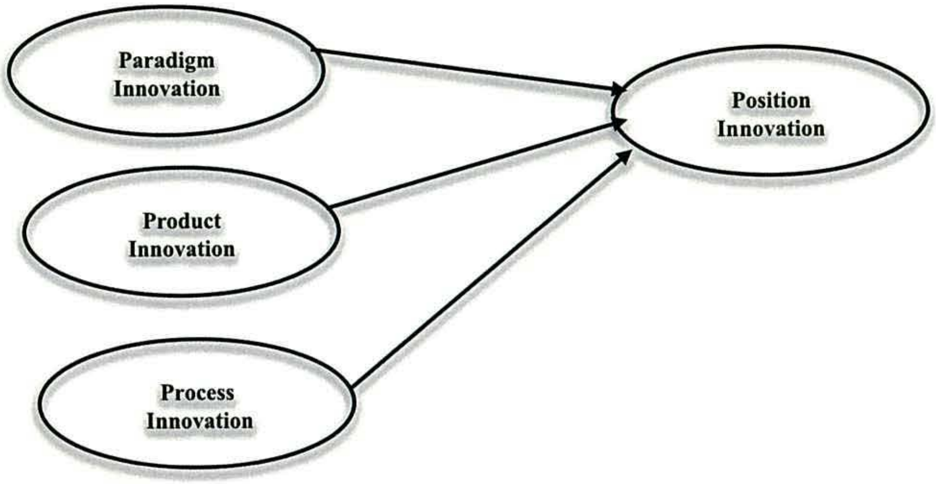


Figure 5.15. The relationship between position and other types of innovation

5.5.4 Paradigm Relationship

A regression test was carried out on the mean value of the statements specific to each types of innovation where paradigm innovation was the dependent variable and position, process and product innovation were the independent variables in investigating the relationship between innovation types. The correlation between these variables is shown in Table 5.8, this was considered in ensuring no instances of multicollinearity (correlation less than .9 is suitable (Field 2009)).

		Paradigm Innovation	Product Innovation	Process Innovation	Position Innovation
Pearson Correlation	Paradigm Innovation	1.000	.593	.652	.666
	Product Innovation	.593	1.000	.673	.688
	Process Innovation	.652	.673	1.000	.643
	Position Innovation	.666	.688	.643	1.000

Table 5.8. Correlations with paradigm innovation

The adjusted R square, 52%, reflects on paradigm innovation's variance explained by the independent variables, this value is close to the R square value, 53%. This is suitable suggesting this result is true to large sample sizes indicating 52% of paradigm innovation's variance can be explained by other types of innovation. Moreover the Durbin-Watson value is a suitable 2.3. This test has generated a sig value of .00, less than .05, which indicates a significant contribution to dependent variable by the independent variables.

The coefficients, depicted in Table 5.9 suggest no multicollinearity based on the VIF (less than 10) and Tolerance values (less than 1). Moreover only process and position innovations demonstrate a significant contribution to paradigm innovation as highlighted in bold (sig. value less than 0.05). This means that product innovation has no significant contribution towards paradigm innovation.

Model		Standardized Coefficients	Sig.	Correlations	Collinearity Statistics	
		Beta		Part	Tolerance	VIF
	Product Innovation	.108	.152	.071	.436	2.292
	Process Innovation	.339	**.000**	.236	.485	2.062
	Position Innovation	.374	**.000**	.256	.468	2.138

Table 5.9. Innovation type relationship with paradigm innovation

The Beta value in table 5.9 reflects on the extent of contributions to paradigm innovation. This shows that Position (Beta: .37) and Process innovation (Beta: .33) contribute more significantly to paradigm innovation when compared to product innovation (Beta: .10). Figure 5.16 illustrates the significant relationships between dependent and independent variables.

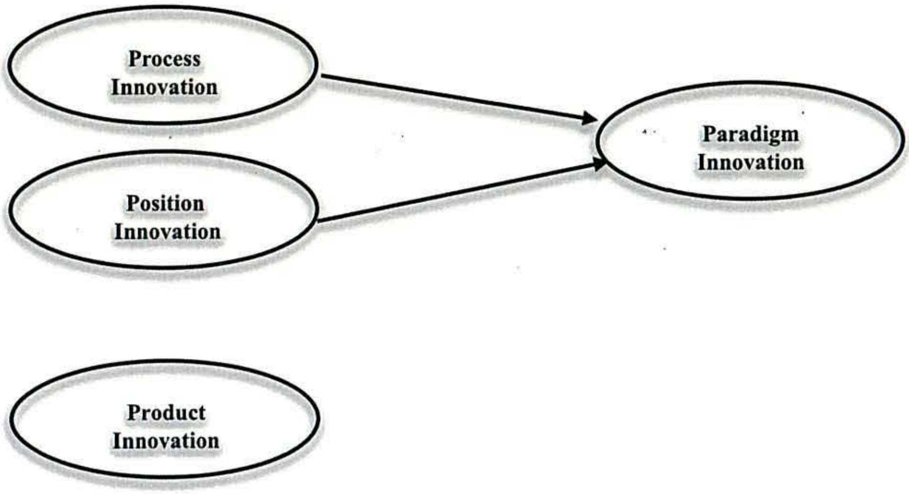


Figure 5.16. The relationship between paradigm and other types of innovation

5.5.5 Discussion

The regression tests carried out above identify a significant relationship between all types of innovation with an exception in the case of product and paradigm innovations. An innovation type relationship diagram has been created on the basis of these findings as depicted in Figure 5.17. This model illustrates the significant relationships between innovation types derived from the regression tests. The number appointed to each relationship notes the correlation between innovation types, hence, illustrating the extent of the relationship between innovation types constructs. The closer the correlation value to 1 (or -1) the stronger the relationship between the constructs. As it can be noted the link between product and paradigm innovation is grey due to the lack of a significant relationship between these two constructs. Although product and position innovation have the highest correlation (.688) and, process and position the lowest significant correlation (.643) yet these correlation values are all close to one another, ranging from .688 to .643.

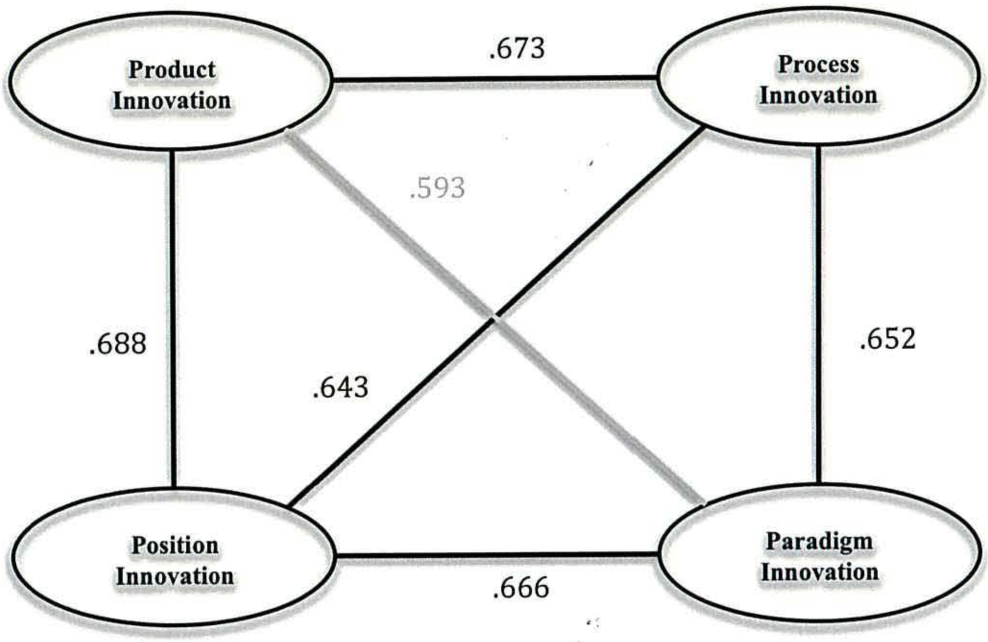


Figure 5.17. Innovation type relationships diagram

Figure 5.17 suggests the following:

- Paradigm innovation contributes to the development of position and process innovations and each of these types of innovation have a significant likelihood to lead into product innovation. It is likely that paradigm innovation has an indirect relationship with product innovation.
- There is a strong link between product and position innovation as they come hand in hand changing the organisational offering through the exploitation of markets and products.
- The correlation between product and process innovation (.673) confirms the close relationship between these two types of innovation. This is where new technologies and processes create new opportunities in terms of products or changes to products result into changes to the operations and processes.
- The close relationship between position and paradigm innovation is due to the fact that changes to markets and marketing strategies may result in changes within the organisational paradigm, business model and vice versa.
- Process and paradigm innovation have a .652 correlation; this relationship might be due to the technological changes within the industry that drive organisations to change their paradigm, or reversely changes to organisational paradigm may result in changes to organizational operations.

- The lack of a relationship between paradigm and product innovation might be due to the fact that paradigm innovation usually take shape as a consequence of big changes to the market (position innovation) and technology (process innovation) while product innovations are parts of the daily survival strategy of the organisations.
- The absence of a stronger relationship between process and position innovation might be due to the fact that there is no obvious dependency between changes to the market and internal processes. For example if the organisation observes the potential in a new technology or changes the order of shop floor operations, this activity is not related to position innovation. However, one might argue that position innovation should have a strong relationship with process innovation. An example would be in cases when the company is exploiting another market in another country where so many changes to the processes should be implemented to support this. However, within the specific context of this study (food sector SME) no such relationship is deemed significant.

In conclusion, this study confirms a positive relationship between different types of innovation (with an exception for product and paradigm innovation) where adoption of one type of innovation contributes significantly to adoption of other types of innovation. This encourages the continuous adoption of all types of innovation bearing in mind that there is a knock on effect accelerating adoption of other types of innovation.

5.6 Innovation Orientation

Principal Component Analysis (PCA) has been chosen for the development of an innovation orientation scale, on the basis of a number of statements adapted from Siguaw et al (2006), as this tool is suitable when faced with large sets of data.

> "Principal component analysis is a statistical technique that linearly transforms an original set of variables into a substantially smaller set of uncorrelated variables that represent most of the information in the original set of variable" (Dunteman 1989, p. 7).

> "Principal component analysis of a data matrix extracts the dominant pattern in the matrix in terms of a complementary set of score and loading plots" (Wold 1987, p. 37).

Having 26 variables on innovation orientation, PCA was deemed a suitable technique to make sense of these data. Consequently, the innovation orientation statements were subjected to PCA using SPSS version 16.0. It should be noted that prior to conducting the PCA, the suitability of the sample for this test was assessed through various means, mentioned below:

- Pallant (2007) has stated "the correlation matrix should show at least some correlations of r=0.3 or greater" (p. 185). The correlation matrix of this study illustrates many coefficients of .3 or above.
- The Kaiser-Meyer-Oklin value is 0.905, which is greater than the recommended value of > 0.6 (Kaiser 1970, 1974)
- Barlett's test of Sphericity is statistically significant with a value of .000 < .05 (Bartlett 1954)

PCA is an exploratory tool and the researcher has to make decisions guided by this test (Field 2009). An important decision within PCA is the number of factors to extract. There are various methods to identify the number of factors among which is the Kaiser's Criterion, Scree test and parallel analysis. In this research Kaiser's Criterion was selected to decide on the number of factors based on the meaningful and insightful results it presented. Kaiser's Criterion identifies number of factors based on number of components with Eigen values (variance explained) greater than 1. This test resulted in five components with Eigen values greater than one as depicted in Table 5.10. These five components explain a total of 66% of variance. To be specific, component one explained 44.5% and components 2 to 5 explained 7.0%, 6.1%, 5.3% and 4.1% of the variance respectively. As it can be noted, the variance is heavily loaded on one component compared to the rest of the items, which is common and expected (Pallant 2007).

Component	Initial Eigen values	
	Total	% of Variance
1	**11.56**	44.47
2	**1.82**	7.01
3	**1.60**	6.17
4	**1.38**	5.33
5	**1.08**	4.16
6	.97	3.74
7	.83	3.22
8	.72	2.77
9	.63	2.43
10	.61	2.36
11	.55	2.12
.	.	.
.	.	.
25	.14	.55
26	.11	.44
Extraction Method: Principal Component Analysis.		

Table 5.10. Total variance explained

To gain information on the variance explained by each item towards other items within the component (common variance) and ensuring that variables are a good-fit the communalities table, provided in Appendix 5.5, was examined. This shows that the extraction variables are all greater than .5, where an expected variance of greater than .3 for all variables is desirable; hence items are in a good-fit with one another in their component. However, if the variables were not a good fit with other items, the researcher could remove the unfit variable from the test to increase the common variance (Pallant 2007).

Once the number of factors is decided, the next step is to rotate the factors. Factor rotation is necessary, as variables tend to load highly on the most important component (the first factor "although their correlation with it might not be high" (Bryman and Cramer 2001, p. 291)) with small loadings on other components, to tackle this, variables will be rotated. There are two different methods of rotation; orthogonal which is suitable when factors are independent of one another; the other method is oblique rotation that is suitable when factors are related (correlated) (Field 2009). In this study the oblique rotation seems more suitable as within innovation orientation, various processes are highly dependent on one another, where one process might lead to another process hence, to innovation orientation. To confirm this further the correlation between factors has been considered, this is reflected in Appendix 5.5. Due to a high correlation between factors (greater than .3 (Pallant 2007)) the oblique rotation seems more suitable. Oblique rotation has two methods of rotating, direct oblimin and promax. Promax is suitable for very large data sets, therefore in this study oblimin rotation has been chosen in which correlation between factors is permitted within the rotation. Oblimin rotation generates two tables' pattern matrix (Table 5.11) and structure matrix (Appendix 5.5). The pattern matrix reflects the factor loadings and the structure matrix reflects the relationship between the factors (Field 2009).

	Component				
	1	2	3	4	5
PROC1	0.7				
PROC2	0.7				
PROC3	0.5				
PROC4	0.5				
STRA1		0.8			
STRA2		0.7			
STRA3		0.7			
STRA4		0.5			
STRA5		0.5			
STRA6		0.4			
PROD1			0.9		
PROD2			0.7		
PROD3			0.7		
PROD4			0.6		
PROD5			0.6		
PROD5	0.4		0.5		
EMPL1				0.6	
EMPL2				0.6	
STRA7		0.4		0.4	
Faster Innovation					
POPA1					0.7
POPA2					0.7
POPA3					0.7
POPA4					0.7
POPA5					0.5
POPA6					0.5
Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.					

Table 5.11. Pattern matrix

The pattern matrix in Table 5.11 reflects the factor loading for each variable. The Pattern Matrix in Table 5.11 shows a clear structure with meaningful strong loadings of variables on only one component and for all components except for 'faster innovation'.

'Faster innovation', which has a lower correlation than 0.4 with other items with; this has resulted in removal of this item from the innovation orientation scale.

At this stage, it should be mentioned that other than the current data, by means of exploring various possible dimensions of innovation orientation, a combination of a variety of sets of data were subjected to PCA. For example all the data within innovation orientation and types of innovation were considered, however none of these resulted in any meaningful patterns expect for the combination discussed here on the basis of Siguaw et al (2007) propositions.

Factor	Item No.	Item *In our organization, we:*
Process Innovation	PROC1	Allocate significant resources to operational innovations
	PROC2	Explore radical new ways of operating
	PROC3	Continuously improve or enhance our operations
	PROC4	Develop and deploy new technologies
Innovation Strategy	STRA1	Gather and use information about our consumers/end-users
	STRA2	Gather and use information about our trade customers
	STRA3	Gather and use information about our competitors and markets
	STRA4	Engage in shaping of an innovative organisational culture
	STRA5	Adopt a cross functional approach to innovation
	STRA6	Are effective at implementing change
	STRA7	Put innovation at the heart of our strategic planning
Product Innovation	PROD1	Continuously improve or enhance our packaging
	PROD2	Develop radical new packaging
	PROD3	Develop radical new products
	PROD4	Continuously improve or enhance our products
	PROD5	Allocate significant resources to packaging development
	PROD6	Allocate significant resources to product development
Employee Orientation	EMPL1	Encourage and support innovative employees
	EMPL2	Encourage new ideas throughout the organisation
Position & Paradigm Innovation	POPA1	Develop new markets for our existing products
	POPA2	Launch new products into new markets.
	POPA3	Make ongoing improvements to our strategy & plans.
	POPA4	Make radical changes to our strategy & business model
	POPA5	Allocate significant resources to marketing.
	POPA6	Allocate significant resources to strategic development

Table 5.12. Innovation Orientation Scale

Analysing Table 5.11 reflects a meaningful pattern among factors, which has resulted in labelling them according to their focus as process innovation, innovation strategy, product innovation, employee orientation and position and paradigm innovations. Table 5.12 presents the innovation orientation scale developed by this research, INNOV.

INNOV is drawn from the factor analysis labelling the identified factors and their components in order of their variance explained:

The exploratory PCA suggested that innovation orientation comprises five dimensions, measured by four, seven, six, two and six items, respectively. The first dimension is dominant, accounting for 44.5% of the variance. The factors are:

- *Factor 1 – Process Innovation (PROC)* – Four items cluster to form the first factor. Three of these items concern operations and operational innovations, whilst the fourth is concerned with the development and deployment of new technologies, which is also typically associated with process innovation.
- *Factor 2 – Innovation Strategy (STRA)* – Seven items are associated with this factor. Three are concerned with gathering and using information about consumers, trade customers, and competitors and markets, respectively. The other four reflect different aspects of a strategic approach to innovation, including placing innovation at the heart of strategic planning, adopting a cross-functional approach, developing an innovative organisational culture, and managing change effectively.
- *Factor 3 – Product Innovation (PROD)* – Six items are associated with this factor. These six items relate to a mix of product and packaging innovation. They relate, variously, to incremental, and radical innovations, and to the allocation of resources.
- *Factor 4 – Employee Orientation (EMPL)* – Two items are associated with this factor. These are concerned with encouraging and supporting innovative employees, and encouraging new ideas.
- *Factor 5 – Position and Paradigm Innovation (POPA)* – six items are associated with this factor. These six items relate to a mix of position and paradigm innovation. Three of these items are concerned with aspects of position innovation, involving entry into new markets, and the allocation of resources to marketing. The remaining three are more closely associated with paradigm innovation, including incremental and radical changes to strategies and business models, and the allocation of resources to strategic development.

In order to gain more insight into the level of engagement of the sample with each of the innovation orientation factors the mean score of each factor has been calculated (mean score of the statements under each factor) excluding the eliminated variable. For example, in the case of EMPL, the mean score of encourage ideas and encourage employees has been calculated. This has resulted in the following order of significance, illustrating that the sample had a high focus on their employees (4.4 representing Always) followed by all the other factors (between 3 and 4, representing Mostly). It should be repeated that these numbers are derived from managers' perceptions of their firms, and reflect on the sector's performance with regards to each of the innovation orientation factors:

1. EMP mean score of 4.4
2. STRA mean score of 3.7
3. PROC mean score of 3.5
4. PROD mean score of 3.5
5. POPA mean score of 3.4

The developed innovation orientation scale reflects the following:

- The factors are a mix of types of innovation and innovation strategy, coupled with employee orientation.
- Types of innovation are prominent factors in innovation orientation. The important role of firms' engagement with all types of innovation (product and packaging (PROD), process (PROC), position and paradigm (POPA)) has been highlighted in both radical and incremental degrees of change, encouraging firms to be alert to improvements and extreme changes.
- Position and paradigm innovation collapse onto one factor, POPA, suggesting that they are exceptionally highly coupled.
- Product and packaging innovation, likewise, collapse onto one factor, PROD, suggesting that they are exceptionally highly coupled, especially in the food sector.
- Additionally, the role of resource allocation to all types of innovation has been emphasized, reconfirming the role of engagement with all types of innovation as lack of a resource allocation implies lack of dedication to innovation types. This directs organisations to an even resource allocation, avoiding a focus on one of the innovation types (e.g. products).

- The vital role of employees within innovation orientation has been reiterated with one factor dedicated to it. As mentioned previously, the respondents had rated highly on this factor on the basis of their perceptions implying the sector has a positive focus on employees. Additionally, only two items load onto the Employee Orientation factor (EMPL). Others that might have loaded onto this factor, such as STRA4 'Engage in shaping an innovative organisational culture', have instead loaded onto Innovation Strategy.
- The imperative role of innovation strategy (STRA) throughout the organisation has been highlighted leading to firms' overall engagement with innovation, noting that firms should be aware of their markets, and should constantly collect and analyse information from customers, competitors and consumers. In addition to this, they should be prone to change, consider innovation in strategies, processes and culture. Additionally a cross-functional approach to innovation is encouraged where innovation is not limited to a team, department or certain employees.
- Finally, innovating at a faster rate than competitors has been excluded from the scale due to a low correlation with any of the five factors implying that within the context of this study innovation orientation is not concerned with speed of innovation re competitors.

This scale not only encourages and welcomes firms to change their products, processes, position and paradigms leading to a continuous focus on innovation, it also highlights the value of a holistic approach to innovation by investing in employees, culture and strategies. Hence, it can be argued a firm's innovation orientation not only relies on the development and adoption of different types of innovation, it also relies on the close ties between the firm's strategies and processes underlying innovation. Finally, incorporating this scale at the heart of organisational decision making and also valuing this scale within all organisational functions and bodies leads to an overall (long term) innovation orientation.

5.7 Innovation Stages and Innovation Orientation

Aiming to understand the importance of stages of New Product Development for successful innovation in the long run, this study investigated the relationship between innovation orientation and each of the four main stages of innovation; initiation, design, implementation and launch and post launch activities.

It was deemed suitable to carry out a regression test on innovation orientation (dependent variable) and stages of innovation (independent variables) to identify whether stages of product innovation have a significant contribution to innovation orientation. This specific direction has been chosen as previously this study has developed an innovation orientation scale. Subsequently, investigating the role of stages of innovation within innovation orientation follows the direction of this study in gaining an understanding of how firms can maintain an innovation orientation. Additionally, in the case of SMEs, it is understood that firms do not follow a formal new product development process. Hence, identification of a positive association between stages of innovation and innovation orientation adds emphasis to the importance of stages of NPD reflecting the value of innovation process.

As noted in section 5.6 of this chapter, an innovation orientation scale, INNOV, was developed through principal component analysis; the challenge in this section was to find a way to measure the innovation orientation to feed into the regression test. It was decided to use the sum of the factor score generated in the principal component analysis (SPSS 16.0) as Field notes researchers "could add the scores up to obtain a single score for each participant" (2009, p. 670). Factor scores are used to estimate each respondent's score for each factor on the basis of each factor's weight or in other words the factor score "is a composite score for each individual on a particular factor" (Field 2009, p. 635). There are various methods of calculating the factor score among which is the regression method and the Anderson-Rubin method. The latter is preferable when uncorrelated scores are required. However, if that is not the case the regression method is most suitable as it is easier to understand (Tabachnick and Fidell 2007). Hence, in this study, the regression method has been applied to estimate the factor score, this method uses the coefficients as the factor weights.

When using the factor score to measure innovation orientation, it might be argued that the sum of the factor scores do not demonstrate how well each firm performs within the limits of each factor. Therefore, if a firm performs very poorly on factor 1 and very well on factor 2, this will be not be reflected in detail. The answer to this is that the sum of the factor scores will provide this study with a relatively accurate measurement of the organisation's overall innovation orientation. For a detailed view of how firms perform one might consider each factor score separately. However as this study aims to understand the importance of innovation stages within innovation orientation, at this stage the sum of factor scores is suitable.

On the basis of above, the sum of the factor scores was used to measure innovation orientation. This was fed into regression (SPSS 16.0) as the dependent variable with four independent variables on each of the stages of product innovation. The independent variables were derived from the mean score of the firms' engagement with each of the stage activities of product innovation (these have been reflected in section 5.3).

It should be mentioned again the responses are based on firms' (managers') perceptions of their involvement with each of these activities. Table 5.13, shows the descriptive statistics of the dependent and independent variables, as it can be noted the sample size is a minimum of 125.

	Mean	Std. Deviation	N
Innovation Orientation Factor Score	.1841	3.46033	125
Initiation Stage	3.4046	1.06001	125
Design Stage	3.4793	.95310	125
Implementation Stage	3.4660	.97107	125
Post Launch Stage	3.6880	.97222	125

Table 5.13. Innovation Stages' descriptive statistics

The suitable sample size for regression to be able to generalize should be a minimum of 50+8k, where k is the number of predictors; in this case it is 4. This results in 50+8(4) = 82 records, the number of records in this test is 125 which is greater than 82, hence, the sample size requirement is satisfied (Tabachnick and Fidell 1996).

The correlations between variables were checked to ensure suitability of the data, no correlations greater than .9 were observed (correlations greater than this value are problematic), and the correlation table can be found in Appendix 5.6. (Field 2009).

Furthermore, prior to conducting multiple regressions the suitability of the data should be ensured on the basis of outliers, multicollinearity and normality (Foster et al 2006). The regression variables have been checked to be clear from outliers, the regression standard residual value on the scatter plot should be between 3.3 and -3.3 (Tabachnick and Fidell 2007) and this can be noted in Appendix 5.6.

