

**The development of a growth platform model for small to medium sized
knowledge based firms**

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Abstract

This research builds upon the firm growth literature, by developing a new model that details the factors that influence firm growth, how these factors develop over time, how and why they influence the firm and to what level they need to be developed to in order for growth to occur. The research adds to the firm growth literature through the creation of a holistic, process based model of firm growth that combines complimentary theories to create a new unified theory of firm development.

A case study methodology was implemented, utilising a grounded theory approach. Two case companies were the subject of this research, one that is at an early stage of development and one that has already achieved high growth. 25 in-depth semi-structured interviews were conducted, with 12 different participants, as well as analysis of company documentation. Participant observation was also employed in one of the cases. An interpretive approach was taken consisting of iterations between data collection and data analysis. Data analysis followed the recommendations of grounded theory research methodology.

The research contended that firm growth could only be fully understood through a process oriented, dynamic approach in which multiple theoretical and conceptual positions were considered and that this was neglected in existing research. The research finds that factor specific firm growth processes can be identified and that there are similarities in the way in which firms develop through these. From this it is possible to reach an explanation as to how these factors influence firm development and to what level they need to be developed to for growth to occur.

The research concludes that:

- 1) The factors influencing firm growth cannot be considered in isolation but need to be analysed holistically

- 2) In order to explain how factors influence firm growth and development it is important to consider how each factor influences all other factors. It is this complex interaction which enables firm growth.
- 3) In order to generate a model which is succinct, able to be disseminated practically and which provides practitioners, academics and policy makers with guidance as to how to achieve high growth it is vital to trace the developmental processes of firm growth factors
- 4) The combination of existing theories and models with new concepts and phenomenon are vital in the development of new growth theory
- 5) Firm growth is enabled through a combination of resources, mediating factors and output factors working together in a cyclical manner

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Abbreviations and definitions

1) Abbreviations

SME – Small to medium sized enterprise

MBO – Management buy out

SMT – Senior Management Team

2) Extended definitions

SME:

EU Law defines SMEs as small and medium sized enterprises. “The category of micro, small and medium sized enterprises (SMEs) is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million” (Official Journal of the European Union, Commission Recommendation of 6th May 2003)

High technology firm:

The European Commission define a high tech firm as “being involved in or making use of highly advanced technological development or devices”

Knowledge Based/Knowledge Intensive Firm:

The European Commission defines knowledge intensive firms as “firms that provide knowledge intensive goods or services for other business firms”

High growth firm

All enterprises with average annualised growth greater than 20% per annum, over a three year period should be considered as high-growth enterprises. Growth can be measured by the number of employees or by turnover (OECD, 2007).

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“It always seems impossible until it is done” – Nelson Mandela

Declaration

This is to certify that, except where specific reference is made, the work described in this thesis is the result of the candidate's research. Neither this thesis, nor any part of it, has been presented, or is currently submitted, in candidature for any degree at any other University.

1.0 Chapter One – Introduction

1.1 Introduction

The purpose of this research is to explore the growth processes of knowledge based firms, through the use of a grounded theory methodology. The research takes place in two knowledge based firms, one which has already achieved high growth and one which is at an early stage of development, poised for high growth. Gaining an understanding of the process of firm development from start up to high growth is important as it addresses a distinct gap in the firm growth literature, therefore adding knowledge to existing literature while also informing future firm growth research.

1.2 Justification for the research

The way in which business is conducted and the types of firms that are central to the economic development of our regions has undergone dramatic change since the post-war period. The result of globalisation has been the creation of a knowledge based economy, in which small firms are now the focus (Audretsch, 2006). The discovery that small firms who go on to achieve high growth contribute to the majority of employment (Anyadike-Danes et al 2013b; Autio, 2005b; Birch, 1987; Bravo-Biosca and Westlake, 2009; Dale and Morgan, 2001; Hart et al, 2009; Hijzen et al, 2007; Hijzen et al, 2010; Morris, 2011; Strangler and Kedrosky, 2010; Storey, 1994), has meant that focus into high growth small medium sized enterprises (SMEs) by policy makers has grown. Couple this with the finding that most small firms die within the first two and a half years of life (Cressy, 2006) and this makes research into high growth firms even more valuable. Small business growth creates wealth, jobs and innovation (Carter and Jones-Evans, 2012, pp.1) and due to the current economic climate is very much at the forefront of government policy. As knowledge gained on high growth firms can be used to aid small firms in general, policy makers, government bodies, researchers and practitioners' are continuously searching for ways in which to support and aid firms in achieving high growth, with the consensus being that this knowledge will aid in economic stability and development (Holzland and Friesenbichler, 2007).

However, in spite of the recognised value of extant research there is still a large knowledge gap as to exactly how small firms achieve growth and how policy makers

and government bodies can support this, with many governmental policies having little effect (Bennett, 2008; Bennett, 2012; Storey, 1994). This stems from a lack of academic models that are intended for practical use (Davidsson and Klofsten, 2003) and the lack of a holistic “one stop shop” model which can be used by practitioners, academics and policy makers (Davidsson and Wiklund, 2000; Dobbs and Hamilton, 2007) alike. The growth literature is also highly fragmented (Wiklund et al, 2009) and needs to be merged to form one understandable whole.

Theoretical and model development in the firm growth literature has been limited and this may be due to the complex nature of firm development. As such one of the aims of the research was to combine complimentary theories of firm growth into an integrated whole, capable of assisting in explaining the firm growth phenomenon. The aim was to incorporate new concepts whilst developing existing theories in order to create a new theory of how firm growth is achieved, one supported by a succinct and easy to implement model. After a review of the literature focus was given to one of the most influential theories of firm growth, Penrose’s (1959) theory of the growth of the firm, as well as the resource-based (RBV) and knowledge based views (KBV). With regard to modelling, a variety of model types were reviewed including stage models (Churchill and Lewis, 1983) deterministic models (Barringer et al, 2005) and Klofsten’s (1992) business platform model. These theories and models were selected based upon their prominence in the firm growth literature and due to the identified opportunity for new insight to be gained into each of them through the research.

Firm growth models are extremely diverse and have been the subject of much debate and criticism in the literature. Stage models, such as those by Churchill and Lewis (1983), Kazanjian (1988) and Griener (1972), have been criticised for failing to explain the incidence of high growth firms (Levie and Lichtenstein, 2010) and for failing to reflect the development of firms in reality (Garnsey et al, 2006).

Deterministic models, which aim to explain firm growth through a focus on growth factors, tend not to consider variables found to be of importance in previous research (Wiklund, 1998), resulting in a lack of integrative modelling (Tonge, 2001). One model which combines both stage model and deterministic model principles is Klofsten’s (1992) business platform model. At an early stage of this research the aim was to take the concept of this model to the next stage of firm development, that of

high growth. The business platform model is currently widely used in practice and details the factors which are essential in order for a firm to develop from a start-up stage to one which is stable. The model then goes on to highlight the process of development that each of these factors can take throughout a firm's life, and to what level each factor needs to be developed to in order for the business platform to be achieved. Klofsten was able to show that if a small firm does not achieve the business platform within its first few years of life, it will cease to exist. However, the concept of this model has not yet been researched in the context of discovering how firms develop from a start-up position to one in which they go beyond stability and into a stage in which they are achieving high growth.

There is also a large portion of research which focuses upon the factors associated firm growth, but these are often researched statically at one point in time, or cross sectionally, meaning that current research may highlight what occurs as a consequence of growth as opposed to examining what causes growth (Dobbs and Hamilton, 2007). Many researchers also highlight the lack of process oriented firm growth research (Davidsson et al, 2007; Delmar et al, 2003; Dobbs and Hamilton, 2007; Garnsey et al, 2006; McKelvie and Wiklund, 2010) suggesting that this is a fruitful way in which to discover new knowledge with regard to firm growth.

This research aims to discover how small firm growth is achieved through the use of a process based dynamic approach which will not only describe how firm growth is achieved but also explain how it is enabled. In doing so, insight will be gained for practitioners, academics and policy makers alike. As stated earlier, it is important to discover how small firms achieve high growth, not only to encourage economic growth and recovery and to further academic insights, but in enabling small firm practitioners and policy makers to be proactive in their efforts. This research will therefore focus on a vital knowledge gap highlighted above which needs addressing.

1.3 Research Aim

This research was undertaken as part of the Prince of Wales Innovation Scholarship (POWIS) between a Welsh company, at which the researcher was based, and the University of South Wales (previously University of Wales, Newport). The

partnership is part funded by the University and part funded by the company. The focus of this research is on growth, specifically high growth, within the small firm. This research is based upon the assumption that there are certain factors that influence firm development which can be identified and researched in small firms.

1.4 Research Objectives

The research study had the following objectives:

- 1.4.1 To discover which factors enable a firm to develop from a stable position to one in which it has achieved high growth and is providing wealth and employment for the local community;
- 1.4.2. To discover how these key factors develop over time during the firm's development from start up to high growth;
- 1.4.3. To discover how these factors enable the firm's growth and development;
- 1.4.4 To discover to what developmental level each key factor needs to be developed to in order for growth to be achieved;
- 1.4.5 To develop a growth platform model that answers the above objectives.

1.5 Method of approach

A review of the extant literature within the field of small firm growth (chapter 2) highlights that there is a lack of process oriented, holistic growth models which both describe and explain firm growth. As previously highlighted, and as is covered further in chapter 2, there is a large body of research which studies firm growth quantitatively or through the use of cross-sectional methods, meaning that in-depth knowledge is not gained. Such quantitative research is sometimes only able to explain a small amount of variance in growth (chapter 2) and often only speculates as to why factors influence firm growth after research has been conducted. The fact that policies aimed at improving firm chances of high growth often do not succeed highlights that there is a difference between what is thought to influence firm growth and what does so in reality. This research will address this by discovering which factors influence firm growth, how they develop over time, how they influence the firm and to what level they need to be developed to for this growth to be achieved.

The research approach chosen was that of in-depth case studies, for which a purposeful selection of firms were utilised. These case studies will allow insight into personal in-depth accounts of firm change over time from people who have experienced this change first hand. The methodology will allow for comparison between cases in order to assess similarities and differences. Both cases centre on high technology/knowledge based industries, although one is service based while the other is product and service based. The knowledge based industry was purposely chosen due to its importance to the UK economy (chapter 2).

The cases consist of semi-structured interviewing of multiple personnel within the firms, each with roles related to specific aspects of the firm, as well as analysis of various types of company documentation. Selection of cases took place through a combination of personal contacts and third party award lists. Participant observation was also used in the case in which personal contact allowed for it. Grounded theory methodology was implemented with iteration of data collection and analysis. This methodological approach was carefully chosen based upon a comparison of previous approaches taken, as highlighted above, and due to the fact that this methodology has previously been used to create a process oriented model of early firm development (Klofsten, 1992).

1.6 Outline of the thesis: Chapters

This chapter has so far provided an overview of the research study. Chapter two details the extant literature on the topics highlighted in figure 1.1. These literature topics act as a framework from which the growth platform model will be derived. It is the overlap of each topic that is central to the development of the research need and ultimately the growth platform model. This chapter concludes that although there has been a substantial amount of research conducted in the firm growth domain, there are still many gaps in knowledge that need to be analysed with a process based qualitative approach.

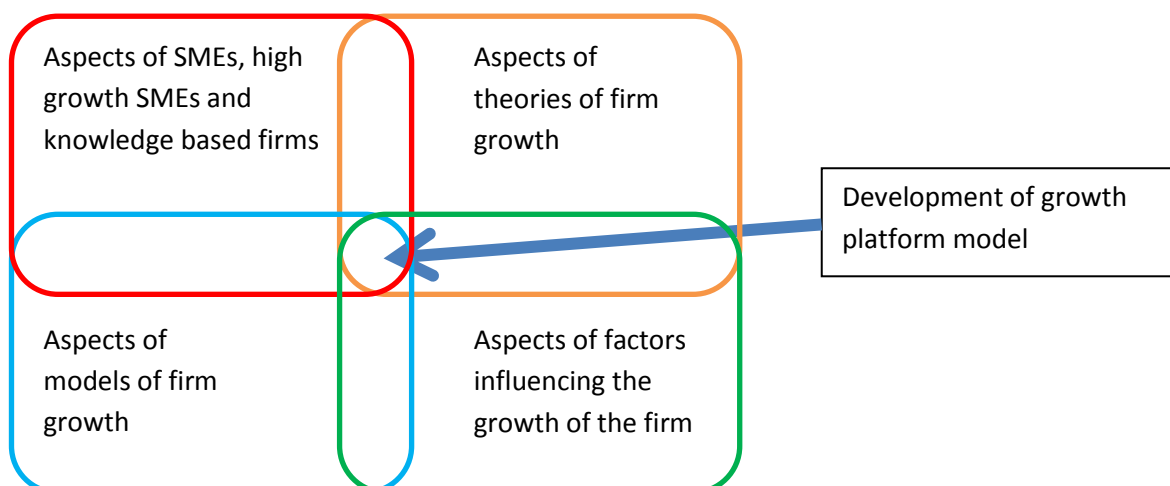


Figure 1.1. The overlap between the extant literature and the focus of this research issue

Chapter three outlines the ontological and epistemological assumptions of the research along with its philosophical position. Existing research tends to utilise either a quantitative or cross sectional approach meaning that detail with regard to process and relationships is lost. Grounded theory (Glaser and Strauss, 1967) is considered the most suitable approach for this research as the aim is to generate a new theory of firm growth. The research design is reviewed and data generation and data analysis methods discussed in detail. The chapter also considers ethical considerations and limitations of the research.

Chapter four and five then provides a within case presentation and analysis of the findings from each case study. The chapters begin with a case and research background and then present the findings and analysis for each factor found within the research to be of importance. The chapters conclude with a summary and interpretation of the findings from each case.

Chapter six presents a comparative analysis of the findings from each case study in an attempt to discover similarities and differences. This chapter is essential in answering the research questions and enables the creation of a growth platform model.

Chapter seven presents the growth platform model detailing what factors enable high growth, how these factors develop over time, why they are of importance and to what level they need to be developed to for growth to occur. A comparison of the research with extant research, models and theories is also undertaken.

The concluding chapter, chapter eight, summarises the key insights obtained from the research. Consideration is given in this chapter of the implications of the model for the development of policy, the implications for practitioners and advice is given for further research into firm growth.

Throughout this research a number of terms are used which relate to the small firm in general, high growth and the research literature. These terms are defined in the introduction to this thesis.

1.7 Delimitations of scope

This research is broad and holistic by its nature and as such it is important to state what this thesis will not cover. There is a wealth of research into individual factors influencing firm growth and although an in-depth review of the extant literature will take place it would not be possible in the scope of this research to review the full literature on each topic. As such, this research concentrates on the key literature within the field and the case studies will include only those firms based in Wales, with a specific research focus on knowledge based firms.

1.8 Conclusion

This chapter has outlined the basis for the research which follows and has given a brief summary of the main research objectives and focus. It has been identified that a process oriented, interpretive methodological approach is well suited in discovering exactly how firms achieve high growth. A brief coverage has been given of the reasons why research such as this is so vital and the gaps in existing knowledge that the research aims to remedy. Many of the ideas and thoughts covered in this chapter will be analysed in greater detail throughout the thesis but the basis for chapter 2 has been established, namely the emergence of SMEs and high growth firms, the theory

of firm growth, modelling of firm growth and research on the individual determinants of firm growth. The importance of gaining knowledge into firm growth has been highlighted and this thesis acts to provide a fresh insight into this domain.

2.0 Chapter Two – Literature Review

2.1 Introduction

This chapter examines the literature relating to the theme of firm growth and SMEs. In particular high growth SMEs and knowledge based firms are reviewed in order to give a general basis for the research. Different theories and models of firm growth are then examined in order to determine the current state of the art in the literature. The numerous factors identified in the literature as affecting firm growth are then reviewed, all of which culminates in the creation of a preliminary growth platform model that is the focus of this research.

Throughout the literature review and thesis the terms ‘growth’ and ‘development’ are used interchangeably. As such it is important to define exactly what is meant by growth and development. Growth is defined based upon the OECD definition of a high growth firm which states that all enterprises with average annualised growth greater than 20% per annum, over a three year period should be considered as high-growth enterprises. Growth can be measured by the number of employees or by turnover (OECD, 2007). As such growth, in the context of this thesis, is defined in terms of increase in revenue and/or employees. Firm development is defined in the context of this thesis as any progression that is made towards the growth definition. This encompasses all areas of the firm as development towards growth in revenue and/or employees could come from the development of the customer base through marketing, the development of new products and services, the training of employees and so on. The Oxford English Dictionary defines a synonym of the term ‘development’ as ‘a specified state of growth or advancement’. Therefore growth is defined as an increase in size while development is defined as what is involved in the progression to this increase in size. Taken together they address both the process and the end state of growth.

The use of these terms being used in the context of development enabling growth is evident throughout the academic literature, especially in the stage model literature (Churchill and Lewis, 1983; Griener, 1972; Kazanjian, 1988; Dobbs and Hamilton, 2006). The use of the terms growth and development together in this research is

appropriate due to the fact that the process of firm growth is being studied. A process, according to the Oxford English Dictionary, is “a series of actions or steps taken to achieve a particular end”. Thus in order to encapsulate the growth process fully it is necessary to include the term development in the vocabulary used throughout this research. Growth is not a phenomenon that involves a single step but is rather a process of developments taken throughout the firms’ existence. This is best highlighted by Penrose (1959, pg1) who states that growth “is an interacting series of internal changes”. As this brief review highlights the terms growth, development and process cannot be separated from one another and are at the heart of what this research aims to explore and address.

2.2 Aspects of Knowledge Based Small to Medium sized enterprises

2.2.1. The emergence of Small to Medium Sized Enterprises and Gazelles

The way in which business is conducted and the types of firms that are central to the economic development of our regions has undergone dramatic change since the post-war period. The result of globalisation has been the creation of a knowledge based economy, in which small firms are now the focus (Audretsch, 2006). In 2012, there were 4.8 million private sector enterprises in the UK of which 99.9% were SMEs (BIS, 2012). Research into small firms has been growing rapidly ever since Birch’s (1987) influential research. According to Birch, two thirds of new jobs created in the US between 1969-1976 were in firms with less than twenty workers. Even though Birch’s work was important due to its influence on research and policy, his methodology has been scrutinized (Davis et al, 1996) and the general belief is that Birch’s general conclusions were correct, albeit over exaggerated (Autio, 2005b; Mason and Brown, 2010; Storey, 1994).

Over the years, there has been much research that has concurred that small firms, especially high growth small firms, account for the majority of job creation (Anyadike-Danes et al 2013b; Autio, 2005b; Dale and Morgan, 2001; Hijzen et al, 2007; Hijzen et al, 2010; Morris, 2011; Storey, 1994; Strangler and Kedrosky, 2010; Kane, 2010). The time span over which similar findings have been discovered suggests that the importance of small firms to job creation is consistent and due to

the current economic climate and resultant job losses, small firm growth is something which warrants close attention. Gaining knowledge on the process of small firm development becomes important when it is considered that most firms die within the first two and a half years of life (Cressy, 2006), highlighting the importance of understanding the processes of small firm survival and growth.

As highlighted previously, it is generally accepted that small firms which do grow contribute greatly to the economy (Acs, 2006; Autio, 2007; Autio, 2012), and the greatest contributors are high growth small firms (Anyadike-Danes et al, 2013b; Autio, 2005b). Acs and Mueller's (2008) research on the growth of the small firm distinguished between different types of growth firms, which they termed as mice, gazelles or elephants. The term 'gazelle' was first introduced by Birch (1987) to describe high growth companies. These high growth firms, of which there are few, are thought to provide the majority of new employment, as evidenced by the report by Bravo-Biosca and Westlake (2009) which states that 6% of UK firms created more than half the growth in jobs between 2002 and 2008. Hart et al (2009) found that in 2002-05 and 2005-08 there were 11,500 high growth firms in the UK which were responsible for 40-50% of new employment.

Small business growth creates wealth, jobs and innovation (Carter and Jones-Evans, 2012, pp.1) and due to the current economic climate is very much at the forefront of government policy. However, Holzland and Friesenbichler (2007) and Allman et al (2011) argue that even though high growth firms play an essential role in economic development and employment, knowledge about them is extremely limited while Roper and Hart (2013, p11) argue that "growth remains something of an enigma". Barringer et al (2005) suggest that gaining knowledge on the attributes of high growth firms will greatly inform our knowledge of the attributes of normal growth firms. If further knowledge is gained on these high growth companies and growth companies in general, which is the aim of this research, then more targeted policy decisions can be made.

The importance of high growth businesses has received much political focus with the prime minister arguing in 2011(<https://www.gov.uk/government/speeches/prime->

[ministers-speech-on-economic-growth](#)) that high growth firms, the “giants of the future”, were essential to economic recovery and development. This is evidenced by Bravo-Biosca and Westlake (2009) who found that not only do high growth firms create employment directly, they also do this indirectly through spill over effects, generating wider benefits for their geographical areas. It has also been found that the phenomenon of high growth firms and their impact on employment holds true under times of economic recession (Coad, 2009). Thus it is vital that policy makers understand how these firms prosper when others fail, in order to be able to encourage this type of firm growth generally. As such the focus on high growth firms has grown in each of the OECD (Organisation for Co-operation and Development) governments (OECD, 2010, OECD, 2013).

2.2.2. SME Policy

The increase in research into high growth firms and the discovery of their importance to economic development has resulted in the issue becoming a key topic for government policy. In response to the failure rate of SMEs, many policies and departments have been developed aimed at aiding these companies in their growth such as ‘The Small Business Act for Europe’ (European Commission, 2009), Business Link and the Department of Trade and Industry, among others (Bennett, 2012). Storey (1994) argues that for policies to be effective, it is important to understand the creation, growth and death of small firms. However, the fact that many government policies aimed at small firms have proved unsuccessful over the years (Bennett, 2012; Storey, 1994) suggests that there is a paradox between what is thought to assist small firms in their growth and what does so in reality (Dennis, 2005). Bennett (2007) argues that the impact of government policies on small firms has been soft even though the targets for these policies tend to be for more substantial, concrete outcomes. Bennett (2008) argues that many of these policies fail due to the complexity with which they are administered, poor planning and lack of utilisation.

SME policy often involves the consideration of entrepreneurship and how the entrepreneur influences growth. This linking of SMEs and entrepreneurship stems from the work of Schumpeter (1942), who coined the term ‘creative destruction’,

whereby new innovations destroy and replace old ones. More recently, the OECD has classed entrepreneurs as being critical to the change and growth of the economy (OECD, 2009) suggesting that entrepreneurs are a vital link in the small business growth process. It has been believed for some time that entrepreneurship policy covers several levels, from the individual entrepreneur to the economic and societal context (Acs, 2001; Autio et al, 2007; OECD, 2010), suggesting that multiple policies are needed which are able to bring each of these levels together. Thus research is needed into these individual elements and how they can best be supported.

2.2.3. The Emergence of Knowledge Based Firms

In 1997, the International Monetary Fund reported that over the years there has been a dramatic decline in the United Kingdom's manufacturing base and that in parallel there has been an increase in high technology firms and service firms. Supporting figures by Jones-Evans and Westhead (1996) show that there was an increase in the number of high technology companies from 1987-1991 while Lawton-Smith and Romeo (2010) discovered high technology service firms now outnumber manufacturing firms. Considering and monitoring this change is vital as deindustrialisation has important consequences for society, affecting general standards of living and the roles into which people are employed.

This increase in high technology companies has led to the concept of the 'technical entrepreneur' which is far less researched than that of general entrepreneurship (MacKenzie and Jones-Evans, 2000, p.270). With the increase in technological innovation as predicted by Moore's Law (2010), the incidence of technical entrepreneurship is surely one which will only increase. This will cause technical entrepreneurship to take an important position in government policies and thus should be a central research topic.

Recent government policies have stated the need to support growth businesses in order to boost the perception of the UK as an area for innovation (HM Treasury, 2011). This is not surprising, as research has highlighted that innovative companies in certain sectors offer higher growth potential (Audretsch, 1995; Perttu, 2008).

Schreyer (2000) finds that high growth firms are more likely to spend money on R&D (Research and Development) activities when compared to other firms, suggesting that high growth firms may be more technologically oriented while Coad and Reid (2012) argue it is a well-known fact that the more R&D conducted by an economy the higher its growth. However the fact that high technology firms are dealing with novel uncertain concepts and ideas (MacKenzie and Jones-Evans, 2012), means that policy support for high technology firms becomes even more crucial. Thus there are many factors that influence and affect high technology SMEs that may not be as applicable to other SMEs and yet high technology firms may be liable to achieving high growth (Siepel et al, 2012). As a result, the more information that can be provided to policy makers as to what is essential for business development, the more targeted policy decisions can be (Bennett, 2012; Carter and Jones-Evans, 2012; MacKenzie and Jones-Evans, 2012).

2.2.4. Summary

In the review of the literature it has been shown how important high growth SMEs are to the economy, especially in the current economic climate. Furthering research on this area should be of priority to researchers and policy makers in order to inform targeted policies, as many are ineffective, something which needs to be remedied. Finally high technology/knowledge based sectors are growing in numbers yet highly volatile compared to other industries. As such, research into these SMEs and their business growth is vital, interesting and current. Table 2.1 shows a summary of the research issues and the extant literature.