With regards to multicollinearity, this has been tested within each test separately and is presented below. The normality of the data was tested through the normality plots and histograms, and also plots of *ZREDSID against *SPRED to check for heteroscedasticity in the data (linearity of the data). These graphs all satisfied the requirements, where the plots were normal, linear and evenly distributed, and these can be found in Appendix 5.6.

The R square value reflects the percentage of variability of the outcome accounted by the predictors (variance explained). In this case it is 49%, where the adjusted value is 48%. This demonstrates the generalizablity of the model, and ideally should be close to the R square value. The Durbin-Watson value is 2.4 where any value between 1 and 3 is desirable and reflects whether the assumption of independent errors is tenable (Field 2009). This test has generated a sig value of .0, less than .05, which is statistically significant. However, to read more into this the coefficients table (Table 5.14) should be considered.

In the table 5.15 below, the last 2 columns show that there are no cases of multicollinearity as all the tolerance values are below 1 and all the VIF values are below 10 (Pallant 2007). The higher the Beta value the stronger the contribution of the predictor to innovation orientation. The predictors with sig values less than 0.05 make a significant contribution to innovation orientations, which are highlighted in bold in Table 5.14.

Model	Standardized Coefficients	Sig.	Correlations	Collinearity Statistics	
	Beta		Part	Tolerance	VIF
Initiation Stage	.257	.015	.160	.388	2.575
Build Stage	.461	.000	.246	.285	3.514
Implementation Stage	-.152	.221	-.080	.275	3.637
Post Launch Stage	.197	.061	.122	.388	2.577

Table 5.14. Stages of product innovation and innovation orientation relationship

Therefore, it can be concluded that the initiation and design stages of innovation have a significant contribution to innovation orientation. Both the beta value and the sig value indicate a stronger association in case of design stage when compared to initiation stage. Identifying these stages of innovation as the main contributors to innovation orientation can assist organisations in moving towards the right direction by placing more emphasis on these stages. However, the results raise more questions on why these stages are more important for innovation orientation and also why the design stage has a more significant contribution as opposed to the initiation stage. This study also suggests that implementation and launch, and post launch stages of NPD do not contribute to an innovation orientation significantly. Additionally, the distinct difference between the initiation and design stage could be due to the specific nature of food sector SMEs, where it is during the actual design stage that innovations happen.

5.8 Organisational Characteristics and Innovation Orientation

To investigate the role of organisational characteristics on innovation orientation, the significant relationships between organisational size, age, product category and the number of customer channels with innovation orientation traits were tested through chi-square test to detect any significant associations.

Chi-Square tests the independence of variables by comparing collected and expected frequency of the categorically coded data, examining whether any difference is statistically significant (Urdan 2005).

> "Chi-Square (X^2) is a frequently used test of significance in social sciences. It is based on the *null hypothesis*: the assumption that there is no relationship between two variables in the total population. Given the observed distribution of the values on the two separate variables, the conjoint distribution that would be expected if there were no relationship between the two variables is computed" (Babbie 2009, p. 483).

> "Chi-Square is a test of statistical significance. It tests the null hypothesis that the variables are independent in the population. If we reject the null hypothesis we are concluding with a known probability of error that the variables are dependent on each other in the population" (Healey 2008, p. 269).

Organisational characteristics relevant to this study are as follows, details of which have been presented in the methodology chapter, section 4.5:

- Organisational size (number of employees):
    - Less than 10
    - 11+
- Organisational product category:
    - Beverage (e.g. wine, beer, juice, tea and coffee)
    - Convenience (e.g. preserves, chutneys, sauces, confectionary)
    - Fresh Food (e.g. bread, meat, cheese)
- Organisational age (years since establishment):
    - Less than 5
    - 6 to 20
    - 21+
- Number of organisational customer channels:
    - 1 to 3
    - 4 to 6

Organisational size has been divided into two categories (micro and small/medium) rather than three categories (micro, small and medium). This was due to the fact that not enough data was available to carry out the chi-square test within the small and medium category. Consequently, they were merged, and this provides insight into the difference of organisational innovation traits for micro and non-micro SMEs.

Also, with regards to customer channels, respondents were requested to identify the type they dealt with (retailer, wholesaler etc) in order to understand the effect of these channels on innovation. In this section the number of customer channels for each respondent has been counted to fit in one of the following suitable categories, 1 to 3 customer channels or 4 to 6. This will identify whether procuring more customer channels has any effect on organisational innovation orientation.

With regards to innovation orientation traits, the responses to these statements fall into five categories (always, mostly, usually, rarely and never). Having five categories at this stage complicates and over loads the statistical test with 'Always' and 'Mostly' on the positive end of the spectrum and 'Rarely' and 'Never' on the negative end of the spectrum. It was deemed suitable to combine always and mostly together and never and rarely together, hence, the responses were merged into three categories:

1. Always and mostly
2. Usually
3. Rarely and never.

The innovation orientation scale's statements (as per table 5.12) were subjected to the chi-square test on the basis of organisational characteristics attributes (size, age, product category and number of customer channel) to test a range of null hypotheses (non-directional hypothesis (Singh 2006)) as follows:

- H1: Organisational size has no significant association with innovation orientation traits.
- H2: Organisational product category has no significant association with innovation orientation traits.
- H3: Organisational age has no significant association with innovation orientation traits.
- H4: The number of organisational customer channels has no significant

association with innovation orientation traits.

The full list of these hypotheses can be found in Appendix 5.7. These hypotheses have been tested in detail below for each of the identified innovation orientation traits. Table 5.15 illustrates the significance of these associations together with effect size and the degree of association. The chi-square requirement which ensures the cell count under each cross tab is not less than 5, is satisfied for most of the statements with a significant value except for effective change, heart of strategy and encourage ideas that have been noted in italic in the table below. Consequently, the subject statements (statements that did not satisfy the chi-square requirement) have not been considered in the analysis.

Org Profile	Innovation Orientation Trait	Sig	Cramer's V	Effect Size	Chi-Square Requirement
H1: Size	PROC1	Sig value, .49, not significant			
	PROC2	Sig value, .36, not significant			
	PROC3	.03	.19	Weak	Satisfied
	PROC4	.02	.21	Moderate	Satisfied
	STRA1	Sig value, .31, not significant			
	STRA2	Sig value, .69, not significant			
	STRA3	Sig value, .45, not significant			
	STRA4	Sig value, .79, not significant			
	STRA5	Sig value, .62, not significant			
	STRA6	Sig value, .78, not significant			
	STRA7	Sig value, .41, not significant			
	PROD1	Sig value, .10, not significant			
	PROD2	Sig value, .66, not significant			
	PROD3	Sig value, .95, not significant			
	PROD4	Sig value, .45, not significant			
	PROD5	Sig value, .84, not significant			
	PROD6	Sig value, .10, not significant			
	EMPL1	Sig value, .33, not significant			
	EMPL2	Sig value, .43, not significant			
	POPA1	Sig value, .52, not significant			
	POPA2	Sig value, .58, not significant			
	POPA3	Sig value, .15, not significant			
	POPA4	.00	.23	Moderate	Satisfied
	POPA5	.04	.18	Weak	Satisfied
	POPA6	.00	.24	Moderate	Satisfied
H2: Product Category	PROC1	Sig value, .19, not significant			
	PROC2	Sig value, .23, not significant			
	PROC3	Sig value, .83, not significant			
	PROC4	Sig value, .25 not significant			
	STRA1	Sig value, .59, not significant			

	STRA2	Sig value, .23, not significant			
	STRA3	Sig value, .48, not significant			
	STRA4	Sig value, .67, not significant			
	STRA5	Sig value, .42, not significant			
	STRA6	.01	.18	Weak	Not Satisfied, *few cells with expected count less than 5*
	STRA7	Sig value, .55, not significant			
	PROD1	Sig value, .12, not significant			
	PROD2	Sig value, .52, not significant			
	PROD3	Sig value, .58, not significant			
	PROD4	Sig value, .09, not significant			
	PROD5	.00	.19	Weak	Satisfied
	PROD6	Sig value, .30 not significant			
	EMPL1	Sig value, .27, not significant			
	EMPL2	*.04*	*.16*	*Weak*	*Not Satisfied, few cells with expected count less than 5*
	POPA1	Sig value, 0.69 not significant			
	POPA2	.01	.18	Weak	Satisfied
	POPA3	Sig value, .18, not significant			
	POPA4	Sig value, .67, not significant			
	POPA5	Sig value, .88, not significant			
	POPA6	Sig value, .11, not significant			
H3: Age	PROC1	Sig value, .16 not significant			
	PROC2	Sig value, .43, not significant			
	PROC3	Sig value, .73, not significant			
	PROC4	Sig value, .64, not significant			
	STRA1	Sig value, .38, not significant			
	STRA2	Sig value, .12, not significant			
	STRA3	Sig value, .08, not significant			
	STRA4	Sig value, .93, not significant			
	STRA5	Sig value, .25, not significant			
	STRA6	Sig value, .72, not significant			
	STRA7	*.02*	*.17*	*Weak*	*Not Satisfied, few cells with expected count less than 5*
	PROD1	Sig value, .33, not significant			
	PROD2	Sig value, .07, not significant			
	PROD3	Sig value, .14, not significant			
	PROD4	Sig value, .14, not significant			
	PROD5	Sig value, .54, not significant			
	PROD6	Sig value, .32, not significant			
	EMPL1	Sig value, .36, not significant			
	EMPL2	Sig value, .56, not significant			
	POPA1	.04	.16	Weak	Satisfied

	POPA2	Sig value, .11, not significant			
	POPA3	Sig value, .36, not significant			
	POPA4	Sig value, .82, not significant			
	POPA5	Sig value, .34, not significant			
	POPA6	Sig value, .87, not significant			
H4: Customer Channel	PROC1	Sig value, .11, not significant			
	PROC2	Sig value, .28, not significant			
	PROC3	Sig value, .20, not significant			
	PROC4	Sig value, .37, not significant			
	STRA1	Sig value, .20, not significant			
	STRA2	Sig value, .13, not significant			
	STRA3	Sig value, .20, not significant			
	STRA4	Sig value, .30, not significant			
	STRA5	Sig value, .20, not significant			
	STRA6	Sig value, .67, not significant			
	STRA7	Sig value, .09, not significant			
	PROD1	Sig value, .84, not significant			
	PROD2	Sig value, .45, not significant			
	PROD3	Sig value, .22, not significant			
	PROD4	Sig value, .31, not significant			
	PROD5	Sig value, .95, not significant			
	PROD6	Sig value, .67, not significant			
	EMPL1	Sig value, .27, not significant			
	EMPL2	Sig value, .06 not significant			
	POPA1	Sig value, .21, not significant			
	POPA2	Sig value, .18, not significant			
	POPA3	Sig value, .90, not significant			
	POPA4	.04	.18.	Weak	Satisfied
	POPA5	Sig value, .53, not significant			
	POPA6	Sig value, .26, not significant			

Table 5.15. Significant associations between organisational profile and innovation orientation traits

The Phi or Cramer's V should be considered when determining the effect size. Phi value is suitable for 2x2 matrices and Cramer's V value is suitable for matrices greater than 2x2. In this study as the innovation statements have 3 categories, the matrix is 3 by 2 or 3 which is greater than 2x2 hence, the Cramer's V has been considered. Table 5.16 has been used to interpret the Cramer V value, which is between 0 and 1, the closer the value to 1 the stronger the effect size and the association between the factors (Morgan et al 2009). The degree of the effect size for all the statements with significant values is shown in Table 5.15.

Cramer V	Interpretation
>.00 to <.10	Negligible Association
>.10 to <.20	Weak Association
>.20 to <.40	Moderate Association
>.40 to <.60	Relatively Strong Association
>.60 to <.80	Strong Association
>.80 to 1.00	Very Strong Association

Table 5.16. Effect size based on Cramer V

The organisational characteristics' effect size (Table 5.15) reflects a weak to moderate association with certain innovation orientation traits, the details of which are provided below. While these significant associations are presented below, it should be noted that the null hypothesis is true for the rest of these traits where organisational characteristics seem to reflect no significant associations.

5.8.1 H1: Size

As noted in Table 5.15, out of the twenty-five innovation orientation traits subjected to the chi-square, five statements seem to be significantly associated with organisational size (measured on the basis number of employees). The crosstab table (Appendix 5.8) generated by SPSS illustrates the count and percentage of responses under each category. The crosstab table suggests that small and medium size companies are more engaged in innovation, with a higher percentage on mostly/always and a lower percentage on never/rarely as opposed to micro companies.

For example, in the case of firms' engagement to deployment and development of new technologies, 18% of small and medium sized organisations have indicated a never/rarely engagement whereas this amount changes to 39% in case of micro companies. These tables are available in Appendix 5.8 and the following can be interpreted on the basis of these numbers for each innovation trait.

- Small and medium sized organisations have a higher tendency to engage in development and deployment of new technologies as opposed to micro companies
- Small and medium sized organisations dedicate more resources to process, position and paradigm innovation compared to micro companies

- Small and medium sized organisations have a greater level of engagement with development of radical paradigm innovations.

On the basis of the significant effect of organisational size on various innovation type activities, this study rejects the null hypothesis and suggests that small and medium sized organisations demonstrate a higher level of engagement with innovation in comparison with micro organisations in case of PROC (Process Innovation) and POPA (Position and Paradigm Innovation) dimensions of innovation orientation. Accordingly, this study demonstrates that organisational size does not influence PROD (Product Innovation), EMP (Employee Orientation) and STRA (Innovation Strategy) dimensions of innovation orientation. Furthermore, allocation of resources to types of innovation is the dominating factors differentiating micro and small/medium organisations.

5.8.2 H2: Product Category

When looking at product category, this research suggests that convenience and beverage food companies tend to have a stronger association with innovation as opposed to fresh food companies with regards to radical position innovation (POPA) and resource allocation to packaging (PROD). Crosstab tables can be found in Appendix 5.8, which reflects the following:

- Convenience and beverage producers allocate more resources to packaging compared to fresh food producers.
- Convenience and beverage producers are more engaged with developing radical position innovation compared to fresh food producers.

Organisational product category affects the innovation traits only in two instances within two different dimensions of innovation orientation; therefore, this study accepts the null hypothesis indicating that overall organisational product category does not influence organisational engagement with innovation.

5.8.3 H3: Age

Investigating a significant association between organisational age and innovation traits suggests that organisational age solely affects innovation orientation in relation to incremental position innovation. It seems that young firms are more engaged with incremental position innovation with 4.8% responses to rarely and never when compared to ‘5 to 20’ and ‘21+’ firms with 16% and 24%. Therefore, it can be concluded firms of age 5 years and below are more engaged in development of incremental market innovation compared to older firms.

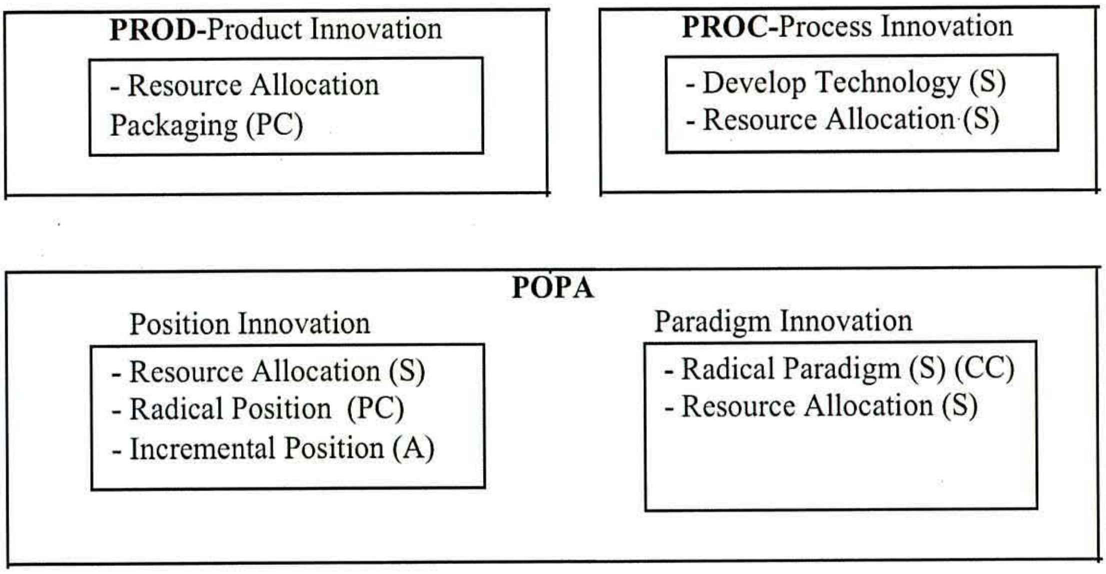
The crosstab tables can be found in Appendix 5.8. Accordingly as age solely affects organisational engagement in an instance, the null hypothesis can be accepted suggesting that overall organisational age does not affect organisational engagement with innovations orientation among food SMEs.

5.8.4 H4: Number of Customer Channel

With reference to the number of customer channels, those customers with 4 to 6 customer channels (46% to always/mostly) are more engaged with radical paradigm innovation as opposed to companies with 1 to 3 customer channels (29%). Therefore, it can be concluded that firms with a greater number of customer channels are more engaged in development of radical paradigm innovations. However, only one significant association (radical paradigm innovation) reflects this organisational characteristic’s lack of association with innovation traits within the target context. Subsequently, the null hypothesis is accepted.

5.8.5 Discussion

Figure 5.18 below clusters these associations based on the innovation orientation dimensions where the relevant organisational characteristics have been sign-coded. Also, only those traits with a significant association with organisational characteristics are illustrated. In figure 5.18 items significantly association with any of the organisational characteristics have been marked with that organisational characteristics initial, for example S for size. The boxes represent the dimensions of innovation orientation affected by organisational size.



Size- => (S)
Product Category => (PC)
Age => (A)
Customer Channel => (CC)

Figure 5.18. Organisational profile and innovation orientation traits

Figure 5.18 suggests that resource allocation is the main innovation traits associated with organisational profile. Organisational resource allocation to process, position and paradigm innovation is affected by organisational size and packaging innovation by product category. Additionally, this figure suggests that organisational Innovation Strategy (STRA) and Employee Orientation (EMP) are not associated with organisational characteristics and only those dimensions related to types of innovation are significantly associated. These findings can assist scholars and practitioners in understanding the specific innovation behaviours within organisations and the role of organisational profile.

It can be concluded that among the organisational profile factors, size has the greatest impact on innovation where the small and medium sized companies seems to be more engaged and involved with innovation compared to micro companies. Product category seems to impact companies in terms of radical position innovation and resource allocation in packaging, where convenience and beverage food companies show a greater level of engagement compared to fresh food producers.

Organisational age is associated with incremental position innovations, where younger firms tend to be more engaged. Also the number of customer channels only seems to be associated with one innovation trait, radical paradigm innovation. Hence, the role of organisational age, product category and the number of customer channels on innovation orientation could be assumed negligible. Additionally, resource allocation to various types of innovation seems to be the main differentiating factor in organisational engagement with innovation orientation on the basis of organisational characteristics.

5.9 Summary and Conclusion

In this chapter, the details of the statistical tests conducted on the collected data have been presented and analysed. Initially, food sector SMEs were profiled through descriptive statistics, which showed that food SMEs within the UK has a higher level of engagement with incremental innovations as opposed to radical innovations. Additionally, although firms are engaged with all types of innovation they tend to have the least level of engagement with paradigm innovation. With reference to innovation orientation characteristics, firms tend to be more focused on encouraging new ideas and innovative employees.

With regards to types of innovation, this chapter first explored respondents understanding of their adopted innovation within their firms on the basis of the open questions. Thereafter the relationship between types of innovation was investigated through multiple regressions. This reflected the complexity of types of innovation and a significant association between all types of innovation with an exception for product and paradigm innovations.

This study also conducted a PCA and developed an innovation orientation scale, INNOV, identifying PROC (process innovation), PROD (product innovation), POPA (position and paradigm innovation), EMPL (employee orientation) and STRA (innovation strategy) as the innovation orientation factors. Furthermore, the role of the stages of product innovation with innovation orientation was explored, and a significant association between initiation and design stages of NPD to innovation orientation was identified.

Finally, the role of organisational characteristics within innovation orientation traits was investigated in four sections: size (H1), product category (H2), age (H3) and the number of customer channels (H3), identifying size as the main factor influencing innovation. Furthermore, this study suggests that types of innovation (POPA, PROD and PROC) are the main dimensions of innovation orientation affected by organisational characteristics.

Overall this chapter has shed light on innovation characteristics of food sector SMEs, developed an innovation orientation scale and investigated the relationships between innovation orientation, stages and organisational characteristics. The following chapter is dedicated to discussing these findings on the basis of past literature, highlighting the specific contributions of this study.

Chapter Six - Discussion

6.1 Introduction

This chapter compares and contrasts the findings of this study with the previous research. In doing so it identifies the differences and similarities between various studies to add to the limited research on innovation and provides an opportunity to reflect on the specific characteristics of food sector SMEs. The contributions of this study to the literature are highlighted and on the basis of this discussion, areas for further research and implications for practitioners and policy makers are suggested in the next chapter.

This chapter presents the discussion of the findings of this study on the basis of the objectives sections that reflect the research in the following sections:

- Innovation profile: in this section patterns of innovation within food sector SMEs on the basis of descriptive statistics has been discussed. This includes identification of the extent of organisational engagement with innovation types and stages among food sector SMEs.
- Innovation types: the significant relationship between types of innovation and its implications are discussed in this section.
- Innovation Orientation Scale: the developed innovation orientation scale and its dimensions are considered in this section.
- Stages of Innovation and Innovation Orientation: the significance of stages of product innovation for an innovation orientation and its implications is presented here.
- Antecedents of Innovation: the specific relationship between organisational characteristics (size, age and product category) for an innovation orientation is presented and discussed here.

6.2 Innovation Profile among Food SMEs

The findings presented in the previous chapter offer an innovation profile of food sector SMEs. The descriptive statistics on the collected data provide an overview of the level of organisational engagement with incremental and radical innovations, various types of innovation, innovation orientation and stage activities of innovation. In addition, the findings from the open questions within the questionnaire, requesting the respondents to provide an exemplar of adoption of a specific type of innovation within their organisation has offered additional insight.

These findings are unique in providing a detailed yet holistic profile of innovation within the research context as the main body of past literature solely focuses on a few aspects of innovation (Karlsson and Olsson 1998; Freel 2000; Avermaete et al 2004; Mosey 2005; Wolff and Pett 2006). Such an overview of food SME innovation could be used as a basis for organisational benchmarking, guiding organisations' improvements on the basis of their specific sector so as to not fall behind their competitors (Laforet and Tann 2006; Massa and Testa 2008; Singh et al 2008).

6.2.1 Types of Innovation

The food sector SMEs in this study exhibit a similar level of engagement with product, process and position innovation, as well as a relatively high level of engagement with paradigm innovation. The positive engagement with all four types of innovation (product, process, position and paradigm) confirms the applicability of Francis and Bessant (2005) innovation type model to food SMEs. This is consistent with research that suggests SMEs engage in a range of different types of innovation (e.g. Menrad 2004; Avermaete et al 2003a) and counters research that suggests that one type of innovation is more or less adopted than another type for SMEs (e.g. Laforet and Tann 2006; Lin and Chen 2007; Oke et al 2007). Most importantly, since these food sector SMEs do not only engage in both product and process innovation, but also engage in paradigm and position innovation, so that any study that restricts its analysis to one type of innovation can achieve only a very partial insight into innovation in the organisations under study.

Resource Allocation

With regards to allocation of resources to types of innovation, although it is known that SMEs face shortfalls in terms of their resources (Pullen et al 2009), the results of this study imply that within the available limited resources, SMEs do attend to the development and adoption of innovations. A breakdown of these findings shows that product innovation seems to receive more resources, closely followed by process and position innovation. The findings of this study also suggest that there is a lower level of resource allocation to paradigm innovation. Resources allocated to all types of innovation should be in proportion to other types of innovation due to the interrelationship between innovation types (Bush 2005). Identifying lower level of resources dedicated to paradigm innovation in comparison with other types of innovation opens opportunities for improvement within food SMEs. This is the first study to identify the patterns of resource allocation among food sector SMEs on the basis of innovation types.

Product and Packaging Innovation

Moving on to examine the types of innovation in more detail, it is important to note that the level of engagement with product and packaging innovation is similar. Additionally, many of the respondents presented their recent packaging innovation when requested to provide an example of a recent product innovation. This suggests that managers in this study of food sector SMEs consider product and packaging together as one form of innovation. In the food sector, it is, therefore, important to extend the consideration of types of innovation to include packaging innovation as noted by Earle (1997) and Gellynck and Vermerie (2009).

Firms are more engaged with incremental packaging innovation than with radical packaging innovation, arguably because radical packaging innovations require significant investment in machinery, design and material. In addition, firms are moderately engaged with usage of information technology to improve product development processes and with the application of a standard new product development process. This use of a standard new product development process suggests a level of formalization that is not always evident in SMEs (Griffin 1997).