2.2. Aspects of SME's and Knowledge Based Firms		
Literature theme	Emergent research issues	Extant literature
2.2.1. The emergence of the small to medium sized enterprises and gazelles	It is accepted that SMEs are of importance to the economy and this research aims to further knowledge into this area with both academic and practical outcomes.	Audretsch (2006), BIS (2012), Birch (1987), Davis et al (1996), Storey (1994), Autio (2005b), Mason and Brown (2010), Kane (2010), Dale and Morgan (2001), Hijzen et al (2007), Hijzen et al (2010), Strangler and Kedrosky (2010), Morris (2011), Anyadike-Danes et al (2013b), Cressy (2006), Bravo-Biosca and Westlake (2009), Acs (2006), Autio (2007), Autio (2012), Acs and Mueller (2008), Hart et al (2009), Holzland and Friesenbichler (2007), Barringer et al (2005), Carter and Jones-Evans (2012), Allman et al (2011), Roper and Hart (2013). Coad (2009), OECD (2010:2013)
2.2.2 SME Policy	Many SME policies have been created attempting to aid small firms in their growth and yet these policies appear to be ineffective, suggesting that policies are at odds with what aids firms in reality.	European Commission (2009), Bennett (2012), Storey (1994), Dennis (2005), Bennett (2008), Acs (2001), Autio et al (2007), OECD (2010), Schumpeter (1942), Bennett (2007), OECD (2009)
2.2.3. The emergence of knowledge based firms	Research into 'technical entrepreneurship' is less explored in the literature than entrepreneurship in general. With the increasing occurrence of high technology companies and the difficulties they face in growing, this research will aim to provide insight into the processes high technology/knowledge based companies experience during growth.	Jones-Evans and Westhead (1996), Lawton-Smith and Romeo (2010), Schreyer (2000), Audretsch (1995), Perttu (2008), Moore's Law (2010), Coad and Reid (2012), Siepel et al (2012), Carter and Jones-Evans (2012), Bennett (2012), McKenzie and Jones-Evans (2012), HM Treasury (2011), The International Monetary Fund (1997)

Table 2.1. Summary of research issues within section 2.2.

2.3 Aspects of ‘Firm Growth’ Theory

2.3.1 Theoretical Development

The most popular and in-depth growth theory was developed over fifty years ago by Edith Penrose (1959). Since this time, development of firm growth theory has been limited due to the complexity of the growth process itself. Add to this the failure to adhere to similar methodological approaches and operational definitions and the result is a lack of theory and model development (Delmar et al, 2003). Davidsson and Wiklund (2000) suggest that the study of firm growth requires consideration of a number of different theoretical perspectives, needed in order to understand the growth process fully. This must be taken into account when using theory to inform research (Wiklund et al, 2009). Therefore an integrated approach will be taken with consideration of numerous theoretical perspectives, including the theory of the growth of the firm (Penrose, 1959), the resource based view of the firm and the knowledge based view of the firm.

2.3.2 The Theory of the Growth of the Firm (Penrose, 1959)

By far one of the most influential theories of firm growth is Edith Penrose’s (1959) ‘The Theory of the Growth of the Firm’ in which many ideas are presented that are centred on the processes of firm growth (Mahoney, 2005). Penrose believed that the key differentiator of the firm from the marketplace is the presence of administration within the firm, defining the firm’s boundaries. The owner and managers are important in setting the firm’s administrative hierarchy and as the firm grows, delegation becomes more important. The firm is a bundle of productive resources that can be combined in different ways to create different goods for sale, and this combination of resources is what makes the firm unique. Firms should diversify while also focusing on existing products. Her study suggests that growth is limited by the capacity of managers to implement strategies and to plan. The experience the management and human capital of a firm have of working together means that they are difficult to replace. The firm creates a learning environment for all those involved, which leads to new resources that can be used for further expansion, with

material resources being of great importance. Penrose believes that internal limits on expansion include unused resources and lack of specialised knowledge.

Many of the principles that Penrose developed, as outlined above, will be used as a basis for the development of the model for this study. This is because of the large number of academic papers published which cite Penrose's work (Lockett et al, 2007) and due to the influence it has had on current academic thought resulting in, for example, the development of the resource based view of the firm (Wernerfelt, 1984). Penrose views firm development as an on-going process "in which an interacting series of internal changes leads to increases in size accompanied by changes in the characteristics of the growing object" (Penrose, 1959, p1).

Interestingly however there is a lack of research that specifically looks at this developmental process and instead research has grown into the individual internal determinants of firm growth (Dobbs and Hamilton, 2007). These determinants are further reviewed in section 2.4.

Due to the period in which Penrose's ideas were created there are issues which are not taken into account or not emphasised enough in her work, such as the importance of intra-firm relations, open innovation, networking and hybrid modes of growth. For instance Nason (2013) found that many of Penrose's principles were evident in empirical research but concluded that the theory did require updating due to the emergence of the knowledge-based economy. Penrose's research focused upon industrial firms and yet there are now more service based firms within the economy (Grant & Parker, 2009), meaning that intangible resources may need more consideration. The way in which certain factors influence growth has also changed dramatically with companies now marketing through social networking (Bernoff and Li, 2008) and developing new products through open innovation (Glassman and Walton, 2010). Even the way in which companies can now communicate has changed with the introduction of Skype, conference calling and smart phones. The increased mobilisation of the workforce may also mean that some of Penrose's claims are not as relevant as they once were. Thus this research will attempt to consider firm growth in light of these developments. Penrose's theory was also based upon large firms and as such this research will provide valuable knowledge as to the applicability of Penrose's concepts to SMEs. Penrose herself, in the 1996 edition of

her book, notes that the applicability of her theory to modern economic society can be questioned.

This research will demonstrate the link between Penrose's widely cited theory and more recent perspectives, in order to create a model more suited to the realities of firms in today's society, as has been suggested by McKelvie and Wiklund (2010). There has also been little empirical testing of Penrose's ideas (Lockett et al, 2007) and, as a result, this research will add to the literature on Penrose's theory by incorporating many of them into an initial growth model, thus confirming, contradicting or extending them.

2.3.3 Resource-Based View (RBV) of the Firm

The RBV builds on, and was inspired by, the work of Penrose (1959) and takes the perspective that the firm should be considered both as a bundle of products as well as a bundle of resources (Wernfelt, 1984). In the RBV approach it is argued that resources are a source of competitive advantage and that they account for inter-firm performance differences (Hoopes et al, 2003). Barney and Arikan (2001) define these resources as tangible and intangible assets which are used by the firm to create and implement strategies, while Wernfelt (1984) defines them as anything which can provide the firm with a strength or weakness. Wernfelt was one of the first academics to discuss the RBV in the 1980s and argues that this way of analysing firms allows a much deeper insight into what leads to their growth and that it may be possible to determine which resources are the most effective at generating high profit. Barney (1991) suggests that capabilities pair with resources to enable competitive advantage while Prahalad and Hamel (1990) refer to core competencies and capabilities.

The main assumptions of the RBV are that competing firms have different resources, that these resource differences are sustainable (Barney and Arikan, 2001) and that the main focus is on what the firm can do with these resources (Davidsson and Wiklund, 2006). Barney and Arikan (2001) argue that in order to be a source of competitive advantage the resource should be valuable, it should be hard for other firms to imitate it and there should be no other resource which can substitute it. Resources that meet these criteria stand the best chance of creating a competitive strategic advantage for

the firm. This is why research that cites the RBV is usually strategically oriented (Ferreira and Azevedo, 2007). Wernfelt (1984) purports that firms should exploit existing resources while developing new ones while Grant (1996) suggests that management's main role is to effectively deploy these resources and develop new ones. These are very similar to some of Penrose's principles thus emphasising the applicability of her claims.

Barney and Arikan (2001) suggest different types of resources that a firm may have including tangible resources such as finance and physical capital and intangible resources such as human capital and relationships. Intangible resources are vital to many knowledge-based firms (Chrisman et al, 1998) and due to the rise of the knowledge-based economy are central to the way in which they achieve and sustain growth (Salmelin, 2013). Chrisman et al (1998) argue that intangible resources are more influential to the firm's success than tangible resources. Concepts previously discussed, such as open innovation and new modes of communication all mean that intangible resources are more important than ever before (OECD Ministerial Report, 2010). Even though these intangible resources are of vital importance, they may be more difficult to research as they are less defined (Chrisman et al, 1998; Levitas and Chi, 2002). This research will attempt to investigate some of these issues and concentrate on the key tangible and intangible resources necessary for firm growth, thus further developing knowledge as to the applicability of the RBV to SMEs. A key contribution of the RBV to this research is that it suggests that there are certain factors or resources within firms that can be identified as being vital for firm growth. Many of these resources have been researched in an attempt to discover whether their presence is associated with firm growth and this is discussed in section 2.4.

However, as Baker and Ahmad (2010) purport, it is not always easy to find a resource which fits all of the criteria set out by Barney and Arikan (2001). Park (2010) also argues that the RBV does not explain in enough depth how certain intangible resources provide the firm with a competitive advantage, and suggests that a combination of the KBV and RBV will help achieve this. Barney and Arikan (2001) suggest that it is not always the case that a firm with valuable resources will gain superior performance, as valuable resources are not the only variables needed for a firm to grow, suggesting that a complete theory of firm growth requires a

consideration of resources as well as other factors. Porter (1991) argues that there is a lack of research analysing how resources and capabilities evolve over time. The RBV literature also alludes to the importance of the combination of different resources but what is less clear is which specific resources need to be combined and in what way, in order to influence firm growth.

Wernfelt (1984) discusses mergers and acquisitions as being good fields for the sale and purchase of resources. However, since this time it has been suggested that firms can also gain knowledge and ideas through open innovation (Chesbrough et al, 2006; Leitner, 2013; McFarthing, 2012). Curley (2013) argues that open innovation use has exploded in the recent years and has coined the new complexity of open innovation, evidenced by the quadruple helix, as open innovation 2.0. Evidence of this complexity can be seen in recent frameworks such as Horizon 2020, which aims to bring together industry, academia and government to achieve the next step in innovation (European Commission, 2011). Lindegaard (2012) suggests that even though some small firms engage in open innovation, it is mostly larger firms who are able to utilise it fully. This research will add important insight as to the use of open innovation in small companies and how this changes as growth occurs.

The RBV of the firm has evolved over the years, with more and more academics and disciplines considering its importance, ranging from entrepreneurship (Foss et al, 2008) to human resource management (Wright et al, 2001). From the RBV has sprung the term 'dynamic capabilities', the 'competences' view and the 'knowledge based' view, which some authors argue are important resources to attain (Teece et al, 1997). Although these different views each purport to being different theories it appears that what is agreed on is that resources in general are important for firm development (Barney and Arkin, 2001).

According to Barney and Arkin (2001) empirical research conducted into the RBV has in the main supported it. Newbert (2007) however purports that the methodology that was used to reach this conclusion was flawed and in their assessment of the literature find that only half of their tests were empirically supported. Newbert (2008) concludes that there is little direct empirical evidence for the RBV and that its acceptance is based upon its logic. Teece et al (1997) argue that it is the way in

which resources are combined and used within the firm through dynamic capabilities that determine whether or not they will provide the firm with a competitive advantage. This suggests that resources by themselves are not sufficient to enabling firm growth, hence why there is a good opportunity for the linkage of the RBV with other perspectives. Wiklund et al (2009) argue that the RBV is important to consider when studying firm growth while Peteraf and Barney (2003) suggest that both its strength and weakness is that it attributes firm performance differences to internal firm variables, while it also does not consider that resources can come from outside of the firm through, for instance, inter-organisational (Dyer and Singh, 1998) and customer, supplier and alliance (Storbaka and Neonen, 2009) relationships.

Rugman and Verbeke (2002) purport that although there has been a large amount of research conducted based on the RBV, its definitions are still vague with no agreement as to what exactly a resource is. It has also been argued that the RBV does not explain how resources add to a firm's competitive advantage, meaning that it is vague and tautological (Priem and Butler, 2001). This research will add knowledge to the RBV by identifying exactly which key resources are required for growth and how they interact with one another. As it is difficult to account for every possible variable, both internal and external, this research will focus on the essential internal and external resources used by the firm and, as such, consideration of the RBV will be advantageous. The current research will use principles from the RBV of the firm as well as Penrose's principles and by considering more than one perspective, a more holistic model will be created. These theories provide a base with which to integrate much of the extant literature on firm growth, and yet need to be considered in light of recent societal, technological and firm changes and a more specific and coherent model needs to be created which combines the principles of them both. By defining exactly what resources are essential, this study will add fresh insight to the RBV of the firm and will update the literature on the RBV, especially in relation to high growth SMEs. Autere (2005) argues that this multi theoretical approach is important as the RBV cannot, on its own, fully explain firm growth.

The RBV is extremely useful as a practical tool to aid managers in understanding their capabilities and as such the RBV is often targeted at journals with managerial audiences. Hansen et al (2004) however argue that its theoretical use in explaining

firm growth is less pronounced and that to overcome this it should be combined with Penrose's framework. Hoopes et al (2003) also suggest that the RBV should be considered as part of a larger theory and not singularly. Ultimately Armstrong and Shimizu (2007) suggest that the RBV needs to be refined theoretically and undergo empirical development, something which this research will aim to explore.

2.3.4 The Knowledge-Based View of the Firm (KBV)

The KBV of the firm is an extension of the RBV with Gassmann and Keupp (2007) arguing that knowledge is an intangible resource and that the KBV attempts to overcome some of the shortcomings of the RBV. Nonaka et al (2000) argue that even though the RBV recognises knowledge as an important resource, it does not go far enough in recognising that it is the most important resource for competitive advantage that a firm has. This new knowledge is created through learning-by-doing, making the knowledge firm specific, and as such hard to imitate and non-substitutable with another resource.

Grant (1996) suggests that different people in the firm have different specialities and that the purpose of the firm is to integrate and coordinate this knowledge in order to produce goods and services. He purports that the most important aspect of knowledge is that it can continuously be developed and extended, a point also highlighted in Penrose's (1959) theory. Essentially the KBV draws upon Penrose's (1959) theory with Prashanthem (2005) positing that the firm's knowledge needs to be used to integrate different resources in order to achieve firm growth.

Nonaka et al (2000) and Spender and Grant (2005) suggest that the KBV has been developed due to changes in society and the shift towards an information and knowledge based age while Grant (1996) argues the KBV is a good basis from which to understand developments such as the incidence of inter-firm alliances and team based structures. The reference to knowledge and its importance is evident in various reports such as the Ingenious Britain Report (2010), which mentions knowledge exploitation and collaboration as being an important aspect in increasing the export trade of the UK.

As Varis and Littunen (2010) point out, it is widely accepted that innovation leads to growth and that knowledge leads to innovation, while Kim and Mauborgne (1999) argue that innovative firms are differentiated from others by their 'stock' of knowledge and the way that this is used to create new innovations. Both Knight and Cavusgil (2004) and Wiklund and Shepherd (2003) argue that knowledge is the most important resource which the firm has and as this study will focus upon knowledge based companies, knowledge will likely be an important aspect to consider. A review of research into these knowledge-based resources is undertaken in section 2.4.

Even though the KBV of the firm has been widely studied, there is still debate as to whether or not it can be considered as a theory due to the lack of consensus in the literature (Grant, 1996). Even though there is still progress to be made the general consensus is that knowledge is an important resource, especially in modern society. In developing the model this study will take principles from the KBV allowing it to have a knowledge, skills and communication base. This theory is similar to the RBV of the firm, with the main difference being that it identifies a specific resource that is of the greatest importance, suggesting that it is possible to reconcile the two.

2.3.5 Summary

Over the years, different theories of firm growth have been developed and still are being developed. Even though they all purport to be different they all have very similar themes. For instance, they all place an emphasis on resources in general and knowledge, skills and management, with the main difference between them being which resource they perceive to be the most important. Each was conceived under the economic and societal feeling of that time and as such each has differing principles that are relevant in today's economic climate. With the exception of Penrose, they concentrate on only a narrow aspect of the firm and attempt to identify one or a small number of variables as being the most important to firm growth. However, together they combine to create a theory of the firm that is dynamic and focussed. What is needed is for the principles of these theories to be researched via a process-oriented approach, while focussing on detailing the essential resources and factors needed in order to achieve growth. For this research, it is argued that it is essential to consider the principles of each theory in order to inform the models

development, and that the research will add to literature on the theory of firm growth by confirming, contradicting or extending their principles, especially in relation to recent societal, technological and economic changes. Using a holistic mixture of perspectives from differing time periods means that the model itself will be more holistic, a characteristic that is essential when considering business growth variables. Table 2.2 shows the emergent research issues and extant literature with regard to firm growth theory.

Theory	Main Ideas	Positives	Disadvantages	Further work needed	Extant Literature
Penrose	The firm consists of a bundle of resources and develops over time. Resources are combined in unique ways to create services and products. There are managerial limits to growth. The firm is a learning environment.	Broad and holistic. Great influence on the development of other theories.	Dated in that it does not consider the role of inter-firm alliances or open innovation. The principles have not been tested.	Testing of some of the principles. Updating of the theory by researching open innovation and external supplies of resources. Integration of the theory with the RBV and the KBV.	Edith Penrose (1959), Mahoney (2005), Lockett et al (2007), Wernerfelt (1984), Dobbs and Hamilton (2007), Nason (2013), Bernoff and Li (2008), Glassman and Walton (2010), McKelvie and Wiklund (2010), Grant & Parker, (2009)
Resource based view	The firm consists of resources which provide the firm with a competitive advantage. These can include intangible and tangible resources	Focuses on the internal workings of the firm. There is supporting evidence in the literature for it.	Too vague as almost anything can be considered a resource. Does not consider external supply of resources.	Resources which are essential in order for growth to occur need to be identified. Work is also needed into how these resources develop over time. Integration with the KBV and Penrose's theory. Consideration is needed of external resources.	Penrose (1959), Barney and Arikan (2001), Wernfelt (1984), Davidsson and Wiklund (2006), Baker and Ahmad (2010), Park (2010), Grant (1996), Chrisman et al (1998), Salmelin (2013), Chesbrough et al (2006), Leitner (2013), McFarthing (2012), Curley (2013), European Commission (2011), Lindegaard (2012), Peteraf and Barney (2003), Dyer and Singh (1998), Storbaka and Nenonen (2009), OECD Ministerial Report (2010), Wiklund (2009), Rugman and Verbeke (2002), Autere (2005), Hoopes et al (2003), Barney (1991), Prahalad and Hamel (1990), Ferreria and Azevedo (2007), Levitas and Chi, 2002, Porter (1991), (Foss et al, 2008), (Wright et al, 2001), (Teece et al, 1997), Newbert (2007) , Newbert (2008), (Priem and Butler, 2001), Hansen et al (2004), Armstrong and Shimizu (2007)
Knowledge Based View	Knowledge is the most important resource the firm has which is used for competitive advantage.	Very relevant especially in relation to the knowledge based economy.	Too narrow in focus.	Needs to be reconciled with other theories. Need to identify which knowledge is most important for firm growth, where this comes from, how this is dealt with and how this process develops over time	Gassmann and Keupp (2007), Nonaka et al (2000), Grant (1996), Penrose (1959), Prashanthem (2005), Spender and Grant (2005), Ingenious Britain Report (2010), Varis and Littunen (2010), Kim and Mauborgne (1999), Knight and Cavusgil (2004), Wiklund and Shepherd (2003),

Table 2.2. Summary of theories of firm growth, including comparisons and suggestions for future research

2.4 Aspects of Models of Firm Growth

2.4.1. Types of Firm Growth Models

Various types of models have been created that attempt to explain how and why firms grow. Although there is an abundance of literature relating to firm growth, there has been relatively little model development in the area (Delmar et al, 2003). According to Dobbs and Hamilton (2007), there are six different types of small business growth models, stochastic, descriptive, evolutionary, resource based, learning and deterministic. This section focuses on four of these model types, due to their dominance in the firm growth literature, and discusses their strengths and weaknesses and how they could be improved upon.

2.4.2 Stages Models of Firm Growth

Stochastic models, generated from the 1930s onwards, represent some of the very first attempts at creating models to explain firm growth and centre on the theme that firm growth is influenced by too many factors to be predictable (Farouk and Saleh, 2011). The focus then shifted to stage models of firm growth with the general assumption being that a firm's evolution can be depicted through separate stages of development (Lester and Parnell, 1999). Perttu (2008) lists 33 variants between 1951 and 1992, while Levie and Lichtenstein (2010) analyse 104 variants between 1962 and 2006, emphasising the body of work which has been conducted into this domain.

Kazanjian (1988) developed a four-stage model which assumes that the firm encounters problems which force them to change their organisational structure which then leads to growth and so the cycle continues (Kazanjian and Drazin, 1989). Greiner's (1972) model, on the other hand, depicts five stages of growth which each have a crisis which needs to be overcome before movement can progress onto the next stage. These five stages are creativity, direction, delegation, coordination and collaboration.

The advantage of stage models of firm growth is that they attempt to describe which variables are of importance at each stage of development and what types of problems

firms may encounter. According to Pasanen (2006), stage models are extremely useful for understanding and predicting a firm's development. However, there has been debate as to their relevance to firms in practice. Penrose (1952) argues that as they view firms as biological organisms they do not take into account human involvement and conscious awareness and how this affects the growth of the firm. Penrose also argues that they assume that all firms will achieve growth, suggesting it is the norm as opposed to the exception. Lester and Parnell (1999) argue that smaller stage models attempt to over generalise firm development while McMahon (1999) argues that the number of stage models which have been developed means that the choice is often confusing.

Levie and Lichtenstein (2010) conducted an assessment of the stage model literature and argue that less focus should be given to stage models due to the fact that there are widespread differences between each model, with no agreement as to the number of stages a firm passes through and why stages change. They also argue that the number of stage models created has increased over the years suggesting no one model is widely accepted and that firms are in a constant dynamic state of change and as such do not follow the typical stages model.

According to O'Farrell and Hitchens (1988) stage models fail to reveal the underlying processes of growth and are too simplistic in the way they assume that all firms travel through the same stages, in the same order and that there can be no regression through stages, something which was found to be evident in Miller and Friesen's (1984a) empirical research. O'Farrell and Hitchens also point out that many stage models of growth are not validated by empirical research and if they are, they often only involve small sample sizes. More recently, it has been argued that high growth firms offer a theoretical and empirical challenge to stage models which have been criticised in recent literature (Levie and Lichtenstein, 2010). For instance, Eggers et al (1994) tested Churchill and Lewis' (1983) stage model and found that 40% of them did not follow this model, while Baron and Shane (2005) suggest that as growth is a continuous process attempting to reduce it down to concrete stages is not appropriate. Burns (2007) agrees with this and states that stages models should be approached with caution and flexibility, especially with regard to sequence. McCann's (1991, p.206) research concluded that "young ventures are able and

The suggestion that finance, goals, people, strategy, planning, systems and delegation are crucial to growth, as well as the volume of research that concurs with this (Stam et al, 2012; Massey et al, 2006; Holtzman and Anderberg, 2011; Mudambi and Zahra, 2007; Weinzimmer, 2000; Wiklund et al, 2009; Caruana et al, 2002; Srivastav, 2010), means that these factors will be some of those included in the development of the model.

This research will focus on the take-off stage and processes associated with getting to this stage from start up. The reasoning for focussing on this particular stage has been highlighted in section 2.1 of this review and relates to the influence that firms at this stage can have on the economy and employment levels. Thus factors and their developmental process will be considered and analysed in detail, as opposed to a focus on stages of general firm development. Stage models of growth describe how firms adapt to growth (Dobbs and Hamilton, 2007), whereas this research will attempt to create a model which is both descriptive and explanatory. As Tullberg (2004) states whether or not firms travel through distinct stages in a sequential manner is of less importance than how they move from one stage to another. This is at the heart of what this research will address, how firms progress to a high growth state.

A major criticism of Churchill and Lewis' (1983) model is that it was applied to hypothetical business situations and it was not until Eggers et al's (1994) research that it was empirically tested. Eggers et al tested it in a sample of low and high growth companies and found support for Churchill and Lewis' (1983) original concept but also for separating the success stage into two stages, stabilisation and growth orientation. They found that 74% of respondents confirmed that they went through the two new stages added. Eggers et al (1994) found that their sample did experience regression and jumping of stages and that the firms went through the stages in many and varied sequences. As such Eggers et al argue that the term "stages of development" is not appropriate and instead use the term management phases, whereby each phase involves a set of common issues which firms will likely face. Naumes (2006) tested the Churchill-Eggers model and found support for it, but highlight that this is one of the few studies that test these models. As such, this research may add to the knowledge on these models.

The stage models presented suggest that a new approach is needed with which to analyse the firm developmental process. Certain principles of the stage models are agreed upon and yet it is the number of stages and how firms progress through these that presents an issue. This research will utilise some of the stage model principles but concentrate on the individual factors influencing firm growth and as such will provide insight into the developmental process of high growth firms. This will result in further knowledge as to the applicability of stage model principles in high growth SMEs.

In reaction to their criticism of stage model approaches, Levie and Lichtenstein (2010) have coined a new dynamic states theory to explain firm growth. They argue that the firm experiences different states based upon the best match between its resources and demands. As these can both change constantly so can the number of states and the sequence of these states. They argue that this approach allows for the flexibility of firms in reality while also explaining why there are so many stages models in the literature. However, it has not yet been focused into a coherent model or empirically tested (Levie and Lichtenstein, 2010). As such its usefulness to business owners and policy makers is vague and this research may provide further insight into the applicability of its claims.

2.4.4 Growth Variable Models

Other types of firm growth models are those which concentrate on determining the factors that explain why and when growth occurs, coined as deterministic models by Dobbs and Hamilton (2007). They include models by Davidsson (1991), Wiklund (1998), Baum et al (2001), Barringer et al (2005) and Wiklund et al (2009). For example, Wiklund (1998) conducted a comprehensive review of small firm growth research, analysing 70 empirical research studies, and concluded that although the research base was large the studies only focussed on a small number of variables each. This is supported more recently by Davidsson et al (2007), who argue that creation of these types of models and empirical testing of them is rare and that there has been a lack of holistic integration. This fragmentation has led to a slow pace of knowledge accumulation with regard to firm growth (Lockett et al, 2011).

In Tonge's (2001) review they argue that there are only seven integrative models of small firm growth (Bygrave, 1989; Gibb and Scott, 1985; Keat and Bracker, 1988; Covin and Slevin, 1991; Davidsson, 1991; Jennings and Beaver, 1997; Naffziger et al, 1994). Gibb and Scott's (1985) model is one of the few which cover a total of seventeen broad factors which may influence development, analysed over eighteen months. This model is useful in that it incorporates the majority of the factors still found to be of importance to firm development, with an emphasis on process, but at the same time is now outdated due to, among other issues, the changes which have taken place to the economy and the way in which businesses market products, communicate and work together to achieve competitive advantage. The main criticism of this model is that its purpose was to focus on product and market development as opposed to growth per se and as such analysis of the factors took place in this context, with a focus on planning. Bygrave's (1989) model again includes a broad range of factors but is not based on empirical research, with Bygrave conceding that it would be very difficult to test. Covin and Slevin (1991) tried to incorporate factors at different levels of analysis but this model was not empirically tested and the authors admit that it would be difficult to do so. This model also focused on large firms and as such its applicability to small firms could be questioned. Perren (1999) argues that these seven models simplify the process of firm development and do not consider how these factors interact or evolve together. During the current review only three further integrative models can be added to this list, namely Wiklund's (1998), Baum et al's (2001) and Barringer's (2005) model. As recently as 2005, Davidsson et al (2007) argued that Davidsson (1991) and Wiklund (1998) represent the few attempts at integrating a broad range of firm growth factors and testing them empirically.