Process Innovation

With regards to process innovation, the results of this study indicate that food SMEs are highly engaged with improving their processes, and moderately engaged with all other process related activities, implying their awareness of the value of IT and new technologies. This complements Avermaete's (2002) findings regarding the high engagement of food SMEs with incremental process innovation and Le Bars et al's (1998) finding that scarcity of financial resources within food SMEs prevents them from exploiting technical/technological related opportunities.

Position Innovation

Overall, there is also a high level of engagement with position innovation, and associated engagement in marketing activities, as found by Lin and Chen (2007), in respect of marketing innovation for SMEs in the manufacturing and service sectors. Yet, this finding is not consistent with the relatively low level of commitment to investing signficant resources into position innovation. Very few studies have examined marketing or position innovation, so data on engagement with the activities associated with position innovation are useful.

Firms reflect a reasonably positive commitment to the development and exploitation of branding, innovation in marketing and promotion, and to identifying the potential of e-marketing. Firms' lowest level of engagement is with CRM, which may be more relevant to some firms than others in line with Srivihok and Batanov's (2005) study on CRM in case of Thai SMEs. This confirms Sparkes and Thomas's (2001) findings noting SMEs' awareness of the value of marketing in developing and maintaining customer relationships, this in turn results in SMEs' engagement with various low cost marketing strategies such as websites.

Paradigm Innovation

Finally, engagement in paradigm innovation is lower than that for other types of innovation; this could be as the result of SMEs managers' lack of competency in viewing their organisations strategically (Singh et al 2008). Nevertheless, within paradigm innovation, firms have quite a high level of engagement with incremental innovations, in the form of ongoing improvements to strategy and plans, although they report a rather lower level of engagement with radical paradigm innovations, or radical changes to strategy and business model. This may be associated with the rather low level of engagement with the allocation of signficant resources to paradigm innovation.

In respect of the other aspects of paradigm innovation, respondents are positively engaged with following a formal business planning process, again counter to the often reported informality of decision-making in SMEs (Gélinas and Bigras 2004). Although collaboration is important for successful innovations (Damanpour 1991; Kumi-Ampofo and Brooks 2009), and some respondents have referred to research collaborations in their attempt to develop a new product and strategies, as a whole, respondents seemed rather less likely to be engaging in partnering and strategic alliances, or considering outsourcing, mergers or acquistions. This confirms Batterink et al's (2006) findings where Dutch agrifood firms reflect a low level of collaboration where networking is not perceived valuable for innovation. Additionally these findings question the belief that "companies almost never innovate in isolation" (Menrad 2004 p. 845). The lack of food SME engagement with external resources could be due to the obstacles SME face in cooperation, with differences in culture, ownership and organisational size (Batterink et al 2010).

Degree of Innovation

The results of this study confirm the previous research on the incremental innovation focus of SMEs in general (e.g. Oke et al 2007) and food SMEs, more specifically (Avermaete 2002). Also, the rate of organisational engagement with radical innovation is relatively high, which bears out Massa and Testa's (2008) assertions concerning the importance of radical innovation in SMEs. So, although the rate of firms' engagement with incremental innovation is higher than radical innovations, firms are also inclined to attend to radical innovations.

This section is valuable in providing an overall view of organisational engagement with all types of innovation, as development and adoption of types of innovation has previously been studied in isolation from other types of innovation. Also the main focus of previous research has been on product and process innovations when considering food sector SMEs (Freel 2000; Avermaete 2002; Avermaete et al 2004; Mosey 2005).

Furthermore, there is lack of understanding in terms of business system innovation (innovations that do not fall under product and process innovation) (Hovgaard and Hansen 2004; Wagner and Hansen 2005), in this study they are referred to as position and paradigm innovation. This study suggests that food sector SMEs are relatively engaged with all types of innovation; introducing/improving (new) products, changing their processes, attending to customers and market and reviewing their strategies and business models.

6.2.2 Innovation Orientation Traits

As discussed in chapter three (section 3.4), innovation orientation has mostly been measured on the basis of organisational inputs and outputs (Bigliardi and Dormio 2009; Capitanio et al 2009). This study has identified the level of organisational engagement with a number of activities often viewed as central to effective innovation on the basis of Siguaw et al's (2006) innovation orientation framework. Firms accorded some priority to encouraging new ideas, and to the encouragement and support of innovative employees. As suggested by many commentators (e.g. Schmidt 1990; Voss et al 1998) these are central to successful innovation. More specifically, it has been noted that SMEs have a tendency to be people orientated (Ghobadian and Gallear 1997). Grunert et al (1997) commented on the importance of food firms' awareness of their markets and, in particular, this group have a reasonably high level of commitment to gathering and using information on customers, consumers and competitors.

Findings of this study suggest that although the food sector is known to lag behind other sectors in terms of radical innovations (Christensen et al 1996), this sector is in tune in maintaining an innovation orientation. Overall, the firms demonstrated a reasonable level of innovation orientation; this is valuable in profiling innovation orientation activities in the case of food sector SMEs, a much-neglected sector (Harmsen et al 2000; Edwards et al 2005).

6.2.3 Innovation Process

Scholarly literature emphasizes the requirements for a context specific approach to the study of innovation processes (Adams et al 2006) specifically in the case of SMEs (Karapidis et al 2005; Vorbach and Perl 2007; Horte et al 2008). Taking the above into account, this study has identified the level of organisational engagement with various stage activities of product innovation on the basis of four main stages of innovation: initiation, design, implementation and commercialisation and post launch (Van de Ven's 2000).

In line with the literature that suggests many SME do follow a formal NPD process (Griffin 1997; Barczak et al 2009), this study notes that food SMEs are regularly engaged with NPD activities with an exception for internal competence analysis, outlining business case, prepare project definition, the usage of external expertise, detailed market research and partnering. However, considering the fact that food SME are not highly engaged in outlining a business case and preparation of project definition, conforms with the conception that many SMEs follow a formal NPD process (Griffin 1997; Barczak et al 2009). This suggests that although a formal NPD process is not often adopted within food SMEs, yet these firms do follow a NPD process in a less formal manner.

Additionally, although detailed market research has been identified as a key to new product development process (Cooper and Kleinschmidt 1986) the sample reflects a lack of engagement with detailed market research and usage of external expertise, this could be due to SMEs lack of resources (Pullen et al 2009). As noted previously food SMEs within this study are not inclined to engage with external sources in various forms with a low score on the usage of external expertise and partnering. This implies that although the value of usage of external resources for innovation within SMEs has been identified (Kumi-Ampofo and Brooks 2009), yet there is a long way for SME to engage with external resources.

Identifying stage activities of product innovation applicable to food SMEs is a key finding of this section, this could be considered as an informal innovation process. This could be adopted by benchmarking; conducting a comparison between individual organisation and the sector to identify gaps and opportunities for improvements. Additionally, practitioners and policy makers could emphasise the role of networks (external sources) on the basis of this study.

6.3 Innovation Types Relationship

Aiming to identify the specific relationship between types of innovation, this study has investigated the association and patterns of adoption of various types of innovation on the basis of Francis and Bessant's (2005) typology (product, process, position and paradigm innovation). An understating of innovation type relationship is useful both for management of change within organisations (Wischnevsky et al 2011) and also for a better understanding of the commonalities and complementaries between innovation types (Cooper 1998; Damanpour and Aravind 2006).

This study has identified a positive association between all types of innovation with an exception for product and paradigm innovation. These findings confirm Damanpour and Gopalakrishnan (2001), and Avermaete et al (2004) in identifying a positive association between product and process innovation. Additionally, considering that technological and administrative innovation fall under process innovation this study supports Wischnevsky et al's (2011) study indicating that product innovations are followed by technological and administrative innovations. It should be noted that the reverse relationship (process innovation is positively associated with product innovations) is also true with regard to this study.

The lack of a relationship between paradigm and product innovation could be due to the specific nature of paradigm innovation, which is on the basis of changing the organisational business model (big changes within the organisation) (Francis and Bessant 2005). Paradigm innovations are seeded on the basis of changes to the markets and technologies (process and position innovation), subsequently, paradigm and product innovation are related to one another indirectly.

The significant relationship between types of innovation is also apparent from the responses to open questions where providing an exemplar of one specific type of innovation respondents have pointed to other types of innovation. This reflects on the close relationship between types of innovation where one leads to another and the difficulty in distinguishing these types of innovation.

Previous studies have mainly focused on binary models of innovation as in product, process, administrative and technological innovations (Damanpour and Gopalakrishnan 1999). Therefore, exploring the relationship between types of innovation, this study has moved beyond the common typologies of innovation (e.g. product and process or administrative and technical) and the neglected concepts of position and paradigm innovation has also been considered. Another significance of this study is in a context specific consideration of all types of innovation (food SMEs) more specially the case of position and paradigm innovation.

On the basis of the identified positive relationship between types of innovation among food SMEs, this study agrees with Damanpour (2010) in stating, "the full potential and benefits of one type of innovation can not be realized unless the other types become an integral party of its development or adoption process" (p. 1008). This implies that innovation types should not be studied in isolation from one another and the significant interdependencies between innovation types should be considered (Gellynck and Vermeire 2009). Furthermore, future studies should not be limited to much researched concepts of product and process innovation. These findings suggest that an integrative view of types of innovation should be adopted and further studied.

In addition, within organisations, a mix of innovation strategies on the basis of all types of innovation should be revised and adopted (Damanpour 2010). Organisations should be open to all types of innovation, as organisational focus on one type of innovation does not lead to a better performance (Damanpour et al 2009). Accordingly, identifying a positive association between various types of innovation suggests that organisations should exploit opportunities that arise in any direction for innovating. Subsequently, development and adoption of any one type of innovation should not be limited to a certain team and an organisation wide approach should be adopted (Lin and Chen 2007) to increase the chances of organisational benefits from the interdependencies of innovation types.

6.4 Innovation Orientation

"Truly innovative organisations, are those that exhibit innovative behaviour consistently over time" (Subramanian and Nilakanta 1996, p. 633). Maintaining an innovation orientation is important for organisations due to the positive relationship between innovation orientation and organisational performance (Subramanian and Nilakanta 1996; Roberts and Amit 2003; Hult et al 2004; Jin et al 2004). However, although this has been noted in the literature, the drivers of innovation orientation within the organisation are yet to be identified (Siguaw et al 2006; Prange and Schlegelmich 2010). In response to this gap in the literature, one of the main objectives of this study has been to develop and test an innovation orientation scale.

Developing and testing an innovation orientation scale, INNOV, this study has identified product and packaging innovation (PROD), process innovation (PROC), position and paradigm innovation (POPA), and employee orientation (EMPL) and innovation strategy (STRA) as the main components of an organisational innovation orientation on the basis of Siguaw et al's (2006) propositions.

This innovation orientation scale is valuable in adopting a holistic approach to innovation and innovation orientation, as the bulk of the past literature is often limited to an aspect of innovation/innovation orientation (e.g. Hurley and Hult 1998; Bouncken and Koch 2007). In addition to a number of studies that measure innovation orientation on the basis of number of patents or new products (e.g. Subramanian and Nilakanta 1996; Erdil et al 2004), some other studies have adopted a uni-dimensional approach to innovation focusing on few characteristics of innovation such as the development of products or competitiveness (e.g. Hurley and Hult 1998; Bouncken and Koch 2007). The more extensive studies either consider employee's innovation orientation (e.g. Tang 1999) or focus on innovation as newness to the market rather than organisation (e.g. Wang and Ahmed 2004).

Therefore, a multi-dimensional scale of innovation orientation that considers various aspects of innovation from its specific operations to strategies could be a suitable platform, applicable to various contexts for future studies. One of the main reasons for the lack of consistency within the past literature is a lack of suitable measure of innovation (Salavou 2004), accordingly, this study could be adopted as a point of departure for future studies as it adopts a holistic approach.

Identifying the drivers of innovation orientation, INNOV draws attention to the importance of organisational engagement with all types and degrees of innovation, value of employees, markets, organisational culture and strategies, this confirms some of the past literature (e.g. Hurley and Hult 1998; Tang 1999; Wang and Ahmed 2004; Siguaw et al 2006; Bouncken and Koch 2007). With the inclusion of all types of innovation within the scale, this study agrees with Damanpour (2010) on an integrative view of innovation proposing that innovation types are complimentary, hence should not be considered in separation from one another.

This scale is consistent with the following studies and agrees with:

- Humphreys et al's (2005) on the importance of culture, technology and leadership for development of an innovation capability.
- Ma and Mcsweeney's (2008) on the role of information, cross functionality, culture, leadership and employees for managing innovation strategically.
- Singh et al's (2008) identification of the role of leadership, culture, alliances, technology management for organisational strategic development.
- Laforet and Tann (2006) in suggesting that culture, process, leadership and strategic orientation as the main contributors to the SMEs innovativeness.
- Wang and Ahmed's (2004) study on the importance of development of organisational products, processes, markets and strategy.
- McAdam et al's (2008) in recognising the role of "leadership, people and culture, total quality/continuous improvement, product and process and knowledge and information and the overriding influence of the market and customers" (p. 12) as determinants of innovativeness in SMEs.

The combination of the innovation type dimensions of this scale (PROD, PROC and POPA) confirms Siguaw et al (2006), proposing that innovation orientated firms are more likely to be engaged in the development and adoption of all types of innovation and all degrees of innovation (radical and incremental). Accordingly, to develop and adopt more of these innovations, innovation orientated organisations should dedicate resources to all innovation types. These findings agree with Prange and Schlegelmich (2010) in identifying the importance of a balance in adopting various types of innovation.

Most importantly, this study challenges all those studies that suggest one or two types of innovation are more important or dominant than other types of innovation within organisations (e.g. Hoffman et al 1998; Oke 2007). This study has identified position and paradigm innovation as one of the components of innovation orientation. While it might be assumed that SMEs are not devoted to these types of innovation due to their lack of resources, it could also be argued that SMEs' flexibility (Madrid-Guijarro et al 2009) enables them to change their organisational paradigm and position.

The fact that these two types of innovation come together as a factor reflects on the close tie between paradigm and position innovation and that they might not be distinguishable from one another in SMEs. It can be argued that paradigm innovations mainly take place due to the changes to the external environment (markets) resulting in strategic changes to organisational operations and directions. These findings counter Wang and Ahmed's (2004) suggestion of an intertwined relationship between market and product innovativeness and argues such a relationship is more significant between position and paradigm innovations. Additionally, as the main focus of past literature is on product and process innovations, this study highlights the need for further research on less studied types of innovation (position and paradigm).

In addition, packaging innovation together with technological change play an important role within innovation type components of this scale; where packaging innovations sits together with product innovation within the scale, confirming the importance of packaging within the food sector (Earle 1997) and Olsson and Larsson (2009) in coupling product and packaging innovation. The importance of organisational engagement with new technologies has also been emphasised within the process innovation component, highlighting the importance of R&D and technological change for innovation orientation (Grupp 1998; Han et al 2001; Humphreys et al 2005).

As for organisational focus on radical and incremental innovations and also the importance of resource allocation to innovation, this study confirms past literature on the importance of both degrees of change for an innovation orientation and allocation of resources to all types of innovation (Henard and Szymanski 2001; Siguaw et al 2006). Although it has been argued that the food sector is a low-tech sector (Christensen et al 1996; Ortega-Argilés and Brandsma 2010) where not many radical innovations are developed yet attention to radical innovations for all types of innovation in important for organisational innovation orientation on the basis of this scale.

Regarding an innovation orientation strategy, the importance of such strategic orientation has been emphasized (Tidd et al 2001; Salavou et al 2004; Siguaw et al 2006, Bouncken and Koch 2007) and confirmed in this study. For example, the importance of organisational culture (STRA) for innovation orientation has been highlighted (Dundon

2002; Hurley and Hult 2004; Humphreys 2005). Furthermore, Simpson et al (2006) observe, "Study respondents indicate that competitive advantage likely arises from an innovation orientation strategy" (p. 1137). However, they raise questions on possible negative effects of an innovation orientation and call for further research in this area.

It should be noted that in terms of proceeding with innovation at a faster rate than competitors (item nine in the questionnaire) this study counters Siguaw et al (2006) and Bouncken and Koch's (2007) work as this item does not have a significant correlation with innovation orientation, this might be due to the specific context of this study and this item might be important within large organisations or other sectors. This finding confirms Langerak and Hultink (2006) questioning the role of speed of innovation for profitability, in their study they found a U-shaped relationship between speed and profitability.

This study confirms the previous literature (Hurley and Hult 1998; Hosseini et al 2003) regarding the importance of employees in an innovation-orientated organisation as being a type of organisational asset and source of ideas generation. Not only do they need to be encouraged to generate new ideas and innovate, they also need to be supported (Tang 1999; Siguaw et al 2006); all employees regardless of their role, position and department need to be regarded as sources of innovation.

To conclude, this study has developed an innovation orientation scale, INNOV. This scale comprises of five dimensions, reflecting the importance of organisational engagement with all types of innovation (product, process, position and paradigm), attention to employees and organisational strategies. Researchers and organisations could use this scale to gain an insight to organisational innovation orientation.

6.5 Innovation Process and Innovation Orientation

Although past literature has identified that a high quality product innovation process contributes to organisational performance (Cooper and Kleinschmidt 1995), the extent of this contribution to innovation orientation has not yet been investigated. On this basis, this study aims to understand the significance of the stages of product innovation for organisational innovation orientation. In doing so, this study investigates the specific relationship between the four main stages of product innovation (initiation, design, implementation and launch, and post launch activities) and innovation orientation. The results showed that the initiation and design stages have a significant relationship with innovation orientation within food sector SMEs. This confirms Chai and Xin's (2006) findings, in which there is a positive relationship between NPD tools and innovation orientation.

The fact that amongst the four stages of product innovation, the two initial stages of product innovation are positively related to innovation orientation, implies that all the activities undertaken from scanning the market and idea generation to the actual production are more important for an innovation orientation than commercialising, launch, monitoring and control. Im et al's (2003) study confirms these findings noting that initial stages of new product development are crucial to the overall success of the product as they are the drivers of the other phases of product innovation. Additionally, it is recognised that the success or failure of new products can be determined in the initiation stage of NPD as this stage involves strategic decision-making (Normann 1971). Hence, more emphasis should be placed on these activities. However, this requires further research and exploration.

Although previously the role of new product process for an innovation orientation has not been investigated, many authors have focused on the relationship between new product process, success and performance. It has been noted that marketing activities such as market assessment and product launch are important for success (Cooper and Kleinschmidt 1986; Mishra 1996; Langerak et al 2004; O'Dwyer and Ledwith 2009). This study confirms the significant role of market assessment (undertaken within the first two stages) for innovation orientation, however product launch and commercialization do not seem to be significant.

This study is consistent with past literature on the importance of the initiation stage, as many scholars have confirmed the importance of the initiation activities for new product success and performance (Khurana and Rosenthal 1998; Henard and Szymanski 2001; Zhang and Doll 2001; Kim and Wilemon 2002; Im et al 2003). It has been empirically proven that an initial market and technical analysis together with planning has a positive association with product innovation success (Verworn et al 2008). Additionally, Koen et al's (2001) study has identified that innovative companies were more proficient in front end activities (initiation). Another study by Cooper (1996) suggests that initiation stage activities are crucial for a quality new product development process, which in turn affects the performance.

With regards to the significance of the design stage for an innovation orientation, the findings of this study confirm Millson and Wilemon (2009) on the important role of organisational technical expertise in new product development success. However, this study identifies a paucity of research on management of the design activities of NPD. Subsequently, the finding of this study questions the previous literature in neglecting the design stage of NPD within the innovation management literature and calls for more emphasis on this stage.

To conclude, this study has identified the significance of stages of product innovation for an innovation orientation. This has demonstrated that the initiation and design stages of innovation contribute to organisational innovation orientation significantly. This in turn highlights the importance of these stages for researchers, practitioners, policy makers and organisations and suggests that more emphasis should be placed on these two stages.

6.6 Role of Organizational Characteristics on Innovation

One of the objectives of this study has been to explore the significance of organisational characteristics for an innovation orientation. To do so, the specific relationship between organisational size, product category, age and number of customer channels on innovation orientation traits has been examined. Innovation orientation traits are referred to as the parameters within the developed innovation orientation scale, INNOV. This is valuable as this study thoroughly analyses whether SME engagement with various innovation orientation traits differs on the basis of their size, age or products.

The body of literature on the role of antecedents of innovation is highly fragmented and contradictory, the bulk of past research mainly focuses on few aspects of innovation in isolation (e.g. Wakasugi and Koyata 1997; Huergo and Jaumandreu 2004; De Mel et al 2009). Hence, in this study the role of organisational characteristics on innovation is explored considering all dimensions of innovation orientation. Additionally, although some scholars have highlighted the need for a context specific understanding of the role of organisational characteristics (Laforet and Tann 2006), the food sector has been neglected in such a context.

Due to the sample limitations the size aspect of organisations falls into two categories as micro and small/medium. Product category has three types as convenience, beverage and fresh food. The age aspect of organisations has three categories as less than 5, 6 to 20 and 21+. Finally, the number of customer channels comprises two groups: 1 to 3 and 4 to 6. Below the findings for each category has been discussed separately.

6.6.1 Size

The findings of this study exhibits that size matters as SMEs of different size groups perform differently from one another on the basis of their innovation orientation activities confirming Voss et al (1998) and countering Ghobadian and O'Regan (2000b). Additionally, this study suggests that size is the most influential organisational characteristic in terms of innovation compared to organisational age, product category and number of customer channels within the food sector. A significant difference was identified between small and medium sized organisations' engagement with innovation traits as opposed to micro organisations.

The larger the size of the organisation the more engaged organisations seemed to be with innovations with regards to their engagement with radical paradigm innovation, resource allocation to process, position and paradigm innovation, and development and deployment of new technologies. This suggests that organisational size affects resource allocation more significantly than other aspects of innovation orientation. Additionally, size has no influence on organisational strategies and employee orientation (EMPL and STRA).

Although this study has adopted the European size categorization of companies, comparing the findings of this study with the past literature is somewhat problematic due to the adoption of different size classifications in various studies (Gobadian and Gallear 1997). However, this section will explain and compare several of these studies by comparing the smaller size organisations with larger ones.

The results of this study indicate that small and medium sized companies dedicate more resources to position, paradigm and process innovation as opposed to micro companies. This is consistent with McAdam et al's (2004a) study suggesting smaller firms face problems to a greater extent in term of resources in comparison with larger organisations. Additionally, these findings are in line with Avermaete et al (2003a) noting that micro organisations dedicate fewer resources to R&D activities as opposed to small organisations.

In terms of application of new technologies this study suggests that small and medium sized companies are more engaged with development and deployment of new technologies in the case of food SMEs countering McAdam et al's (2004b) industry wide study indicating that smaller companies tend to have a higher level of technology.

This study indicates that there are no significant differences between small/medium sized and micro organisations in their analysis of their strategies and their organisational culture. These findings counter Lopez-Gracia and Aybar-Arias (2000) and agree with Ghobadian and O'Regan (2000b).

This study suggests that micro and small/medium sized organisations do not differ significantly in terms of their engagement with various types and degrees of innovation with the exception of radical paradigm innovation. This contributes to the past literature by considering position and paradigm innovation and also agrees with Avermaete et al (2003a) and Damanpour (2010) by identifying that size does not influence adoption of product and process innovations. Additionally, these findings counter De Mel et al (2009) noting that micro organisations are less engaged with product and process innovations. However, as size impacts organisational resource allocation to various types of innovation, it could be argued that there is an indirect relationship between size and types of innovation that is not significant.

To conclude, this study agrees with Voss et al (1998), McAdam et al (2004b), Brown and Kaewkitipong (2009) and De Mel et al (2009) that among SMEs various size categories adopt different patterns of innovation and this contradicts Wakasugi, R. and Koyata, F. (1997), Ghobadian and O'Regan (2000b) and Laforet and Tann (2006). Additionally, this study emphasizes McAdam et al's (2004b) concern on the appropriateness of treating SMEs as a group on the basis of its behavioural differences in engaging with innovations within different SME size categories. On the basis of the above, this study suggests when studying organisational innovation, specifically in terms of resource allocations, paradigm innovation or development of technologies, organisational size should be considered.

6.6.2 Product Category

Focusing on the organisational product category (convenience food, fresh food and beverage) and its role on innovation orientation, this study suggests that product category affects the innovation patterns in relation to the allocation of resources to packaging innovation and radical position innovation. Convenience and beverage food companies are engaged with resource allocation to packaging innovation and radical position innovation to a higher extent as opposed to fresh food products.

A less significant amount of resources dedicated to packaging innovation in terms of fresh food products could be justified by the nature of this subsector, where packaging is simpler and is limited to wrapping the product (e.g. bread or meat). While, in the case of beverages and convenience food, the industry is facing a lot of innovations with many health and environmental factors to considers. Additionally, these products could be offered in an array of different types and models of bottles, packs and plastic containers (Paine and Paine 1992). Subsequently, fresh food producers at times are not able to take advantage of information technologies due to the specific nature of their products, an example of this is the usage of bar code systems (Salin 1992; Eastwood 1994) specifically in the case of agricultural food supply chain.