Davidsson (1991) is one researcher who did create a model of small firm growth that was also empirically tested. Davidsson's model subsumed all variables thought to influence growth into three determinants of ability, need and opportunity and found that all variables influenced growth. However, the model does not analyse certain factors which have recently been found to be related to firm growth (Davidsson et al, 2007) and Davidsson (1991) himself admits that the model does not explain a large enough amount of variance. Although detailed, this model is not useful for giving

practical advice to small firm owners and managers as to how to achieve firm growth as it does not provide descriptors of each variable.

Wiklund (1998) then focused on integrating three theoretical perspectives; the RBV, the motivation perspective and strategic adaptation, along with their associated factors. He hypothesised that strategy was directly related to growth while resources, motivation and the environment affected the firm through their effect on strategy. He also found that all three themes of variables influence growth which lends weight to the argument that the relationships between a wide range of factors need to be studied from different levels of analysis. The main criticism of Wiklund's research is that it does not analyse the effect of moderating variables (Davidsson et al, 2007), which may aid in providing a more comprehensive explanation of firm growth.

One of the more recent models is that by Barringer et al (2005), who analysed variables relating to different types of founder characteristics, firm attributes, business practices and human resource management practices against case study narratives from both rapid and slow growth firms. They found that a number of variables were associated with growth including industry experience, education, commitment to growth, participation in inter-organisational relationships, customer knowledge and employee development. The inclusion of inter-organisational relationships and employee development is rare in models such as this, even though subsequent research has suggested inter-organisational relationships can influence financial performance (Lawson et al, 2009), suggesting there is a benefit to the growth of the firm. Although the model does further knowledge as to which variables influence rapid growth firms, Barringer et al point out that it is narrow in scope. The categories of variables are not holistic and there are many variables found to influence firms in previous research that are not included in this model such as innovation (Coad and Rao, 2006) and finance (Carpenter and Peterson, 2002). The model is also not empirically tested and as such this research will provide insight into the relevance of its claims under empirical testing. The model developed throughout this research will thus attempt to create a more holistic model than that of Barringer et al by including more variables, and will also take a process-oriented approach to study their development.

Another model that attempts to integrate factors previously found to influence growth is that by Baum et al (2001). This model attempts to pinpoint the direct and indirect influences of different factors on growth, via responses given by CEOs to a questionnaire. The research discovered that venture growth was better predicted when indirect effects were considered as well as direct effects. They argue that the entrepreneur's traits lead to different skills which are used to create a strategy, and that the entrepreneur's motivation and technical skills allow for the implementation of this strategy. Davidsson (2007) argues that Baum et al's approach, of concentrating on a specific and small sub set of firms, is advantageous as otherwise the relationships found between factors may have remained undetected, while Shane et al (2003) argues that this approach allows for control of regional, environmental and opportunity related factors. This model does further knowledge as to the entrepreneur's effect on growth and is considered by Poon et al (2006) to be unusual in the way it analyses interactions between individual, firm and environmental factors. The use of indirect and direct effects gives a clearer picture of venture growth by creating a story of the interrelated effects of different factors on growth. As strategy, motivation and competencies were found to influence venture growth these will be researched for the development of the current model and will thus provide complimentary or contradictory evidence for Baum et al's (2001) model. However, Baum et al acknowledge that they do not include all factors which may influence growth, such as innovation and intangible assets. Thus it could be argued that the model is not holistic, concentrating too much on the entrepreneur to the detriment of other factors.

Each of the models above and others like them have furthered our knowledge as to what influences firm growth and have begun to untangle what is a complex array of factors. Much research concentrates on discovering the variables which are associated with small firm growth (Dobbs and Hamilton, 2007) yet there is a lack of conceptual modelling which attempts to link factors at different levels of analysis (Stam et al, 2006). As Wiklund et al (2009) argues, the growth literature is highly fragmented while Davidsson and Wiklund (2000) suggest that there is a lack of holistic modelling. Wiklund's (1998) review found many studies choose to only focus on a limited number of variables found to be important in previous research.

This means that the research does not always inform each other and previous research is not used to form cumulative, integrative and holistic models.

Dobbs and Hamilton (2007) argue that the nature of small firm growth offers challenges for each type of model evident in the literature, with stage models not being flexible enough and deterministic models not offering a full enough explanation of a wide enough range of factors. This suggests that a different approach to the creation of small firm growth models is needed that allows for the flexibility of real firms but also incorporates the wide range of factors which influence small firms.

The main issue with quantitative models of firm growth is that they often only explain a small percentage of variance in growth, such as in Wiklund et al's (2009) study in which only 13% of variance was initially explained. According to Davidsson and Klofsten (2003) these models also rarely provide practical advice and tools which both researchers and practitioners can use, as can be seen in the above models which have not been widely disseminated and used. In Dobb and Hamilton's (2007) review of deterministic models, they conclude that although there is an abundance of research in this field, our understanding of the growth processes of firms remains limited. They argue this is due to both the complexity of growth and the types of methodology that researchers are using. Their main criticism of the methodology often used, such as that of cross sectional, is that this may not explain the cause of growth but rather the factors which are present as a consequence of growth, a view supported by Sheppard (2010). They suggest that research needs to be longitudinal in order for researchers to be able to trace the processes leading up to growth and which may therefore explain growth. Stam et al (2006) argue that what is missing from the firm growth literature is research that explains the sequencing of events which lead to growth. The methodology used throughout this research will attempt to remedy these issues by tracing the processes and sequence of events leading to growth.

This research will aim to create a model of the essential factors needed to achieve high growth. The factors included will be those that other researchers have considered, while some will be more recent and less explored areas such as open innovation and intra-organisational relationships. The aim of the model will be to be

holistic, to describe the processes of growth, to be practical and to achieve this by using previous research to inform model development.

2.4.5 The Business Platform Model (Klofsten, 1992)

Klofsten's (1992) business platform model attempts to incorporate both stage model principles and deterministic model principles into one. The model focuses on the essential factors needed to progress from a start-up stage of development to one in which the firm is stable and less vulnerable (Klofsten, 1992). Klofsten (1992) developed the business platform model during his dissertation, in which he undertook three in-depth case studies of high technology start-up firms, although he has subsequently updated and improved his approach, with the most recent version to be found in Klofsten's (2010) updated business platform model book.

According to Klofsten (2010), to reach the business platform the firm needs to secure an inflow of resources. The firm must then utilise and manage these resources via employees and the general organisational structure. The business platform model has proved successful in both academic and business circles (Davidsson and Klofsten, 2003; Klofsten, 1992; 1994; 1997; 1998; Kirwan et al, 2008; Yencken and Gillan, 2006) and as such is an important model to consider. The business platform model lists the factors or 'cornerstones' which it is essential a firm has to become less vulnerable and more likely to develop (Klofsten, 2010). These are shown in Klofstens model detailed in table 2.3 below.

Cornerstone	Low Level (L)	Intermediate Level (I)	High Level (H)
Idea	Idea is vague. Business concept not yet articulated	Clear articulated understanding of the uniqueness of own products and know-how. First step towards to business concept is taken	Business concept in initial version. It defines users (customers), their needs and ways to satisfy the latter
Product	No finished product exists. Working model or prototype may be available	Beta product is tested on pilot customers	Finished product available and with key customer acceptance
Definition of market	Market not clearly defined. Perhaps tentative efforts to find customer categories	Early mapping of customer categories but no priorities yet	Market basics are defined. One or more profitable niches
Organisational Development	No organisational structure. No key functions, only informal ad hoc contacts	Reduced overlapping of functional roles. Coordination of internal/external activities	Operational organisational structure that enables problem solving, including integration/coordination of key internal/external functions
Core group expertise	Necessary business and technological expertise is lacking	Necessary business and technological expertise available.	Corporate association with actors with high and well matched business and technological expertise
Prime mover and commitment	No driving force to develop a business activity. Founder(s) treat idea as a hobby	No strong driving force to create a business activity. Small-scale commitment with personal orientation	At least one highly committed actor striving to create a business. Strong commitment of corporate staff.
Customer relations	Underdeveloped customer relations. Sales procedure is non-existent	Sufficient quantity and quality of customer relations. Pilot selling and sales evaluation	Sufficient quantity and quality of customer relations. Market acceptance. Opportunity for continued sales
Other firm relations	No relational network for complementary resources. Shortage of capital	No variety in other relations financial relations established for capital supply	Network to supply capital, management, credibility

Table 2.3. The business platform model (Adapted from Klofsten, 2010). The bold dictates the minimum level which needs to be attained on each cornerstone

According to Klofsten (2010), in order to achieve a stable position, the firm needs to achieve the minimum level which the model dictates is needed for each cornerstone (as long as there are no dramatic changes in the environment and these minimum levels are attained the firm will reach a stable position). According to Klofsten, three levels were chosen in order to make it easier to differentiate one from another.

According to Klofsten, firms may start at different levels on each cornerstone and may not develop them sequentially or simultaneously. Some cornerstones may develop at a faster rate than others as some cornerstones are easier to develop. Klofsten argues that it is important to consider that a high level on one cornerstone cannot compensate for a lower level on another, suggesting it is vital for all areas of the model to develop in order for firm development to occur. Klofsten's (2010) case studies demonstrated that if the business platform was not attained then the firm would eventually disappear and that if the platform is attained it is usually within the first three years of the firm's life.

Tullberg (2004) suggests it is possible to see that the eight cornerstones are all linked to each other and flow in a meaningful way. According to Brillois (2000) Klofsten's original model is holistic in the way that it takes many of the problems associated with new business development and encompasses them into one model. As the business platform model is based on the start-up stage of development it acts to create a holistic view of a small 'stage' of a firm's development (Tullberg, 2004). Thus it is associated with the stages models of growth and yet overcomes many of their limitations by being more narrowly focused. However, according to Klofsten (2010) achieving the business platform is not the end of the development process. This research will attempt to uncover these further processes that are essential at the next stage of development.

The business platform is based upon the inflow and utilisation of resources and has its roots in various theoretical perspectives, including the RBV (Tullberg, 2004). The emphasis Klofsten (2010) puts on resources also seems to have great similarity to the emphasis that Penrose (1959) also places on resources. Klofsten (1992) created the model through an extensive literature review, detailed well in Davidsson and Klofsten's (2003) article.

Tullberg (2004) argues that the main reason for the success of the model is due to its applicability to real life firms. According to Tullberg, the model is easy to understand and requires no prior theoretical knowledge. The fact that the model is aimed for use by entrepreneurs, management and venture capitalists exemplifies the models benefits for detailing solid proactive measures to improve the businesses prospects. According to Brillois (2000), the model is useful for financial investors to assess whether or not to continue to financially support the firm. Thus the model provides a framework within which to analyse a firm's development and is reactive in its approach as opposed to being merely descriptive and predictive.

According to Tullberg's (2004) research, there is no need to add any additional cornerstones, with the only suggestion being that some of the cornerstones are merged. This lack of need for amendment to the model suggests that Klfosten has managed to capture the early development processes of firms well. Brillois (2000) states that it could be argued that Klfosten's model has less relevance in the 'new economy' but feels that it still has relevance today and has not filtered out like some models before it.

An attempt to transform Klfosten's (1992) model into a quantifiable questionnaire instrument has been made by Davidsson and Klfosten (2003). This attempt proved successful with statistical tests indicating that the concepts that were being measured were reliable, suggesting that it may be possible to disseminate the model and its benefits to a wider audience. The questionnaire was then used by Yencken and Gillan (2006) who found it to be an effective self-diagnostic tool for use by companies.

Even though the business platform model has proved successful, Tullberg (2004) states that one of the main criticisms is that some of the descriptions of the cornerstones are vague, and that it is difficult to decide where to place a firm within the three levels. This may be the price to pay for such a holistic model, but could be remedied by having more detailed descriptions of what is required for each cornerstone. Tullberg (2004) also suggests that the model may point to symptoms of potential problems within the company, as opposed to the source of the problem.

According to Brillois (2000), the business platform is, like other models, a simplification of reality suggesting that this must be taken into account when it is used to assess firms. However, the more complex a model becomes the harder it is to practically use it due to the level of analysis needed.

According to Neary's (2007) research there are six factors that are not included in the business platform model (Klofsten, 1992) but which should be. These are people (as without them nothing can be done); systems (to make information control and jobs easier); ethos (as this defines everything in the business); leadership (for inspiration and motivation); and communication (to control the flow of information and mentoring). According to Neary (2007), the most important addition should be the entrepreneur's vision and energy, as this should underpin the whole model. Many of the suggested variables above including people, systems, leadership and communication will be incorporated in the model which will be developed throughout the course of this research.

Brillois (2000) also suggests that the importance of each cornerstone is changed with the addition of a new cornerstone solely related to finance, as without finance the business cannot develop. The need for a cornerstone focusing solely on finance is emphasised by other literature that suggests it is of importance (Wiklund et al, 2009; Daskalakis et al, 2013; Inderst and Mueller, 2009; Kitching et al, 2011; Dollinger, 1999; Ullah et al, 2011; Klofsten et al, 1998). Brillois also suggests that the cornerstone 'other firm relations' be made less important due to the evolution of the new economy. However, this study will suggest that other firm relations or contacts is an important part of a firm's development as discovered by Gray (2003) and Littunen and Niittykangas (2010). For instance, there is a wide range of literature which suggests that networking is of importance to firm development (Lechner and Dowling, 2003; OECD, 2010; Parkhe et al, 2006; Perren, 1999; Zhao and Aram, 1995) as well as literature highlighting the importance of supply chains (Craighead et al, 2009; Hult et al, 2006; Wyncarczyk and Watson, 2005) If anything, other firm relations may never have been so important due to open innovation (Curley, 2013). This research will argue that there are some variables which Klofsten (2010) should have included in his model or placed more emphasis on and which have been neglected including contacts, finance and human capital. As such, the model which

will be developed will likely include more variables than the business platform model.

This research will attempt to create a model of the processes needed for firm growth, very much like Klofsten's model. However, as opposed to focusing on the start-up phase of development, this research will focus on the growth phase. Due to their success and emphasis in recent literature many of the cornerstones of Klofsten's model will be used as a basis for the 'growth platform' model in this research. The research will add to knowledge, as Klofsten's did, in the way that it will assess growth processes holistically. Thus this research hopes to extend knowledge of the variables and processes that affect firm growth. The research will also add to the literature on the business platform model (Klofsten, 2010) by discovering which variables are still relevant in the next stage of the firm's development.

2.4.6 Summary

There are various types of models of firm growth some of which have been reviewed above. Stage models are useful to gain an overall picture of firm development yet are often too simplistic. Variable or deterministic models are extremely useful in pinpointing the factors associated with growth yet there is lack of a holistic, process orientated model of this type which also provides practical advice to business owners. Klofsten's (2010) business platform model is the best attempt so far to create a model that is holistic, deterministic and practical. This model focuses on the start-up stage of development whereas the next step is to create a model which focuses on the high growth stage of development. Unfortunately there has been a lack of model development in recent years and as such there seems to be no comprehensive model of firm growth which details the interconnected processes which are essential in order for a firm to go from a stable position to a rapidly growing position. This is exactly what the current research will attempt to remedy. Table 2.4 highlights the key research issues from this section as well as key extant literature.

2.2. Aspects of Models of Firm Growth		
Literature theme	Emergent research issues	Extant literature
2.4.2. Stages models of firm growth	There are many stage models of firm growth which focus on the various stages of firm development. This research will argue that it is vital to view the modelling of firm growth from a different perspective.	Farouk and Saleh (2011), Lester and Parnell (1999), Perttu (2008), Levie and Lichtenstein (2010), Kazanjian (1988), Kazanjian and Drazin (1989), Griener (1972), Pasanen (2006), Penrose (1952), McMahon (1999), O'Farrell and Hitchens (1988), Eggers et al (1994), Churchill and Lewis (1983), Baron and Shane (2005), Burns (2007), Miller and Friesen (1984a), McCann (1991), Garnsey et al (2006)
2.4.3. The five stages of small business growth	This model appears to overcome many of the criticisms of stage models, however stage models by their nature are too holistic, neglecting the detail which is needed to understand firm development. This research will attempt to remedy this by focusing on one stage of this model and examining in detail the processes needed to reach it.	Churchill and Lewis (1983), Dobbs and Hamilton (2007), Tullberg (2004), Eggers et al (1994), Naumes (2006), Levie and Lichtenstein (2010),
2.4.4. Growth variable models	Growth variable models have provided knowledge as to the factors which are associated with growth yet they neglect important factors which influence growth, and do not provide practical advice as to how to achieve growth. There is not yet a model of firm growth which is holistic, integrative and practical. This is what this research will attempt to create.	Dobbs and Hamilton (2007), Barringer et al (2005), Wiklund et al (2009), Davidsson (1991), Wiklund (1998), Baum et al (2001), Lockett et al (2011), Tonge (2001), Gibb and Scott (1985), Keat and Bracker (1988), Bygrave (1989), Covin and Slevin (1991), Davidsson, (1991), Naffziger et al (1994), Jennings and Beaver (1997), Perren (1999), Davidsson et al (2007), Lawson et al (2009), Coad and Rao (2006), Carpenter and Peterson (2002), Shane et al (2003), Poon et al (2006), Dobbs and Hamilton (2007), Stam et al (2006), Wiklund et al (2009), Davidsson and Wiklund (2000), Davidsson and Klofsten (2003), Sheppard (2010), Davidsson (2007)
2.4.5. The Business Platform Model (Klofsten, 1992)	The business platform model is the best attempt to create a holistic and practical model of firm development so far. However, there does seem to be factors which are not included in the model which appear to influence firm development and importantly there has been no attempt to create a model such as Klofsten's for the next stage of development; the growth stage.	Klofsten (1992), Klofsten (2010) Davidsson and Klofsten (2003), Tullberg (2004), Brillois (2000), Klofsten (1994, 1997, 2010), Yencken (2006), Neary (2007), Wiklund et al (2009), Gray (2003), Littunen and Niittykangas (2010), Perren (1999), Lechner and Dowling (2003), OECD (2010), Parkhe et al (2006), Zhao and Aram (1995), Craighead et al (2009), Hult et al (2006), Wynarczyk and Watson (2005), Curley (2013), Klofsten (1994:1997:1998), Kirwan et al (2008), Yencken and Gillan (2006)

Table 2.4. Summary of research issues within section 2.4.

2.5 Aspects of ‘Factors affecting the growth of the firm’

2.5.1 Introduction

There has been an overwhelming amount of research conducted into the factors associated with firm growth (Davidsson et al, 2007; Gibrat, 1931, as cited in Coad and Holzl, 2010; Parker et al, 2010; Dobbs and Hamilton, 2007). The aim of this section will be to review some of the key literature and to suggest further research that needs to be conducted. It is important to consider that each of these factors could alone constitute a PhD thesis. Each factor has its roots in broad, in-depth fields in which an abundance of research has been conducted. This review will cover the key literature for each factor providing a succinct review. The review of these factors is crucial in guiding the research, enabling the complex phenomenon of firm growth to be researched in a more structured way. Many of the factors discussed in this section have their theoretical underpinnings in the theories reviewed in section 2.3.

2.5.2 Emergent Themes

Much of the research into factors associated with firm growth use Gibrat's (1931, as cited in Coad and Holzl, 2010) stochastic model as a reference point. This model states that firm growth is independent of firm size and depicts growth in terms of random events. Research takes this as a null hypothesis and attempts to discover factors that will explain firm growth in a systematic way (Coad and Holzl, 2010). Coad (2007) argues that the growth of SMEs is found to be variable, while the SCALES Report (2009) argues there are certain processes which lead to growth. This highlights the heterogeneity of firm growth and the importance of discovering variables which affect growth consistently.

In an attempt to discover emergent themes from the literature on the factors associated with firm growth, Storey (1994) conducted a review and grouped these factors into three themes covering strategy, the firm and the entrepreneur. Smallbone and Wyr (2012) argue that this framework is generally agreed upon within the small firm growth literature. With regard to the entrepreneur Storey argues that this will have a major impact on firms due to factors such as the owners' motivation,

dedication, goals, previous experience, education, management experience, sector experience, age, training and number of founders. However, as Smallbone and Wyer (2012) argue, even though these factors have been found to be associated with small firm growth none of them have been consistently found to exert an influence. With regard to firm characteristics that affect the firm Storey argues that these consist of age, size, ownership, location, legal form and sector or markets. With regard to strategy Storey is referring to decisions taken once the firm has started and argues that factors such as training, equity, technological sophistication, market strategy, planning, management, products and customers affect firm growth.

As will be shown in forthcoming sections, these themes have been repeatedly referred to throughout the literature and used as a basis for further research. In a more recent review, Smallbone and Wyer (2012) condensed the literature into themes consisting of management strategies, the entrepreneur, environmental/industry specific factors and the characteristics of the firm. These themes are very similar to those of Storey (1994) and highlight that similarities in the factors associated with firm growth can be found. However, since both of these reviews additional factors have been suggested, such as open innovation (Chesbrough, 2003a) and networking (Hite and Hesterly, 2001), meaning that they therefore neglect the influence of external people and organisations on the firm. The following sections will review the literature on factors associated with firm growth, splitting them into three sections, with the aim of identifying any gaps in current knowledge.

2.5.3 People

2.5.3.1 The Entrepreneur: Motivation and Aspirations

An understanding of the small firm requires an understanding of the entrepreneur's motivations (Carsrud and Brannback, 2011; Locke and Baum, 2007; Reynolds et al, 2002; Shane et al, 2003; Smallbone and Wyer, 2012; Wang et al, 2007) Motivation and aspiration is defined here similarly to the way in which it is in Hessels et al's (2008) research, with motivation being the reasoning as to why the entrepreneur starts the business, and aspirations meaning the wants for the future of the firm. It is thought that the entrepreneur's motivation and aspirations have a profound influence

as to whether or not the business grows (Kozan et al, 2006; Massey et al, 2006) with Stam et al (2012) positing that growth is rarely achieved without growth motivations. Davidsson's (1991) model included growth motivation as one of the core determinants needed for growth to occur and argues that growth motivation by itself will not result in growth but is determined by ability, need and opportunity, suggesting that motivation interacts with other factors to exert an influence.

Gray (2002) discovered that the presence of a growth orientation was related to actual growth while those firms who were growth averse were more likely to be small. Statistically Smallbone et al's (1995) research found that 93% of high growth companies had been aiming for high growth compared to 32% of other companies while Delmar and Wiklund (2008) and Baum et al (2001) have also discovered that the owner's motivation was associated with growth, suggesting that motivation is a precursor to growth and is one of the key factors influencing firm development.

Wiklund and Shepherd (2003) also found that growth motivation was associated with actual firm growth but did find that this effect was mediated by the entrepreneur's level of education and expertise, with higher expertise influencing motivation through the discovery and exploitation of opportunities, which in turn influenced firm performance. They also found that access to growth opportunities in the environment and access to resources mediated the relationship between growth motivation and growth. This suggests that motivation does not act solely but interacts with other factors to influence the level of growth achieved and that as these factors change so may the motivation.

Extant literature also alludes to some of the reasons as to why motivation may influence growth. For instance, Cooper and Artz (1995) analysed the goals of the entrepreneur and argue that their goals drive their actions. Baum and Locke (2004) also found that goals that were communicated were related to firm growth with Mahoney (2001) discovering that the communication of a vision helped align the entrepreneur and the employee goals. This suggests that it is not only important to have goals in mind for the firm but to ensure that other people also understand what these goals are. However, Baum and Locke's (2004) research was cross sectional and

as such may neglect to highlight important changes taking place with regard to goals during these time frames.

This is not to say that all firms have growth aspirations. Wiklund et al (2003) and Human and Matthews (2004) found that not all small firms have the motivation to grow while Kelly et al (2010) found that only 9% of all start ups expect to create 20 or more jobs in the next five years. This suggests that understanding how growth aspirations influence firm growth is important for both business owners and policy makers, as this may enable an understanding as to why the majority of small businesses do not achieve high growth.

However, attempting to link the entrepreneur's motivation with the firm's success has received criticism from, for example, Gibb and Davies (1990) and Carsrud and Brannback (2011), who suggest that many of these approaches neglect the fact that people can change over time, suggesting that motivation should be considered as a dynamic process. Shane et al (2003) also argue that there is a lack of research into motivation and how it interacts with other areas and thus what its indirect effects are, suggesting that research needs to consider motivation and its relationship with other factors, which will be one of the aims of this research. One study that did research the indirect effects of motives was Baum et al (2001) who found that motives affected growth through skills, situation specific motivation and strategies. This type of insight may be aided by qualitative research and it has been suggested that qualitative research into growth aspirations has been limited (Bagranoff and Turner, 2004; Morris et al, 2006).

It appears that there is a general consensus that motivation for growth is associated with growth. No research has been found suggesting that growth motivation is not associated with firm growth, but rather that motivation alone is not enough to achieve growth. What is lacking is research into how motivations develop over time, exert an influence on the firm and interact with other factors that are needed for firm growth.

2.5.3.2 The Entrepreneur: Competences

Entrepreneurs are thought to be central to economic growth and development (Baumol et al, 2007) and as such it is reasonable to assume that the entrepreneur's competences would exert an influence on firm growth. Man and Chan (2002, p2) define entrepreneurial competences as "a higher-level characteristic encompassing personality traits, skills and knowledge".

Kulicke et al (1996, cited in Alums and Nerlinger, 1999) found that the growth of high technology firms was associated with the owner's technical knowledge, needed in order to develop high technology products. There is much research which discovers that technical skills are associated with firm growth (Zhou and De Wits, 2009; Almus and Nerglinger, 1999; Mudambi and Zahra, 2007). However, Oakey (2003) argues that this technical knowledge must be coupled with managerial skills in order to make full use of it. Colombo and Grilli (2005) highlight this in their research in which they find that rapid growth is highest when technical knowledge is combined with commercial knowledge, arguing that if only technical knowledge is present growth may not occur. Ganotakis (2012) also found that complementary skills are important to business performance. Thus there appears to be debate in the literature as to whether both technical and business skills are required for growth to occur.