Accordingly, this study suggests that fresh food, convenience and beverage producers do not significantly vary in their engagement with various types and degrees of innovation and in their innovation orientation behaviour. These findings contradict Avermaete et al (2003a) and Hsiao et al (2011), noting that sub categories of the food sector perform differently in their engagement with outsourcing and development of product innovations. Furthermore, as these findings imply that product category does not impact innovation processes highly among the food sector SMEs, it could be concluded that product category should not be a differentiating factor studying innovation among the food sector.

6.6.3 Age

Exploring the relationship between organisational characteristics on innovation, this study tested the pattern of organisational engagement with innovation orientation traits on the basis of organisational age in 3 categories, less than 5, 5 to 20 or 21+ from the date of establishment. This has resulted in the identification of an insignificant relationship in the case of food SMEs with an exception for engagement with incremental position innovation.

Reporting an insignificant relationship between organisational age and innovation orientation traits counters Huergo and Jaumandre (2004) identifying that younger firms (new entrants) reach a higher productivity growth and innovative probability within the manufacturing SMEs. This also counters Salavou et al (2004) and Lee and Ging (2007) by suggesting that younger firms are more innovative within Greek food, beverage and textile SMEs and Malaysian manufacturing sector.

Although Sorensen and Stuart (2000) suggest a positive relationship between firm's age and number of generated innovations, this study does not find any significant relationships between organisational age and engagement with incremental and radical product and process innovation, this confirms Cefis and Marsili (2005) and Avermaete et al (2003a). Additionally, these results confirms Cefis et al (2007) finding that organisational age is not related to innovation input (resources).

The only exception with the organisation age and innovation relationship arises from position, the case of incremental position innovation. Young organisations' higher rates of engagement with incremental position innovations agree with Balasubramanian and Lee (2008) suggesting that young firms are better in incremental innovations. In terms of technology these findings does not find any difference between various organisational age ranges, contradicting Balasubramanian and Lee (2008) finding a negative relationship between firm age and technology.

Finally, it can been concluded that although a number of contradictory results have been noted on the impact of age on the organisational processes where organisational age is positively associated with survival (which is also highly dependent of innovation) (Cefis and Marsili 2005) and negatively associated with performance (Hoxha 2009; Rosenbusch et al 2010) nevertheless, focusing solely on innovation orientation, findings of this study agree with Brouwer et al (2005), Reino and Vadi (2010) and Laforet and Tann (2006). These studies suggest that age does not influence organisations innovativeness, productivity and value. Accordingly, the findings of this study imply that categorization of organisations on the basis of age is not necessary within innovation research among food SMEs.

The role of organisational engagement with various types of customer channels has not been discussed here, as the researcher was unable to find any relevant literature with this regard. Nevertheless this study suggests that food sector SMEs engagement with different types of customer channels is not associated with their innovation orientation activities.

6.6.4 Summary of Organizational Characteristics

Aiming to understand the role of antecedents of innovation on innovation orientation, this study identifies that among a set of organisational characteristics (age, size, product category and customer channel) among food SMEs, organisational size has a significant relationship with innovation activities, specifically in terms of allocation of resources to types of innovation (POPA and PROC). This implies that further research on SMEs should be on the basis of the organisational size categories, accordingly governmental policies for SMEs, should be customised to be suitable for each size categories specific needs.

This study identifies a significant size and innovation relationship in case of certain activities. However considering the interrelationship between types of innovation (as illustrated in section 6.3) where adoption of one type of innovation leads to adoption of another type of innovation, it can be assumed that size affects other innovation orientation activities indirectly. Hence, by means of generalizing, this study suggests that size affects innovation.

Finally, organisational characteristics do not seem to impact innovation orientation traits in terms of culture and strategies, the main affect is on types of innovation (product, process, position and paradigm); this could be due to the lack of skills and resources within SMEs. Furthermore, this study identifies that organisational age, product category and number of customer channels do not influence innovation orientation activities to a great extent.

6.7 Summary and Conclusion

This chapter compared and analysed the findings of this study in the past literature, this resulted in the identification of areas for further research and implications for practitioners and policy makers, which has been discussed in the next chapter.

An innovation orientation scale was developed in this study and it was demonstrated that the dimensions of innovation orientation scale, INNOV, are in line with the past literature. Furthermore, the extent of organisational engagement with innovation types was tested within the food sector and it was noted that all four types of innovation (position, paradigm, product and process) are being adopted although the important concepts of position and paradigm innovation have been neglected within the past literature. It was illustrated that product and packaging innovation should be treated as one within the food sector. Additionally, this study reflected a positive association between innovation types.

Both an interrelationship between types of innovation, and the importance of all types of innovation within an innovation orientation are evidence of applicability of an integrative view of innovation within food sector SMEs. Hence, this study agrees with Damanpour (2010) on suitability of an integrative view of innovation. In relation to food SMEs, exploring the role of antecedents of innovation on an innovation orientation, this study suggests that among organisational size, age, product category, and number of customer channels, organisational size is the factor that has most influence on innovation orientation. With this view, this study agrees with McAdam et al (2004b), calling for more research on the basis of SME size categories. As for the innovation process, this study highlights the significance of the initiation and design stages of innovation for innovation orientation and calls for more emphasis on these two stages of innovation.

The next chapter will discuss the specific implications of these findings and proposes areas for further research. Additionally the specific contributions of this study to the literature will be discussed in more detail.

Chapter Seven - Conclusions

To conclude this thesis, the contributions to the literature are presented here followed by recommendations for researchers, practitioners and policy makers; finally, the areas for further research are highlighted. Prior to bringing this study to a close, below some reflective notes on this study are provided.

This PhD has provided the researcher with the chance to work closely with practitioners (BIC Innovation, sponsors of this study). As mentioned in the methodology chapter, BIC Innovation supported this study in way of piloting the questionnaire and data collection. Although this ensured that this study is realistic and suitable for the context of food SMEs, however, working closely with practitioners posed some challenges due conflicts of interest. The differences between academics' and business world's perspectives means that they have different views on the notion of value. While value for the business world is equated to profit, within the academia value is equated to contribution to literature. Hence, the researcher found it challenging at times to create a balance between the two different stakeholders of this thesis, however, this provided the researcher with a good platform to conduct a study applicable to both research and practice. In addition to this, the more and the longer the researcher got involved with this study, the more the complex notion of innovation overwhelmed her. It appeared that there is no end to this journey and as a matter of fact this has just been the warm up.

7.1 Contributions

Proposition of a multidisciplinary definition of innovation

One of the objectives of this study was to offer a multidisciplinary definition of innovation for a multidisciplinary concept, proposing a general definition of innovation. Content analysis of 60 definitions of innovation has resulted in proposition of the a multidisciplinary definition, in which innovation is:

> "The multistage process whereby organisations transform ideas into new / improved products / services or processes, in order to advance, compete and differentiate themselves successfully in their marketplace" (Baregheh et al 2009, p. 1334).

A consensus on the definition of innovation offers a way forward for the identification of innovation within organisations. The typology of innovation, implicit in the diagrammatic definition (Figure 2.1) offers a means of classifying innovations. For example, there is an opportunity to classify definitions on the basis of whether they bring forward something new, or improve an existing aspect of the organisation (nature). Similarly, innovations may be classified as product, service, process or technical (type), and the resources or means used to drive and support innovation can be identified in respect of the balance of technology, ideas, inventions, creativity, and market (means). The value of this definition is in providing scholars with a definition applicable to all contexts, as one of the difficulties within the concept of innovation is the lack of a comprehensive definition (Weiss and Legrand 2011).

Development of an innovation types model

In addition to a multidisciplinary definition of innovation, this study has also developed an innovation type-mapping tool on the basis of previous models and type definitions of innovation. This tool makes a contribution to understanding of 'types of innovation' by offering some insights into the terms and terminology associated with types of innovation. Hence, a clear relationship between several of different types of innovation has been identified and an adaptive reference model (Figure 3.4) based on Francis and Bessant's (2005) has been created to provide an interpretation tool to review previous studies and offer guidance to future studies.

Profile innovation among food sector SMEs

Aiming to profile innovation in food sector SMEs within the UK, this study sheds light on the level of firms' engagement with various innovation activities, processes and types, which is on the basis of the responses of managers of food SMEs. Thus, this research has identified patterns of innovation within food sector SMEs. This profile of innovation could be used as the basis for benchmarking specific food SMEs to the wider food sector. The findings of this study reflect a positive engagement of food SMEs with innovative activities and innovation types.

The importance of these findings is due to a lack of a holistic research within the food sector SMEs, where the bulk of past literature solely focuses on product and process innovations as important concepts of position and paradigm innovations have been ignored (Rowley et al 2010). Additionally, no insights on various dimensions of innovation are available. Accordingly, by drawing a big picture of innovation within this context on the basis of innovation processes and activities this study makes a unique contribution to the literature.

Identification of types of innovation adopted by food SMEs

This study suggests that food SMEs engage in all four types of innovation (product, process, position, paradigm), also Employee orientation of SMEs was confirmed (Ghobadian and Gallear 1997). This study also identifies that the food SMEs in the sample lack a positive involvement with CRM, radical paradigm innovation and networking (merger/acquisition, partnering and outsourcing). In comparison with other studies, where the main focus tends to be on incremental, radical, product and/or process innovation, this study encompasses all of incremental, radical, product, packaging, process, position and paradigm innovation. Additionally, this research also considers engagement with a range of other innovation related activities.

Exploration of the stage activities of the NPD applicable to food SMEs

This study suggest that SMEs take a structured and organised approach to innovation; they engage in strategic planning, use standardized new product development processes and gather information about customers, consumers and competitors. However, their engagement with the allocation of significant resources to innovation lags behind their engagement with types of innovation and innovation activities, which might account for their lower level of engagement with radical paradigm innovation, the development and deployment of new technologies.

Furthermore, there is a relatively low level of engagement in partnering or strategic alliances. Within a new product development process, this study suggests that food sector SMEs lack a positive involvement with internal competence analysis and outlining business case; preparation of a project definition, usage of external expertise and detailed market research together with partnering. Nevertheless, SMEs reflected a positive level of engagement with the different stages of innovation.

Investigation of the extent and nature of integration between different types of innovation in SMEs

Although a number of past studies have investigated the relationship between different types of innovation, the focus of these studies has mainly been on binary models of types of innovation (product and process or administrative and technical) (Damanpour and Gopalakrishnan 1999) and the concepts of position and paradigm innovation has been neglected. Additionally, the relationship between different types of innovation within food sector SMEs has not been studied previously.

An identification of a positive relationship between different types of innovation results in acceptance of an integrative view of innovation (Damanpour 2010). An integrative view of innovation entails that with a positive association among different innovation types, further research and practice, rather than differentiating these innovation types, should adopt a complementary view, considering all types of innovations. By identifying a significant relationship between all types of innovation (product, process, position and paradigm), this study agrees with the integrative view. This reflects the importance of paradigm and position innovation, as both of these types of innovation are positively associated with one another and process innovation. Additionally, position innovation has a significant association with product innovation.

Proposition and testing of an innovation orientation scale model

This study presents a multi-dimensional innovation orientation scale. This is a significant contribution in the light of paucity of research on the development of comprehensive or empirically tested innovation orientation frameworks or scales. In particular, this scale explicitly embraces different types of innovation, and goes beyond the usual process-product dichotomy to embrace position and paradigm innovation.

The scale presented in this study, INNOV, is informed by previous literature on innovation and innovation orientation; and takes as its point of departure the theoretical framework suggested by Siguaw et al (2006). This study confirms and enhances Siguaw et al's (2006) propositions and proposes an innovation orientation scale compromising of the following factors: process innovation (PROC), innovation strategy (STRA), product innovation (PROD), employee orientation (EMPL), position innovation and paradigm innovation (POPA).

Furthermore, the study also confirms earlier research (e.g. Hurley and Hult 1998; Tang 1999; Wang and Ahmed, 2004; Siguaw et al 2006; Bouncken and Koch 2007) regarding the importance of innovation types, innovation culture and innovation strategy. In relation to the food sector context, the scale emphasises the need to consider packaging innovation alongside product innovation, confirming Earle's (1997) and Olsson and Larsson (2009).

Identification of the importance of stages of NPD on innovation orientation

Although it has been noted that the adoption of a new product development process is vital for success and performance (Cooper and Klienschmidt 2007), the extent of the role of a new product process for an innovation orientation has not been explored. Accordingly, this study has investigated the specific relationship between the four stages of product innovation (initiation, design, implementation and launch and post launch activities) to understand whether any of these stages play a significant role.

This study identified that initiation and design stages of NPD contribute significantly to innovation orientation. This confirms the past literature with regards to the importance of the initiation stages of product innovation (e.g. Koen et al's 2001; Zhang and Doll 2001; Kim and Wilemon 2002; Im et al 2003;Verworn et al 2008). However, as the bulk of the literature on the different stages of innovation focuses on initiation activities, these findings call for more attention to the management of the design stage of product innovation. Nevertheless, the findings of this study imply that within a new product development process, more emphasis should be placed on initiation and product design activities.

Exploration of the relationship between organisational characteristics and innovation orientation traits

For many years scholars have investigated the specific role of organisational characteristics on organisational performance, success and innovations (McAdam et al 2004b; Damanpour 2010). These have resulted in contradictory results. Additionally the bulk of these studies have focused on organisational size and product/ process innovations, leading to a paucity of research with regards to other organisational characteristics (e.g. age and product category) and innovation activities.

Additionally, scholars have called for context specific research on innovation, as different sectors perform differently, therefore findings of one sector is not applicable to another (Laforet and Tann 2006). On this basis this study has investigated the role of organisational size, product category, age and number of customer channels on innovation orientation traits in detail. The contribution of this study is providing a holistic overview of the effects of organisational characteristics on organisational innovation orientation within food SMEs.

This study has identified a positive relationship between organisational size and innovation orientation, where the bigger the employee size, the more engaged the organisation is with innovation specifically in terms of their resource allocation. These findings confirm Avermaete et al (2003a), McAdam et al (2004b), Brown and Kaewkitipong (2009) and De Mel et al (2009).

Furthermore, no significant relationship between organisational age and organisational engagement with innovation orientation activities was identified within food SMEs with an exception for incremental position innovation. The lack of a relationship between organisational age and innovation confirms Avermaete et al (2003a), Cefis and Marsili (2005), Laforet and Tann (2006), and Reino and Vadi (2010). In relation to product category (convenience food, fresh food and beverage), this study identified that innovation activities are not associated with organisational product categories significantly, with an exception for allocation of resources to packaging innovation and radical position innovation. In this regard, these findings contradict the research conducted by Hsiao et al (2011) and Avermaete et al (2003a) within the food sector. Finally, this study has also found a non-significant relationship between innovation orientation and number of customer channels.

The lack of a relationship between organisational age, product categories and number of customer channels, implies that innovation theories within the food sector SMEs could be generalised regardless of any differences within these organisational characteristics.

This also suggests that it may be the organisational attitude towards innovation that dominates its innovation orientation rather than its characteristics. However, in terms of organisational size (where a positive association was identified with innovation orientation), this study suggests that size affects the extent of organisational resources, hence, the significant association with innovation orientation.

7.2 Recommendations

This section provides recommendations, based on the possible application of the findings of this study, for researchers, practitioners and policy makers.

Definition of Innovation and the Innovation Type-Mapping Tool

Researchers and practitioners in various disciplines can use the definition of innovation mutually as a point of departure to avoid any confusion. Additionally, the innovation-type mapping tool could be used as a guide of innovation types. The use of this tool for this purpose would have a number of benefits:

- It would help researchers and practitioners to interpret the existing knowledge base on innovation.
- It is a basis for greater clarity in the use of terms in order to describe different types of innovation and could therefore enhance consistency in the application of terms used to refer to innovation type in both research and practice in the future.
- Whilst focusing on different types of innovation, the tool also highlights and makes more explicit the relationships between the different types of innovation.

This type of analysis would be useful for businesses in strategy and planning, and would offer a useful framework for comparing different innovation processes in different organisations, towards knowledge-building.

Profile of Innovation in the Food Sector

From the profile of the sampled food sector SMEs within the UK, there is evidence of a vibrant sector in terms of its engagement with innovation; where investment can act as a constraint. Therefore, the results of this study could be adopted as follows:

- Policy makers interested in economic development might consider strategies that can assist food sector SMEs in accessing and managing resources for innovation.
- Policy makers and practitioners could explore the potential to encourage and support food sector SMEs to engage in more collaborative innovation.

- Practitioners and regional development agencies could offer advice and support on innovation processes and activities with a particular focus on supporting food sector SMEs to evaluate technological developments towards enhancing their business performance.
- Researchers could use this profile to gain a detailed understanding of innovation within food sector SMEs.
- To ensure that individual organisations do not lag behind the sector, managers could benchmark engagement with the various dimensions of innovation within their organisation to engagement levels within the sector. This opens up opportunities for improvement. For example the sector reflects on a positive level of engagement with collection and use of market information; accordingly, individual organisations should ensure that their organisation also gathers and takes advantage of market information.
- Managers of food sector SMEs could compare the stages in their NPD process to the stages adopted in the sector, and thereby identify gaps for improvement.
- Managers of food sector SMEs could consider collaborations (partnering, merger, acquisitions) where they face shortfalls within their organisations.

Innovation Type Relationship

Finding a positive association within various types of innovation means innovation types should not be considered in isolation from one another as the antecedent of one type of innovation lies in another type of innovation. These findings encourage and emphasise a balanced organisational engagement with all types of innovation. This implies that practitioners and policy makers should change their strategies from a purely product or process focus to an integrative approach, taking advantage of the interrelationship between different types of innovation. This implies that organisations should adopt a mix of strategies in their innovations considering (and investing in) all types of innovation rather than solely product and process innovations. Hence, policy makers should focus on encouraging food sector SMEs to engage in various types of innovation. To do so, policy makers could support workshops and training programmes to inform food SMEs of ways to adopt such an integrative approach to their innovation strategy; these could use presentations of best practice. Practitioners and advisors should also raise awareness towards the benefits of integrative adoption of innovations. Researchers could investigate and devise appropriate strategies for food SMEs transition to integrative development and adoption of innovations. Additionally, managers of food sector SMEs should encourage and facilitate the development of various types of innovation. They should change their organisational strategies from a product focus to a focus on overall innovation and seek to invest in all four types of innovation (product, process, position and paradigm).

Innovation Orientation

The innovation orientation scale developed in this study can be used by managers in food sector SMEs as a diagnostic tool to profile the level of innovation orientation of their organisation. If profiling were to be conducted across a range of food sector SMEs, comparison and benchmarking would be possible; this could assist organisations to improve on the basis of sector standards. In addition to generating an overview of innovation orientation, the application of the scale would offer insight into an organisation's perceived commitment to aspects of innovation, such as innovation strategy, or specific types of innovation.

More specifically, the items in the scale suggest that high innovation orientation scores may be achieved through:

- Engagement with all types of innovation, including process, product and packaging, and position and paradigm.
- Engagement with both incremental and radical innovation.
- Allocation of resources to all types of innovation.
- Adoption of a strategic approach to innovation that is strongly informed by proactive gathering of information about consumers, trade customers, competitors and markets. Firms should continuously gather and use information from their markets, competitors and customers.
- Developing an organisational culture that welcomes ideas and supports innovative employees.

Accordingly, mangers of food sector SMEs should attend to the various dimensions of innovation orientation as discussed above.

This scale can assist policy makers, regional development offices and local authorities in initiating programmes to develop innovation practices and competences amongst food sector SMEs. As such, organisations should be encouraged to improve the various dimensions of innovation orientation, as specified on INNOV, to gain an overall propensity towards innovation. This scale could also assist policy makers to benchmark, compare and assess innovation orientation among various groups of organisations, e.g. on the basis of regions to gain an insight to regional innovation characteristics and identify areas for improvement. In addition, with the lack of a holistic innovation orientation scale within the literature, researchers could use this scale to measure innovation orientation or benchmark their sample on the basis of the drivers of innovation orientation.

Innovation Process and Innovation Orientation Relationship

A positive association between innovation orientation, and initiation and design stages of innovation among food SMEs could prompt researchers, practitioners and policy makers to place more emphasis on these stages. Practitioners and policy makers should raise organisational awareness of the key role of these two stages for an innovation orientation, encouraging and training organisations to dedicate more attention and resources to these stages moving towards an innovation orientation. Managers of food sector SMEs, in turn, should place more emphasis on initiation and design of their new products. Additionally, further research could explore the basis for the significance of the initiation and the design stages of NPD as opposed to implementation and commercialisation, and post launch stages.

Role of Organisational Characteristics on Innovation

Identifying a significant relationship between organisational size and innovation orientation suggests that SME size categories should be differentiated within research on innovation orientation. Additionally, policy makers should place emphasis on supporting SMEs on the basis of their shortfalls due to their size (number of employees). As an example, policy makers, regional development officers and local authorities should assist micro firms in terms of their resources and managing them in an efficient manner considering all types of innovation. Managers of Micro organisations should embrace their differences with larger organisations on the basis of their characteristics (e.g. size);

they should be aware of these differences as it is through such awareness that they can push their organisations forward and compete successfully with larger organisations. By acknowledging the advantages and disadvantages of their specific organisational characteristics, they can take advantage of their strengths and weaknesses. For example, by acknowledging that micro organisations lag behind small and medium sized organisations in terms of their resources, managers should consider networking, mergers, acquisitions and outsourcing.

In relation to organisational age, the results of this study indicate that policy makers, regional development offices and local authorities should guide older organisations in improving their marketing strategies. Meanwhile, fresh food producers should be assisted with their radical position innovation and organisations with few customer channels should be assisted with their radical paradigm innovation.

7.3 Further research

Innovation Types

By identifying the important role of position and paradigm innovation, both within an innovation orientation and in the innovation type relationship model, this study highlights the need to extend the study of different types of innovation beyond the dominant focus of product and process innovation, to embrace less studied types of innovation, such as position and paradigm which poses a challenge/opportunity for scholars to further study and explore these innovation types. Additionally, the role of all four types of innovation within the innovation orientation and innovation type relationship model confirms the necessity of an integrative view of innovation, implying that future studies should consider all types of innovation. Further research within this field could test the innovation type-relationship findings of this study among different contexts (e.g. industry sectors) and investigate the basis of these interrelationships qualitatively and longitudinally.

Innovation Orientation

The innovation orientation scale differs to a considerable extent from the often rather limited previous approaches to the measurement of innovation orientation; there is considerable scope for more research in this area.

1. As this scale has been tested in a specific context, further research could usefully focus on testing this scale in other contexts, both in other sectors and in larger organisations in the food sector. It is envisaged that some adaptations may emerge to accommodate these different contexts, leading, in due course, to a battery of multi-dimensional organisational innovation orientation scales.
2. There is also scope for further investigation of innovation orientation of SMEs in the food sector. Qualitative data collection methods could be used in order to gain insights into the relationship between different types of innovation; to identify and understand the innovation processes adopted by those firms with a high level of innovation orientation.
3. The close relationship between product and packaging innovation should be examined in other sectors to test the generalizability of coupling of product and packaging innovations.

Innovation Process

The lack of research on the important role of the design stage of innovation coupled with its role in an innovation orientation opens up scope for further research on the elements of product design and its management applicable to the food sector. Additionally, the specific role of the various stages of innovation for an innovation orientation should be examined in other contexts, e.g. large organisations, and other sectors.

Organisational Characteristics

Further research should be conducted on the role of organisational characteristics (size, age and product category) within other contexts. Furthermore future research within food SMEs could further differentiate SME size categories to micro, small and medium, investigating the role of organisational size among small and medium size organisations. Also, innovation should distinguish SME size categories due the differences of engagement with innovation categories between micro and small/medium sized organisations.

7.4 Summary

This chapter has presented the contributions and limitations of this study, together with suggestions on areas for further research. It was reflected that one of the main contributions of this study to literature is the inclusion of paradigm and position innovation within the concept of innovation where relevant as the main body of literature is on the basis of product and process innovation (e.g. Karlsson and Olsson1998; Freel 2000; Avermaete et al 2004; Mosey 2005; Wolff and Pett 2006; Capitanio et al 2010). Another contribution is in adding to the limited literature on innovation within food SMEs and development of an innovation orientation scale. In summary, this study has provided scholars with a detailed and customized demonstration of innovation in SMEs, which will also assist practitioners in formulating effective innovation strategies.

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Appendices

Appendix 1.1- Towards a Multidisciplinary Definition of Innovation

Abstract

Purpose – This paper aims to undertake a content analysis of extant definitions of "innovation" as a basis for proposing an integrative definition of organizational "innovation".

Design/methodology/approach – A literature review was used to generate a representative pool of definitions of organizational innovation, including definitions from the different disciplinary literatures of economics, innovation and entrepreneurship, business and management, and technology, science and engineering. A content analysis of these definitions was conducted in order to surface the key attributes mentioned in the definitions, and to profile the descriptors used in relation to each attribute.

Findings – The key attributes in the paper present in definitions were identified as: nature of innovation; type of innovation; stages of innovation, social context; means of innovation; and aim of innovation. These attributes are defined, descriptors assigned to them, and both a diagrammatic definition and a textual definition of organizational innovation are proposed.

Originality/value – As a concept that is owned and discussed by many business disciplines, "innovation" has many different definitions that align with the dominant paradigm of the respective disciplines. Building on these diverse definitions, this paper proposes a general and integrative definition of organizational "innovation" that encompasses the different perspectives on, and aspects of, innovation, and captures its essence.

Citation: Anahita Baregheh, Jennifer Rowley, Sally Sambrook, (2009) "Towards a multidisciplinary definition of innovation", Management Decision, Vol. 47 Iss: 8, pp.1323 - 1339

Appendix 2.1- Sources of Innovation Definitions

Economy	Schumpeter, 1934	Business & Management	Karger and Murdick, 1966	Technology, Science and Engineering	Myers and Marquis, 1969
	Mansfield, 1963		Knight, 1967		Rothwell and Gardiner, 1985
	Freeman, 1974		Caroll, 1967		During, 1986
	OECD, 1981		Becker & Whisler, 1967		Nord and Tucker, 1987
	Nelson & Winter, 1982		Shepard, 1967		Badawy, 1988
	Dosi, 1990		Daft, 1978		Damanpour and Gopalakrishnan, 1998
	Baumol, 2002		Van de Ven, 1986		Udwadia, 1990
	Chen, Zhaohui and Xie, 2004		Tushman and Nadler, 1986		Sundbo, 1996
	Roper and Love, 2004				Dunphy, Herbig and Howes, 1996
Innovation & Entrepreneurship	Barnett, 1953		Lewis and Seibold, 1993		Tang, 1998
	Drucker, 1985		Wolfe, 1994		Figueroa and Conceicao, 2000
	Kuhn, 1985		Brown, 1994		Smits, 2002
	Urabe and Child, 1988		Pouder and StJohn, 1996		Francis & Bessant, 2005
	Lundvall, 1992		Damanpour, 1996	Organization study	Barnett, 1953
	Cumming, 1998		Klein and Sorra, 1996		Thompson, 1965
	Salavou, 2004		McGrath, Tsai, Venkataraman and MacMillan, 1996		Zaltman, Duncan and Holbek, 1973
	Alves, Marques, Saur and Marques, 2005		Mone, McKinley and Barker, 1998		Kimberly, 1981
	Bessant and Tidd, 2007		Trott, 2005		West and Farr, 1991
Management	Swan, Newell, Scarbrough and Hislop, 1999		Freeman & Engel, 2007		García-Morales, Matías-Reche and Hurtado-Torres, 2008
	Cardinal, Alessandri and Turner, 2001	Marketing	Porter, 1990		
	Plessis, 2007		Berthon, Hulbert and Pitt, 2004		

Table 2.3: List of sources of definitions categorized by disciplines

Appendix 2.2- Innovation Attributes

	Nature	Type	Stages	Environment	Means	Aims
Business & Management	***new, 16*** ***change, 4***	***product, 7*** ***process, 5*** ***service, 5*** program, 2	***adoption, 3*** ***creation, 4*** design, 2 ***implementation, 2*** ***development, 2***	***organization, 7*** ***firm, 6*** ***customer, 2*** ***developer, 2*** ***external, 2*** ***system, 2*** ***users, 2***	*idea, 5* resource, 4 ***invention, 3*** ***technology, 3*** investment, 2 ***market, 2*** ***creativity, 1***	**superior, 4** **advantage, 2** **value, 2** **competition, 2** **influence, 2** **sustain, 2** **differentiation, 2**
Economy	***new 24*** ***improved, 4***	***product, 9*** ***process, 6*** ***service, 3*** ***technical 3***	Production, 4 introduction, 3 manufacturing, 3 ***development, 2*** ***commercialization, 3***	***organization, 2*** ***actor, 1*** ***consumer, 1*** ***customer, 1*** ***social system, 1***	economy, 2 equipment, 2 ***idea, 2*** industry, 2 ***market, 2*** ***technology, 2***	**Economic, 2** **compete, 3**
Innovation & Entrepreneurship	***new, 10*** ***change, 2***	***product, 4*** ***service, 4*** ***technical, 3***	generation, 3 application, 2 ***development, 2*** ***implementation, 2*** acceptance, 1 ***creation,1***	***organization, 2*** ***users, 2*** ***customers, 1*** ***employee, 2***	***idea, 5*** ***creativity, 5*** ***invention, 2*** innovativeness, 1	**economy, 2** **need, 2** **compete, 2** **success, 2**
Technology/ Science /Engineering	***new, 11*** challenge, 2 ***change, 2***	***product, 10*** ***service, 8*** ***process, 7*** ***technical, 3***	***adoption, 7*** ***development, 3*** generation, 7 ***implementation, 2*** introduction, 2 ***commercialization, 4*** ***creation, 2***	***organization, 12***	***market, 6*** ***technology, 6*** ***creativity, 4*** ***invention, 4*** ***idea, 2*** innovativeness, 1	**economic, 2** **success, 2** **differentiation, 1**

Knowledge Management	***new, 2*** ***improve, 1***	***product, 2*** incremental, 1 ***process, 1*** radical, 1 ***service, 1*** ***technical, 1***	***creation, 2*** decision, 1 design, 1 ***development, 1***	***group, 1*** ***internal, 1*** ***organization, 1***	knowledge, 2 ***idea, 1*** ***market, 1***	business, 1
Marketing	***new, 3*** ***change, 2*** ***improve, 1***	***product, 2*** ***process, 1*** ***service, 1***	learning, 1 communication, 1	***organization, 1***	***technology, 1*** ***invention, 1***	***Superior, 1***
Organizations Studies	***new, 4***	***product, 4*** ***process, 3*** ***service, 3***	***adoption, 3*** application, 2 ***development, 2*** program, 2	***firm, 5*** ***organization, 4*** ***group, 2*** ***unit, 2***	***idea, 3*** innovativeness, 3	***idea, 3*** innovativeness, 3

Table 2.4: Result of first of phase of innovation content analysis, word frequency count based on sector and attribute

Appendix 3.1- Towards an Innovation-Type Mapping Tool

Abstracts
Purpose – Seeking to distil and integrate a range of previous definitions, models, frameworks and classifications relating to types of innovation, this paper aims to make a contribution to clarity in innovation research and practice through offering insights into the definitions of the different types of innovation, and, specifically, the relationships between them.

Design/methodology/approach – This theoretical paper is based on a review of extant models and frameworks of types of innovation, which includes earlier foundation models, and more recent integrative models.

Findings – This distillation results in a diagrammatic representation of the key frameworks, which is used as a platform to propose a new framework of types of innovation.

Originality/value – This paper draws on all the terminologies used for types of innovation and creates an innovation type-mapping tool that can be used to clarify the various definitions and terminologies of the innovation type concept.

Citation: Jennifer Rowley, Anahita Baregheh, Sally Sambrook, (2011) "Towards an innovation-type mapping tool", Management Decision, Vol. 49 Iss: 1, pp.73 – 8

Appendix 4.1- Pilot Interview

Before starting the interview a summary introducing the researcher and the purpose of this research together with assurance of confidentially will be given.

Section A, Details of Respondents

Name of business:

Name and Role of Interviewee:

Established in:

Number of Employees:

Particular sector, particular product:

Section B, Business Innovation Profile

1. As there are different perceptions of innovation, could you please tell me, what is the meaning of innovation in your point of view, and also what are the different modes of innovation other than new products?
   (What is innovation and what are the different types of innovation in your point of view?)

   For the purpose of this interview, we define innovation as,

   Innovation is the process whereby organisations transform ideas into new/improved products, service or processes.

   Here is a brief explanation on different types of innovation,

   Product innovation: is concerned with the development of a new or improved product, Service innovation: is concerned with the development of new or improved services such as Internet-based financial services

Process innovation: any new process affecting organisations' internal procedure and, issues (the nature of process innovations could be production, administrative or technical), such as a new internal communication system, introduction of a new accounting procedure, or application of new systems such as TQM (Total Quality Management), BPR(Business Process Re-Engineering) it could also consists of Quality Circles, JIT manufacturing system, new production planning software such as MRPII

2. Can you please name a few or any of your recent innovations (new/improved products or service, changes to your production, procedures or management) preferably within the past two years?
   (What are your main and recent (during the past 2 years) innovations?)

3. Is there an approximate figure of total innovations (new/improved products or process) that you carry out each year?
   (How many innovations do you usually undertake in a year?)

4. Before deciding to proceed with an innovation, usually how many ideas or options do you analyse on average? Also based on what factors do you choose one idea/option over other ideas? Is there an exact criterion for that?
   (In the beginning of each innovation, how many innovative ideas do you start your selection with on average? How do you decide which idea to select and proceed with?)

5. What are the sources of these new ideas for innovation, usually they are proposed by whom? (Management, staff, customers?)
   (What are the derivers of your innovation? (External/ internal))
   (If it's internal, is it usually initiated by management or staff?)

6. Would be it possible for you to share with me your latest turn over figure?

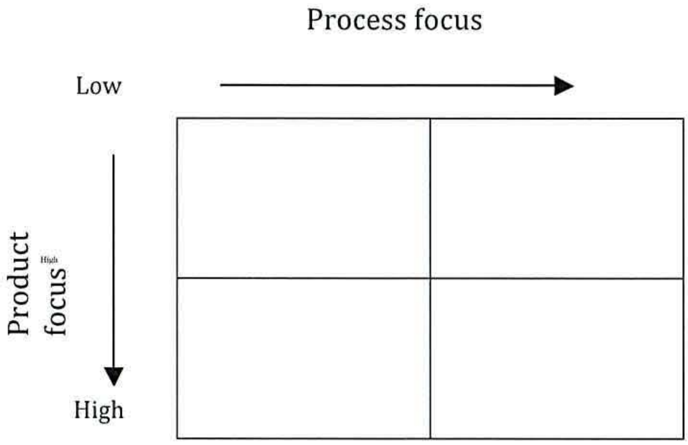
Section C, Innovation Stages and Processes

1. Would you please think of one of your recent innovations, How did you start thinking about it (coming up with such idea), implementing, testing and launching it? How long did it take you to start this innovation and finish it?
   Or in other words, once you decided to proceed with this innovation, what happened next?
   (Can you think of a recent innovation, how did you start it? How are you doing now and how long has it taken?)

2. Do you usually have the same approach to new ideas and changes you decide to proceed with?
   (Regarding question two, is it normal? Do you usually approach innovations like this?)

3. If we want to distinguish and label the different actions you undertook for these innovation, how would you do that? For example when you analyse different possibilities and ideas, lets name it idea generation stage.
   (If you can differentiate the stages of your innovation process, what stages have you had or do you undertake?)
   (Is there any standard model for the undertaken stages?)
4. Among the innovations (changes) you have applied, approximately how many of them were new/improved products or services and how many were regarding production, improving the performance, changing the organisational procedures?
   Has it ever happened that making a change (an innovation) has resulted to other changes in other areas? For example in order to make a change to a product, you had to make a change to the organisational processes or vice versa?
   (To what extent do you engage in product and/or process innovation? If you engaged in a product innovation what are the implications on your organisational processes and vice versa?)

5. Where can you place your company in the below graph?
   Process focus refers to the number of innovations you have undertaken in your processes, products, administration or management
   Product focus refers to the number of new/improved product or service innovation you have undertaken



Appendix 4.2-Pilot Interview Introduction

My name in Anahita Baregheh and I am doing a PhD at Bangor University sponsored by BIC Innovation. The focus of my PhD is on innovation, details of which are provided below.

Innovation is the multi-stage process whereby organisations transform ideas into new/improved products, services or processes, in order to advance, compete and differentiate themselves successfully in their marketplace. There are two main types of innovations:

- Product innovation which involves providing new products and services to users
- Process innovation which improves the organisational performance.

In my research I aim to identify the relationship between process and product innovations among SMEs in THE Food sector.

The result of such research will provide organisations with a better understanding of the relationship between process and product innovation, WHICH can have an impact on organisational strategies and IMPROVE PRODUCT AND PROCESS INNOVATION.

In order to progress my research, I am seeking to make contact with a number of SME's in the Food sector initially to conduct a pilot interview (with one of the managers) and later for questionnaire completion.

The pilot interview evolves around understanding the business, their innovation profile (past innovations) and finally their innovation stages and processes. This interview should not take more than an hour and a half.

Appendix 4.3-Survery Questionnaire

PRIFYSGOL BANGOR UNIVERSITY

bicinnovation

Invitation to Participate in a Survey on Innovation in Food Sector

You are invited to participate in a unique survey on food sector innovation.

BIC Innovation is collaborating with Bangor Business School to undertake a UK wide research study of innovation within the food sector, as a key driver for growth, performance and competitiveness.

This study is an opportunity for you to consider your own company's approach to innovation currently and all participants will receive an executive summary of the research.

The researcher on this project is Anahita Baregheh. If you have any questions she can be contacted by e-mail (anahita@bangor.ac.uk or else anahita.baregheh@bic-innovation.com).

Most of the questions are multiple choice and quick to complete. There are four open questions which invite you to explain your innovation processes in a little more detail.

Respondent's anonymity and confidentiality will be respected and protected. No identifying information relating to you or your organisation will be accessible to any third parties.

This study will model innovativeness within the food sector and will benchmark key innovation processes. Respondents will have an opportunity to participate and learn from further testing of these tools through consultative interviews.

Also, if you would be interested to receive the executive summary that will be produced based on the analysis of the data collected through this survey; you will have the opportunity to provide your email address at the end of this survey.

1. How innovative are we?

Please respond on the following scale.

In our organisation we...	Always	Mostly	Usually	Rarely	Never
encourage new ideas THROUGHOUT the organisation.					
Encourage & support innovative employees.					
gather & use information about our trade customers.					
Are effective at implementing change.					
gather & use information about our consumers/end-users.					
Put innovation at the heart of our strategic planning.					
gather & use information about our competitors & markets.					
engage in shaping of an innovative organisational culture.					
proceed with innovations at a faster rate than our competitors.					
adopt a cross functional approach to innovation.					

2. Innovation Types

Please respond on the following scale.

I. Products

In our organisation we...	Always	Mostly	Usually	Rarely	Never
continuously improve or enhance our products.					
develop radical new products.					
continuously improve or enhance our packaging.					
develop radical new packaging.					
allocate significant resources to product development.					
allocate significant resources to packaging development.					
exploit information technology to improve product development processes.					
Use a standard new product development process.					

To help me understand product and packaging innovation in your organisation can you please describe a recent product launched?

II. Operations

In our organisation we...	Always	Mostly	Usually	Rarely	Never
continuously improve or enhance our operations.					
explore radical new ways of operating.					
allocate significant resources to operational innovations.					
have expertise in performance improvement techniques.					
Exploit information technology to improve our operations.					
develop and deploy new technologies.					

Can you please describe a recent operational improvement or innovation?

III. Sales and Marketing

In our organisation we...	Always	Mostly	Usually	Rarely	Never
develop new markets for our existing products.					
launch new products into new markets.					
allocate significant resources to marketing.					
Invest in developing & exploiting brands.					
are innovative in our marketing & promotions.					
see the potential of e-marketing.					
fully exploit a CRM system.					

Can you please describe a recent sales or marketing change (innovation)?

IV. Strategy

'Big' changes in organisational structure and long term strategy.

In our organisation we...	Always	Mostly	Usually	Rarely	Never
make ongoing improvements to our strategy & plans.					
make radical changes to our strategy & business model.					
allocate significant resources to strategic development.					
analyse & challenge existing strategies & business models.					
follow a formal business planning process.					
actively engage in partnering & strategic alliances.					
actively consider outsourcing, mergers or acquisitions.					

Can you please describe any recent strategic change (innovation) you have made?

3. Product Innovation Activities

As part of new product development process, to what extent does your company engage in the following activities? (In case you don't have the answers don't tick any option for that specific activity);

I. Initiation

	Always	Mostly	Usually	Rarely	Never
Scanning market opportunities					
Idea generation					
Initial screening of ideas					
Preliminary market research					
Internal competence analysis					
Product concept generation					
Consideration of alternatives					
Financial analysis					
Feasibility study					
Outline business case					

II. Build

	Always	Mostly	Usually	Rarely	Never
Prepare project definition					
Evaluate knowledge & skills required					
Use external expertise					
Detailed market research					
Technical/process development					
Product development					
Packaging development					
In-house tasting					
External customer tasting					
Operation design and planning					
Prepare product development plan					

III. Implementation and Launch

	Always	Mostly	Usually	Rarely	Never
Sales & marketing plan					
Partnering					
Manufacturing planning					
Training staff					
Logistics and supply chain planning					
Trial production					
Pre-launch marketing					
Production start-up					
Market launch					
Marketing & PR					

IV. Post Launch

	Always	Mostly	Usually	Rarely	Never
Ongoing review & monitoring					
Mainstream production established					
Sales targets achieved					
Scanning and planning for future improvements to the new products					

4. Organisational profile

Please be assured that your anonymity and confidentiality will be maintained.

Name of Organisation: ______________________

Year of Establishment: ______________________

Product range: ______________________

Company operations (tick all that applies):	Customers:
☐ Discrete manufacturing (complete operations) ☐ Processing ☐ Component manufacture (e.g. food ingredients) ☐ Assembly (e.g. sandwich manufacture, catering) ☐ Services (e.g. testing lab)	☐ Large retailers ☐ Small/independent retailers ☐ Wholesalers/cash & carry's ☐ Direct to consumers ☐ Other food manufacturers ☐ Catering outlets (e.g. hotels, restaurants, pubs)
How many products have you launched in the last 3 years? ☐ None ☐ 1-5 ☐ 6-20 ☐ 21-50 ☐ 51+	How many products you intend to launch in the future 3 years? ☐ None ☐ 1-5 ☐ 6-20 ☐ 21-50 ☐ 51+

Role of respondent: ____________________

Number of Employees:

- ☐ Less than 10
- ☐ 11-50
- ☐ 51-250
- ☐ 250+

Postcode: ____________________

Thank you for completing this questionnaire. Would you be willing to participate in the next stage of this research in the form of consultative interviews? (Please provide your email address)

Yes

No

Email Address: ____________________

Would you like to receive the executive summary of the findings of this survey? (Please provide your email address)

Yes

No

Email Address: ____________________

Thank you for completing this survey!

Appendix 4.4-Comparison of Questionnaire Distribution Methods

N	Question	Mean Score Exhibition	Mean Score Online	N	Question	Mean Score Exhibition	Mean Score Online
1	EncourageIdeas	4.45	4.43	38	MergerAcquisition	2.23	2.12
2	EncouragaEmployees	4.24	4.22	39	Scanningmarketopportunities	2.81	2.69
3	CustomerInformation	4.03	3.98	40	Ideageneration	3.03	2.93
4	EffectiveChange	3.88	3.81	41	Initialscreeningofideas	2.72	2.61
5	ConsumerInformation	3.80	3.75	42	Preliminarymarketresearch	2.68	2.57
6	HeartOfStrategy	3.79	3.72	43	Internalcompetenceanalysis	2.27	2.16
7	CompetitorInformation	3.73	3.67	44	Product concept generation	2.48	2.37
8	OrganisationalCulture	3.58	3.51	45	Consideration of alternatives	2.81	2.69
9	FasterInnovation	3.45	3.38	46	Financial analysis	3.14	3.02
10	CrossFunctional	3.45	3.38	47	Feasibility study	2.71	2.61
11	IncrementalProduct	3.90	3.78	48	Outline business case	2.38	2.27
12	RadicalProduct	3.24	3.12	49	Prepare project definition	2.31	2.22
13	IncrementalPackaging	3.45	3.33	50	Evaluate knowledge & skills required	2.63	2.51
14	RadicalPackaging	2.79	2.68	51	Use external expertise	2.22	2.13
15	ResourcesProduct	3.12	3.01	52	Detailed market research	2.11	2.01
16	ResourcesPackaging	2.86	2.74	53	Technical/process development	2.46	2.34
17	ITforProducts	3.05	2.94	54	Product development	2.95	2.83
18	NPDProcess	2.84	2.72	55	Packaging development	2.74	2.63
19	IncrementalProcess	3.73	3.61	56	In-house tasting	3.19	3.07
20	RadicalProcess	3.16	3.05	57	External customer tasting	2.83	2.71
21	ResourcesProcess	2.95	2.83	58	Operation design and planning	2.44	2.33
22	PerformanceImprovement	2.89	2.77	59	Prepare product development plan	2.46	2.35
23	ITforProcess	3.12	3.00	60	Sales & marketing plan	2.74	2.63
24	DevelopNewTechnology	2.98	2.86	61	Partnering	1.96	1.89
25	IncrementalPositioning	3.61	3.49	62	Manufacturing planning	2.60	2.48
26	RadicalPositioning	3.23	3.11	63	Training staff	2.77	2.65
27	ResourcesPositioning	2.92	2.80	64	Logistics and supply chain planning	2.61	2.49
28	Branding	3.01	2.89	65	Trial production	2.81	2.69
29	Promotions	3.17	3.05	66	Pre-launch marketing	2.37	2.26
30	MarketingPotential	3.20	3.08	67	Production start-up	2.45	2.34
31	CRM	2.16	2.05	68	Market launch	2.46	2.35
32	IncrementalParadigm	3.39	3.27	69	Marketing, promotion & PR	2.53	2.42
33	RadicalParadigm	2.64	2.52	70	Ongoing review & monitoring	2.98	2.86
34	ResourcesParadigm	2.69	2.57	71	Mainstream production established	2.49	2.38
35	BusinessModel	3.03	2.91	72	Sales targets achieved	2.64	2.53
36	BusinessPlanningProcess	2.75	2.64	73	Scanning and planning for	2.86	2.75

					future improvements to the new products		
37	PartneringAlliances	2.60	2.48				

Table 4.8. Distribution Method Comparison

Appendix 4.5-Questionnaire Invitation Email

Dear Colleague,

BIC Innovation is collaborating with Bangor Business School to undertake a UK wide research study about the importance of innovation within the food sector. The study will try to measure whether innovation is a key driver for growth, performance and competitiveness.

This questionnaire is an opportunity for you to reflect on, & consider, your own company's approach to innovation.

All participants will receive an executive summary of the research.

Please participate by clicking the link to the online summary below.

(Link to the questionnaire)

Yours sincerely,

Anahita Baregheh
Postgraduate researcher
Anahita@bangor.ac.uk
Anahita.baregheh@bic-innovation.com

Appendix 4.6- Questionnaire Response Count

N	Question	Count	N	Question	Count
1	EncourageIdeas	221	38	MergerAcquisition	192
2	EncouragaEmployees	217	39	Scanningmarketopportunities	182
3	CustomerInformation	221	40	Ideageneration	180
4	EffectiveChange	220	41	Initialscreeningofideas	181
5	ConsumerInformation	220	42	Preliminarymarketresearch	179
6	HeartOfStrategy	220	43	Internalcompetenceanalysis	177
7	CompetitorInformation	220	44	Product concept generation	177
8	OrganisationalCulture	217	45	Consideration of alternatives	178
9	FasterInnovation	215	46	Financial analysis	178
10	CrossFunctional	211	47	Feasibility study	178
11	IncrementalProduct	202	48	Outline business case	176
12	RadicalProduct	198	49	Prepare project definition	170
13	IncrementalPackaging	201	50	Evaluate knowledge & skills required	169
14	RadicalPackaging	199	51	Use external expertise	169
15	ResourcesProduct	198	52	Detailed market research	169
16	ResourcesPackaging	198	53	Technical/process development	168
17	ITforProducts	198	54	Product development	169
18	NPDProcess	197	55	Packaging development	169
19	IncrementalProcess	201	56	In-house tasting	170
20	RadicalProcess	201	57	External customer tasting	169
21	ResourcesProcess	197	58	Operation design and planning	168
22	PerformanceImprovement	198	59	Prepare product development plan	168
23	ITforProcess	200	60	Sales & marketing plan	162
24	DevelopNewTechnology	199	61	Partnering	162
25	IncrementalPositioning	200	62	Manufacturing planning	161
26	RadicalPositioning	200	63	Training staff	161
27	ResourcesPositioning	198	64	Logistics and supply chain planning	160
28	Branding	197	65	Trial production	159
29	Promotions	199	66	Pre-launch marketing	160
30	MarketingPotential	199	67	Production start-up	159
31	CRM	171	68	Market launch	160
32	IncrementalParadigm	195	69	Marketing, promotion & PR	160
33	RadicalParadigm	193	70	Ongoing review & monitoring	163

34	ResourcesParadigm	194	71	Mainstream production established	163
35	BusinessModel	191	72	Sales targets achieved	164
36	BusinessPlanningProcess	190	73	Scanning and planning for future improvements to the new products	165
37	PartneringAlliances	192			

Table 4.9. Questionnaire response count

Appendix 4.7- BAM 2009, Developmental Paper

Title: Innovation in food sector SME's

Abstract:

This paper outlines a research proposal for a research project that seeks to contribute to knowledge on innovation orientation and types of innovation in SME's, specifically focussing on the relationship between types of innovation, stages of innovation, the role of IS in business innovation. The proposed research methodology uses a mixed methods design. A questionnaire has been developed based on the literature and on insights from pilot interviews with SMEs in the food sector; it will be used to develop an innovation orientation scale, profile the types of innovation used by SMEs and identify the stages of innovation within SMEs. In addition, mini-case studies will be conducted to offer further in-depth insights into the relationships between different types of innovation, focusing on the role of IT in product innovation.