Gibb and Scott (1985) analysed competences and discovered that the process of firm development is highly dynamic with learning taking place from the entrepreneur, influenced by his/or attitudes and knowledge. Along similar lines, Rae (2004) argues that the entrepreneurs experience and capability evolves over time suggesting that learning is an integral part of both firm and owner development. Thus it may not only be that specific competences are needed for firm growth but that owners must be flexible and co-evolve with their firm.

Chorev and Anderson (2006) asked managers, owners and financiers to rank variables that may be associated with firm growth into an order of importance. They found that this group of people consistently ranked expertise highly. Baum et al's (2001) research found that entrepreneurial technical, organisational and industry skills had direct effects on venture growth. However, they can only speculate as to

why this was the case and only used quantitative data suggesting that further qualitative research is needed in order to gain insight into how exactly this expertise influences the firm.

Taking a different stance, Barringer et al (2005) compared rapid growth firm narratives with slow growth firm narratives and found that the rapid growth firms were more likely to have firm owners with prior industry experience, a finding supported by Ganotakis (2012). According to MacMillan and Day (1987) this previous experience provides them with a wide array of contacts which can aid with the growth process. More recently, Littunen and Niittykangas (2010) found that there was an association between high firm growth and the owners' knowledge with regard to the firm's products. Jones-Evans (1996) found that management and technical competence exerted an influence on the strategy of the firm. This highlights multiple areas of the firm that previous experience has been found to influence, suggesting that certain factors, such as management and strategy, cannot be considered without reference to entrepreneurial expertise. With regard to specific competencies needed Arnaldo et al (2012) found that entrepreneur's with skills in planning, directing others, bargaining and information gathering outperformed entrepreneurs without these skills.

Jones-Evans (1995) research into the previous experience of technical entrepreneurs found that they could be divided into different types relating to their industry and academic experience. One of these was the researcher-producer, someone whose previous experience is mainly in academia with some industry experience. The research found that the majority of technical entrepreneurs' fell into the researcher-producer category, suggesting that technical entrepreneurship is related to technical knowledge. Thus it would be important to see if high growth knowledge based firms fall into this category of expertise or whether they can now gain some of this expertise from, for example, open innovation (Chesbrough, 2003a).

However, Stam and Garnsey (2007) analysed six empirical studies on education, skills and experiences of founders and found that only one found a relationship between management experience and growth (Vivarelli and Audretsch, 1998) and that the influence of prior industry experience is found to have an effect in some

studies (Bosma et al, 2004) but not in others (Stam et al, 2006). There is a need to discover which of these competences are essential as not all research finds the same results and does not attempt to discover why these competences are important, only speculating on this after research has taken place. Only a minority of the above studies focus on high growth firms meaning that there is a significant lack of knowledge as to whether these same competencies are relevant for high growth to occur. There is also a lack of research into how these competences develop over time and at what level they need to be developed to before growth will occur.

2.5.3.3 Management: Necessity and Competences

Willard et al (1992) argue that as a firm grows managerial influences become more important to firm development, suggesting that the management team is important in the growth process. For instance, Birley and Stockley (2000) highlight the role of entrepreneurial teams in firm growth while Chorev and Anderson (2006) discovered that owners, managers and financiers felt that the core team and their commitment and expertise were the most important factors needed to achieve success in high technology firms.

Statistically Smallbone et al (1995) found that 73% of high growth firms increased their management numbers during growth and half of them increased the time allowed for management tasks. However, Levy et al (2011) found that accessing management skills is a problem for growing firms, with 34% of growth firms citing this as a barrier to further growth. This is highlighted in the OECD (2009) review of high growth firms, which argues that it is important for policies to encourage the training of management skills in order for firms to cope with the issues created during growth. Thus research suggests that management competence is needed, especially during a growth phase.

Joyce et al (2003a; 2003b) and Nohria et al (2003) researched which management practices influenced growth. The research analysed management practices over a ten year period and then compared this to financial returns to shareholders. They found that strategy, execution, culture, structure, talent, innovation, leadership, and mergers and partnerships were essential management practices. Gronholdt and Martensen (2009) took this one step further and analysed high performing and low performing

companies according to these management practices. They found that the largest differences were on strategy, culture, talent, and leadership but that high performing firms handled all eight management practices better. However both Joyce et al's and Gronholdt and Martensen's sample consisted of large firms. As such both these studies fail to provide information as to the essential management practices needed to influence initial growth and instead give information as to what is needed to improve or sustain growth.

The influence of management on growth has been alluded to in the literature. For instance, Alvarez and Barney (2004) argue a management team must develop commercial knowledge and use it for competitive advantage, while Beaver and Jennings (2005) argue that the relationship between owners, entrepreneurs and managers is important as at some point delegation must take place, meaning that the owner must separate from management tasks. Teece and Pisano (1994) argue that the resources of the firm need to be combined in order to form a competitive advantage and management does this by using their existing knowledge and experiential learning.

From a theoretical perspective, Penrose (1959) argues that managers who have experience of working within the firm are part of the firm's growth process as they are integral to the planning and execution of growth ideas. Penrose consistently refers to 'managerial services' as being different to 'entrepreneurial services' in that managers should maintain the firm while the entrepreneur identifies opportunities and associated risks. The research already mentioned accords with these assumptions by suggesting that management is needed in order for the firm and employees to be managed. Stage models such as those by Churchill and Lewis (1983), Kazanjian (1988) and Miller and Freisen (1984a) highlight the need for managers during growth phases, in order for delegation to take place. Thus it appears that managers are integral to the transition from start up to growth.

2.5.3.4 Managerial Leadership

Ensley et al (2006) researched leadership styles of top management teams in fast growth ventures aged between 4 and 9 years and found that both vertical and shared leadership had a positive influence on firm performance. They speculate that this is

due to vertical leadership being needed when the company is small which then needs to be developed into shared leadership as the firm grows. They suggest future research should attempt to discover if this is true and look at the process of how management teams leadership styles change over time.

Liang et al (2007) highlight the importance of the leader in the context of organisational processes, while Srivastava et al (2006) argue that the leader has an influence on the knowledge sharing of employees and that empowering leadership means they are more likely to share knowledge as they will feel they will get recognition for this. Both of these studies focus on medium sized firms and as such although they provide valuable knowledge on the role of management they do not provide insight into how the management within these firms has developed since start up. Xue et al (2011) researched team climate and empowering leadership and its relationship with knowledge sharing and found that both exerted an influence on knowledge sharing, which they argue suggests firms should use this approach. This research however used a sample of university students and as such does not provide insight into the relevance to high growth SMEs.

Although there is much research which seems to suggest that management are a crucial part of the growth process there seems to be a lack of research which aims to discover how the way in which the firm is managed changes over time. This is likely due to lack of management staff in the start-up phase, but many stage models of growth depict a development from the entrepreneur acting as manager to the hiring of lower level managers as the firm grows (Churchill and Lewis, 1983; Miller and Freisen, 1984a). Theoretical work (Penrose, 1959) also considers management to be of importance to the growth process and as such it seems important to analyse management separately from owners. It appears that the role of second level management is generally researched in large or medium sized firms, while in early stage firms CEO management or human capital is the focus. What is needed therefore is research which gives an insight into the process of development of management from the early stage to the high growth stage of a firm's development. This type of process oriented approach would offer more insight into how firms should develop their managerial capabilities in reality. In conjunction with this there appears to be a lack of insight into how leadership changes as the firm grows which

is important knowledge to have due to evidence in the literature pointing to leadership skills influencing firm development. Thus the literature provides insight into management and leadership in both small and high growth firms but is less specific as to how this developmental process occurs.

2.5.3.5 Human Capital: Skills

Human capital is defined by the OECD (2008) as the “productive wealth embodied in labour, skills and knowledge”. According to Holtzman and Anderberg, (2011, pg2) teams are capable of improving the firm’s success through the combination of their various skills “making the whole greater than the sum of its parts” finding that 87% of executives said they would prefer a diversified team over a homogeneous team According to Holtzman and Anderberg the critical success factors which are needed in teams are competence with regard to knowledge, technical skills and experience. Common goals are needed which are associated with clear aims and high commitment.

Jensen and McGuckin (1997) suggest that the majority of variation in firm performance is due to unobservable factors such as the skills of the management and workforce. However, Laursen et al (1999) argue that variables such as human capital tend to be neglected by empirical studies of firm growth. More recently Barringer et al’s (2005) research found that high growth firms depended on their human capital in order to sustain their growth orientated strategies. Pansiri and Temtime (2008) discovered that SMEs felt that lack of a skilled workforce and lack of experience and training options impacted firm performance and that these issues were critical for management to deal with. Chen and Chang (2013) found that entrepreneurial manpower had a strong effect on profitability and patent creation, suggesting that human capital skills are crucial in enabling the development of outputs for the firm.

Rauch et al (2005) used longitudinal analysis and found that human resources were a critical factor for predicting firm growth. Similarly Robson and Bennett (2000) found a positive association between firm growth and employee skill level. Lopez-Garcia and Puente (2009) also found that human capital was associated with firm growth. However their method consisted of using as a regressor the average employee salary and salary premium paid by the firm. However, this means that no detail is provided

as to what human capital the firm has, how it is used and if it is mediated through employee training. Just because an employee is paid a certain salary does not necessarily mean they have high experience in their role. It seems that what is missing is exactly what type of human capital aids the firm most and how it does this. Crook et al (2011) conducted a meta-analysis of the human capital-firm performance literature and found that human capital relates strongly to firm performance, especially when this human capital is firm specific. Baptista et al (2012) also found that firm specific human capital was more important than general human capital. This suggests that in knowledge based firms human capital will be especially crucial to the firm growth process.

2.5.3.6 Human Capital: Intra-Organisational Relationships and Knowledge Sharing

Gray (2006) argues that the combination of employees' knowledge and the sharing of this knowledge through routine procedures is central to knowledge management and that to many SMEs this is vital to their business. Cross et al (2001) argue that trust, accessibility and engagement are needed in order for knowledge transfer, suggesting that knowledge sharing is dependent upon the quality of relationships within organisations. Desouza and Awazu (2006) agree that knowledge management is an important issue in SMEs and argue that research needs to concentrate on the transfer of knowledge through people, as opposed to through technological means. In Durst and Edvardsson's (2012) review of the SME knowledge management literature they found that knowledge management implementation, perception and transfer is well researched while knowledge identification, storage/retention and utilisation is not, highlighting a fragmented knowledge base. Even those areas well researched are based on SMEs and not based on distinctions between micro, small and medium firms (Durst and Edvardsson, 2012). The authors call for more qualitative research able to gain insight into the less researched areas.

Ensley et al (2003) argue that cohesion, shared leadership and a common vision are characteristics of intra-organisational relationships and that these aid firm development, while Hulsheger et al (2009) argue that the team climate is one of the most important influences on individual behaviour. Ipe (2003) argues that it is people within the firm who generate, use and share knowledge and as such if this is not

shared effectively then it will not be exploited, while Bock et al (2005) suggests that innovative teams assist each other through learning, information flow and reasonable risk taking. This suggests that this form of team environment may be useful in knowledge based firms where innovation is vital to day to day activities.

There is consensus in the literature that the employees of a firm need to be competent. However, there is a lack of research which analyses how these skills develop and to what level they need to be developed to in order to aid in achieving growth. There is also research which analyses knowledge sharing between people within an organisation. However, there appears to be less research into the relationships between these employees and how these relationships develop and are used by the firm in order to achieve growth. Most research focuses on inter-organisational relationships and although this is an important area of research more information is needed into how relationships closest to the firm develop and to integrate this with principles of knowledge management.

2.5.3.7 Networking and Relationships

Networks have long been recognised as being important to the development of firm growth (Birley et al, 1991), with the renewed interest in this area suggested by Hoang and Antoncic (2003) to be due to an embracing of the view that the entrepreneur and the firm must be considered in their social context. This research will use Hoang and Antoncic's (2003, p.167) definition that networks are "a set of actors and some set of relationships which link them".

As early as 1985, Birley demonstrated that entrepreneur's contacts can aid with finance, advice and customer relationships, while more recently Parkhe et al (2006) cited international networking to be vital to new business development. Zhao and Aram (1995) found that high growth firms took part in both a greater range and a greater intensity of networking and were more likely to have strong ties to their networks compared to low growth firms. However, this research does not determine what the contacts are utilised for or how they developed. Mu (2013) argues that networking capability, network resources and open innovation link to enable new venture growth. This suggests that when researching firm growth it is important to also analyse the linkage between contacts and other areas of the firm. De Jong and

Hulsink (2012) found that networking affects innovation through input from suppliers, customers, informal contacts, banks, accountants, science contacts and government contacts, suggesting that an ecosystem of contacts exists for small firms. Furlan et al's (2014) research found that growth is a process which takes place over time and which is fed by external relationships and argue that these relationships are crucial to enabling growth.

With regard to the strength of relationships Rowley et al (2000) argues that strong and weak ties are positively related to firm performance whereas Gargiulo and Benassi (1999) argue that strong ties negatively affect firms. Burt (2000) argues that the strength of a tie and its effectiveness depends upon population or purpose and that both types play different roles. Ritter and Gemunden (2003) introduced the concept of network competence which is the firm's ability to collaborate with various organisations such as customers, suppliers and academic institutions and found that network competence increases a firm's product innovation success.

Additionally the importance of networking with numerous sources is highlighted in the OECD report (1996) which claims that the knowledge based economy is based upon innovation networks whereby knowledge is shared between industry, government and universities. Caloghirou et al (2004) argue that the knowledge obtained from networks can be used by the entrepreneur to spot new opportunities or to improve upon existing ones. Macpherson and Holt (2007) suggest that knowledge networks in particular are crucial to SME growth with Hughes et al (2009) arguing that SMEs use networks as a source of knowledge for competitive advantage. Gray (2003) found that most SMEs belonged to at least one network which was used for the exchange of business and technical knowledge.

It appears that the importance of networks and contacts to the firm is widely agreed upon. However, there is disagreement as to which types of relationships are the most beneficial and how strong or weak these ties should be in order to be effective. What is needed and what is lacking from the literature is a process oriented approach using qualitative research in order to determine how networks are created, how they are sustained, how they develop and what they are used for, thus providing information on network type and relationship quality.

2.5.3.8 Summary of people factors

The preceding section has given a broad overview of the main literature relating to factors associated with people, both within the firm and external to it. It has been demonstrated that although there is an abundance of literature that finds that these factors do influence firm growth there is also research which finds that they do not influence growth consistently. Much of the literature with regard to these factors also neglects to analyse their interactions with other factors and the process of how and at what point they enable growth within the firm. There is a lack of agreement in the literature with regard to what type of each factor is needed. For instance is technical or commercial expertise needed or both and are strong or weak ties needed with contacts. Overall the literature provides a clear base from which to explore each factor and yet there are still many unanswered questions.

2.5.4 Firm Level Factors

2.5.4.1 Growth Strategy

Rumelt (1980, pg2) provides the following definition of strategy: “a strategy is a set of objectives, policies and plans that taken together, define the scope of the enterprise and its approach to survival and success”. Weinzimmer (2000) suggests that strategy is the most important determinant of firm growth. Porter (1980) identified three strategies based upon price, focus or differentiation. Baum et al (2001) tested Porter’s suggestion that strategy would be more effective if only one strategy was focused upon and discovered that firms who choose a differentiated strategy achieved the fastest growth.

However, a variety of growth strategies have been highlighted in the literature (Pasanen, 2006), with empirical studies sometimes finding conflicting results as to which are the most effective. For instance, Sandberg and Hofer (1987) argue that product based strategies are more effective than focused ones, while Cooper (1993) argues that focused strategies are more effective than product differentiated based ones. Perry (1986/87) on the other hand found that the most effective strategies were niche strategies. Hermelo and Vassolo (2007) found that diversification was no more

effective for achieving growth than specialised strategies, suggesting that perhaps strategy alone cannot lead to growth. Smallbone et al (1995) analysed high growth firms and discovered that there was no one strategy which was best for growth, but that these firms tended to use product and market strategies and developed new products for existing customers, developed new markets and new customer bases and made their products more competitive.

Similarly Berman and Hagan (2006) found that innovative companies used market and technology driven strategies as opposed to traditional strategies. Mazzoral et al (2009) also found that high sales performance firms are likely to understand the importance of the sale of existing products while planning for new products and markets. This suggests that these firms used diversification as a strategic tactic, yet as a quantitative methodology was used this does not detail the processes involved in this strategic decision. Another study by Upton et al (2001) found similar results in that fast growth businesses aimed for differentiation and innovation, as opposed to competition based on price. Interestingly they also found that most of the fast growth businesses had formal business plans while Gibcus and Kemp (2003) found that few Dutch SMEs had these in place. This suggests that this type of formal planning may be more likely to take place in those firms that achieve fast growth. Thus insight is needed as to how these plans aid in this growth and how they are developed. A more recent strategy that has been advocated is that of strategic alliances with Niosi (2003) finding that strategic alliances contributed to the rapid growth of the firms they studied.

O’Gorman (2012) argues that a strategy should be generated which has a clear competitive advantage as its outcome, but that in small firms this strategy generation is through experiential learning. O’Gorman argues that formal strategic planning enables the setting of goals and objectives, time management, good financial management and staff development and allows the consideration of alternative options for business development. This suggests that strategy must be researched in conjunction with a wide range of factors and that the process of how this develops in growth firms needs to be established. However Tell (2012) found that fast growing manufacturing firms did not have the time for strategic activities. This suggests that the process of strategy focus needs to be analysed in order to determine when this

drop off takes place and how it can be avoided. In his review of the literature O’Gorman (2012) concludes that small firms’ strategic aims may be hindered as many firms do not have the financial or managerial resources to implement their strategies. This suggests that strategic implementation may improve as the firm grows and resources develop, and suggests that other factors must be considered in conjunction with strategy, as a strategic aim does not necessitate success.

The aforementioned research indicates that there are discrepancies in research findings specifically with regard to what strategy, if any, is most appropriate to achieve high growth, meaning that the literature can appear confusing. In an attempt to account for such differences Covin et al (1990) suggest that the type of strategy a firm employs depends upon their level of technology intensity while Quinn and Voyer (1998) argue that the development of strategy is an incremental process. This suggests that the study of strategy should focus on one industry and use a method of research which allows a process oriented approach thus allowing the analysis of how firm strategy changes and develops over time. It appears that this has been neglected in the literature with research not identifying how a firm’s strategic direction changes over time.

2.5.4.2 Finance

Access to and use of finance by SMEs has been studied widely in the academic literature. According to Wiklund et al (2009), finance and human capital are the most important resources the firm has available to them. Taking a similar resource based stance Greenfield (1989) argues that access to limited financing can sometimes be positive for the small firm by forcing it to make the most effective use of its resources it can, while Dollinger (1999) argues that finance is of importance as it can be converted into other valuable resources. Mac an Bhaird (2010) however found that finance alone was not enough to provide a firm with a competitive advantage and that it was important how resources were managed.

Kitching et al (2011) researched firm finance in the current economic context and looked at the effect of the recession on UK businesses. They found that some businesses decline while others grow and that this largely depends on resources such as networks, finance and skills but that ultimately there is no best practice which can

be advocated as each firm responds in different ways with different results. This is very much a contextual issue and this research will determine the most important resources and uses of finance which are needed in order to grow during a recessional period.

Berger and Udell (1998) argue that firms are initially financed by the owner and as they grow begin to be financed via venture capital. Rahaman (2011) found a statistically significant relationship between finance and firm growth and found that firms switched between using internal finance and external finance. Rahaman found however that internal finance had more of an effect on those firms who were more financially constrained. Firms who were not financially constrained relied more on external finance. This suggests the source of a firm's finance may change over time, something which this research will investigate. The source of firm financing may now be affected by the large number of grants and early stage financing which is available from government schemes such as Local Investment Funds, Single Investment Funds and Regional Growth Funds (Pierrakis and Westlake, 2009). For instance Pickernell et al (2013) found that new and young firms were able to access government and external finance more easily than older firms, suggesting that the source of finance changes with age due to external factors. Zhou and De Wit (2009) argue that a secondary type of finance is reinvesting the firm's financial performance in the firm with Beck and Maksimovic (2008) arguing that more research is needed into less traditional forms of finance.

Inderst and Mueller (2009) argue that finance is of great importance especially in the early stages of a company. However, there are numerous different types of finance available with Berger and Udell (1998) breaking them down into four instances of equity and nine instances of debt. Daskalakis et al (2013) discovered that the majority of SMEs in his sample avoided both short and long term debt. Those that did use it tended to use both forms, while those that didn't used neither. The firms used equity finance from themselves, family or friends and a quarter used grant financing. This highlights the wide range of financial choices made by small firms and Daskalakis et al argue these choices may reflect the relationship quality the firm has with their bank. Donati et al (2012) also found that close firm to bank relationships meant that firms are more likely to be able to gain external finance. Due

to the large number of grant funds available these findings support the claim of relationship quality influencing finance, linking finance with networks and suggesting the two should be considered together.

However, firm finance is not a given with Carpenter and Peterson (2002), who conducted research into internal finance in 1600 SMEs, concluding that growth is constrained by availability of internal finance. Beck and Demirguc-Kunt (2006) on the other hand found a lack of access to external finance for SMEs while Pierrakis and Westlake (2009) have suggested that new technology based growth is affected by a lack of external finance. Ullah et al (2011) found that lack of finance led to slow growth through the reduction of R&D and product and sales development.

Deakins et al (2008) suggests that certain sectors such as manufacturing and high technology may find it difficult to gain finance compared to other sectors due to the banks informational processing of their plans, and determined that this lack of finance in some cases halted their growth or stopped projects from taking off. Similarly Ullah et al (2011) found that in the 2007-2010 period new technology based firms found it difficult to gain finance and that this was especially true for young firms and those in an early product innovation cycle. This suggests that finance may be most needed at the start of a firm's life and during product innovation and that these times are also the most risky which may be why finance was difficult to obtain. Interestingly Shane and Cable's (2002) research suggests that technology based firms may be adverse to providing financial institutions with the information they need due to worries over intellectual property. Thus the research appears to suggest that lending is difficult due to information symmetry issues and that this stems from both the financial institution and the entrepreneur. It will be interesting therefore to discover how knowledge based firms overcome this issue.

The influence of finance on the firm has been studied by Klofsten et al (1998) who conducted quantitative research into the use and effects of loans and grants on small high technology based firms. They found that grants and loans increased the credibility of the firm, allowed them to gain expertise and was used for R&D, marketing, development of prototypes and business planning. Although this suggests that finance affects firm development in numerous ways the problem with this

method of analysis is that the respondents were given stringent answers with which to respond meaning that relevant data may have been lost, as well as the relationship of finance with other factors.

A key financial strategy which Lam (2010) argues has been neglected in the literature is that of financial bootstrapping, which is when firms use means other than external financing to create and develop resources (Winborg and Landstrom, 2000). Its importance is highlighted by Harrison et al (2004) who found that 95% of software entrepreneurs used bootstrapping for business development. Thus it would be interesting to discover whether firms grow out of bootstrapping as they develop.

There is also a body of research which argues that financial management is of importance for a firm's survival and growth. Jarvis et al (1999) found that SMEs felt cash flow to be their key monitor for the performance of the company, partly due to the weighting they felt banks put on this. Collis and Jarvis (2002) replicated this finding and also discovered the monitoring of bank statements and accounts, suggesting that growth firms will be likely to conduct financial management practices based around constant monitoring of the financial state of the company.

It appears that there is a variety of research which suggests that finance is of importance to firm growth. Which type of finance is the most effective is debated and it may be that how finance is used is more important. There appears to be lack of agreement over how a firm's relationship with finance develops over time and how this finance is used. The literature suggests it is important to take into account the firm's relationship with financial institutions as the quality of information sharing can affect firm finance prospects.

2.5.4.3 Organisational structure

As reviewed previously people within the firm and firm level activities, such as strategy, are extremely important assets used for firm growth, but as Worch (2006) argues how the workforce is co-ordinated is also of importance. Covin and Slevin (1990) suggest that organisational structure involves workflow, communication, authority and relationships.

Stage models such as that by Miller and Friesen (1984a) argue that as firms grow they progress into more decentralised organisations which are more formalised with different departments, while Drucker (1999) argues that as a firm grows management is needed as the entrepreneur cannot occupy all roles needed. Meijaard et al (2005) found that firms who had a centralised, hierarchical structure and had specialised employee functions achieved growth. This suggests that it is important to analyse the change in the organisational structure in conjunction with strategy development, as organisational change affects strategy, with more time enabled for growth oriented strategy.

Covin and Slevin (1990) argue that firms often have decentralised decision making, minimum hierarchy and free flowing communication enabling them to be flexible and allowing for fast decision making. Caruana et al (2002) argue that decentralised structures enable better firm performance whereas Simons (2000) argues that decentralisation can lead to loss of control and ineffective use of resources. Zhou (2008) conducted a literature review on the different organisational structure perspectives and concludes that there is no one organisational structure which can be advocated as being the most effective as each organisational structure type involves trade-offs between, for instance, delegation and control. This suggests that research should not only focus on organisational structure type but should also focus on how this structure is managed by people within the firm. Thus it appears that there is debate in the literature as to which type of organisational structure should be advocated. Perhaps the type of organisational structure needed depends upon the industry in which the firm is in. A structure encouraging creativity of thought and ease of communication may be more effective in a high technology firm than others as research has suggested that high technology firms are characterised by innovation (De Wit and Timmermans, 2008). Pertusa-Ortega et al's (2010) research finds that organisational structure exerts an indirect influence on firm performance through competitive strategy. This suggests it is crucial to consider organisational structure in conjunction with other factors in order to analyse exactly what it acts to mediate.

There does not appear to be consensus as to how organisational structures develop over time leading up to growth. This may be because structural change may be

considered as a consequence of growth, yet research is needed with regard to which organizational changes impact the firm to aid in their growth.

2.5.4.4 System Development

The influence of I.C.T. (Information Communication Technology) systems on the firm was highlighted as early as 1958 by Leavitt and Whisler where they suggested that information technology would change the organisational structure of firms by encouraging them to centralise. This suggests that organisational structure and system development should be researched together as they do not affect the firm independently.