Authors: A. Baregheh, J. Rowley and S. Sambrook
Presented in: BAM, Sep 2009, Brighton
Track: Innovation

Appendix 4.8- BAM 2010, Full Paper

Title: Organisational Innovation Orientation in UK Food Sector SMEs

Abstract:

Innovation orientation, defined as organisational propensity to innovate, plays an important role in organisational long-term success and improved performance. This paper draws on an empirical study, with the aim of understanding what contributes to an organisational innovation orientation and creating a framework. The study employed a questionnaire survey, designed and adapted from previous literature, to collect data from 221 food sector SMEs within the UK. Factor analysis identified 5 main factors contributing to firms' innovation orientation as process innovation, organisational strategy, product innovation, employee orientation and paradigm / positioning innovation. Implications and recommendations for further research are suggested.

Authors: A. Baregheh, J. Rowley and S. Sambrook
Presented in: BAM, Sep 2010, Sheffield
Track: Innovation

Appendix 5.1-Descriptive Statistics' Statements and Variable Names

Category	Sub Category	Questionnaire Statements	Variable Name	INNOV Caption
Innovation Orientation Traits		Encourage & support innovative employees.	EncourageEmployees	EMPL1
		Encourage new ideas THROUGHOUT the organisation.	EncourageIdeas	EMPL2
		Gather & use information about our consumers/end-users.	ConsumerInformation	STRA1
		Gather & use information about our trade customers.	CustomerInformation	STRA2
		Gather & use information about our competitors & markets.	CompetitorInformation	STRA3
		Engage in shaping of an innovative organisational culture.	OrganisationalCulture	STRA4
		Adopt a cross functional approach to innovation.	CrossFunctional	STRA5
		Are effective at implementing change.	EffectiveChange	STRA6
		Put innovation at the heart of strategic planning.	HeartOfStrategy	STRA7
		Proceed with innovations at a faster rate than our *competitors*.	FasterInnovation	
Types of innovation	Product	Continuously improve or enhance our packaging.	IncrementalPackaging	PROD1
		Develop radical new packaging.	RadicalPackaging	PROD2
		Developm radical new Products.	RadicalProduct	PROD3
		Continuous improvement or enhancement of packaging.	IncrementalProduct	PROD4
		Allocate significant resources to packaging development.	ResourcesPackaging	PROD5
		Allocation of significant resources to product development.	ResourcesProduct	PROD6
		Exploitation of information technology to improve product development processes	ITforProducts	
		Application of a standard new product development	NPDProcess	

		process.		
	Process	Allocate significant resources to operational innovations.	ResourcesProcess	PROC1
		Explore radical new ways of operating.	RadicalProcess	PROC2
		Continuously improve or enhancement our operations.	IncrementalProcess	PROC3
		Develope and deploy new technologies.	DevelopNewTechnology	PROC4
		Expertise in performance improvement techniques	PerformanceImprovement	
		Exploitation of information technology to improve operations	ITforProcess	
	Position	Develope new markets for existing products.	IncrementalPosition	POPA1
		Launch of new products into new markets.	RadicalPosition	POPA2
		Allocate significant resources to marketing.	ResourcesPosition	POPA5
		Investment in development and exploitation of brands	Branding	
		Innovative in marketing and promotions	Promotions	
		Identify the potential of e-marketing	eMarketingPotential	
		Fully exploited a CRM system	CRM	
	Paradigm	Make ongoing improvements to our strategy & plans.	IncrementalParadigm	POPA3
		Make radical changes to our strategy & business model.	RadicalParadigm	POPA4
		Allocate significant resources to strategic development.	ResourcesParadigm	POPA6
		Analyse and challenge existing strategies and business models	BusinessModel	
		Follow a formal business planning process	BusinessPlanningProcess	
		Actively engage in partnering and strategic alliances	PartneringAlliances	
		Actively consider outsourcing, mergers or	MergerAcquisition	

		acquisitions		

Table 5.17. Questionnaire statements and captions

Appendix 5.2- Descriptive Statistics

	N	Min	Max	Mean	Std. Deviation	Profile of Responses in % 5=Always, 4=Mostly, 3=Usually, 2=Rarely, 1=Never				
	Stat	Stat	Stat	Statistic	Statistic	5	4	3	2	1
EncourageIdeas	221	2	5	4.5	.7	62	26	12	0	0
EncourageEmployees	217	1	5	4.3	.8	59	22	15	3	1
CustomerInformation	221	1	5	4.0	.9	40	33	18	8	1
EffectiveChange	220	2	5	3.9	.8	26	44	25	5	0
ConsumerInformation	220	1	5	3.8	1.0	35	29	23	12	1
HeartOfStrategy	220	1	5	3.8	1.0	35	27	26	9	3
CompetitorInformation	220	1	5	3.7	1.1	31	31	22	13	2
OrganisationalCulture	217	1	5	3.6	1.1	28	29	27	13	4
FasterInnovation*	215	1	5	3.5	1.1	26	26	26	19	3
CrossFunctional	211	1	5	3.5	1.1	26	27	30	13	4

Table 5.18. Innovation Characteristics

	N	Min	Max	Mean	Std. Deviation	Profile of Responses in % 5=Always, 4=Mostly, 3=Usually, 2=Rarely, 1=Never				
	Stat	Stat	Stat	Statistic	Statistic	5	4	3	2	1
IncrementalProduct	202	1	5	4.2	1.0	54	23	16	5	1
RadicalProduct	198	1	5	3.5	1.2	30	27	17	22	5
IncrementalPackaging	201	1	5	3.7	1.1	36	25	19	17	2
RadicalPackaging	199	1	5	3.0	1.3	20	22	15	31	13
IncrementalProcess	201	1	5	4.0	.9	38	36	20	5	0
RadicalProcess	201	1	5	3.4	1.2	28	20	24	24	4
IncrementalPosition	200	1	5	3.9	1.1	45	24	17	12	3
RadicalPosition	200	1	5	3.5	1.2	30	25	19	24	4
IncrementalParadigm	195	1	5	3.7	1.0	33	28	25	11	2
RadicalParadigm	193	1	5	2.9	1.2	16	20	19	39	7

Table 5.19. Radical and Incremental Innovations

	N	Min	Max	Mean	Std. Deviation	Profile of Responses in % 5=Always, 4=Mostly, 3=Usually, 2=Rarely, 1=Never				
						5	4	3	2	1
IncrementalProduct	202	1	5	4.2	1.0	54	23	16	5	1
RadicalProduct	198	1	5	3.5	1.2	30	27	17	22	5

IncrementalPackaging	201	1	5	3.7	1.1	36	25	19	17	2
RadicalPackaging	199	1	5	3.0	1.3	20	22	15	31	13
ResourcesProduct	198	1	5	3.4	1.1	21	28	27	20	4
ResourcesPackaging	198	1	5	3.1	1.2	19	21	26	24	10
ITforProducts	198	1	5	3.3	1.2	22	27	25	17	9
NPDProcess	197	1	5	3.1	1.3	18	22	28	16	16
IncrementalProcess	201	1	5	4.0	.9	38	36	20	5	0
RadicalProcess	201	1	5	3.4	1.2	28	20	24	24	4
ResourcesProcess	197	1	5	3.2	1.1	17	26	28	22	7
PerformanceImprovement	198	1	5	3.1	1.2	20	22	25	22	10
ITforProcess	200	1	5	3.4	1.1	22	27	28	16	7
DevelopNewTechnology	199	1	5	3.2	1.2	23	21	23	26	8
IncrementalPosition	200	1	5	3.9	1.1	45	24	17	12	3
RadicalPosition	200	1	5	3.5	1.2	30	25	19	24	4
ResourcesPosition	198	1	5	3.2	1.2	21	20	28	22	9
Branding	197	1	5	3.3	1.3	25	17	24	24	11
Promotions	199	1	5	3.4	1.2	31	19	25	19	7
eMarketingPotential	199	1	5	3.4	1.4	34	23	14	17	13
CRM	171	1	5	2.5	1.3	12	17	18	22	31
IncrementalParadigm	195	1	5	3.7	1.0	33	28	25	11	2
RadicalParadigm	193	1	5	2.9	1.2	16	20	19	39	7
ResourcesParadigm	194	1	5	3.0	1.1	14	20	26	32	7
BusinessModel	191	1	5	3.4	1.2	25	25	28	16	7
BusinessPlanningProcess	190	1	5	3.1	1.2	17	21	29	22	11
PartneringAlliances	192	1	5	2.9	1.2	13	22	26	21	17
MergerAcquisition	192	1	5	2.5	1.3	12	14	18	27	30

Table 5.20. Types of Innovation

	N	Min	Max	Mean	Std. Deviation	Profile of Responses in % 5=Always, 4=Mostly, 3=Usually, 2=Rarely, 1=Never				
						5	4	3	2	1
Scanningmarketopportunities	182	1.0	5.0	3.4	1.4	30	24	20	9	17
Ideageneration	180	1.0	5.0	3.7	1.4	38	21	21	9	11
Initialscreeningofideas	181	1.0	5.0	3.3	1.4	27	24	20	10	18
Preliminarymarketresearch	179	1.0	5.0	3.3	1.4	27	23	18	15	17

Internalcompetenceanaly sis	177	1.0	5.0	2.8	1.5	20	18	17	15	31
Product concept generation	177	1.0	5.0	3.1	1.5	23	23	17	12	25
Consideration of alternatives	178	1.0	5.0	3.5	1.3	30	24	24	11	12
Financial analysis	178	1.0	5.0	3.9	1.3	47	20	15	7	10
Feasibility study	178	1.0	5.0	3.3	1.5	30	22	17	12	19
Outline business case	176	1.0	5.0	3.0	1.6	24	20	13	13	30
Prepare project definition	170	1.0	5.0	3.0	1.5	21	25	14	13	27
Evaluate knowledge & skills required	169	1.0	5.0	3.4	1.4	27	25	23	11	14
Use external expertise	169	1.0	5.0	2.9	1.3	18	16	19	32	15
Detailed market research	169	1.0	5.0	2.8	1.4	19	9	26	20	26
Technical/process development	168	1.0	5.0	3.2	1.4	24	22	23	10	20
Product development	169	1.0	5.0	3.8	1.3	42	22	22	5	9
Packaging development	169	1.0	5.0	3.6	1.4	37	22	18	8	15
In-house tasting	170	1.0	5.0	4.1	1.3	61	12	14	5	8
External customer tasting	169	1.0	5.0	3.7	1.4	37	26	15	11	11
Operation design and planning	168	1.0	5.0	3.2	1.5	27	20	21	10	22
Prepare product development plan	168	1.0	5.0	3.2	1.5	27	23	17	11	23
Sales & marketing plan	162	1.0	5.0	3.7	1.4	38	24	13	12	13
Partnering	162	1.0	5.0	2.6	1.4	16	15	13	27	30
Manufacturing planning	161	1.0	5.0	3.5	1.4	36	18	19	11	16
Training staff	161	1.0	5.0	3.7	1.3	40	20	21	11	9
Logistics and supply chain planning	160	1.0	5.0	3.6	1.4	33	25	18	10	15
Trial production	159	1.0	5.0	3.8	1.4	48	16	15	9	13
Pre-launch marketing	160	1.0	5.0	3.2	1.4	25	21	18	17	18
Production start-up	159	1.0	5.0	3.3	1.5	27	20	22	9	22
Market launch	160	1.0	5.0	3.4	1.4	26	26	20	10	18
Marketing, promotion & PR	160	1.0	5.0	3.5	1.3	28	25	19	16	12
Ongoing review & monitoring	163	1.0	5.0	4.0	1.2	45	25	17	7	7
Mainstream production established	163	1.0	5.0	3.3	1.4	25	25	23	10	17
Sales targets achieved	164	1.0	5.0	3.5	1.3	27	27	25	8	12
Scanning and planning for future improvements to the new products	165	1.0	5.0	3.8	1.3	45	13	26	10	7

Table 5.21. Innovation Stage Activities

* Variable excluded from PCA analysis due to low correlation with any of the factors, however the variable has not been excluded from any of the other sections as they are independent of the innovation orientation scale

Appendix 5.3-Innovation Type Exemplar

Innovation Type	Example
Product Innovation	100% Peanut Butter
	We were the first in our sector to use a pot made from 60% recycled PET - rPET, which is also recyclable
	The development of a new innovative cheese product
	new type sausage roll using different fills that are now being served on airlines
	Use of all bio degradable packaging for all over counter sales
	not applicable
	Salad dressing
	Rampait Ram- a cider matured in rum-Barrels from Barbados- available in bottles, container and 10 litre bag in a box
	new range of traditional soft drinks-new label design
	Redesign of labels
	to cater our ice-fuge cider for the younger crowd
	Designed a bespoke 500ml mini Goliath bottle to make our products stand out from others on the shelf
	searching for compostable or recycled and recyclable packaging
	light weight glass - as a sugar premium brand our innovation can be slow but 5 considered to protect brand values
	no artificial ingredients/preservatives. All natural cream little chocolate vanilla cream liquer, wine based unique 187ml mini plastic wine bottle
	Cider brandy mince meat
	product - we will be lauching a instant coffee with added antioxidants - more than 30% more than normal instant coffee. On packaging we developed a two part carton for our new R&G coffees
	Gin, Vodka based fruit liquers
	Yang Mei Juice in 2009
	The RDA Organic kids range has been specifically designed with children and their parents in mind. Sqqquishy smoothie (blackcurrant, apple and banana) and Squeeezy juice (mango, apple and orange) come from a credible, recognisable and healthy brand and are the only chilled organic drink for children in the UK.RDA Organic has responded to demands from parents for honestly priced, pure organic fruit juices that children actually enjoy drinking. The drinks have the seal of approval among parents for its quality nutritional value and among children for its delicious flavour and fun design. Each drink provides children with one portion of their daily fruit requirement and their RDA (recommended daily allowance) of vitamin C. In line with the entire RDA Organic product range, the fruit used is 100% premium organic grade and certified by the Soil Association. The entire chilled range contains no added sugar, no added water, no concentrates, colours or preservatives and importantly for kids no bits. The Squeeezy and Sqqquishy packs are also the perfect size for lunchboxes and with resealable caps ideal for opening and then finishing later. The drinks are also in line with government school standards and vending machine friendly, making them the convenient and healthy option for children.
	Sloe whisky truffles and brandy
	change packaging to an eye catching, attractive box
	Lemonade traditional 75d/33/ glass bottles used because of our processes
	beetroot juice
	New range of Glasto Real Festival Ciders
	Crips
	Matcha super green organics- packaging essential, clear bold image emphasis on health qualities

Muffins, seethrough wraping
Naturally locally produced cider
Customer feedback told us that not everyone wants/can afford 70 ml. so we launched our miniature 5ml 3.5 pound. They ve proved very successful with little impact on the sales of our big bottles
new sparkling vodka with no competotors
new liquer blueberry whisky
repackaged two orphan whisky brands sheep dip and pigs nose see
developing a new label for our wine bottle
Yumberry UK a yang mei berry juice from China
Moroccon dish
New piantan chips, packet size, customer base review prices
Recently launched a new range of salad dressing, only based in extravirgin olive oil and vine, helps maintain flavour
Spiced Strawberry Chutney - unique in the market place
Auntys desert mix panna cotta
Cranberry plus chilli chutney
8 years old balsamic
Baobab Fruit jam and lemonade
Small hamper with chilli chocolate
Beyond Chocolate
Apple Pie
black cake in resealable bags
Davids chilli oil
A very extreme chilli sauce called Satans shit
Gold Award winning (great taste award of Great Britain) mint chilli jelly
Just launched the new best of british range, three exclusive flavous aimed at celebrating everything British. These were sold exclusive to independants
We launched our chilli chocolate onto the market this year, all our products have similar disegn so nothing special was done extensive taste tests were carried out
Gluten free brownies
we package chocolate so ideas have got to have something new about them
new range of chocolate including goats cream caramel (a unique dairy free chocolate) plus 4 other diary free chocolates
New security 'tab' to indicate a range within our brand highlighting seasonal and special lines.
1.5 oz mini jars in 4 jar gift pack
Changed size of pail to suit customer's requirements for using in a sandwich premix. Instead of opening 2 pails now only need to open one.
Cold pressed avocado
Personalised boxed confectionary
Biscuit w/a message
New sauces, pickles chutneys
the potato
the current packaging was changed after 40 years into the current one
A new range of water soluble fruit and veg extracts
Mayonnaise made with cold pressed rapeseed oil additive free, first in UK
new flavoured variant
Blackberry with danzy jones whisky
carretting testing 1sr new producer flavour in 6 months-ongoing
Gluten free savoury, tart baked in a dried palm leaf
smokin hot chilli fudge
Christmas pudding flavour for christmas autumn
Tubs redesigned to push the brand up market
tomato, apricot and raisins jam in stackable square jars

Mixed bag of 15 sticks at high discount price
recently launched a range of award winning herb mayonnaises- unique flavours
Fresh ingredient olive oild- worlds only!
Oak smoked rapeseed oil
we are a new business start up so we recently launched a product after many months of research that we believe is the only one of its type in the market
As you know we sell olive and one of the recent innovation is that we mixed olives and marinated with different things and we found very tasty olives and everybody likes it
Steam valve on flexible baby food pouch so can be microwaved and stood upright in baby's bottle warmer
The picnic pie
Apple lemon plus sage jelly-marketed directed to public through food festivals, agreculture shows and the like
launched new type of packaging for our Diabetic puddings
Ongoing cycle of product and packaging innovation - with a 50%+ innovation churn
Relaunched products in new packaging to make the product a more 'artisan' one.
we have developed a product which will be packaged in 100% biodegradable packaging
an organic range of products
Fresh salad wraps in Marks and spencers
Bangin Bhangra Sauce
Mr Singhs pocket rocket, a handbag pocket size version of our sauce
Natures Kitchen, sauces and pickles **oil free**
Packaging, first to use cold seal in pastry. Product, blending olive oil into pastry fats.
In the process of launching gingerbread advent calendar and pick n mix advent calendars. Design + production comes first packaging is a last thought kind of.
Mixed case of individually wrapped and labelled mini snack bars. Can be own label too.
none.we use bare required minimum.the accent is on product excellence, not fancy presentation
resealable pots of yoghurt
Freedom natural sweetener and natural syrup
Wehave launched very successfuly our new packaging range this month. We are developing a new product to fit into an exciting new market.
New Extract
new product_ dried fruits range developed at moment
Locally grown Barley to produce Barley and Soda Bread with new packaging concept.
Pre-pack cheese format for mature deli-quality blue cheese for sale in multiples.
1) new nad unique (to UK) French bread product launched October 08, 4 spin-off prodcuts followed. 2) New and unique (to UK) german bread launched in May 09.
Letterbox cheese service cheese posted first class
pre pack blue cheese. new brie. twin pack "oatcake and soft cheese". develop washed rind cheese
no new product launches in ten years
we are about to work with Business Link and Leeds Met Uni re NPD and packaging
cards for display shows/shops
Cheese under oil in a jar.
Cheese fruit topping, blending cheese with a fruit topping, new product+packaging now available in ASDA+export USA, we spend 60 K pound on packaging development for this product
Sparkenhoe cheese
A cheese plus onion pasty
New product, packaging,system and process for a new customer
something that occurs unintentionally can be recorded and used if successful
Angelsey farm chumed butter
Pie production brewing company and new outlet started

	Liquid egg white
	We work closely with Exeter
	Rhubarb and pear chutney
	we recently launched our range of chutneys which have been packaged to give a home made look
	We sell Welsh black beef, Welsh lambm farming.
	looking at different medias for packaging for oùr fresh beef
	We haven't had one.
	we recently started selling mixed meat boxes and credit crunch boxes to meet consumer needs as they change
	re engineered product to offer more competitive price and maintain quality
	Tried using boidegradable but consumers did not like presentation as much -gone back but still looking
	Suasages with Nantwich Blue
	Under development Granda+Muesli bar
	Oat cookies
	we introduced a single-portion range of our products for hospitality/foodservice/sampling
	reduced unit size/shape with new packaging to reduce unit cost at retail point
	Mozzarella
	free from range, also high meat content sausages (97%) packaging FSC Board, rebrand increased sales by 30% in the mults
	Diamonds of the Sea- giant sea salt crystals used for garnishing foods
	Our Naturally smoked mackeral which has a lime, chilli and corriander topping
	We recently Launched a range of single serve cocktail mixes
	Developed a new cheese very different in character from anything else
	Using ozonated water to cut down on the amount of chemicals used for sterilizing equipent etc
	Introduction of our new Robot onto the production line
Process Innovation	Introduction of new equipment
	employing interim staff to help with product efficiency
	Not applicable
	Use Kaizen in our apple pressing operation
	new packaging line
	IT outsourced to India
	constant relocation of vessels for ease of use
	Automation of production processes
	Just been on the BBC national news to promote our perry
	Installed a PET line in addition to our glass bottling line
	fixed price distribution and sourcing of more CO2 efficient packaging
	change of packaging to reduce costs and introduction of lightweight glass
	New filtering machine for cider+juice
	Purchase of cupping machine to improve automation
	New coding system, better efficiency
	reviewed and optimised our micro brewing and casking process for speed and cost efficiency
	Baring technology
	Sales teams now have all internet/website info to increase long team sales. also inspires instant sales on stand as delivery costs are relatively high
	transport of 3 palattes instead of 1 to optimize cost of transport
	better packaging min delays
	Recently purchased machinery to help improve equal distribution of product, help to maintain consistency of products.
	I am trained In lean MANUFACTURING AND SIX SIGMA
	More staff going out with samples to new markets

new e commerce website
Now website
preparation for lime cake improved using storage technology
online development
have a new program for designing our labels
Rebranding over range new labelling, signace etc
Expanding our production capacity with new machinery and buildings
currently investing on a new production facility
Chilli chocolate bars, mango and passion fruit truffle
Using a 'test kitchen' to work out if investment was best into mechanisation or personell
automated depositing and labelling
Recently rearranged all cooking equipment to enhance production flow.
increased capacity at real time
Packaging biscuits w/a message
new machinery to alter worldwide market needs
Revising our order processing system
Production line improvement
re organise work flow
New machinery
Own delivery since extended rather than using- in house emphasis
new machine portioning cookies
work more hours
we are a very new company with 26 years gift experience
The launch of our online shop being linked directly to our warehouse
water proof labels
we are currently looking at machineries that can speed up our process without diminishing the quality of our product.
Purchase of new equipment to ensue product consistency and quality
Lean manufacturing process and training 'academy'
New kitchens for our chef to produce the product
we have semi automated our processes in producing onion bhajees
Introduction of new sandwich packing line to pack and seal new packaging format
Manufacturing of sauce
developing a new manufacturing facility
Date decoder, gas packaging, new machinery
Keeping invoices/deliveries/orders in numbered order in a ring binder other than by client in order to help with unpaid invoices+ necessary paper work
New production line for pastry and biscuit based products.
internet selling instead of road visiting
Web site re-design
Purchase of automatic Hot Plate machine for Welsh Cakes and new products for the future.
High tech new packing thermofoming machine and weigh-labelling systems
Introduction of PDX technology
pre ripening milk for cheese manufacture
Yes, we developed a new cheese
pre packs
Temperature control on waxing equipment
New shift systems for 2 shifts a day that staff +management agree
New printer so we could print A3 size posters
new packing machine
using a net curtain to separate curds and whey less wasteage than a sieve
organising production flow, new machinery
purchase of multi bed burner
Sattelite tracking of HGV's

	now packaging machinery
	different usage of cuts of beef for maximum usage and less waste
	we are a website based business so we constantly look at improving systems eg. Two weeks ago started taking automated payments
	change in product slicing to eliminate waste
	lean manufacturing in one of our departments
	New labelling machine
	faster packaging machines for productivity and new products
	We were planning to move stock to a dedicated external warehouse serving Tesco, but then the line was delisted.
	new label printing techniques
	Restructure
	fully automated packaging line and deep chill
	new method of concentrating brine still being trialled
	we purchased a new style of slicer for smoked salmon which slices in a way which reduces waste
	we recently restructured our operation production facility to produce longer pack size
	Total re-design of packaging
	A complete remarketing of our product range under new and innovative labelling
Position Innovation	sorr i can't its private at the moment
	trying to keep the brakes on at the moment, to maintain stock levels
	Sponsorship
	sales about to start from brewery when license granted
	launching our farmhouse perry
	Our Living Orchards Project to raise brand awareness of our Organic range. See livingorchards.com
	new product marketing via new print media
	brand out POS materials research into retail catergory to develop new products
	2*6 Display tray mini 187ml plastic wine bottle
	We have started to use specially designed and printed coasters to encourage consumers to have on their desk at work. In this way we hope to increase purchase through consumers being reminded about RDA Organic while sitting at their desk.
	we are trying to utilise and exploit web based sales
	Shows and events
	Employment of part time sales person to help us move product into new area
	Juices to concentrated shot formula
	New website
	developed a new locally sourced and produced food product (the Glasty) targeting the festival market
	Focus on food service
	drink real tea campaign, name and shame marketing campaign of companies selling poor quality teas
	Branching out to sell at food festivals and craft fairs rather than just the large commercial food shows
	on line shop
	promoting wine through recipe cards/wine has to be drunk with food
	we have now started to sell products on the internet as well as in shops to increase interest and availability
	we find that direct marketing in selling and promoting at shows works better
	Feed the Dragon at Harrogate - gained Harrods and Harvey Nics as customers
	Using sponsorship of food TV programs
	More visits to new stocklists
	Apart from online sales we have began distributing to restaurants
	Have just employed a sales rep
	Online Sales
	Sales-smaller items now more popular so we ve launched mini versions of bars

we are very backward at sales and marketing
Changing our packaging to meet a food service need/demand and developing cross marketing opportunities for customers
focus in expansion of markets
expanded number of exhibitions attended
developing new food application ingredient
Appointed distribution
Posters
Entering India on international trade food and drink expo on 2-4 of Dec in New Dehli
launch of a new product
We are in the process of updating the web site
launched on Amazon to enhance existing ecommerce
to use distribution networks identified to suit our needs- not across the board
trade show in Germany
promotion of online sales though consumer events
Monthly e-newsletter to customers
Direct web sales
E-bay shop
Aiming for online and PR into consumer press
we recently changed our web address and redesigned our labeling and shapes and size of our bottle
targeting moslem communities as see gap in the market for halal baby food
going live on the internet in 6 weeks time
Acquisition of FooGo brand, relaunch of Sutherlands Deli brand and move into Sushi. Industry leading category management expertise.
Recipe cards for our retailers to aid the sale of the product
we have recently brought several variants of our cocktail samosa range for retai as well as food service
a scratch card promotion for the Olympics
Meal deal promotion
Using events for products
Joining Twitter and Facebook
Internet sales
New hot food outlets within key accounts.
Dipping my toe in the world of social networking to see if it is a viable way of getting more people to know of my business
The move into catering and foodservice markets.
sacking an incompetent web hosting company
changing our marketing ideas to appeal to new consumers
on the back of our packaging re launch, an extensive marketing campaign is held, using different media.
Posters
Sampling new products in supermarkets/outlets and Food Festivals/ Events.
Direct sales to New Zealand and Australia
122 second ad, longest in history to relaunch brand and generate significant PR and buzz
Using the farmers market in the online game world "Second Life"
A new distribution company to the food service sector
new website
seeing wholesale customers and giving presentations to the sales staff
new product for airline industry small portion
developed e-trading
new website
Box to share, a promotion allowing customers to have an organic dinner party box to develop new customers also the £8 cost goes to our 'send a cow' charity.