Cragg et al's (2002) research found that many manufacturing SMEs had a high degree of alignment between their I.C.T systems and their business strategy and that this was positively related to performance. However, the authors admit that they cannot determine causality and that a case study approach may be better in order to analyse the factors from a process point of view. In a much debated paper Carr (2003) argues that the widespread availability of I.C.T systems means that software has become more of a risk to a firm than an advantage, whereas Olsen and Satre (2007) argue that in the case of niche companies bespoke I.C.T systems, such as ERP (enterprise resource management) systems, offer many benefits. Yeh and OuYang (2010) found that ERP implementation improved business processes, communication and customer interaction, while Hassan et al (2012) found that ERP supports new product developments and introductions, suggesting that I.C.T systems have a mediating influence on the firm. Some streams of research argue for the alignment of I.C.T systems with strategy (McGovern and Hicks, 2004; Yen and Sheu, 2004), suggesting that systems need to be considered in conjunction with other factors in order to fully understand their influence.

With regard to the development of systems and procedures research has found that these become more formalised as a firm grows. Srivastav (2010) and Acharya and Sanjit (2000) found that ISO 9000 enables different roles and departments to cooperate as it enables them to identify their interdependencies. Feng et al (2008) discovered that ISO certification had a positive and significant effect on operational performance but a positive weak effect on business performance because other

factors need to interact with ISO certification to enable it to affect business performance. This suggests that research is needed which considers the influence of quality systems in conjunction with other factors and that this will highlight if it exerts an influence and how. The authors also call for more process oriented research analysing change in quality systems over time.

Xydias-Lobo and Jones (2003) argue that research into the use and success of quality systems is often conceptual as opposed to empirical, meaning that there is room for further research into exactly how systems interact with the firm and influence its development. Xydias-Lobo and Jones (2003) found that three quarters of high growth SMEs introduced quality assurance programs as opposed to one third of low growth firms. However, Xydias-Lobo and Jones (2003) admit further research could benefit from analysing how these high growth firms developed their quality assurance programs before and during their growth, in order to provide more information as to how these influence firm development. For instance did growth lead to quality assurance or did quality assurance aid in growth. McAdam (2000) found that not all quality systems have a positive influence on SMEs as they find them bureaucratic and reduce the flexibility and innovative nature of the firm.

There appears to be a lack of research which links the development of organisational structure with systems, such as I.C.T systems. A key issue to resolve is determining the causality of both organisational structure and systems, do they aid in growth or develop as a result of growth.

2.5.4.5 Summary of Firm Level Factors

The previous section has broadly discussed the main firm level factors which have been found to influence firm growth. Again, as with the people oriented factors, there is disagreement in the literature as to what extent these factors influence firm growth. Much of the literature fails to analyse the process of development of these factors and although a vast amount of information is now known about these factors there are still gaps in knowledge with regard to how exactly they consistently interact with other factors to enable firm growth. As with the people oriented factors there is also

disagreement as to what type of each factor influences firm growth. For instance is a decentralised organisational structure needed or a centralised one, is a focused strategy needed or a differentiated one.

2.5.5 Customer and Product Factors

2.5.5.1 Marketing and Market Creation

The traditional view of marketing is thought to be at odds with how firms, especially small firms, carry out marketing in practice (Carson et al, 2001; Fillis 2002). As such there has been a wealth of research into the way in which SMEs market products and create markets for these products (Read et al, 2009; Sarasvathy and Dew, 2004; Silberzahn and Midler, 2008). Hill (2001) argues that traditional marketing approaches do not apply to SMEs, due to their ability to adapt and be flexible, while Gilmore et al (2001) suggests that due to lack of resources SMEs are unable to conduct marketing in the traditional way.

Sarasvathy (2001a) opposes the traditional views of how markets are created and discovered that entrepreneurs approach market creation via an effectual process, whereby entrepreneurs use their means such as what they know, who they know and who they are to decide what they can create, as opposed to creating markets through a causal process, whereby they choose a goal and then decide what they need to reach this (Sarasvathy, 2003). Sarasvathy and Dew (2004) also emphasise new market creation which they argue is creation through interaction with others who then become stakeholders, combining ideas to create new markets. It is important however, to consider other issues such as the protection of intellectual property rights and the structure of collaborations, suggesting marketing needs to be analysed in conjunction with open innovation, organisational structure, management and networking.

Borg (2009) and Garnder et al (2000) argue that networks are crucial to high technology marketing whereby firms may develop products in conjunction with customers and clients. This research will attempt to add further insight by discovering the process through which firms discover customers, develop products

and then sell these. It will be interesting to see if the high growth firms analysed in this research use an effectual process, as Sarasvathy (2003) states.

It is also suggested that new product development in existing markets as well as existing product sales in new markets are important for growth (Kelly and Nakosteen, 2005; Littunen and Tohmo, 2003), suggesting market diversification is also of importance. Research also suggests that commercialisation is based around a firms awareness of new technology, markets and competition, as well as engagement in R&D (Akgun et al, 2004; Del Monte and Papagni, 2003; Yasuda, 2005). This suggests that market knowledge is of importance to product development and research has argued that the close involvement of owners in SMEs means that they have personal relationships with customers, which is used to gather market information (Carson and Coviello, 1995; Shaw, 2006). Shin and Aiken (2012) make an interesting point arguing that market capabilities are crucial to firm performance due to the mediating effect they have on the firm. Therefore it may be that marketing and market analysis exerts its influence indirectly.

It has been argued that SMEs cannot compete with larger firms and so develop their own market niches and technologies, enabling them to compete in a different way (Walsh and Lipinski, 2009). Yet small firms still encounter difficulties relating to marketing due to a lack of finance and lack of marketing expertise resources (Carson and Coviello, 1995; Hill, 2001; Shaw, 2006; Simpson and Taylor, 2002). The difficulties SMEs face means that a new type of marketing term has been generated to describe marketing in SMEs, that of entrepreneurial marketing (Carson and Coviello, 1995; Miles and Darroch, 2006).

Carson et al (2002) argues that SMEs participate in contextual marketing and establishes a range of factors which underpin what this contextual marketing consists of. These include industry norms, marketing theory, opportunity recognition, customer enquiries/requirements, competency based marketing, communications and products/services. This suggests that each firms marketing will be slightly different based upon these factors and therefore the context in which they are operating. This also suggests that marketing cannot be understood without reference to other factors

as these act to make marketing specific to that firm, with Enright (2001) referring to this as context rich marketing.

Interestingly recent research such as that by Barringer et al (2005) and Wiklund et al (2009) does not include marketing, be that market analysis or market creation in their analysis of how firms achieve rapid growth. This suggests that what is lacking from the literature is an integration of marketing into a holistic model. Recent developments in the marketing literature, such as effectuation need to be taken into account and there needs to be more research into how the marketing process of firms develops over time.

2.5.5.2 Customer Development

When considering firm growth it is important to also consider customer development, including the development of both new and existing customer relationships. Previous research has found a positive relationship between customer satisfaction and the customer's intention to re-purchase the product (Mittal and Kamakura, 2001) and between customer satisfaction and firm financial and market performance (Williams and Naumann, 2011) and yet research has suggested that this association depends upon the nature of the relationship with the customer (Lemon et al, 2002; Reinartz and Kumar, 2005), suggesting good customer relationships are of importance. Gruca and Rego (2005) find an association between customer satisfaction and increases in cash flow suggesting that financial benefits can be accrued from the maintenance of a positive relationship, while Yli-Renko et al (2001) discovered that a close customer relationship can provide a firm with knowledge which they can use for innovation. O'Cass and Weerawardena (2010) consider market capabilities to be crucial to small firm performance with Zhou and Li (2010) arguing that a firm with good customer values excels in customer relationship management, which results in positive financial outcomes.

Barringer et al (2005) found that rapid growth firms are far more likely to emphasise the importance of understanding customer needs than slower growth companies and to use words such as 'trust' and 'relationship' when describing them. Barringer et al acknowledge that the importance of customers is not entirely prevalent in existing research, suggesting that more needs to be discovered on this topic. In further case

study research Klofsten (2010) found that firms need a good quantity and quality of customer relationships as these are the firm's source of revenue.

Storbacka and Nenonen (2009) argue that previous research is limited in the way that it does not consider the customer, the resources which customers can provide for firms and the way in which this relationship must be managed. They argue that firms need to be flexible in their approach to customer management, structuring each approach according to the specific customer, while Reuber and Fischer (2005) discovered that close relationships with customers can enhance the reputation of the firm.

Another perspective in the literature is that of customer involvement in firm development. Prahalad and Ramaswamy (2000) describe the evolution of customer relationships as developing from that of a passive audience to an active player. Svendsen et al (2011) discovered that customer involvement in new product development has a positive impact on the profitability of these relationships. Thus overall the research seems to suggest that there is a multitude of ways in which customers can be used for firm growth.

Although there appears to be general consensus as to the positive effect of customers on firm development there needs to be more research into how customer development interacts with other factors within the firm. Further research is needed into how the customer-firm relationship develops and if this relationship involves co-creation of products then further research is needed into how these relationships are managed. Thus it seems that customer development needs to be considered in light of issues such as open innovation and knowledge management.

2.5.5.3 New Product/Service Development and Innovation

Oke et al (2007) argues that although there has been much research into high growth SMEs and how innovation links with growth there has been a lack of research into the types of innovation which small firms pursue. De Wit and Timmermans (2008) studied gazelle firms compared to non-gazelle firms and found that the former were more likely to engage in ten different types of innovative activity, such as introducing new products, engaging in R&D, co-operating with other firms and

having employees who work solely on innovation. This research however could not prove or disprove this association with statistical analysis suggesting qualitative research is needed in order to understand these relationships in depth. Carden et al (2005) comment that the McKinsey Global Survey of Business Executives found that executives cited innovation as being a requirement for business growth, while Stam and Wennberg (2009) found that R&D was strongly related to the growth rate of fast growth firms. They find that this R&D exerts its influence via inter-firm alliances in the early years of the firm's life and that this does encourage new product development, but that this new product development is not related to firm growth.

Schimke and Brenner (2014) found that R&D activities have a positive effect on turnover growth, while capital investments have both positive and negative effects. In a similar vein Lofsten (2014) found that variables relating to innovation such as patents, copyrights and licences had a positive effect on firm sales. Corsino and Gabriele (2011) tried to empirically test the association between innovation and sales growth and found that in semiconductor companies past product innovations positively affect their revenue streams. Nijssen (2006) found that radical innovations in service firms were positively related to firm performance and suggest that this is due to the fact that incremental service innovations are too easy to imitate. Thus it would be interesting to see if knowledge based high growth firms fit this finding. The authors also suggest future research would benefit from a consideration of innovation in conjunction with other factors.

Holtzman (2008) interviewed the top level managers of SMEs in the USA, Canada, the UK and Israel and found that they emphasised the importance of innovation to the company's success. Holtzman suggests that differentiation in offering through a deep understanding of the customers' needs and involving the customer is what leads to enhanced market share. With regard to new service development similar findings are highlighted, with customer involvement in service development increasing the superiority of services (Alam, 2002; Thomke, 2003). Matthing et al (2004) argue that although the literature suggests customer involvement is crucial it falls short of identifying exactly how this knowledge transfer and involvement takes place. McDermott and Prajogo (2012) argue that significant research has not taken place into innovation in service SMEs, while other authors argue innovations in service

firms are under-researched when compared to manufacturing firms (Goldstein et al, 2002; Jaw et al, 2010; Menor et al, 2002), suggesting that this is a fruitful area for future research. Nijssen (2006) argue that the literature suggests new product and service development require different sets of factors to enable them to develop successfully. Thus it would be interesting to see if knowledge based firms have any similarities in the ways in which new services/products are developed.

There is some research in the literature which questions whether innovation aids firms in their growth. For instance, Winters and Stam (2007) find no evidence of innovation leading to growth while Freel and Robson (2004) find a negative effect. Coad and Rao (2008) have recently suggested that innovation only affects growth for a small amount of high growth firms. Yet as Stam and Wennberg (2009) argue these discrepancies may be due to the fact that most research only concentrates on R&D activities and neglects the indirect effects and associated processes which come after R&D and combine with it to create growth. Laforet's (2011) research suggests that innovation does influence firm development but indirectly through its effect on other factors such as human capital, finance, reputation, operations and expertise. Wynarczyk (2013) on the other hand found that innovation needs to be paired with open innovation, managerial competencies and finance in order to make the firm competitive.

It appears that the majority of research agrees that innovation exerts a positive influence on SMEs and is necessary for their survival and growth. There is however room for more knowledge generation as to which types of innovations are the most crucial and what other factors interact with innovations to enable them to exert an influence, especially with regard to service firms. Further research is needed in order to track the development of innovation as a firm develops in order to determine its effect on growth and its interaction with other areas of the firm. It would be interesting to research whether high growth firms innovate in the same way using the same techniques.

2.5.5.4 Existing Product/Service Development

The majority of research into product development focuses on new product development but firm growth may be achieved partly through existing product

development (Kelly and Nakosteen, 2005). Wilhelm and Xu (2002) suggest that in high technology environments product upgrades are important, due to the need to compete with others who may be introducing new and improved technologies and acknowledge that the majority of research concentrates on new product development as opposed to existing product upgrades, yet the latter often happens more than the former.

Models which have been developed detailing factors found to be associated with firm growth seem to have neglected to include product/service factors (Barringer et al 2005; Moreno and Casillas, 2006; Wiklund et al, 2009), be that existing product upgrades or new product introductions. It seems that they concentrate more on the inputs into the firm as opposed to the outputs. However, this neglects the outputs which ultimately enable the firm to achieve growth. Klofsten's model (2010) does involve a finished product, needed for achievement of the business platform, but what is neglected is what is done with these existing products as the firm develops. Thus there is a gap in the research which neglects the realism of existing product upgrades that occur in firms in reality. This gap is important to address due to the literature suggesting that product upgrades are important for increased market share (Banbury and Mitchell, 1995) and competitiveness (Wilhelm and Xu, 2002) and due to the fact that research should reflect real firm processes.

McDermott and Prajogo (2012) found that with regard to service firms neither existing service development nor new service development was directly associated with business performance. However they found that the interaction between these two forms of innovation did have a positive effect on performance, suggesting that the influence of innovation on firm development is complex. Innovation may need to be considered in the context of multiple types of innovation and in synergy with other factors in order for its influence to be fully understood. This may explain why some research does not find an association between innovation and firm growth, as the research does not consider a wide enough set of influences. The findings of McDermott and Prajogo's (2012) research also suggest that service firms benefit more from conducting both radical and incremental innovations and it would be interesting to discover just how they manage to gather the resources required to do this. Gottfridsson (2010) found that new service development tends to take place

informally during interactions with customers and external sources and therefore services develop incrementally and may eventually form a radical form of innovation.

However, it is important to approach the literature on existing product development or incremental innovations with caution. For instance Banbury and Mitchell (1995) found that incremental innovations resulted in increased market share and firm survival in developed firms. Koberg et al (2003) also discovered that incremental innovations increased with firm age and size. This suggests that existing product development may be used once a firm has established itself and thus it would be interesting to see if this is also a technique used on the path to firm growth. Oke et al (2007) tested whether SMEs engage more in radical innovation as opposed to incremental innovation and found that SMEs do use incremental innovation more than radical innovation. However this research was quantitative in nature meaning that depth of knowledge as to why this type of innovation was chosen and how it developed is not gained.

The literature on innovation is complex with more focus on radical innovations than incremental innovations, especially with regard to small firms. However, the literature does point to existing product/service development as being associated with growth firms and as such it is important that this is considered in research into how firms achieve high growth. Specifically knowledge is needed as to when firms begin to engage in this type of innovation, why and what influence this has on the firm.

2.5.5.5 Open Innovation

In the last ten years a new form of innovation has been suggested, coined by Chesbrough (2003a) in his research of large companies as open innovation. Chesbrough (2003a p.XXIV) defines open innovation as “a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as firms look to advance their technology”. There is a lot of research into open innovation which focuses on large multinational enterprises (Lichtenthaler and Ernst, 2007; Lichtenthaler and Ernst, 2009) and thus research is needed into whether the same process is found in small companies. Chesbrough (2003a) labelled the traditional innovation process as the closed innovation model

whereby firms kept tight control over their innovation, allowing them to gain the most amount of revenue from these as possible. Chesbrough (2003a) argues that the increase in knowledgeable workers able to move around more freely and the increase in venture capital brought about the change to open innovation.

In empirical research Van de Vrande et al (2009) found that the SMEs they analysed used their customers to generate new products, thus using internal and external knowledge. They found that external networking was widely used as part of this knowledge generation and support. Dahlander and Gann (2010) conducted a review of the open innovation literature and identified four different types of open innovation; revealing internal resources externally (Henkel, 2006), licensing or selling products (Chesbrough and Rosenbloom, 2002), using external customers, universities and suppliers etc. to gain more knowledge (Lakhani et al, 2007) and the use of formal and informal relationships to gain new innovative ideas (Christensen et al, 2005).

Chesbrough et al (2006) argue that inter-organisational networks are an essential part of open innovation and that it is important to understand how these networks are managed. Chesbrough et al conclude that it must be ensured that the interests of all parties are taken into account. Further Chesbrough et al argue that innovation can no longer be studied at only the firm level and that analysis of intra-firm relationships are needed as innovation is created by groups (Bock et al, 2005) and an analysis of inter-organisational networks are needed as firms are automatically linked to other organisations by their nature.

However, Laursen and Salter (2006) analysed manufacturing firms and concluded that the degree of openness in the firm must be treated with caution as too much openness can have a detrimental effect on the firm. They found that as the firms searched for too many sources their innovative performance decreased. This research also found that in the early stages of the innovation there are only a few people in the network who have depth of information, as the innovation develops more people become involved in the networks and as such the breadth of relationships widens. This again suggests that relationship type and relationship management is an important avenue which needs to be explored. Fey and Birkinshaw (2005) find that a

partnering relationship is more beneficial to R&D activities than external contracting, emphasising again that relationship type is important. Both of these studies used quantitative analysis and in order to determine how these relationships are formed, what knowledge is shared and how agreements are made a more qualitative approach is needed.

Curley (2013) argues that there is now a new open innovation paradigm which they have termed open innovation 2.0. This is characterised by increasing complexity involving government, academia, industry and consumer in a quadruple helix innovation process. This suggests that as open innovation and research into it develops the concept is becoming more encompassing than could be envisaged even as little as a decade ago. Salmelin (2013) refers to this helix as an innovation ecosystem and argues that this system speeds up the innovation process. Leitner (2013) argues that open innovation and the increasing involvement of customers in the innovation process creates a challenge for SME innovation management and argue that innovation now involves more automation, changing motivations and wider geographical markets. Thus it would be interesting to see if these changes are apparent in high growth firms. The importance of researching open innovation becomes apparent with McFarthing's (2012, pg4) statement that "the risk may be greater for those companies who don't fully embrace open innovation". Brem and Viardot (2013) argue that open innovation involves organisational ambidexterity or dual exploration and exploitation. They argue that the whole company culture and human capital needs to be directed to open innovation in order for the firm to have more of a chance of success with regard to conducting these dual roles. Gassman et al (2010) argue that the process by which companies manage open innovation is often through trial and error and as such this is something that this research will explore further.

There are however potential problems with open innovation with Dahlander and Gann (2010) arguing that open innovation blurs the boundaries of the firm and that it makes it far easier for others to exploit intellectual property and resources. Christensen et al (2005) argues that the success of open innovation differs depending upon technology and industry. Thus it will be interesting to see if open innovation has been used by knowledge based firms in order to achieve high growth and if so

how this process has developed. The open innovation literature is still in its infancy and as such there are many interesting discoveries yet to be made. There is no model as yet which incorporates open innovation explicitly as a way of describing firm growth and survival and this is something which needs to be both researched and remedied.

2.5.5.6 Summary of Customer and Product Factors

The previous section has broadly discussed the customer and product factors that have been found to be associated with firm growth in the literature. A large amount of these factors have been neglected in existing firm growth models, while others such as open innovation are so recent a phenomenon that they are still being developed. It can be concluded that the product factors in particular will be important to consider, especially in their relation to other factors. As with the previous factor types of people and firm level factors there is a gap in knowledge with regard to what state these factors need to be developed to and how they interact with other factors to enable firm growth. Although the existing literature is very useful in extending knowledge with regard to these factors there is still much opportunity for knowledge gain, especially with regard to process and interactions.

2.5.6 Summary

It is possible from the existing literature to indicate which factors will have an influence on firm growth. However, it is more difficult to hypothesise how these factors develop over time and exactly how they influence firm growth, as this has generally been neglected in the literature. This is at the core of what this research will remedy by providing a clear description of how each factor develops over time leading up to growth and why these factors are of importance.

In summary it is evident that there has been a wealth of research into the factors associated with firm growth. There is vast debate within the literature with regard to some of these factors and whether they exert an influence at all, and if they do how they do this. The extant research is extremely useful in distilling what may influence

small firm growth yet there is a lack of research which takes these factors, combines them into one holistic model and analyses their effects and influences on each other. There is also a lack of research which analyses the process of development of these factors and to what level they need to be developed to before the firm achieves growth. The vast majority of research into these factors appears to be quantitative in nature and as such does not make addressing this issue an easy one. Quantitative data is unable to provide information as to process and change, especially in relation to factors which are difficult to articulate or observe. The review of the literature alludes to the co-dependency of certain factors on other factors, in order to exert an influence on the firm and yet there is a lack of research analysing these relationships. The amount of factors identified within the literature can often be large and thus confusing and what is needed is research which identifies essential variables as opposed to all variables which may exert an influence. Thus a more qualitative approach is needed which incorporates the essential factors needed for growth to occur and analyses their developmental process. The existing literature often fails to produce research capable of being used by practitioners and academics alike to improve firm performance and this is also an issue which needs to be remedied. Table 2.8 summaries the representative research on firm growth factors and suggested questions for further research. The next section of this literature review (section 2.6) provides hypotheses regarding which factors are of importance to firm growth and to what state they need to be developed to in order for firm growth to be enabled and is based upon the review of the literature that has already been presented.

Factor	Representative research (qualitative, quantitative and conceptual)	Further Work Needed
The Entrepreneur – Motivation/Aims	Gray (2002), Smallbone and Wyer (2012), Carsrud and Brannback (2011), Wang et al (2007), Shane et al (2003), Locke and Baum (2007), Kozan et al (2006), Massey et al (2006), Stam et al (2012), Reynolds et al (2002), Baum et al (2001), Davidsson (1991), Smallbone et al (1995), Baum et al (2001), Wiklund and Shepherd (2003), Baum and Locke (2004), Delmar and Wiklund (2008), Cooper and Artz (1995), Wiklund et al (2003), Human and Matthews (2004), Kelly et al (2010), Gibb and Davies (1990), Bagranoff and Turner (2004), Morris et al (2006), Mahoney (2001), Hessels et al (2008)	How does this motivation develop over time in sync with the development of the firm? How does this motivation interact with other factors?
The Entrepreneur – Competences	Baumol et al (2007), Zhou and De Wits (2009), Almus and Nerglinger (1999), Mudambi and Zahra (2007), Oakey (2003), Colombo and Grilli (2005), Gibb and Scott (1985), Rae (2004), Chorev and Anderson (2006), Baum et al (2001), Barringer et al (2005), MacMillan and Day (1987), Littunen and Niittykangas (2010), Bosma et al (2004), Stam and Garnsey (2007), Stam et al (2006), Vivarelli and Audretsch (1998), Jones-Evans (1996), Jones-Evans (1995), Chesbrough (2003a), Ganotakis (2012), Arnaldo et al (2012)	What competences are needed? How do these develop over time? Why are they needed? To what level do they need to be developed?
The Management	Willard et al (1992), Birley and Stockley (2000), Chorev and Anderson (2006), Penrose (1959), Smallbone et al (1995), Alvrez and Barney (2004), Gronholdt and Martensen (2009), Levy et al (2011), OECD (2009), Joyce et al (2003a; 2003b), Nohria et al (2003), Beaver and Jennings (2005), Teece and Pisano (1994), Churchill and Lewis (1983), Kazanjian (1988), Miller and Freisen (1984a), Ensley et al (2006), Liang et al (2007), Srivastava et al (2006), Xue et al (2011), Penrose (1959)	How does the management structure of the firm change over time, both formally and informally? How does the leadership structure of the firm change over time? What competences do management need?
Human Capital	OECD (2008), Robson and Bennett (2000), Rauch et al (2005), Lopez-Garcia and Puente (2009), Holtzman and Anderberg (2011), Jensen and McGuckin (1997), Laursen et al (1999), Barringer et al (2005), Pansiri and Temtime (2008), Gray (2006), Cross et al (2001), Desouza and Awazu (2006), Durst and Edvardsson's (2012), Ensley et al (2003), Hulsheger et al (2009), Ipe (2003), Bock et al (2005), Chen and Chang (2013), Crook et al (2011), Baptista et al (2012)	How does this develop over time? How do employee relationships develop over time? How does knowledge management develop?
Networking and Relationships	Birley (1985), Zhao and Aram (1995), Gargiulo and Benassi (1999), Rowley et al (2000), Hoang and Antoncic (2003), Parkhe et al (2006), Hughes et al (2009), OECD report (1996), Ritter and Gemunden (2003), Caloghirou et al (2004), Macpherson and Holt (2007), Gray (2003), Birley et al (1991), Mu (2013), De Jong and Hulsink (2012), Furlan et al's (2014)	How do these networks develop? How are they managed? What are they used for?
Strategy	Rumelt (1980), Perry (1986/7), Sandberg and Hofer (1987), Cooper (1993), Smallbone et al (1995), Weinzimmer (2000), Niosi (2003), Pasanen (2006), Hermelo and Vassolo (2007), Berman and Hagan (2006), Mazzoral et al (2009), Gibcus and Kemp (2003), Covin et al (1990), Quinn and Voyer (1998), O'Gorman (2012), Tell (2012)	What type of strategy is best for high growth? How does this strategy develop over time?
Finance	Dollinger (1999), Klofsten et al (1998), Wiklund et al (2009), Ullah et al (2011), Greenfield (1989), Mac an Bhaird (2010), Kitching et al (2011), Berger and Udell (1998), Zhou and De Wit (2009), Beck (2008), Inderst and Mueller (2009), Daskalakis et al (2013), Carpenter and Peterson (2002), Beck and Demirguc-Kunt (2006), Deakins et al (2008), Shane and Cables (2002), Lam (2010), Winborg and Landstrom,	What type of finance is most used by high growth firms? How does the influence of finance develop over time?

	(2000), Harrison et al (2004), Jarvis et al (1999), Collis and Jarvis (2002) Pierrakis and Westlake (2009), Rahaman (2011), Pickernell et al (2013), Donati et al (2012)	How are relationships with finance providers managed?
Marketing and Market Creation	Sarasvathy (2001a), Borg (2009), Fillis (2002), Carson et al (2001), Silberzahn and Midler (2008), Sarasvathy and Dew (2004), Read et al (2009), Hill (2001), Sarasvathy (2003), Gardner et al (2000), Kelly and Nakosteen (2005), Littunen and Tohmo (2003), Akgun et al (2004), Del, Monte and Papagni (2003), Yasuda (2005), Carson et al (1995), Shaw (2006), Walsh and Lipinski (2009), Simpson and Taylor (2002), Miles and Darroch (2006), Carson et al (2002), Enright (2001), Barringer et al (2005), Wiklund et al (2009), Shin and Aiken (2012)	How do growth firms create markets? How do they market their products? How does this process develop over time?
Organisational Structure and System Development	Miller and Freisen (1984a), Covin and Slevin (1990), Simons (2000), Caruana et al (2002), Cragg et al (2002), Worch (2006), Drucker (1999), Meijaard et al (2005), Zhou (2008), De Wit and Timmermans (2008), Leavitt and Whisler (1958), Dunhan et al (2001), Carr (2003), Olsen and Satre (2007), McGovern and Hicks (2004), Yen and Sheu (2004), Srivastav (2010), Acharya and Sanjit (2000), Feng et al (2008), Xydias-Lobo and Jones (2003), McAdam (2000), Pertusa-Ortega et al (2010), Yeh and OuYang (2010), Hassan et al (2012)	How do high growth firms' organisational structures develop over time? How do their systems develop over time?
Existing Product/Service Development	Klofsten (2010), Wilhelm and Xu (2002), Kelly and Nakosteen (2005), Barringer et al (2005), Wiklund et al (2009), Moreno and Casillas (2006), Banbury and Mitchell (1995), McDermott and Prajogo (2012), Gottfridsson (2010), Koberg et al (2003), Oke et al (2007)	Is existing product/service development important for firm growth? How does this process develop over time?
Customer Development	Klofsten (2010), Yli-Renko et al (2001), Lemon et al (2002), Reinartz and Kumar (2005), Grua and Rego (2005), Barringer et al (2005), Svendsen et al (2011), Mittal and Kamakura (2001), Storbacka and Nenonen (2009), Reuber and Fischer (2005), Prahalad and Ramaswamy (2000), Williams and Naumann (2011), O'Cass and Weerawardena (2010), Zhou and Li (2010)	How does the amount of customers develop over time and how does this relationship develop over time? What influence do customers have on firm development?
New Product/Service Development	Freel and Robson (2004), Winters and Stam (2007), De Wit and Timmermans (2008), Coad and Rao (2008), Stam and Wennberg (2009), Oke et al (2007), Carden et al (2005), Corsino and Gabriele (2011), Nijssen (2006), Holtzman (2008), Alam (2002), Thomke, 2003), Matthing et al (2004), McDermott and Prajogo (2012), Goldstein et al (2002), Menor et al (2002), Jaw et al (2010), Schimke and Brenner (2014), Lofsten (2014), Laforet's (2011), Wynarczyz (2013)	How does the new product/service development process develop over time? How does this interact with other factors?
Open Innovation	Chesbrough (2003a), Van de Vrande et al (2009), Lichtenthaler and Ernst (2009), Lichtenthaler and Ernst (2007), Curley (2013), Salmelin (2013), Leitner (2013), McFarthing (2012), Brem and Viardot (2013), Dahlander and Gann (2010), Chesbrough and Rosenbloom (2002), Christensen et al (2005), Chesbrough et al (2006), Bock et al (2005), Laursen and Salter (2006), Fey and Birkinshaw (2005), Dahlander and Gann (2010), Christensen et al (2005), Gassman et al (2010)	Is open innovation engaged in and how is it managed?

Table 2.5. Summary of representative research on firm growth factors and suggested questions for further research

2.6. The proposal of a preliminary growth platform model

2.6.1 Conclusions drawn from the extant literature

This section details the conclusions that can be drawn from the literature presented in section 2.5. Hypotheses are made with regard to what factors are vital for firm growth to occur and from this a preliminary model depicting the factors needed for firms to achieve high growth emerges. A proposition will also be put forth, based on the literature, hypothesising what is required from that factor for growth to occur. This model is limited to knowledge based SMEs and is based upon certain key factors which have emerged through the literature review and observations of the host company. These factors are critical in guiding and focussing the research, while at the same time maintaining the holistic, multi-level approach required for the study of firm growth.

Once the research has been completed the aim is for each factor to be given descriptors of their different levels of development (see table 2.6). These descriptors will emerge through the case study research of two knowledge-based companies and will involve analysing how each factor has developed over time. It is hoped that a number of levels will be described for each factor which SMEs can then use to track their progress against. Although it may be argued that there are too many factors included in this model there is good reasoning for doing this. These factors have been chosen in order to detail the holistic processes needed to achieve high growth and as such no weighting will be given to the factors. It is hoped that due to the structure of the model it will be relatively easy to understand with each descriptor being written in a practical way.

The model is based upon Penrose's (1959) theory of the growth of the firm, the RBV of the firm and the KBV of the firm. Many of the factors included in the model are included in these theories and have subsequently been analysed by numerous researchers. The model illustrated in table 2.6 lists the factors thought to be essential for high growth. The model aims to focus on the developmental process involved in evolving from a start up to a high growth firm and therefore to take Klofsten's (2010) business platform model concept to the next level, that of growth.

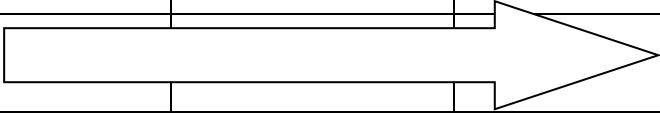
Factor	Level One	Level Two	Level Three
Aspirations			
Technical and Commercial Expertise			
Management and Leadership			
Human Capital and Intra-organisational relationships			
Contacts			
Strategy			
Finance			
Organisational Structure and System Development			
Market Analysis and Creation			
Customer development			
Existing Product Development			
New Product Development and Innovation			
Open Innovation			

Table 2.6. The proposal of a preliminary growth platform model for small to medium sized high technology companies (The development of each factor will enable the firm to achieve growth).

The factors included in the model can be split into three themes:

2.6.2 People oriented factors

These factors involve people both within the firm and external to the firm, all of which combine to contribute knowledge, skills and resources to the firm, thus enabling its development. It is assumed that these factors interact with both the firm level factors and the customer and product level factors.

- Aspirations: The core members of the firm need to have a growth aim and the motivation and commitment to achieve this aim. The core members of the firm include owners, chief executives and the top level management team.
- Technical and commercial expertise: The core members of the firm need to have the appropriate technical and commercial expertise for the firm.
- Management and Leadership: The management team needs to be competent both in knowledge and in being able to deal with the resources around them. They need to have adequate leadership skills to motivate the team.
- Human capital and intra-organisational relationships: The human capital of the firm should be competent in their areas and have good working relationships in which knowledge is shared.
- Contacts: The firm needs to have contacts in various areas in order to establish a network of support

2.6.3 Firm level factors

These are factors which are needed in order for the firm to focus its activities, fund its activities and manage its activities appropriately. These are managed by specific people factors mentioned above meaning they interact with each other to create growth.

- **Strategy:** The firm needs to have growth strategies which are communicated to the team and on which the firm's activities are centred.
- **Finance:** The firm needs to ensure that they have adequate access to finance in order to fund research and design, to ensure a healthy cash flow and to aid the firm's growth
- **Organisational Structure and system development:** The firm needs to have a defined organisational structure which allows for delegation and involves set procedures. Appropriate systems should also be in place to support the growth of the firm

2.6.4 Customer and Product factors

These factors are needed in order for the firm to bring in revenue and interact with the people and firm level factors in order to create growth. Some of these factors may operate internally in the firm, while others may involve external resources.

- **Market analysis and creation:** Market analysis should be conducted prior to the commitment to products in order to ensure that the market need and size is acceptable. New markets should actively be sought after.
- **Customer development:** The firm needs to have an adequate amount of customers with whom relationships should be strong. Understanding of these customers and their needs should be strong also and there should be an active attempt to increase the customer base.
- **Existing Product Development:** The firm needs to improve upon existing products and sell more of their existing product lines in order to increase their customer base

- New product development and innovation: The firm needs to continually be involved in new product development in order to keep ahead of competition and gain market share.
- Open innovation: The firm needs to engage in open innovation with other firms to ensure that they are dealing with the most advanced information and resources they can.

During the case studies emphasis will be put on how each factor has developed over time which will thus provide information as to the different levels of development for each factor which will then be included in the model. By comparing and contrasting companies it is hoped that it will be possible to ascertain what the minimum level which needs to be attained on each factor is.

The model presented in this chapter is in its most basic form as the aim was originally to only determine what factors should be included in the model and not how they develop over time. After the research it may become evident that certain factors need to be removed, changed slightly or that new factors need to be added. Thus at this stage the model is very flexible.

2.6.5 Conclusion

In conclusion, it is evident from the literature that SMEs play a vital part in today's knowledge based economy and that it is a small number of these firms which achieve high growth and create the majority of new jobs created. The knowledge based economy in which these firms are thriving is also creating a wealth of knowledge based firms, which are important in driving the economy forward. Further knowledge is required into these firms if policy decisions are to encourage their existence. Although theories of firm growth are evident in the literature, which have been influential in forming new streams of research, these do not consider factors such as external resources and open innovation and are not coherent enough to be used to aid firm growth in reality. Each theory considered alone fails to explain the growth of firms in today's economy and yet it was shown that these theories can be combined to form a more holistic theoretical base from which to conduct the current research.

Looking at growth from a closer lens are models of firm growth, of which there are many different types. It was highlighted how stage models have become widespread in the literature and yet are fraught with problems, while deterministic models have so far not been holistic or process based, meaning that they fail to fully explain the firm growth phenomenon. Klofsten's (2010) model is a good attempt at combining the principles of stage and deterministic models while at the same time acting to create a holistic, process based model. As such it was decided that this research would follow the same approach as Klofsten, but for the growth stage of development as opposed to an early stage of development.

The review then turned to looking at the literature on the individual factors which have been identified as having an influence on firm growth. This review concluded that although there is a large body of research on each of these factors there is still a lack of knowledge with regard to the relationships between them and the way in which these factors develop leading up to growth. The sheer amount of factors can be confusing and research is needed which brings together the essential factors in a coherent form and which ultimately aims to provide guidance and assistance to SMEs. From a methodological point of view it was highlighted that the majority of this research is quantitative in nature even though there is a wide range of researchers who call for a qualitative process based approach in order to gain a more detailed view on the process of development of these factors. From the literature review and participant observations a preliminary list of factors influencing the growth of the firm was developed, along with preliminary suggestions as to how these factors need to be developed and why. The following chapter will now detail the methodological approach taken in the research.

3.0 Chapter 3 – Methodology

3.1 Introduction

The purpose of this chapter is to analyse how the research was carried out and how the data analysis and results were generated. Thus a review will take place of the philosophical and methodological underpinnings of the research, the type of research design and instruments chosen, the criteria for analysis and the limitations of the research approach.

3.2 Research Ontology

Ontology is concerned with reality and whether “there is a ‘real’ world ‘out there’ that is independent of our knowledge of it” (Marsh and Furlong, 2002, pg18). This research takes the view that it is not possible for participants to articulate a reality which is not affected by their interpretation of that reality, and therefore the world is socially constructed (Morgan and Smircich, 1980). There are multiple realities depending upon the individual’s experience (Streubert and Carpenter, 1999) and as such a socially constructed research approach was deemed necessary. This reality is also further affected by the researcher’s perception of the participants ‘reality’, resulting in a double hermeneutic (Marsh and Furlong, 2002). The context of this research is open and uncontrollable due to the fact that the research takes place in a business setting and involves analysing events which have already taken place. As such a research methodology was needed fitting of this purpose in order to gain in-depth, personal accounts of firm growth factors and their change over time.

3.2.1 Research Epistemology and Research Philosophy

The epistemological approach can be defined as "the branch of philosophy that studies the nature of knowledge and the process by which knowledge is acquired and validated" (Gall et al, 1996) and as such guides the research design and analysis. There are two main epistemological approaches, positivism, which views knowledge as being independent of people (Levin, 1998; Girod-Seville and Perret, 2001), as such enabling it to be objectively analysed. The aim is to identify causal relationships

and to generalise results (Lin, 1998; Shankman, 1984a). Interpretivism views knowledge as being socially constructed (Berger and Luckman, 1966), affected by interpretation by the participant and the person conducting the research (Guba and Lincoln, 1994), assumes that the participant and the person conducting the research are linked and that reality is socially constructed and as such so is the knowledge gained during research (Denzin and Lincoln, 1994; Guba and Lincoln, 1994). The interpretivist paradigm opposes reducing a social science to a natural science (Schutz, 1970) and was created in reaction to the naturalist position (Kincaid, 2002). The aim is for understanding and interpretation, with the word interpretivist being derived from the Greek *hermeneuein* meaning to interpret (Blaikie, 1993; Carson et al, 2001). Geertz (1973, p9) argues in favour of an interpretivist paradigm claiming that data cannot be fully objective because data we think are facts are “our own constructions of other peoples constructions of what they and their compatriots are up to”. Table 3.1 summarises the key differences between positivist and interpretivist philosophies.

	Positivism	Interpretivism
Ontology Nature of the world	No direct access to the real world	Have direct access to the real world
Reality	Single external reality	Multiple realities
Epistemology Grounds of knowledge/relationship between reality and research	Independent of phenomena under investigation	Interactive with the phenomena
Methodology Focus of research	Concentrates on description and explanation	Concentrates on understanding and interpretation
Role of researcher	Independent	Involved
Unit of analysis	Large samples	Small numbers
Rhetoric	Impersonal and formal definitions	Personal and descriptive

Table 3.1. Key differentials of a positivist and interpretivist paradigm, adapted from Carson et al (2001:6)

Using the ontological and epistemological stances previously discussed it can be seen that this research falls within the interpretivist paradigm. This study deals with actors in a given social setting (organisations) and the factors which enable these organisations to evolve, and as such it is not possible to separate the actors from the factors and the relationships between them. Therefore it is essential that the research approach recognise that knowledge gained is affected by social contexts (Saunders, 2005) and is socially constructed. As such the research methodologies chosen allow for personal interaction between the participant and the person conducting the research, in order that growth processes can be discussed and observed in context (Yin, 2009). The person conducting the research is part of the research instrument, analysing and interpreting information based upon what is observed (Weber, 2004).

Epistemologically this research attempts to understand the reality of growth processes by focusing on growth variables and accounts of their change over time. As such it aims to provide insight into “the complex world of lived experience from the point of view of those who live it” (Schwandt, 1994, p.118), resulting in an “understanding from within” (Hofstede and Hofstede, 2005, p.4). This research will adapt Weber's (1947:88) *verstehen* approach which is “the interpretive understanding of social action in order to arrive at a causal explanation of its course and effects”, as this research attempts to both understand and explain. The research design accords with the interpretivist stance as the person conducting the research is engrossed in the research setting, the selection of participants has been purposeful, the research interaction will be personal and the aim is for theory development.

Although there are some instances of an interpretivist paradigm being used to research business growth factors and processes, (Barringer and Greening, 1998; Doorley and Donovan, 1999) the majority of research in this field utilises a positivist paradigm and associated research methods (Baum et al, 2001; Davidsson, 1991; Reid and Smith, 2000; Sigel et al, 1993; Watson et al, 2003; Wiklund et al, 2009). Carson and Coviello (1995), Romano and Ratnatunga (1995) and Sexton (1987) all note the dominance of positivist research methods in firm/entrepreneurship research while Hill and McGown (1999, pg.2) argue that using positivist paradigms when researching the firm/entrepreneurship is, to an extent, “square pegging from traditional disciplines into the rounder holes of firm/entrepreneurship research”. The

results obtained are usually from cross sectional research, meaning that the processes are not captured and that they highlight the factors which accompany growth and not those that enable it (Dobbs and Hamilton, 2007). Thus the issue of how firms develop is best answered by a process oriented approach (Dobbs and Hamilton, 2007; Littunen and Niittykangas, 2010; Furlan et al, 2014), one best suited to an interpretivist paradigm (Sale et al, 2002). As there is lack of process oriented firm growth research (Davidsson et al 2007; Delmar et al, 2003; Dobbs and Hamilton, 2007; Garnsey et al, 2006; McKelvie and Wiklund, 2010) and as a result a lack of process oriented models then the use of an interpretive paradigm will enable the discovery of new knowledge in this field.

3.2.2 Theory Building

There are two research approaches, inductive and deductive, with Saunders et al (2000) suggesting that the combination of both is the most advantageous. An inductive approach involves generating theory from data and empirical observations, and as such theory follows data (Saunders et al, 2000). A deductive approach on the other hand involves generating hypotheses from existing literature which can be tested through research (Ghauri & Gronhaug, 2002).

For this research a thorough literature review was carried out from which a preliminary model of firm growth was created (see chapter two), thus utilising a deductive approach. Empirical observation was also carried out at the same time which informed the development of the preliminary model, thus utilising an inductive approach. Throughout the research the model will be amended as is fit and as such new theory will be generated.

The reason theory building is required as opposed to theory testing is due to the fact that there is no holistic, comprehensive, process oriented model of firm growth factors (For a comprehensive review see chapter 2; Davidsson and Wiklund, 2000; Davidsson et al, 2007; Delmar et al, 2003; Dobb and Hamilton, 2007; Garnsey et al, 2006; Stam et al, 2006; Wiklund et al, 2009; Wiklund, 1998). The purpose of a theory is to provide a means of understanding “diverse and unrelated facts” in a structured and coherent way (Morse, 1994b, pp.25-56), which is a part of this

research aim. Eisenhardt (1989) advocates case studies for theory building in areas where existing theory appears to be inadequate (see chapter 2) and suggests that while existing literature should highlight potential important variables, relationships between these variables should emerge during the research. This is the protocol which has been followed in this research whereby a literature review has identified possible important variables, yet depth of information with regard to them were gained throughout the course of the research.

3.3 Research design

3.3.1. Grounded Theory Approach

Interpretive methodologies include ethnography, action research and grounded theory (Carson et al, 2001; Strem, 1994). Action research was first developed in 1946 by Kurt Lewin and concentrates on how research can address practical problems (Street, 2003) and suggest solutions (Denzin and Lincoln, 1994). Ethnography on the other hand traditionally involved immersion in another culture in order to observe and collect data. More recently participant observation has become accepted as one of the methodologies of ethnographic research (Bryman, 2002; Delamont, 2007). However, it was decided that action research would not be the most suitable methodology as the events in question have already passed and cannot be changed. The research does utilise methods used in ethnography, for instance participant observation, but the use of an entirely ethnographic approach would not have provided the information needed to answer the research questions. Historical research on the other hand was not suitable as the research focuses on current on-going firms. While each approach has its strengths and weakness it was decided that grounded theory would be the best approach to pursue, due to the need for theory development.

Grounded theory was first developed by Glaser and Strauss (1967) because they felt social science required a different research approach to the natural sciences (Suddaby, 2006). Charmaz (2006, p.2) describes grounded theory as “guidelines for collecting and analysing qualitative data to construct theories ‘grounded’ in the data

themselves”. Grounded theory involves constantly switching between data collection and data analysis in an iterative process called constant comparison.

Glaser (1978) acknowledges the importance of using existing theory and literature to familiarise the person conducting the research with themes which may become apparent during the course of the research arguing that without this prior knowledge, data analysis and the conclusions drawn become superficial. Suddaby (2006), Ni (2006) and Eisenhardt (2002) suggest that it may not even be possible to approach research without regarding prior knowledge and that research cannot be logically approached without prior research hypothesis. This suggests that grounded theory involves both inductive and deductive approaches, iteratively, a concept confirmed by LaRossa (2005). Although it may be argued that a pre-defined framework was imposed on the research prior to data collection this is not the case. The purpose of the factors was to guide the research, as it would have been too complex without it. These factors were not rigid, with the knowledge that these may change.

Grounded theory has been amended since its first conception, with Glaser (1978) stressing the importance of iterative data collection and theory development and Strauss (1987) advocating stringent coding schemes. This research will use Glaser and Strauss (1967) initial development of the theory as a guideline, in which research is an iterative process of data collection and data analysis, but will lean more towards Strauss’ (1987) advocacy of clear coding schemes.

Glaser and Strauss (1967) and Charmaz (2006) argue that grounded theory enables researchers to look at processes, which is at the crux of what this research is analysing. Glaser and Strauss (1967) also suggest that theory generated from grounded theory should have a practical aim which sits well with the aims for the use of the model. Theoretical sensitivity to data is considered important and assists in deciding which information is relevant (McCann and Clark, 2003a, 2003c; Strauss and Corbin, 1998). This was ensured through a review of the literature and the fact that the person conducting the research was working full time at a developing company.

Even though there are criticisms of the grounded theory approach it was felt to be the most appropriate method for this research and as such many of these criticisms were overcome. It is suggested that grounded theory may not be the most appropriate technique for use by an inexperienced researcher with application improving with practice (Suddaby, 2006). As such the technique was practiced during the pilot stage of the research and the researcher became more proficient in its use after each type of data collection. Another criticism is that the grounded theory process is not always made clear, meaning that it is difficult to know how coding and analysis took place (Suddaby, 2006). As such clear processes were set out for coding and data analysis. It has also been suggested that coding the data separates the data from its context (Alvesson and Skoldberg, 2000). However this has been overcome by the way in which the data and codes were set out in the excel spreadsheet, explained later in this chapter.

3.3.2 Case Study research

Yin (2009) advocates the use of case studies when dealing with “how” and “why” questions, which is what the present study is dealing with, i.e. how do firms achieve high growth and why do these factors enable that growth. Yin suggests that case studies are suitable when the situation cannot be manipulated, the focus is on contemporary phenomenon, the context is of importance and there is no clear distinction between the phenomenon and the context. For this research business growth factors cannot be separated from the business context itself and as such the research must take place in this context. There is also no control over the events as these occurred before the research took place. Gummesson (2003, p.488) defines the purpose of the case study as being “systemic and holistic, to give a full and rich account of a network of relationships between a host of events and actors”. Curran and Blackburn (2001, p.59) state that case studies are investigations of “complex change processes” and due to the amount of variables and the likely complex relationships between them, a case study approach seemed to be fitting of the research aims. This research will use Lee’s (1989) definition of an organisational case study “as an intensive study of a single case where the case consists of the individuals, groups, and social structure in the setting of an organisation”.

There are both strengths and weaknesses of using a case study approach over other methodologies. A case study approach was deemed as more suitable as the information gained needs to be holistic, in-depth and needs to analyse process which Halinin and Tornroos (2005) argue a case study is suited to. However, if a quantitative methodology was used this would not allow the accumulation of the level of information needed, making process analysis difficult. Firms tend to be complex and difficult to generalise (see chapter two) making them difficult to research in an objective manner. As Jung (1995, pg17) argues “science works with concepts of averages which are far too general to do justice to the subjective variety of an individual life”, or in this case to an individual organisation. This research aims to develop new theory and it is often useful to utilise case studies to firstly develop theory which can then be widely tested using a quantitative approach (Gable, 1994). A case study method also allows cycling between data collection and analysis (Gasson, 2003) allowing theory to emerge from data. The aim of this research is also for the model to be practically used, an aim to which case study research is ideally suited (Amabile et al, 2001). Thus it is not argued that quantitative methods are not useful, but rather that they are not suitable for this type and stage of research.

A quantitative methodology is steeped in positivist tradition in which the person conducting the research is to distance themselves from the event they are studying (Bryman, 1984). However, this research will be dealing with concepts which can be abstract and as such it is essential that more subjective methodologies are used to gain in-depth understanding. This is supported by Johnson and Duberley (2000) who suggest that positivist research methods cannot fully explain motivations, or emotions, phenomenon which are abstract. Questionnaires are also associated with problems such as bias or the use of socially acceptable answers. If likert type questionnaires are used it is possible to note that participants often choose answers which are in the middle of the band (Brown, 2000).

These statistical approaches make it far more difficult to analyse process as their aim is for statistical representitiveness (Easton, 1995). Entrepreneurship scholars call for a return to in-depth, process oriented case studies (Gartner, 2007; Van de Ven and Engleman, 2004). A classic example of research which did utilise a case study approach and which aided the development of one of the most well-known theories

of firm growth is that of Penrose (1959). A recent model which also utilised this case study based approach in order to research process and firm development is that of Klofsten (2010) who undertook three case studies. As this research is emulating Klofsten's research for the growth phase of a firm's development then emulating his research methods also seemed appropriate. The success of Klofsten's approach highlights that case studies can provide in-depth data which can be used to provide practical advice

However, case studies are not without their problems as they involve a lot of skill on the part of the person conducting the research (Yin, 2009), it is difficult to reduce bias and they often create data which is difficult to analyse (Cavaye, 1996; Gerring, 2005; Soy, 2006). The data collection itself is also affected by the researchers' background and experience, as is the data analysis (Galliers, 1992). Both qualitative and quantitative research methods can result in similar problems and difficulties and the decision with regard to which should be applied has to be drawn by an in-depth consideration of which is more suitable for the research question. As a case study research methodology accords with the research approaches specified in previous sections and is most suitable for a how and why research question then this was deemed as being more suitable, with the strengths outweighing the weaknesses.

3.3.2.1 Type of case

This research is split between research of external companies and research of the host company, in which the researcher is working full time. The host company is currently progressing through an early stage of development with the aim of developing to a growth stage. As such it was felt it would be invaluable to conduct participant observations of the host company thus utilising an inquiry from the inside approach (Evered and Louis, 1981). This approach accords with the epistemological and interpretive stances previously discussed as the person conducting the research becomes a part of the research and the data.