	local charity prizes of vouchers advertising our product, sponsoring events
	we are just implementing a new CRM system. Starting to do food shows
	do not exploit any of the above too laid back
	Website, Logo Design, Direct Mail Campaign
	continual website development
	Web have recently seen a growing rate of export orders to new markets
	provide free samples of new products to wholesalers for distribution to their retailers who do not currently buy them
	appoint an event/marketing manager
	we have used PR +blog +twitter (750k last year)
	Virtual Farmers market
	we gave launched a new website which is dedicated to a popular food products
	move to e marketing/sales
	Changing our Brand name
	On constant look out for new drink recipes
	In depth analysis of operations by an external source
Paradigm Innovation	including distribution to out sales drive
	outsourced some production to new partner to cope with increased product demand
	Beet It- shot development and implementation
	Co-partnering with local/larger cider producer to help in development of new products/brands as part of reciprocal sales/distribution strategy
	we employed a bookkeeper
	We have developed the packaging after taking on public reaction to the bottle and product preferences
	going into the discounter market
	we now have a second van
	Packaging
	Extension of product range
	recently took on a coffee shop to promote the brand works to a certain extent+ profile is raised
	growth of shops and new production
	Considering joint ventures with other companies
	move into fresh, ready to eat avocado
	sold off part of non core business
	ready made individual biscuits w/a message
	car deliveries
	Developed 5 new recipes, packaging and changed to paste rather than sauce
	Arranged strategic alliance with a new partner
	partnering for new product offers
	Distribution networks/partners
	wrote a 5 year business plan for the first time
	Focusing on online distribution and wholesale markets, dropping plans for own stores
	pushing online coverage
	We form partnering relationships with other organisations that work in our sector. As a recent example we have joined other companies on their stand at exhibitions
	working with a major supplier to the nhs to produce products for people with dysphagia (difficulty swallowing)
	we have outsourced our produce cleaning and preps prior to delivery for processing
	We are embarking on a joint business planning/innovation/technical/trend driven innovation project to deliver first to market innovation.fresh salad wraps came out of the last one.
	cutting out distributers and distributing in house
	devoping new ways of working in trad van selling arena
	We are currently deciding on the future of our business which direction to more in. To stay small or to push bigger and enable us to approach larger customers and pass their

vetting procedure SALSA etc which we can not currently do
Investing in some new business practices. Using BIC and SWMAS for strategic production planning.
putting a complete supply mechanism in place
New production unit to build confidence with multiple in ability to supply
manufacturing product specific to customers requirement
New units for Expansion
we are too small for a lot of this
collaboratng with customers at trade shows
We have decided to leave farming and our beef herd and move on
we are recently putting a system in place to all staff meet and discuss new ideas and event
tried to encourage small co-op but not successful
Removal of two of our manufacturing processes and out sourcing them.
working in collaboration with a food development centre to develop/improve products
collaboration with another cheese producer to market both companies' products together
Micro management of all retailers using their data to assist in CAT management
we formed a sale alliance with a complementary product to boost sales

5.22. Innovation types examples by respondents

Appendix 5.4-Innovation Type Relationship, Normality and Linearity Charts

Product innovation versus other innovation types

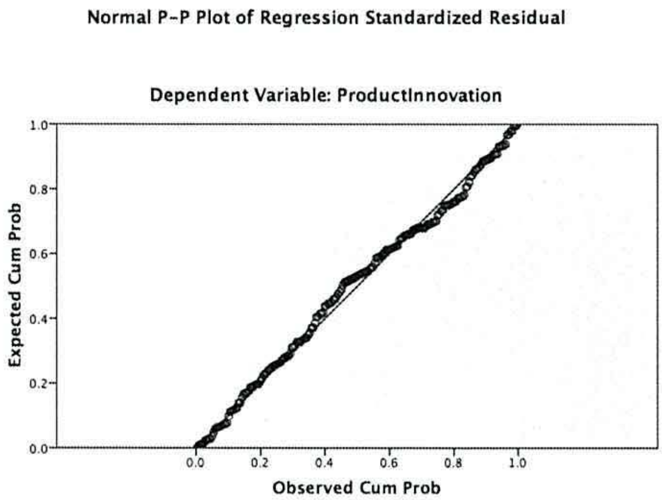


Figure 5.19. Product Innovation P-P Plot

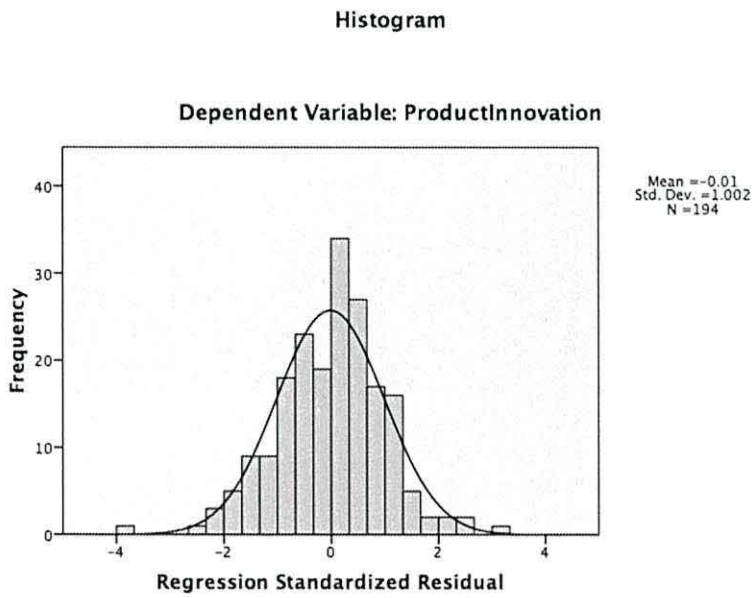


Figure 5.20. Product Innovation Histogram

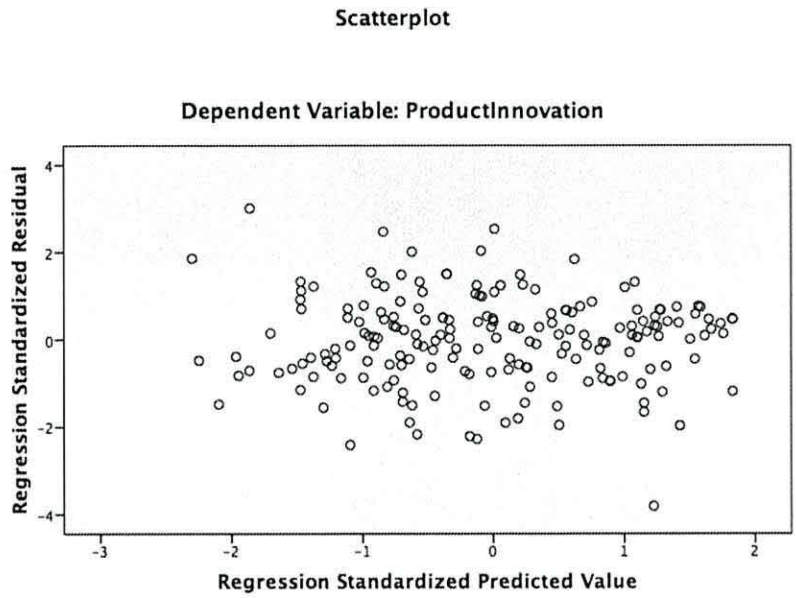


Figure 5.21. Product Innovation Scatterplot

Process Innovation versus other Innovation types

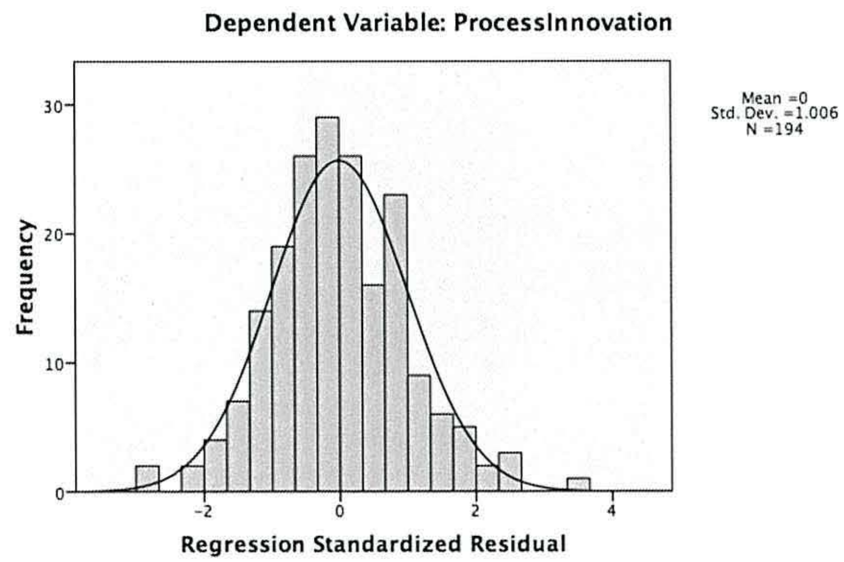


Figure 5.22. Process Innovation Histogram

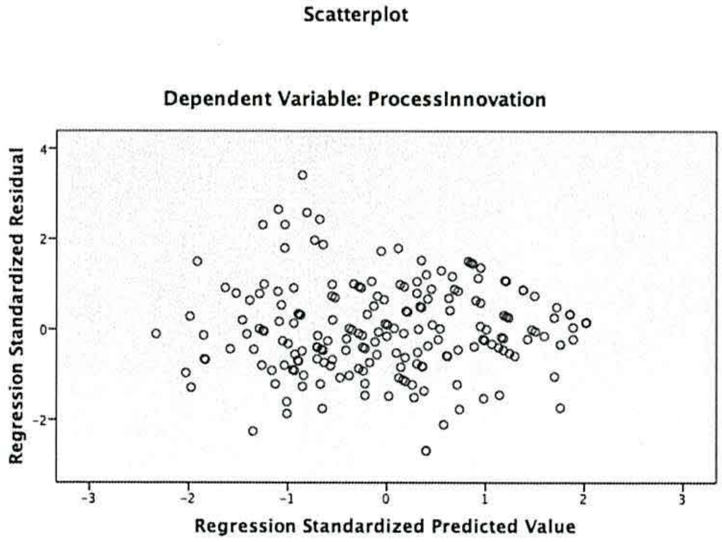


Figure 5.23. Process Innovation Scatter Plot

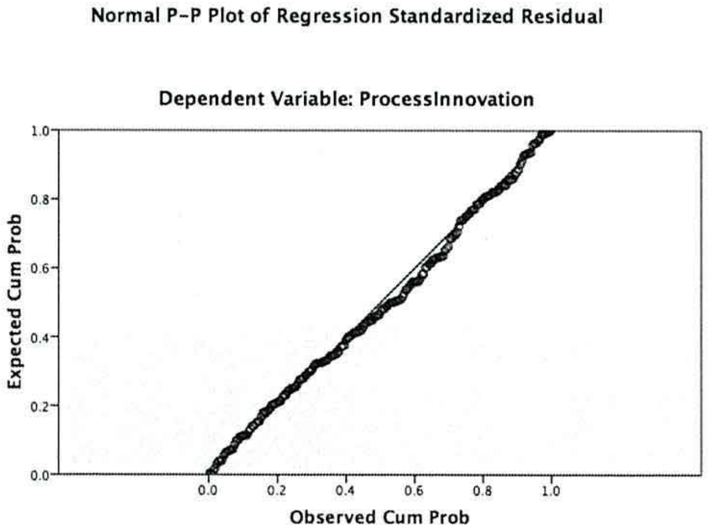


Figure 5.24. Process Innovation P-P Plot

Position Innovation vs. other Innovation Types

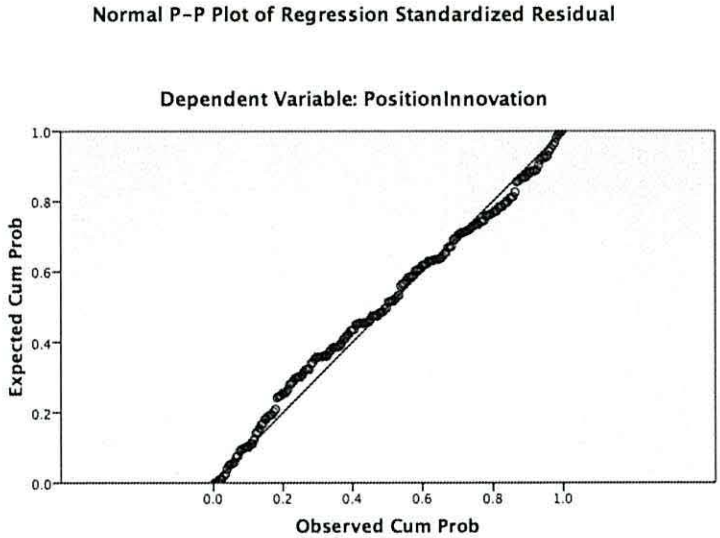


Figure 5.25. Position Innovation P-P Plot

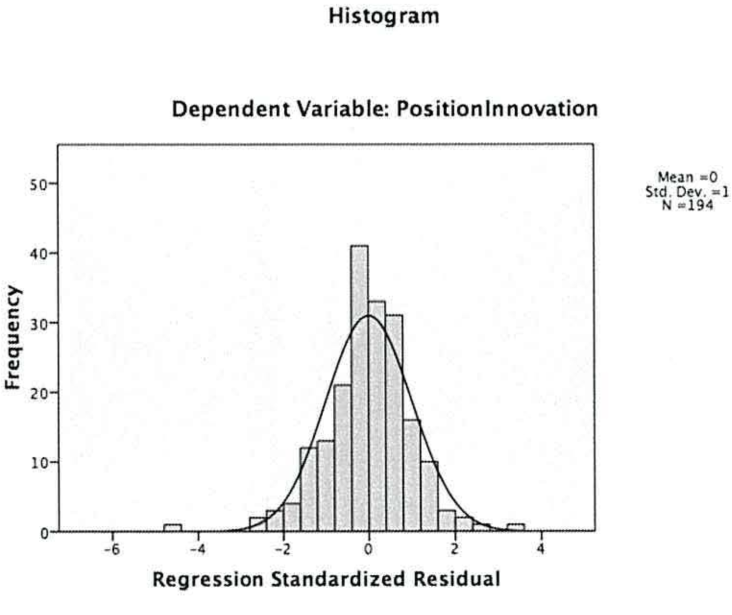


Figure 5.26. Position Innovation Histogram

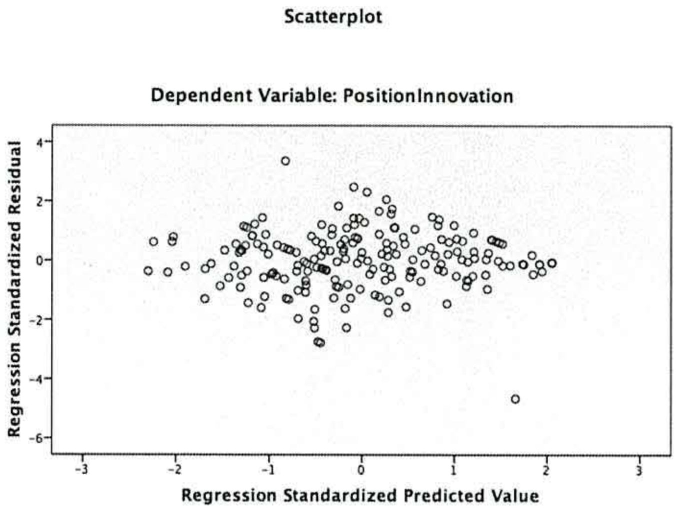


Figure 5.27. Position Innovation Scatterplot

Paradigm Innovation vs. other Innovation Types

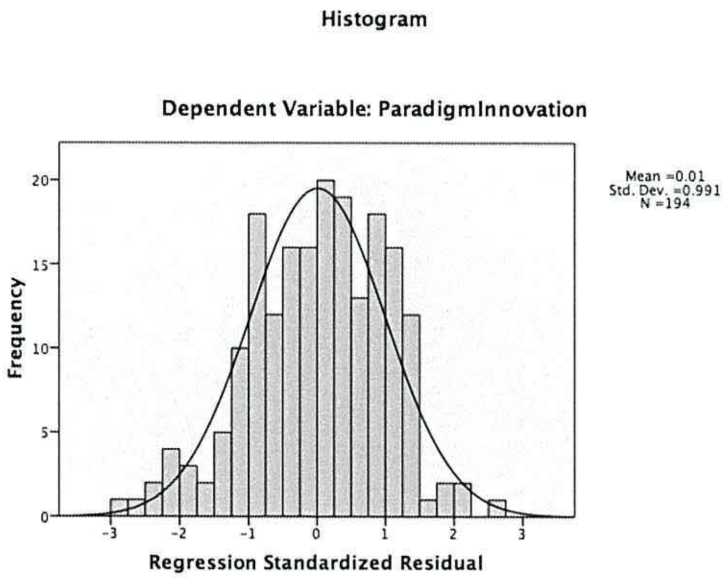


Figure 5.28. Paradigm Innovation Histogram

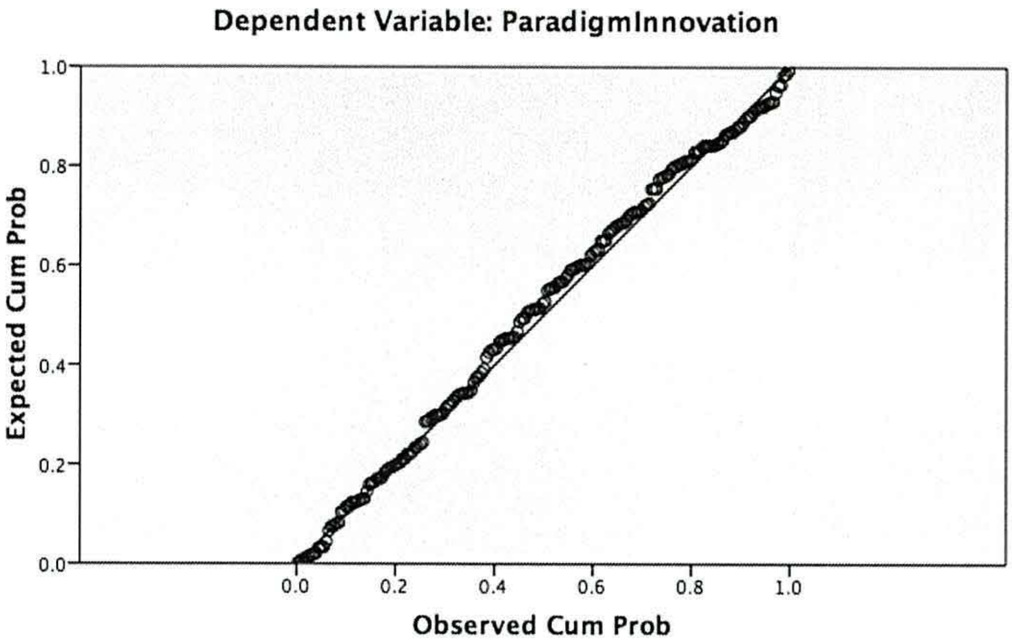


Figure 5.29. Paradigm Innovation P-P plot

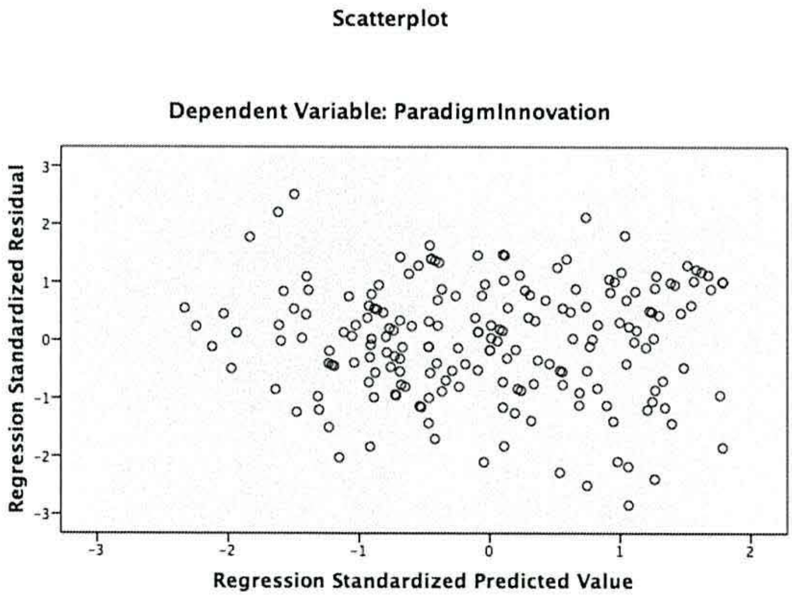


Figure 5.30. Paradigm Innovation Scatterplot

Appendix 5.5- Innovation Orientation

	Initial	Extraction
EncourageIdeas	1.0	.6
EncourageEmployees	1.0	.6
CustomerInformation	1.0	.6
EffectiveChange	1.0	.5
ConsumerInformation	1.0	.6
HeartOfStrategy	1.0	.7
CompetitorInformation	1.0	.6
OrganisationalCulture	1.0	.7
FasterInnovation	1.0	.5
CrossFunctional	1.0	.6
IncrementalProduct	1.0	.5
RadicalProduct	1.0	.6
IncrementalPackaging	1.0	.7
RadicalPackaging	1.0	.8
ResourcesProduct	1.0	.7
ResourcesPackaging	1.0	.7
IncrementalProcess	1.0	.5
RadicalProcess	1.0	.7
ResourcesProcess	1.0	.7
DevelopNewTechnology	1.0	.6
IncrementalPosition	1.0	.5
RadicalPosition	1.0	.6
ResourcesPosition	1.0	.7
IncrementalParadigm	1.0	.6
RadicalParadigm	1.0	.6
ResourcesParadigm	1.0	.6
Extraction Method: Principal Component Analysis.		