Research of the external companies however will not be inquiry from the inside as the process of firm growth will be discovered retrospectively and the person conducting the research will not be involved in the firm as a participant. However as

the process of firm growth will be discovered through in-depth interaction with the firm members these cases will be highly interpretivist in nature with knowledge being created through the interaction of the participants and the person conducting the research. Although it could be argued that this results in different levels of detail being gained between the two cases this methodological approach has been used previously by Vasst (2002), Leonard-Barton (1990), Sutton and Callahan (1987) and Burgelman (1983). Hill and Wright (2001, p.436) argue that the majority of researchers agree that when using a qualitative paradigm more than one data gathering method is advantageous and these “should accommodate situations which arise in the research context”. Leonard-Barton (1990) advocates the use of retrospective and real-time cases in order to aid in the reduction of bias, which is partly what this research has done while Eisenhardt (1989) argues that researchers can use different methodologies at different cases if new data collection opportunities become apparent. The participant observation that took place was not the main research method, with the main research method always intending to be semi-structured interviews supported by company documentation. Thus the participant observation in the one firm leads to another method in which to support other data. Each case study company was asked to validate a time ordered display for their firm, with each firm confirming the findings.

3.3.2.2 Unit of analysis

It is necessary to define the unit of analysis which identifies what the case is focused upon (Patton, 2002; Yin, 2009). As this research will focus on the process of firm growth then the appropriate unit of analysis will be the processes that took place within the firm leading up to and during their growth.

3.4 Analysis of generated data

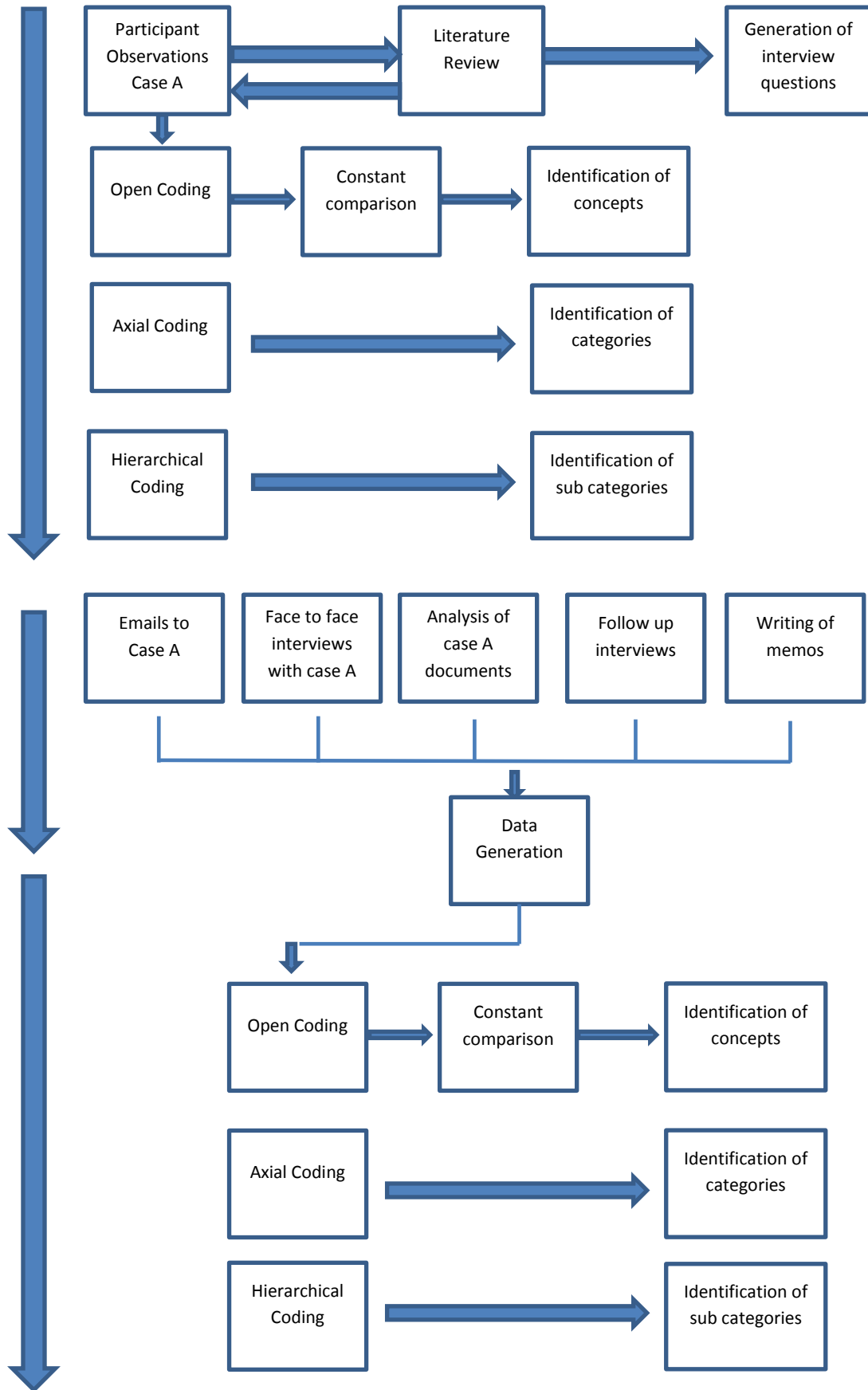
This section focuses on how the data was analysed in order to reach the conclusions formed and in order to inform the design of the interview questions.

3.4.1 Criteria for analysis

Based on the literature analysis in chapter two there is only one other model which looks at the firm development process, with this being Klofsten's Business Platform Model (1992). As such the framework of this model was used as the basis for the framework of the current model. The aim was to create a model of a very similar type but for the development to a high growth firm. In Klofsten's model there are distinct factors, each of which progress through three levels of development, with a description of why these are important. As such it was decided that the most efficient way to analyse the data would be to follow this process i.e. identify distinct factors, describe their levels of development over time and analyse why they are important to the firm. The resultant model will provide new insight into how firms grow and why this is the case.

3.4.2. Analysis process

There is literature pointing to the challenges of grounded theory data analysis techniques. For instance Wilson (2012) highlights it can be difficult to perceive both the detail of the data and the wider picture simultaneously, and the difficulty of gaining an understanding and theoretical framework of how all the themes link together. As Charmaz (2006) states, the use of grounded theory involves ambiguity, trust and surrender to the analytic process while Parkhe (1993) describes grounded theory as "messy". Boeije, 2002 and Suddaby (2006) also argue that the grounded theory data analysis technique is vague, however grounded theory can be very well documented and set guidelines were followed in order for others to be able to repeat the process, as is suggested by Strauss (1987). Figure 3.1 highlights the process which was followed during this research.



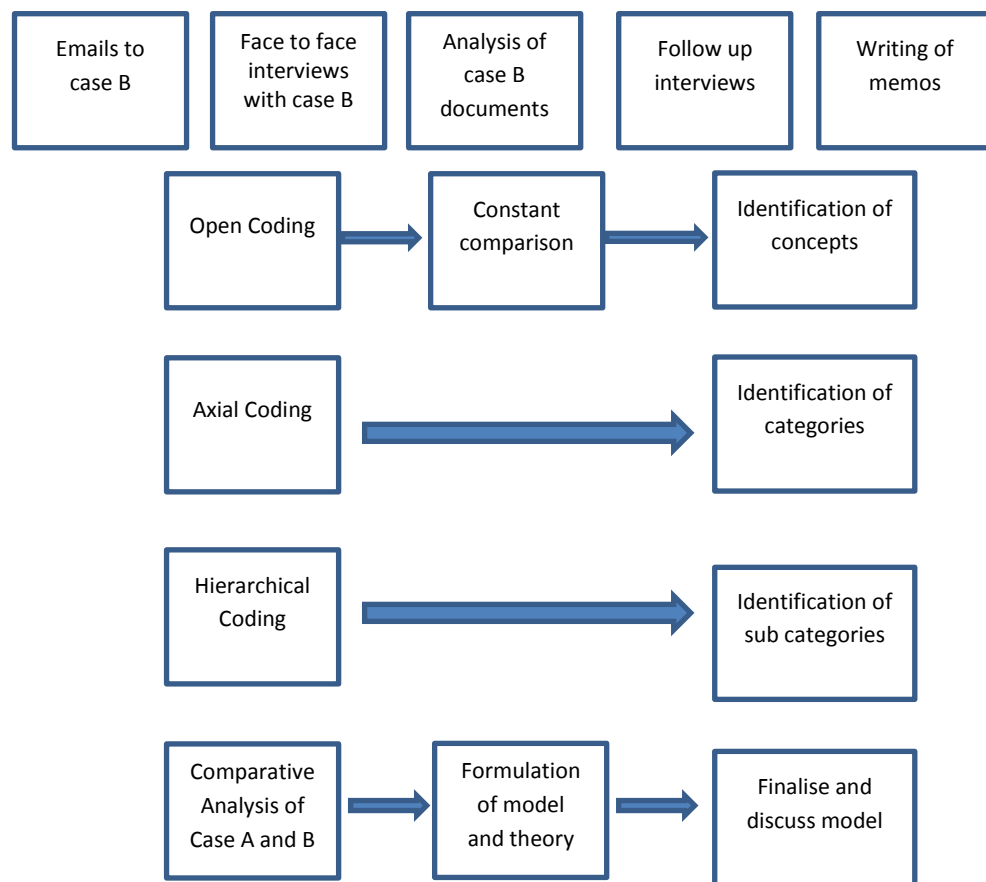


Figure 3.1. The process of grounded theory (adapted from Burden and Roodt, 2007)

Below is a detailed account of the data generation and analysis process:

1. Participant observations were conducted with case A in conjunction with the literature review. This enabled the generation of the questions to be asked in the interview schedule for both cases.
2. The participant observation data underwent the same analysis process as the interview and company documentation data. This process is described in points five to nine below. The participant observation data was analysed prior to the interviews starting and was used for triangulation purposes. The analysis from the participant observations was compared with the analysis for the interviews and analysis of company documentation. During the case write up the participant observations were used to corroborate the interview data

and also to provide additional detail to the analysis. Therefore in the case write up the participant observation data is not explicitly referred to that often and yet was instrumental in providing support and additional information to the interview and company documentation data. When participant observation data is referred to then this is highlighted in the case write up.

3. Once the interviews had been conducted the interview data was transcribed serving to both transfer the data into a useable format to analyse and also enabling familiarisation with the data encouraging initial thoughts with regard to themes. The interview data from case A was analysed prior to moving onto the data generation in case B.
4. Read through interview transcripts while listening back to the recorded interview and also read observation notes and company documents. This was done in order to become familiarised with the data and to check the interviews had been transcribed correctly.
5. The data i.e. the interview transcript, field notes or company documentation text was then inserted into an excel spreadsheet for data analysis. It was decided that no proprietary qualitative software would be used as after a trial of NVivo9 it was decided that it would be too time consuming to learn and use. Seidel (cited in Welsh, 2002) argues that the software may guide researchers in a certain direction while Welsh (2002) argues that it distances the person conducting the research from the data and attempts to transform qualitative data into quantitative data. NVivo is also criticised for not taking into account alternative words with the same meanings (Ozkan, 2004). There are also advantages of conducting the analysis manually as more familiarity is gained with the data and the spreadsheet was checked constantly meaning that any irregularities could be noticed. The spreadsheet was set out with the following headings: company, participant, role, interview question and interview answer. Each interview answer was then given a code. If numerous codes were needed in one paragraph then the text that needed a new code was moved to a new cell beneath the full text. This enabled filtering for specific codes but still ensured the data was in context as the cell above contained the

previous text. The same process was followed for the participant observations and company documentation.

6. Open coding process. This involved analysing the interview transcripts line by line and assigning codes to them where necessary. Strauss and Corbin (1990;1998) describe open coding as applying meaning to a chunk of text based on the interpretation of that text. These codes were then put into a master coding structure which defined when that code should be used. Early in the research process multiple code names were generated for the same theme with decisions as to which was the most appropriate to use being made after a substantial amount of coding had been done. This ensured that codes were constantly re-analysed as was associated text to confirm they were grouped consistently.
7. Memo writing was an on-going process throughout data collection in which notes are written with regard to data and categories (Creswell, 2002). This aided in the noticing of themes, relationships and possible contradictions in the data. Advantages of memoing include aiding in idea development (Orona, 2002), reflection (Lofland and Lofland, 1984), identifying gaps in analysis (Charmaz, 2006) and acting as an audit trail (Smith and Biley, 1997)
8. Axial coding process (Strauss and Corbin, 1998). This involved looking at all the codes which had been assigned and grouping them into similar categories (Brown et al, 2002). This relied heavily on the constant comparison technique in which concepts or themes are compared with all other themes and broader themes result (Glaser and Strauss, 1967). This axial coding process took place in conjunction with open coding and was refined after it. All codes were compared across all interviews. These axial categories are covered in the next chapter.
9. Hierarchical coding process. This involved reducing the codes even further by grouping them into yet more categories (see appendix 6 and 7). For instance if there were many codes within for example the 'contacts' category which all related to 'gaining new contacts' then 'gaining new contacts'

became a hierarchical code while still being included under the category of 'contacts'.

10. Create time ordered displays. This involved taking the axial/hierarchical categories and creating a table briefly describing how each category developed over time. This type of display is advocated by Miles and Huberman (2004) in order to study processes and chronology. The open codes were used to describe how the axial categories had progressed over time. Each time a change was observed in that factor this became a new level in the time ordered display. For instance if one code highlighted no processes being in place and then another highlighted the introduction of processes then these became two separate levels of development. In order for a change in a factor to be considered as a new level of development its change needed to affect other factors and therefore the overall firm development in some distinct way. For instance with regard to finance if the firm developed from handling their own finances to hiring an external accountant then this was considered as a new level of development as the hiring of the accountant enabled better financial management and more time for strategic thinking.
11. Start the write up of the data. This was started so that further analysis would take place as thoughts were being generated about the data through the writing process. This also involved the comparison of the codes and findings from the different data sources. The data analysis detailed the process of development of each factor ascertained from the time ordered displays, coding and reference to the original data (e.g. participant observations, interviews and company documentation) and what influence this factor had on the firm and why by looking at each code, its associated codes and the original data. The write up of each case is narrative in nature, telling a story with regard to the firm's development. According to Pentland (1999) this narrative approach allows for indicators of an underlying process and enables better explanation of a phenomenon, thus moving to a better theory. Abott (1990) meanwhile argues that the use of narrative writing addresses the existence of sequential patterns, the antecedents of them and the

consequences of them. These are crucial points to address in this research in order to identify key factors and their developmental processes.

12. Create a 'connecting factors' diagram. This diagram was created to show which factors link with other factors in order to highlight the relationship between them, something which Strauss (1987) and McCann and Clark (2003a) recommend. This was created by looking at the case write up and analysing which factors were described as influencing another factor. During the write up of the data this was ascertained by writing about each code while referring to the original interview data and associated codes. For instance many pieces of text had multiple codes such as 'utilising existing contacts' and 'first customer'. From this analysis it became obvious which factors or themes linked with one another and how.

13. Develop theory. This occurred along the lines of developing a core category as is suggested by Strauss and Corbin (1998). This took place almost unconsciously and was enabled through the comparison of all the higher level codes. Three core categories were identified and although Strauss and Corbin advocate only one core category this research involves so many variables that in order to explain the connection between them three was deemed necessary. These core categories are described in chapter seven as their identification was enabled during the comparative analysis of the two cases.

Throughout the whole research process codes were constantly examined in order to ensure the correct codes were assigned to the correct text. Data generation continued during the data analysis process, as is suggested when utilising a grounded theory technique (Glaser and Strauss, 1967). The only difference in analysis process came when the company documents were analysed and depended on the type of document being analysed. For instance if a patent application was used then the whole document would be given one code as the document was needed purely to support participant responses. However a business plan was analysed line by line as business plans contain a lot of detail with regard to various areas of the firm.

When a new case study began to be analysed or when participant observation took place as opposed to semi-structured interviews the previous coding schemes were not used and instead a fresh one was created. This was done so that codes were not forced onto the data and instead the data would speak for itself. However, once the coding scheme had been completed this was compared to the other coding schemes in order to see similarities and differences. It is interesting to note that all coding schemes were very similar albeit to differing levels of detail depending on the data source and the length of life of the company. This approach ensured that integrity of the methodology and the key foundations of grounded theory (Glaser and Strauss, 1967) were maintained, but also that it was possible to analyse across the cases. Throughout the analysis process a high number of codes were identified due to the high number of factors discovered and the level of detail needed with regard to them. These were able to be reduced through the processes of axial and hierarchical coding. As Patton (2002) argues data is first described, then conceptualised then progresses to theorising.

3.4.3 Analysis of between case data

An essential part of the analysis process was to compare the case studies with one another in order to identify similarities and differences. This was done by comparing the coding schemes and the time ordered displays for each case, as suggested by Eisenhardt (1989). The comparison between each case centred on the themes, so each firm was compared on strategy, then contacts and so on. This enabled creation of a generic time ordered display for all firms and for a theory to be created explaining why each factor was of importance.

Based on the analysis process described previously it was important to generate the data in a consistent and detailed manner, as is specified in the forthcoming sections.

3.5 Data generation

So far this chapter has considered the approach taken to the research and the analysis process applied to the data. This section will now explore how the research data was gathered.

3.5.1 Research method

As has been reviewed the philosophical stance of the research is interpretivist in nature and as such the research methods chosen should reflect this. The use of a grounded theory methodology is usually associated with data collection through interviews, observation and examination of records (Creswell, 2003; Easterby-Smith et al, 2002). Glaser and Strauss (1967) refer to the use of multiple data sources in order to provide further rigour to the research (McCann and Clark, 2003c). As such the methods chosen for this research consisted of:

1. In-depth interviews
2. Participant observation (used only for early stage company)
3. Analysis of company documentation
4. Under the band of a grounded theory methodology (Glaser and Strauss, 1967).

3.5.1.1 Semi-structured Interviews

The main methodology was that of semi-structured interviews. Bryman and Bell (2007) define a semi-structured interview as one in which there is a list of pre-defined questions but in which the respondent has freedom in the way to respond. Questions may not be asked in the order specified and new questions may be asked during the interview. Interview themes and questions were developed from both the literature review and the observations of the host company (see appendix 4). The analysis process specified previously aided in the development of the type of questions asked and the way in which they were to be asked. There are different types of interview types ranging from unstructured to structured. This particular interview type sits between that of semi-structured and structured. An unstructured

interview type was not chosen as it was felt that in order to gain all the information needed in the timeframe given that set questions needed to be asked. A structured interview technique was not chosen as these are more useful for when data is being quantified (Polit and Beck, 2006).

Each question was given prompts to delve into the issue in more detail with Gray (2004) suggesting that this enables exploration of new themes and ideas which may emerge during the interview process. Interviews are one of the most commonly used qualitative research methods (DiCicco-Bloom and Crabtree, 2006), especially in grounded theory research (Goulding, 2002). Although the majority of research into firm growth variables utilise quantitative research methods Barringer et al (2005) identified the following researchers as using a qualitative approach: Kazanjian (1988), Cooper and Bruno (1977), Doorely and Donovan (1999), Ahrens (1999), Zhao and Aram (1995), Barringer and Greening (1998), Fisher et al (1997), Van de Ven (1980), Roure and Maidique (1986), Hobson and Morrison (1983), Patterson (1998) and Barringer et al (1998). However, Barringer et al (2005) identified far more research utilising a quantitative approach, highlighting the fresh insights which may be gained in this research.

3.5.1.2 Participant Observation

Bryman and Bell (2007) argue that participant observation centres on observing behaviour and writing this down in field notes and as Remenyi et al (1998) state the person conducting the research joins and take part in the group being studied. This type of longitudinal research method has been argued to be lacking in the literature (Coviello and Jones, 2004; Davidsson, 2005; Davidsson and Wiklund, 2000).

These observations are advantageous as they complement the interviews and provide in-depth data. Bernard (2006) argues that participant observation enables access to a wider range of data, is less intrusive, enables the formulation of questions to be asked at a later stage, enables an understanding of the meaning of the data and enables direct knowledge gained through doing. Participant observations also enable the observance of current events within their context (Bryman, 2002). However bias had

to be omitted from the field notes as much as possible by ensuring that no personal opinions were written in the field notes and if they were these were not included for coding. However, it was important to accept that this research is interpretative and as such the researcher's interpretation of the data is a part of the research process. The comparison of the coding from the field notes and the interviews enabled validity to be ascertained as the codes were very similar but to differing degrees of detail. The observations aided in the creation of the interview schedule as it became obvious certain themes were influencing the firm's development.

3.5.1.3 Company documentation

This method was chosen because access to documents was particularly easy in the host company and because a secondary data source was needed for the external case studies. Boslaugh (2007) argues that secondary data sources can provide a wide range of data for a small resource outlay while Remenyi et al (1998) suggest multiple sources of evidence should be used when using grounded theory. The company documentation enabled the confirmation or contradiction of findings from other data sources thus adding to the validity of the research (Yin, 2009; Remenyi et al, 1998).

Scott (1990, p.34) argues that documents "must be studied as socially situated products". As such consideration was made of the source of the document and for what purpose it had been created and then its information was compared to other data sources to determine its accuracy. Ahmed (2010) argues that the use of company documents is one of the most widely used data collection methods in the social sciences.

3.6 Selection of cases

Theoretical sampling of multiple cases was undertaken, in order to compare and contrast each firm's developmental progress on each factor. Thus one high growth firm was studied and one early stage firm on the path to high growth was studied. The early stage firm was chosen as the researcher was working full time at this host company which presented an opportunity to gain knowledge as to the firm's process of development and to compare it with that of a high growth company.

The high growth company was chosen as the research aim was to provide a practical tool for use by knowledge based companies, highlighting high growth processes. Due to this research took place in order to identify potential case study companies from the Fast Growth 50 awards list. This award was created in 1999 and ensures that an independent party will have recognised the companies as having achieved high growth. In order to qualify the company must be independent and privately held, had sales of at least £250,000 in the two years before the award and be based in Wales; an advantage as it meant that all the firms would have experienced generally the same external environment. Rankings are based upon the percentage growth in revenue over a two year period meaning that those included in the list are those firms who have grown the fastest in a short amount of time. This method of identifying case study companies was first used by Langrish et al (1972) who choose companies from the Queens Award winners list. This methodology has been used since by researchers such as Oakey et al (1980), Smith and Miner (1984), Hendricks and Singhal (1997), Crick and Bradshaw (1999) and Crick et al (2002).

3.6.1 Number of cases and selection of participants

Two case study companies (table 3.2) were identified for data collection and analysis. There is no set number of cases which is thought to be the optimum needed in order to provide credible results (Gummesson, 2003) and yet there were reasons for focussing on two. Klofsten's (1992) research involved the use of three case studies, resulting in findings which have been widely utilised in practice. Yin (2009) advocates the use of single and multiple case studies and argues that a replication logic should be utilised with two or more cases. As this research utilises grounded theory then it can be argued that the number of cases is less important than the concept of theoretical saturation, achieved when no new relevant data emerges and when the relationships between concepts is established (Strauss and Corbin, 1998). This research is gaining information on multiple facets of an organisation and as such research needs to provide depth of information. Voss et al (2002) state multiple case studies do not allow for in-depth understanding of each case but by using only two cases this research overcomes this limitation. Both Glaser (1998) and Stern (1994) argue that when using grounded theory methodology small sample sizes do not cause

problems. Flyvbjerg (2006) is another proponent that single case study methods are extremely useful and uses the examples of Galileo's rejection of Aristotle's law of gravity being based on a single experiment as well as carefully chosen experiments by Darwin and Freud. There are also examples of only one or two case studies being used in PhD theses such as that by Zhong (2009) and in well-respected participant observation ethnographies such as that by Sutherland (1937). Robson (1993) argues that individual case studies are useful to explore processes, a key requirement of this research.

The table below highlights how many people were interviewed, what their role is and their duration at the firm. CEOs and CTOs were chosen as they are likely to have been with the firm from start-up and should have a detailed knowledge of all factors. Finance, sales and marketing and technical managers were chosen as it was felt they would be able to provide in-depth answers in relation to each of their areas and would also be able to answer all other questions, allowing comparison with other participant responses. All employees at company A were interviewed as there were only a small number of people working in the firm while one retired employee was interviewed at company B as this person had been with the firm from start up to growth and would be able to provide a perspective of the firm from a different hierarchical level. The contact at each company ultimately had the final say as to who was interviewed and as such additional staff members were sometimes interviewed, such as quality and operations directors.

Case Number	Company Reference	Generic Role	Description of position	Been with firm since
1	A	CEO	Commercial lead of the firm	2007
1	A	CTO	Technical lead in the firm	2007
1	A	Operations Manager	Runs day to day business operations	2010
1	A	Mechanical Design Engineer	Design of mechanics for products	2011
1	A	Design and development manager	Management of the design and development of products	2010
1	A	Electronics design manager	Management of the electronic design of products	2011
2	B	Former CEO	Former commercial lead of the firm	1997
2	B	Current CEO	Current commercial lead of the firm	2009
2	B	Former BD and Operations Manager now Project Manager	Identify new business opportunities / Head of day to day business operations / Manage projects	2004
2	B	Former BD Director	Identify new business opportunities	2007

		now Operations Director	/ Head of day to day business operations	
2	B	Finance Director	Head of financial aspects of the firm	2009
2	B	Retired employee	Project Management	1997
2	B	Quality Director	Head of quality control	2009

Table 3.2. A list of study participants including their role, position and length at firm

3.6.2 Number of interviews and observations

After the case study companies had been chosen consideration was given to the number of interviews and observations which would take place. There are four phases to this research set as follows:

Phase one: Initial introductory contact meeting in able to build rapport.

Phase Two: Collection of company documentation. This phase was on-going throughout the research process.

Phase three: Participant observations. This took place at the host company and was on-going from the commencement of the research until the interviews started. This consisted of 380 observation days.