Table 5.23. Commonalities

Component	1	2	3	4	5
1	1.000	.344	.365	.188	.464
2	.344	1.000	.428	.226	.383
3	.365	.428	1.000	.264	.455
4	.188	.226	.264	1.000	.243
5	.464	.383	.455	.243	1.000

Table 5.24. Component Correlation Matrix

	Component				
	1	2	3	4	5
ResourcesProcess	.870	.446	.367		.504
RadicalProcess	.857	.337	.432	.357	.543
DevelopNewTechnology	.741	.478	.468		.522
IncrementalProcess	.700		.382	.431	.458
ConsumerInformation		.806			.371
CustomerInformation		.786	.406		
CompetitorInformation	.422	.781	.326		
CrossFunctional	.520	.716	.449	.476	.459
OrganisationalCulture	.451	.715	.435	.558	.486
HeartOfStrategy	.400	.646	.511	.628	.457
EffectiveChange	.425	.612	.463	.378	.459
FasterInnovation	.358	.572	.545	.545	.440
IncrementalPackaging		.349	.868		.366
RadicalPackaging	.424	.368	.862		.602
RadicalProduct		.379	.791	.434	.368
ResourcesPackaging	.536	.462	.779		.492
ResourcesProduct	.647	.461	.720		.475
IncrementalProduct		.308	.699	.350	
EncourageIdeas		.328	.433	.757	.511
EncouragaEmployees	.361	.345	.357	.727	.307
ResourcesParadigm	.559	.326	.392		.803
IncrementalParadigm	.435		.332	.342	.777
RadicalParadigm	.466		.359	.302	.772
IncrementalPosition		.421	.434		.746

ResourcesPosition	.521	.506	.467		.735
RadicalPosition	.329	.468	.609	.347	.730
Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.					

Table 5.25. Structure matrix

Appendix 5.6- Innovation Orientation and Stages

Correlations						
		InnovationOrientationFactorScore	Initiation Stage	Build Stage	Implementation Stage	Post Launch Stage
Pearson Correlation	InnovationOrientationFactorScore	1.000	.614	.662	.553	.598
	InitiationStage	.614	1.000	.716	.726	.702
	BuildStage	.662	.716	1.000	.817	.719
	ImplementationStage	.553	.726	.817	1.000	.724
	PostLaunchStage	.598	.702	.719	.724	1.000
Sig. (1-tailed)	InnovationOrientationFactorScore	.	.000	.000	.000	.000
	InitiationStage	.000	.	.000	.000	.000
	BuildStage	.000	.000	.	.000	.000
	ImplementationStage	.000	.000	.000	.	.000
	PostLaunchStage	.000	.000	.000	.000	.
N	InnovationOrientationFactorScore	125	125	125	125	125
	InitiationStage	125	125	125	125	125
	BuildStage	125	125	125	125	125
	ImplementationStage	125	125	125	125	125
	PostLaunchStage	125	125	125	125	125

Table 5.26. Correlation between innovation orientation measure and innovation stages

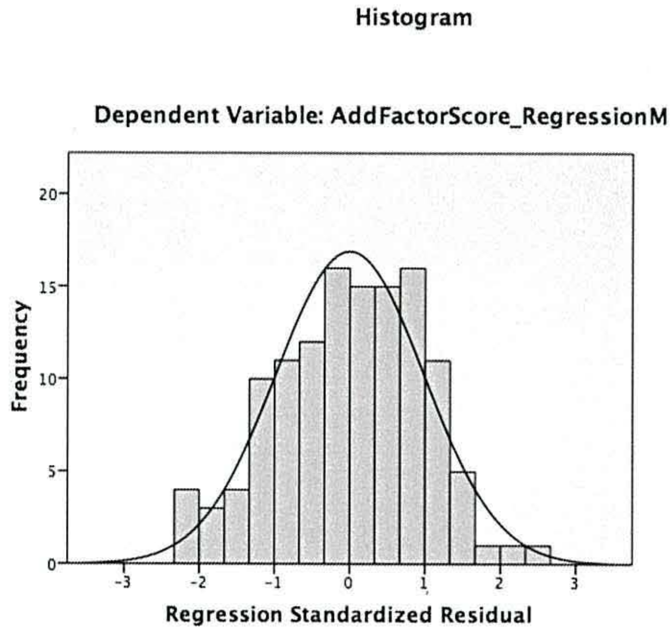


Figure 5.31. Innovation Orientation Histogram

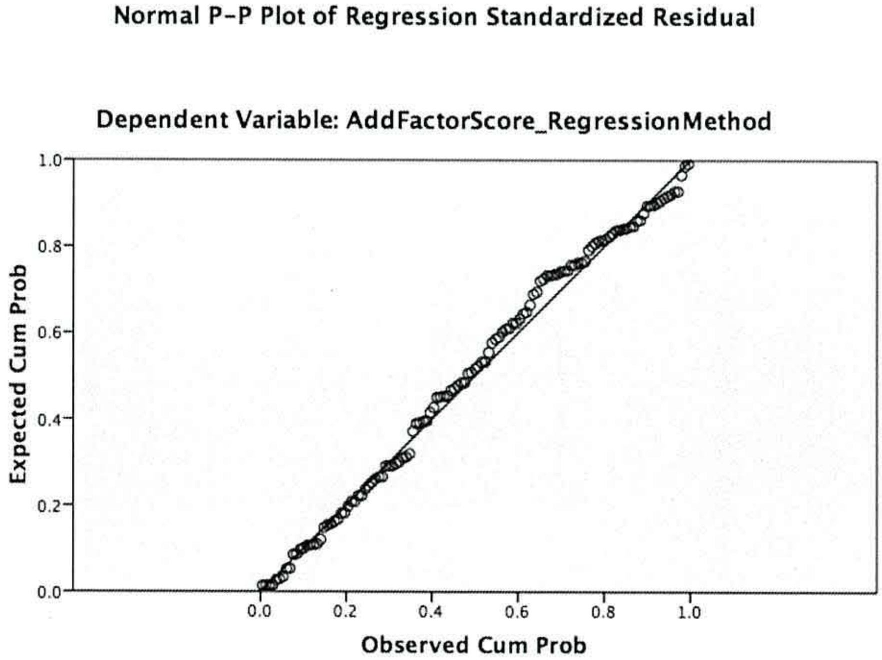


Figure 5.32. Innovation Orientation P-P plot

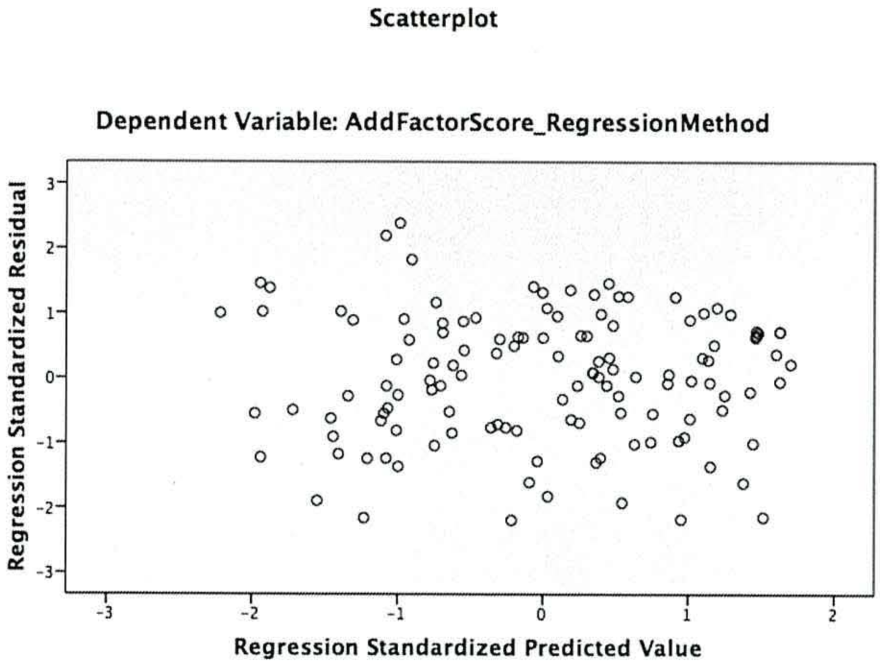


Figure 5.33. Innovation Orientation Scatter plot

Appendix 5.7-Innovation Traits and Organisational Profile

Hypothesis

Hypothesis		
H1	A	Organisation's size has no significant association with encouragement of new ideas THROUGHOUT the organisation.
	B	Organisation's size has no significant association with encouragement & support of innovative employees.
	C	Organisation's size has no significant association with collection & use information about trade customers.
	D	Organisation's size has no significant association with affectivity at implementing change.
	E	Organisation's size has no significant association with collection & use information about consumers/end-users.
	F	Organisation's size has no significant association with placing innovation at the heart of strategic planning.
	G	Organisation's size has no significant association with collection & use information about competitors & markets.
	H	Organisation's size has no significant association with shaping of an innovative organisational culture.
	I	Organisation's size has no significant association with adoption of a cross functional approach to innovation.
	J	Organisation's size has no significant association with continuous improvement or enhancement of products.
	K	Organisation's size has no significant association with development of radical new products.
	L	Organisation's size has no significant association with continuous improvement or enhancement of packaging.
	M	Organisation's size has no significant association with development of radical new packaging.
	N	Organisation's size has no significant association with allocation of significant resources to product development.
	O	Organisation's size has no significant association with allocation of significant resources to packaging development.
	P	Organisation's size has no significant association with continuous improvement or enhancement of operations.
	Q	Organisation's size has no significant association with exploration of radical new ways of operating.
	R	Organisation's size has no significant association with allocation of significant resources to operational innovations.
	S	Organisation's size has no significant association with development and deployment of new technologies.
	T	Organisation's size has no significant association with development of new markets for existing products.
	U	Organisation's size has no significant association with launch of new products into new markets.
	V	Organisation's size has no significant association with allocation of significant resources to marketing.
	W	Organisation's size has no significant association with ongoing improvements to strategy & plans.
	X	Organisation's size has no significant association with radical changes to strategy & business model.
	Y	Organisation's size has no significant association with allocation of significant resources to strategic development.
H2	A	Organisation's product category has no significant association with encouragement of new ideas THROUGHOUT the organisation.

	B	Organisation's product category has no significant association with encouragement & support of innovative employees.
	C	Organisation's product category has no significant association with collection & use information about trade customers.
	D	Organisation's product category has no significant association with affectivity at implementing change.
	E	Organisation's v has no significant association with collection & use information about consumers/end-users.
	F	Organisation's product category has no significant association with placing innovation at the heart of strategic planning.
	G	Organisation's product category has no significant association with collection & use information about competitors & markets.
	H	Organisation's product category has no significant association with shaping of an innovative organisational culture.
	I	Organisation's product category has no significant association with adoption of a cross functional approach to innovation.
	J	Organisation's product category has no significant association with continuous improvement or enhancement of products.
	K	Organisation's product category has no significant association with development of radical new products.
	L	Organisation's product category has no significant association with continuous improvement or enhancement of packaging.
	M	Organisation's product category has no significant association with development of radical new packaging.
	N	Organisation's product category has no significant association with allocation of significant resources to product development.
	O	Organisation's product category has no significant association with allocation of significant resources to packaging development.
	P	Organisation's product category has no significant association with continuous improvement or enhancement of operations.
	Q	Organisation's product category has no significant association with exploration of radical new ways of operating.
	R	Organisation's product category has no significant association with allocation of significant resources to operational innovations.
	S	Organisation's product category has no significant association with development and deployment of new technologies.
	T	Organisation's product category has no significant association with development of new markets for existing products.
	U	Organisation's product category has no significant association with launch of new products into new markets.
	V	Organisation's product category has no significant association with allocation of significant resources to marketing.
	W	Organisation's product category has no significant association with ongoing improvements to strategy & plans.
	X	Organisation's product category has no significant association with radical changes to strategy & business model.
	Y	Organisation's product category has no significant association with allocation of significant resources to strategic development.
H3	A	Organisation's age has no significant association with encouragement of new ideas THROUGHOUT the organisation.
	B	Organisation's age has no significant association with encouragement & support of innovative employees.
	C	Organisation's age has no significant association with collection & use information about trade customers.
	D	Organisation's age has no significant association with affectivity at implementing change.
	E	Organisation's age has no significant association with collection & use information about consumers/end-users.
	f	Organisation's age has no significant association with placing innovation at the

		heart of strategic planning.
	G	Organisation's age has no significant association with collection & use information about competitors & markets.
	H	Organisation's age has no significant association with shaping of an innovative organisational culture.
	I	Organisation's age has no significant association with adoption of a cross functional approach to innovation.
	J	Organisation's age has no significant association with continuous improvement or enhancement of products.
	K	Organisation's age has no significant association with development of radical new products.
	L	Organisation's age has no significant association with continuous improvement or enhancement of packaging.
	M	Organisation's age has no significant association with development of radical new packaging.
	N	Organisation's age has no significant association with allocation of significant resources to product development.
	O	Organisation's age has no significant association with allocation of significant resources to packaging development.
	P	Organisation's age has no significant association with continuous improvement or enhancement of operations.
	Q	Organisation's age has no significant association with exploration of radical new ways of operating.
	R	Organisation's age has no significant association with allocation of significant resources to operational innovations.
	S	Organisation's age has no significant association with development and deployment of new technologies.
	T	Organisation's age has no significant association with development of new markets for existing products.
	U	Organisation's age has no significant association with launch of new products into new markets.
	V	Organisation's age has no significant association with allocation of significant resources to marketing.
	W	Organisation's age has no significant association with ongoing improvements to strategy & plans.
	X	Organisation's age has no significant association with radical changes to strategy & business model.
	Y	Organisation's age has no significant association with allocation of significant resources to strategic development.
H4	A	Organisation's number of customer channel has no significant association with encouragement of new ideas THROUGHOUT the organisation.
	B	Organisation's number of customer channel has no significant association with encouragement & support of innovative employees.
	C	Organisation's number of customer channel has no significant association with collection & use information about trade customers.
	D	Organisation's number of customer channel has no significant association with affectivity at implementing change.
	E	Organisation's number of customer channel has no significant association with collection & use information about consumers/end-users.
	F	Organisation's number of customer channel has no significant association with placing innovation at the heart of strategic planning.
	G	Organisation's number of customer channel has no significant association with collection & use information about competitors & markets.
	H	Organisation's number of customer channel has no significant association with shaping of an innovative organisational culture.
	I	Organisation's number of customer channel has no significant association with adoption of a cross functional approach to innovation.
	J	Organisation's number of customer channel has no significant association with continuous improvement or enhancement of products.

	K	Organisation's number of customer channel has no significant association with development of radical new products.
	L	Organisation's number of customer channel has no significant association with continuous improvement or enhancement of packaging.
	M	Organisation's number of customer channel has no significant association with development of radical new packaging.
	N	Organisation's number of customer channel has no significant association with allocation of significant resources to product development.
	O	Organisation's number of customer channel has no significant association with allocation of significant resources to packaging development.
	P	Organisation's number of customer channel has no significant association with continuous improvement or enhancement of operations.
	Q	Organisation's number of customer channel has no significant association with exploration of radical new ways of operating.
	R	Organisation's number of customer channel has no significant association with allocation of significant resources to operational innovations.
	S	Organisation's number of customer channel has no significant association with development and deployment of new technologies.
	T	Organisation's number of customer channel has no significant association with development of new markets for existing products.
	U	Organisation's number of customer channel has no significant association with launch of new products into new markets.
	V	Organisation's number of customer channel has no significant association with allocation of significant resources to marketing.
	W	Organisation's number of customer channel has no significant association with ongoing improvements to strategy & plans.
	X	Organisation's number of customer channel has no significant association with radical changes to strategy & business model.
	Y	Organisation's number of customer channel has no significant association with allocation of significant resources to strategic development.

Table 5.27. Innovation trait and organisational profile hypothesises

Appendix 5.8-Innovation Trait Relationship with Org. Profile

Crosstabs

Resource Allocation to Process Innovation and Size

			ResourcesProcess			
			Rarely+ Never	Usually	Always+ Mostly	Total
Number of Employees	Micro	Count	39	35	48	122
		% within NumberOfEmp	32.0%	28.7%	39.3%	100.0%
		% within ResourcesProces	84.8%	70.0%	63.2%	70.9%
		% of Total	22.7%	20.3%	27.9%	70.9%
	Small and Medium	Count	7	15	28	50
		% within NumberOfEmp	14.0%	30.0%	56.0%	100.0%
		% within ResourcesProcess	15.2%	30.0%	36.8%	29.1%
		% of Total	4.1%	8.7%	16.3%	29.1%
	Total	Count	46	50	76	172
		% within NumberOfEmp	26.7%	29.1%	44.2%	100.0%
		% within ResourcesProcess	100.0%	100.0%	100.0%	100.0%
		% of Total	26.7%	29.1%	44.2%	100.0%

Table 5.28. Resource Allocation to Process Innovation

Develop New Technologies and Size

			DevelopNewTechnology			
			Rarely+ Never	Usually	Always+ Mostly	Total
Number of Employee	Micro	Count	49	24	50	123
		% within NumberOfEmp	39.8%	19.5%	40.7%	100.0%
		% within DevelopNewTechnology	84.5%	61.5%	65.8%	71.1%
		% of Total	28.3%	13.9%	28.9%	71.1%
	Small and Medium	Count	9	15	26	50
		% within NumberOfEmp	18.0%	30.0%	52.0%	100.0%
		% within DevelopNewTechnology	15.5%	38.5%	34.2%	28.9%
		% of Total	5.2%	8.7%	15.0%	28.9%
	Total	Count	58	39	76	173
		% within NumberOfEmp	33.5%	22.5%	43.9%	100.0%
		% within DevelopNewTechnology	100.0%	100.0%	100.0%	100.0%
		% of Total	33.5%	22.5%	43.9%	100.0%

Table 5.29. Development of new Technologies

Resource Allocation to Position Innovation and Size

Crosstab						
			ResourcePosition			
			Rarely+ Never	Usually	Always+ Mostly	Total
Number of Employees	Micro	Count	41	40	43	124
		% within NumberOfEmp	33.1%	32.3%	34.7%	100.0%
		% within ResourcePosition	77.4%	80.0%	61.4%	71.7%
		% of Total	23.7%	23.1%	24.9%	71.7%
	Small and Medium	Count	12	10	27	49
		% within NumberOfEmp	24.5%	20.4%	55.1%	100.0%
		% within ResourcePosition	22.6%	20.0%	38.6%	28.3%
		% of Total	6.9%	5.8%	15.6%	28.3%
	Total	Count	53	50	70	173
		% within NumberOfEmp	30.6%	28.9%	40.5%	100.0%
		% within ResourcePosition	100.0%	100.0%	100.0%	100.0%
		% of Total	30.6%	28.9%	40.5%	100.0%

Table 5.30. Resource Allocation to Position Innovation

Radical Paradigm Innovation and Size

Crosstab						
			RadicalParadigm			
			Rarely+ Never	Usually	Always+ Mostly	Total
Number of Employees	Micro	Count	63	19	38	120
		% within NumberOfEmp	52.5%	15.8%	31.7%	100.0%
		% within RadicalParadigm	82.9%	59.4%	62.3%	71.0%
		% of Total	37.3%	11.2%	22.5%	71.0%
	Small and Medium	Count	13	13	23	49
		% within NumberOfEmp	26.5%	26.5%	46.9%	100.0%
		% within RadicalParadigm	17.1%	40.6%	37.7%	29.0%
		% of Total	7.7%	7.7%	13.6%	29.0%
	Total	Count	76	32	61	169
		% within NumberOfEmp	45.0%	18.9%	36.1%	100.0%
		% within RadicalParadigm	100.0%	100.0%	100.0%	100.0%
		% of Total	45.0%	18.9%	36.1%	100.0%

Table 5.31. Radical Paradigm Innovation

Resource Allocation to Paradigm Innovation and Size

			ResourceParadigmCoded			
			Rarely+ Never	Usually	Always+ Mostly	Total
Number of Employees	Micro	Count	53	34	34	121
		% within NumberOfEmp	43.8%	28.1%	28.1%	100.0%
		% within ResourceParadigm	82.8%	73.9%	57.6%	71.6%
		% of Total	31.4%	20.1%	20.1%	71.6%
	Small and Medium	Count	11	12	25	48
		% within NumberOfEmp	22.9%	25.0%	52.1%	100.0%
		% within ResourceParadigm	17.2%	26.1%	42.4%	28.4%
		% of Total	6.5%	7.1%	14.8%	28.4%
	Total	Count	64	46	59	169
		% within NumberOfEmp	37.9%	27.2%	34.9%	100.0%
		% within ResourceParadigm	100.0%	100.0%	100.0%	100.0%
		% of Total	37.9%	27.2%	34.9%	100.0%

Table 5.32. Resource Allocation to Paradigm Innovation

Resource Allocation to Packaging and Product Category

			ResourcePackaging			
			Rarely+ Never	Usually	Always+ Mostly	Total
Product Range	1	Count	10	12	17	39
		% within ProductRange	25.6%	30.8%	43.6%	100.0%
		% within ResourcePackaging	16.1%	24.5%	22.7%	21.0%
		% of Total	5.4%	6.5%	9.1%	21.0%
	Beverage	Count	24	28	43	95
		% within ProductRange	25.3%	29.5%	45.3%	100.0%
		% within ResourcePackaging	38.7%	57.1%	57.3%	51.1%
		% of Total	12.9%	15.1%	23.1%	51.1%
	Convenience	Count	28	9	15	52
		% within ProductRange	53.8%	17.3%	28.8%	100.0%
		% within ResourcePackaging	45.2%	18.4%	20.0%	28.0%
		% of Total	15.1%	4.8%	8.1%	28.0%
	Total	Count	62	49	75	186
		% within ProductRange	33.3%	26.3%	40.3%	100.0%
		% within ResourcePackaging	100.0%	100.0%	100.0%	100.0%
		% of Total	33.3%	26.3%	40.3%	100.0%

Table 5.33. Resource Allocation to Packaging Innovation

Radical Position Innovation and Product Category

			RadicalPosition			
			Rarely+ Never	Usually	Always+ Mostly	Total
Product Range	Beverage	Count	9	7	25	41
		% within ProductRange	22.0%	17.1%	61.0%	100.0%
		% within RadicalPosition	18.0%	20.0%	24.3%	21.8%
		% of Total	4.8%	3.7%	13.3%	21.8%
	Convenience	Count	21	14	61	96
		% within ProductRange	21.9%	14.6%	63.5%	100.0%
		% within RadicalPosition	42.0%	40.0%	59.2%	51.1%
		% of Total	11.2%	7.4%	32.4%	51.1%
	Fresh Food	Count	20	14	17	51
		% within ProductRange	39.2%	27.5%	33.3%	100.0%
		% within RadicalPosition	40.0%	40.0%	16.5%	27.1%
		% of Total	10.6%	7.4%	9.0%	27.1%
	Total	Count	50	35	103	188
		% within ProductRange	26.6%	18.6%	54.8%	100.0%
		% within RadicalPosition	100.0%	100.0%	100.0%	100.0%
		% of Total	26.6%	18.6%	54.8%	100.0%

Table 5.34. Radical Position Innovation

Incremental Position Innovation and Age

			IncrementalPosition			
			Rarely+ Never	Usually	Always+ Mostly	Total
Age	Less than 5	Count	3	11	48	62
		% within Age	4.8%	17.7%	77.4%	100.0%
		% within IncrementalPosition	12.0%	34.4%	40.0%	35.0%
		% of Total	1.7%	6.2%	27.1%	35.0%
	5 to 20	Count	12	16	46	74
		% within Age	16.2%	21.6%	62.2%	100.0%
		% within IncrementalPosition	48.0%	50.0%	38.3%	41.8%
		% of Total	6.8%	9.0%	26.0%	41.8%
	21+	Count	10	5	26	41
		% within Age	24.4%	12.2%	63.4%	100.0%
		% within IncrementalPosition	40.0%	15.6%	21.7%	23.2%
		% of Total	5.6%	2.8%	14.7%	23.2%
	Total	Count	25	32	120	177
		% within Age	14.1%	18.1%	67.8%	100.0%
		% within IncrementalPosition	100.0%	100.0%	100.0%	100.0%
		% of Total	14.1%	18.1%	67.8%	100.0%

Table 5.35. Incremental Position Innovation

Radical Paradigm Innovation and Number of Customer Channel

			RadicalParadigm			
			Never+ Rarely	Usually	Always+ Mostly	Total
Number of Customer	1-3	Count	54	24	33	111
		% within NumberofCustomers	48.6%	21.6%	29.7%	100.0%
		% within RadicalParadigm	65.1%	75.0%	50.8%	61.7%
		% of Total	30.0%	13.3%	18.3%	61.7%
	4-6	Count	29	8	32	69
		% within NumberofCustomers	42.0%	11.6%	46.4%	100.0%
		% within RadicalParadigm	34.9%	25.0%	49.2%	38.3%
		% of Total	16.1%	4.4%	17.8%	38.3%
	Total	Count	83	32	65	180
		% within NumberofCustomers	46.1%	17.8%	36.1%	100.0%
		% within RadicalParadigm	100.0%	100.0%	100.0%	100.0%
		% of Total	46.1%	17.8%	36.1%	100.0%

Table 5.36: Radical Paradigm Innovation