Phase four: Semi-structured interviews. This involved interviewing numerous people within the firm, sometimes on more than one occasion (see table 3.3) due to the length of the interview schedule. Twelve interviews were conducted with case A and thirteen with case B. By the time case B was conducted it became obvious there was no need for three separate interviews and so the interview questions were compiled into two documents.

Case Number	Participant Reference	Observation period	Interview Date	Interview Date	Interview Date
A	A	May 2010 – December 2011	February 14 th 2012	February 16 th 2012	March 23 rd 2012
A	B	May 2010 – December 2011	March 1 st 2012	May 2 nd 2012	
A	C	May 2010 – December 2011	February 15 th 2012	February 29 th 2012	
A	D	May 2010 – December 2011	April 17 th 2012		
A	E	May 2010 –	February 24 th	March 2 nd 2012	

		December 2011	2012		
A	F	May 2010 – December 2011	March 5 th 2012	May 7 th 2012	

Case Number	Participant Reference	Observation period	Interview Date	Interview Date
B	A	----	08 th August 2012	22 nd August 2012
B	B	----	06 th August 2012	24 th August 2012
B	C	----	01 st August 2012	10 th August 2012
B	D	----	10 th August 2012	
B	E	----	01 st August 2012	6 th August 2012
B	F	----	01 st August 2012	24 th August 2012
B	G	----	September 4 th 2012	September 11 th 2012

Table 3.3. Frequency of interviews and observations

The justification for this setup was numerous:

1. Interviewee availability. Many of the participants are directors of their company or at a high managerial level. As such interviews were conducted according to the interviewees' timetable.
2. Data triangulation. Multiple people were interviewed each with a different role so that perspectives could be gained from differing hierarchical levels allowing information to be compared and contrasted.
3. Time restrictions. Observations were only conducted at the host company and not at the external company due to the fact that the researcher worked full time at the host company.
4. Interviewee fatigue. None of the interviews lasted longer than two hours consecutively. This was accomplished by splitting the interviews into two or three separate entities conducted on separate days. This was done in order to maintain interviewee and interviewer concentration and to enhance the quality of answers.

3.7 Pilot Interviews

In order to test the interview schedule prior to the case studies it was felt that pilot interviews were of importance (De Vaus, 1993; Sampson, 2004; Yujin, 2010). Prior to the pilot interview practice interviews were conducted with two high technology SMEs. The purpose of these was to afford experience of conducting interviews and not to test the questions per se as the practice interview companies were start-up companies and therefore many of the questions were not relevant to them.

The two practice companies were chosen from the list of POWIS companies as the researcher is part of the POWIS project. The POWIS programme places a researcher in a business to work on research and design. The companies were contacted to explain the purpose of the research and a meeting was arranged at their offices for the interviews to take place. These interviews were transcribed for practice purposes, but no analysis took place. The interviews enabled an understanding of the difficulty of semi-structured interviews. None of the questions were drastically changed due to these interviews but certain questions were re-worded to become clearer.

In order for testing of the interview schedule a high growth company was approached, chosen based upon their inclusion in the Fast Growth 50 list. The company were provided with a briefing letter and a consent form (see Appendix 1 and 2) and once the company had agreed to participate a meeting was set up in order for the interview to take place. The consent form was discussed and then signed, with the interviewee being assured of confidentiality. The interview only involved certain sections of the full interview schedule due to time restraints and researcher resources and only one company was chosen due to the difficulty of finding appropriate companies. None of the questions which had been practiced with the practice companies were tested with the pilot company, thus ensuring that almost all questions had been tested in some form.

The purpose of the pilot interview was:

- To highlight any ambiguous questions
- To expose items which will provide inadequate data
- To indicate the length of the interviews
- To indicate if the wording of the questions was suitable
- To indicate if certain questions were repeated
- To enable a case study protocol to be created
- To gauge the appropriateness of the questions
- To enable practice analysis
- To enable experience of conducting semi-structured interviews

Once the interview had been conducted a contact summary form (see Appendix 8) was completed and the interview transcribed. The data underwent a process of open, axial and hierarchical coding, as is suggested for grounded theory research (Strauss, 1987). A time ordered display and a sub time ordered display were created in order to reduce the complexity of the information. Throughout the analysis it became evident that certain changes needed to be made to the interview instrument. For instance ambiguous questions were re-worded and the order of some of the questions was changed in order to make the interview flow. Certain lessons were also learnt by the interviewer including ensuring all prompts are asked and following up brief answers with another open ended question or prompt.

3.8 Research protocol – Case Studies

Phase one consisted of an initial meeting with the key contact at each company. Prior to this desk research was carried out in order to obtain as much information about the firm as possible and a briefing letter, consent form and the list of interview questions was emailed to the contact (see appendix 1, 2 and 4). The aim of the meeting was to explain the purpose of the research, who needed to be interviewed, for what length of time and to develop a rapport with the key contact.

Phase Two: Collection of company documentation. This was on-going throughout the research process. The key contact was given a list of documentation needed (see appendix 5), if possible, and these were then provided as and when was possible. Once the case studies had started documents were added to this list if new ones emerged. It was explained that the information would be kept in a private location, that if permission was not given no documents would be used and that all information would be treated with the strictest confidence. Decisions with regard to which text should be analysed were based upon the research question and interview themes (Remeyni et al, 1998).

Phase Three: Participant observation was undertaken at the host company from May 2010 to December 2011. Some were retrospective and were written in a brief format at the end of the working day. These observations are not fully indicative of the firm's development as most relate to what was observed while conducting normal working duties. Prior to the observations staff members were informed that daily observations would be taking place and all information would relate to the general working day in the firm. All staff members consented and no issues arose throughout.

Phase Four: Semi-structured interviews were conducted with questions centred on themes that should be present in every business. The plan was for these to aid in the creation of a corporate history of the firm. The interviews did flow more as an interview than an informal conversation but this was needed due to the high level of data required and to minimise the amount of bias conveyed through informal conversation. With regard to the host company the respondents were asked to answer the questions as though the researcher did not work at the firm in order that more detail would be provided and less bias would occur.

It is suggested that interviewees are given as much information as possible prior to the commencement of an interview (Gillham, 2000). As such the respondents were given the consent form and informed why the interview was taking place, were told that participation was voluntary, confidential, that they could withdraw at any time, that the interview would be recorded should permission be given, that all quotations used within the thesis would be anonymous and that they would be able to review the

write up at any time. An estimate was given as to how long the interview would last and what themes would be covered in that section. None of the participants declined to take part and none of the questions elicited uncomfortable responses.

3.8.1 Research Protocol – Interview Schedule

The interview schedule covered the following themes and focused on their importance to the firm's development and why and how they had developed over time. These themes originate from the literature review and from the participant observations. The interviews were cut into three separate sections:

People

- i) Aspirations
- ii) Technical and Commercial Expertise
- iii) Management
- iv) Human Capital, skills and relationships, team work
- v) Contacts

Corporate Level Decisions

- vi) Strategy
- vii) Organisational Structure and Systems and Software
- viii) Finance

Product

- ix) Marketing
- x) Customers
- xi) Open Innovation
- xii) New Product Development
- xiii) Existing Product Development

Each respondent was asked questions related to each theme. As is suggested by Howard and Sharp (1983) all interviews utilised the same interview instrument to ensure comparison between sites. Interviewees were told to tell the interviewer to move on if they felt they could not answer a question. The majority of respondents were able to answer questions on each theme. The only difference was that the directors of each firm were asked about themes in detail whereas managers and

employees were not. For instance a CEO may be asked what staff experience was prior to starting whereas an employee may only be asked about their previous experience. The wording of the questions was tailored to the respondent's time at the firm and the first question asked was aimed to be general and open ended and well suited to the research question.

3.8.2 Research Protocol – Post Interview Process

After each interview the respondent was thanked and the next interview and the themes that would be covered were arranged. They were also informed that they could contact the researcher should they have any questions and were asked if they had anything further they would like to add. If a second interview was conducted respondents were asked if they had anything they wished to discuss with regard to the last interview. Once all interviews had been conducted the respondents were again asked if there was anything they would like to add.

After each interview a contact sheet was completed (see appendix 8). Any interesting themes and any themes which may have been missed were noted and reflective thoughts added, as is suggested by Chesney (2000). The interviews were reviewed the same day and any new questions were written down to be asked as follow ups. The interviews were then transcribed and then the transcription checked by listening to the audio while reading the transcription. Decisions as to whether further interviews were required were made during and after data analysis (Glaser, 1978).

Throughout the interviews some of the questions were changed, removed or new ones added. These decisions were based upon the answers given by previous participants and the analysis of these. However none of the changes were drastic.

3.9. Validity

Validity was ensured in a number of ways. After each case analysis a meeting was held with the key contact at each company who reviewed their case model and 'connecting factors' diagram to confirm what was portrayed or request amendments. Neither company requested that changes be made. Construct validity has been

adhered to by operationalising each factor and what needed to be discovered with regard to these and why (see appendix 3). Multiple sources of evidence and multiple case studies were used enabling analytical generalisation.

Validity in the traditional sense is not seen as an issue in grounded theory but instead should be judged by fit, relevance, workability and modifiability (Glaser and Strauss, 1967). Fit was ensured through constant comparison, relevance by interviewing relevant people within the firm and creating an academic and practical model, workability through multiple case studies and modifiability by the flexibility of the model.

Yin (2009) argues that construct validity can be adhered to by ensuring that there is a clear chain of evidence from research questions to conclusions and that triangulation should be adopted. A note was kept of how the research instruments were generated, cases chosen, data collected and data analysis undertaken, thus ensuring a clear evidence chain. A mixture of research methods and the use of multiple interviewees enabled triangulation. If a conflict between participants accounts was discovered then all participant responses were compared to see if there was an explanation for this difference. Conflicts were rarely found but if they were it was obvious why this was the case and this was covered in the results and analysis.

3.10 Reliability

Reliability has been ensured by establishing a clear chain of evidence from research questions to data collection and data conclusions. The research questions together with the literature review and participant observations led to the creation of the interview instrument. Case study companies were chosen from a list of award winners and the interview instrument was followed throughout. The collection of company documentation came from a pre-defined list while the participant observations were written at the end of each working day. The analysis process, analysis focus and reporting process was clear throughout and followed the lines of previous research (Fisher, 2007; Dunne, 2008) while also following the process advocated in the literature (Glaser and Strauss, 1967; Strauss, 1987; Charmaz, 2006)

3.11 Limitations of the research

Limitations have been avoided as much as possible through the rigour of the methodological approach and the research design utilised. However, it could be argued that the biggest limitation of this research is in its interpretivist nature. The research requires being actively involved in the research and on the skills of the person conducting the research. However, previous sections of this chapter highlight how these limitations have been acknowledged and attempted to be overcome by ensuring validity, reliability and repeatability. These limitations are outweighed by the benefits of such an in-depth and holistic approach, one which was required in order to answer the research questions. The drawbacks had a quantitative methodology been utilised include low explanation of variance, as was found in Davidsson's (1991) and Wiklunds (2009) research. The research method utilised has been done so in order to overcome the limitations evident in the existing literature including lack of integration (Davidsson, 2007; Wiklund et al, 2009; Wiklund, 1998) and a lack of process oriented modelling (Dobbs and Hamilton, 2007; Stam et al, 2006; Littunen and Niittykangas, 2010). The research did seek to establish generalisability as the detailed findings will be used to generate new theory however, it is recommended that this will need to be tested further, perhaps through quantitative research in order to generalise the findings yet again and to check the claims of the theory.

3.12 Ethical considerations

It was not felt that this research held any ethical concerns to the wider public and the main ethical considerations related to anonymity and confidentiality. Ethical approval was sought from the University board and was granted prior to the research being carried out. Through the use of consent forms and verbal conversations all participants were made aware of confidentiality and anonymity issues and discussions were made as to how they should be dealt with. Anonymity was ensured by providing alias names to all participants.

3.13 Conclusion

This chapter has detailed the ontological and epistemological approach taken during the research, resulting in an interpretivist philosophy and appropriate methodologies. In order for research to have both academic and practical implications it must be shown to adhere to methodological rigour and the appropriate research philosophy must be chosen according to the research question. As this research aims to add knowledge and create theory as to how firms develop from start up to growth and to create a model able to be used by practitioners and academics alike, then a philosophical stance allowing for in-depth, context driven, personal accounts was needed. A grounded theory approach was chosen in order to allow for theory generation while specific methodologies were chosen based on the level of detail needed and through an analysis of extant research. Importantly it was highlighted how extant research generally tends to utilise quantitative approaches and that there is a distinct lack of research utilising interpretive approaches. Pilot interviews and observations were conducted which aided in the formulation of the interview instrument and triangulation was implemented to aid in validity. Clear protocols were in place to guide the research process from research question to data collection to data analysis, protocols well established within the grounded theory methodology literature. Ethical issues were considered and dealt with accordingly.

The research approaches specified in this chapter have a large influence on the analysis and reporting of data and as such the next chapter will report the findings of the study using the criteria for analysis outlined previously.

4.0 Chapter 4: Findings and Analysis Case A

4.1 Introduction

This chapter details the results and interpretation of the research. In order to make the complex nature of these findings clear the analysis has been split into different sections relating to the different factors found to have been of importance to the development of the company. It is not until the comparative analysis in chapter six that the level each factor needs to be developed to in order for growth to occur will be discovered through an analysis of the similarities and differences between each case. The implications of this research for extant literature will be considered in chapter seven.

4.1.1 Case A history

Case A was founded in 2007 by the CEO and CTO and is a high technology optoelectronics or photonics company with a focus on laser and LED products. The company's main offerings centre on LED Multiplexing technology, whereby the company offers bespoke design and manufacture of products specifically to customer requirements. Therefore each of case A's potential product applications is different yet centred around the same technology. Their technology essentially combines different wavelengths or colours of LEDs into one output light, although each colour can also be output separately. This technology then replaces bulb technology in various applications, with the benefits including a far longer lifetime, reliability, system maintenance reduction and market specific functional benefits. The main markets in which this company currently operate is that of life sciences, namely endoscopy and also digital display, although there are many more markets into which they are hoping to expand including military applications, flight simulation, photodynamic therapy and a wide range of life science applications. The company is therefore inherently a research and design company who work with a number of business to business customers who act as their route to market. The company can be classed as both a product and service company as although they manufacture they also offer consultancy services. The firm has also created a "cash cow" product which they hope will bring in some revenue while waiting for the high technology

products to commercialise. This “cash cow” is a wireless temperature monitoring device.

The firm is very much a high technology knowledge based firm and the directors view themselves as entrepreneurs and innovators in their field. The company is based in a business and technology centre in South Wales where they rent offices and are therefore surrounded by other companies and service providers. They are part owned by Finance Wales and The University of South Wales (formerly the University of Glamorgan), from which they are a spin out. The CEO and CTO knew each other for a number of years prior to starting this firm. Both directors have a vast amount of experience in the photonics field, both technically and commercially. The company currently employs nine people and the human capital base consists of both technical and commercial staff. The majority of staff members have been present at the firm since its early years. The CTO is also a professor at a local university and as such works at the company on a part time basis. The CEO is present at the company full time. The firm has not, as of yet, made any substantial sales revenue due to the fact that there is a lag between the development of customers products and their commercialisation. Therefore the company has essentially been surviving on various government grants and non-recoverable engineering (NRE) payments from customers. The firm expects that their first commercialised products will be available for sale by their customers in early 2015. A timeline of the firms key developments are listed below.

2007: Firm starts and has a generic product prototype

2007: Firm is sustained through the sale of low technology products

2007: Aim for the firm is for the generation of high technology differentiated products that enable the firm to achieve high growth

2007-Present: Grant monies are received and knowledge generation is evident through experiential learning and open innovation

2008: Firm rents their first office

2009: Firm takes on its first staff member

2010: The firm receives its first large injection of finance from Finance Wales

2010: The firms first open innovation customer projects begin as does their cash cow project

2010-2011: A large increase in staff members becomes evident increasing from one to ten

2011: Official quality certification is gained

2012: Second round of finance received from Finance Wales. Monthly management accounts are generated externally

2011: Departments begin to emerge within the firm

2011-14: The firm generates advanced prototype products for their customers meaning that new patents are generated

2013: The firm starts to increase its marketing efforts and more customer projects are brought on board

4.1.2 Analysis Process

The analysis below will detail the process of development for each factor found to be of importance and will importantly detail the ways in which these factors enable the firm's growth. This will allow different levels to be seen in each factors development and will enable an understanding of how these factors affect growth. It is important to note that the resultant process of development for each case is different, with case A going through a smaller number of levels of development when compared to case B, due to the fact that case B has gone through an additional 10 years of development when compared to case A. This will be analysed in more detail in chapters 5 and 6.

The narratives that are presented below have been enabled through the coding scheme generated through the analysis process. For each factor there is an associated table of codes which are presented in appendix 6. These tables detail the open codes, axial codes and hierarchical codes that were used to create a time ordered display for each case and which was then used to enable the creation of the narratives.

4.2 Factors: Their Development and Influence

4.2.1 Aspirations

The main aim for this firm is that of achieving high growth, with all staff members referring to this aim.

“When you talk to them, I mean it seems like they are looking at exponential growth, you know. They see us going to the stars” (Participant C)

And yet alongside this five other aims were also discussed consisting of aims for job creation, product/service differentiation, high margins, high technology and aims for an exit strategy. Each of these sub-aims relates to the overall aim of growth and suggests that the aims are complex, with multiple layers appearing beneath the surface. Each of these sub-aims relates to a different aspect of the firm, hinting at how the firm plans to achieve their overall aim of growth and thus this theme links well with that of planning. This is the key reason as to why aims are influential to this company, as it enables them to plan how to move forward. Participant B describes what took place within the firm in order to move closer to their growth aim and uses phrases such as *“built up a team”*, *“finances to move forward”* and *“technology”*. The themes these phrases represent, namely human capital, finance and innovation were referred to constantly as being the most important to enable firm development.

Although there is no change in the owners’ overall aims for the firm there is a development from the aim being held within the owners’ own minds to communication of this to both staff and contacts. The aims are communicated to staff as and when they start working for the firm and communicated to contacts as is needed. The communication of these aims to staff ensures that everyone understands how they fit into the overall vision for the firm, while communication to finance providers is one of the main reasons the firm is granted finance as the financial provider needs to see a plan for an exit strategy. As such it is evident that the firm’s aims are also in synergy with their main financial providers aim.

“Immediately when they started and during their interview it was explained what the company had done, where it aimed to go, and where they would fit into that” (Participant A)

Our aspirations? We did convey to Finance Wales¹, in fact they like to see an exit strategy. They have their own exit strategy in 3-5 years” (Participant B)

Although aims did not appear as a conceptual variable within the observations, it was evident that the owners not only communicate aims to the staff but ensure these aims are the same. The observations highlight that the firm’s official mission and vision statement is jointly created by everyone within the firm. Thus it is possible to see the development of communication of the firms aims from the owners, to finance providers and staff, and the development of the aim in conjunction with staff.

4.2.2 Technical and Commercial Expertise and Learning (Of Directors)

The firm has a high level of technical and commercial expertise at start up, via the directors’ previous experience. The CTO has a PhD and experience of creating and commercialising products at a large Optoelectronics company. This enables technological development within the firm, with the filing of three new patents, and is crucial to the development of the firm’s products in line with commercial aims. The CEO has a high level of company sector, commercial and operational expertise due to working at optoelectronic companies since 1999. He also has a degree of technical expertise through working in the Optoelectronics field for so long. It is evident that without these skills and knowledge certain aspects of the firm would have been more difficult to develop. For instance Participant A suggests that the technical knowledge of the firm aids in the gaining of customers:

“You have to be extremely technically knowledgeable in order to convince those companies that you have the technical skills to give them what they want” (Participant A)

While participant B suggests that the CEO’s commercial and operational experience has aided with multiple areas of the firm including quality processes, staff management and financial management. Participant B states that *“without the CEO the company wouldn’t be anything at this point”* highlighting the importance of close

¹ Finance Wales is the finance arm of the Welsh Government who are able to provide equity participation, loans and advice to SMEs based in Wales

high level management within the firm. However it was also highlighted that it is important for both directors to have insight into each other's professions:

“If you don't understand the technology, then you cannot make the decision as to whether the development is going down the right route, and if you don't have the commercial skills then you may end up spending a considerable amount of money on a product that is never going to come to market” (Participant A)

The communication between the technical and commercial lead is vital and enables a collective decision as to which is the best way to proceed with a certain project. This theme links well with that of planning, as it is the expertise and communication which ultimately enables creation of plans for the firm's future. Although there isn't a large amount of change in the expertise of the directors, there is knowledge gained and developed through experiential learning. The CEO gains more commercial knowledge, but also firm specific technical knowledge while the CTO gains more technical knowledge, something supported by the increase in patents filed since start up. The CTO himself alludes to his knowledge gain in the commercial field.

“I think the same way as X has developed a commercial understanding of costs, cash flow, you become more acutely aware of that in a smaller company than you do in a larger company” (Participant B)

The directors also gain further knowledge by engaging in open innovation with the company's collaborative partners enabling them to gain *“knowledge which you won't get any other way” (Participant B)*. The theme of expertise relates strongly to the contact theme as the majority of the firm's customers have been sourced as a result of the contacts gained throughout both directors working lives. The firm's first customer comes from a contact made at the CEO's previous firm, while the firm's main collaborative partner comes from contacts gained through the CTO's role at a University. The firm's financial investors were also known to the directors prior to them launching the firm. Vitally even the technology upon which the company was founded came from a contact gained through the CTO's previous experience.

4.2.3 Contacts

It is evident that this firm has contacts in abundance from start-up and this is consistently referred to throughout the interviews. This theme links with the expertise theme as it is the owners' previous experience which has enabled them to gain these contacts. For instance the CEO's "*contacts were with suppliers*", meaning he "*knew literally all the American, Chinese and European suppliers in the field of optoelectronics*" and these are relationships which have "*been established over many years*". The firm's contact base is also constantly increasing:

"Those contacts are growing all the time because you have to know and establish the contact with the LED companies"
(Participant A)

As contacts are highlighted as being one of the most influential factors to the firm then their increase is vital. The firm utilises their contacts within the financial sector when applying for finance and utilise their supplier contacts who give them advice to aid in product development. The firm-supplier relationship develops in conjunction with product development because as the product develops so must the supply of goods to produce that product, with the observations highlighting the level of time invested by suppliers into free consultancy. They state their suppliers are "*experts within their own particular field, whereas we are designing a product to be specific to that particular field*" (Participant A) emulating that the firm embraces open innovation, understanding that they cannot be specialists in every area. The firm's supplier contacts also help them financially by enabling them to reduce the costs of some of their components "*through my contacts in China, lenses now come into us at approximately £1.20 each*" (Participant A). The firm also utilises the CTO's University contacts who supply the firm with further contacts, components and staff. The firm's collaborative customers and the technology upon which the firm is based stems from the CTO's existing contact base, while some of the CEO's contacts are even used to provide the firm with new employees:

"So X was brought on board to be honest, because I knew him, I trusted him and to a certain extent, trust is worth almost as much as background" (Participant A)

One of the biggest developments with regard to contacts involves the firm's suppliers, in that they develop from having a multitude of suppliers to having a set supplier list. Thus the firm's supplier base stabilises over time.

"I've got probably half a dozen supplier contacts out there that I didn't have when I started. And that's stabilised things. Because we were going to people that people knew, that people knew. But now we've got good contacts that we use"
(Participant C)

This also highlights the use of staff in providing new contacts for the firm and suggests that the firm needed to 'test' a multitude of suppliers prior to settling on their set supplier list. This is supported by the observations where the theme of 'supplier issues' highlighted that some of the company's initial suppliers produced incorrect parts. This led to problems for the firm and their customers, and it was through trial and error that adequate suppliers were chosen. The firm-supplier relationship also develops over time with the firm having contact with their suppliers via face to face meetings as well as via telephone. As these relationships develop knowledge sharing and free consultancy become more evident. Various staff members also begin to develop a rapport with certain firm contacts.

"If you don't know a supplier, then you start off by paying pro forma. And you would be wise to go there and meet them face-to-face. It's always better to put a face to the name. And over time you establish a rapport. And that's what we've done"
(Participant A)

The firm's relationship with finance providers stays at a high level due to their previous contact with them prior to this firm.

4.2.4 Management

The only management within the firm at start up are the owners. Once staff are employed they become key members of the firm but although they have managerial titles they have not yet developed to the stage where they have control over a department. Nevertheless, these "managers" manage the firm collectively, taking control of areas which align with their speciality and as such do provide a

management function. This is supported by the analysis of the staff involvement in strategy implementation and project planning:

“If you look at their business cards, they’ve all got the title of Managers. But it depends what you mean. The term Managers I suppose tends to mean that you manage staff and none of them manage staff. They manage the business collectively”
(Participant A)

This suggests that when the firm employs more staff the current staffs’ role will develop into that of staff management as well as general firm management. Thus the concept of management and staff changes over the course of a firm’s life and develops from closely managing the firm in conjunction with owners, to managing staff and departments as employee numbers develop. As the management are the employees then their influence on the firm is covered in the human capital section.

4.2.5 Human Capital and Inter-Organisational Relationships

The number of employees which the firm has increases over the course of the firm’s life and as a result the structure of the firm develops into that of a team environment, with increasingly good relationships. The level of team work increases and links closely with the employee numbers and staff roles and relationships. It is evident that the increase in employee numbers influences other areas of the firm such as quality, as *“more people demand more control”* (Participant A). The increase in staff also means that the skill set of the firm improves, which aids in the development of the firm’s products and marketing. Employee relationships are of importance because the more the relationship develops the more comfortable the employees are in knowledge sharing and team work, which aids in product development. As such there is an interaction between the themes of employees, team work and relationships. These “good” employee relationships are cited as being vitally important to the firm’s survival and development. It is interesting to note that every member of the firm refers to the importance of this due to it enabling a good work ethic and encouraging team work and knowledge sharing. The firm purposely sets out to employ people who they believe will be a good fit with the personality of other employees, highlighting their belief in the effect of good team work on firm productivity.

“It’s absolutely critical, if people don’t get on in work, you can forget it” (Participant C)

“It means everybody chips in a little bit more” (Participant D)

“when you interview somebody, you’re not looking for just the technical competence, you’re looking for the personality” (Participant A)

Staff members refer to the emergence of multiple teams throughout the firm’s development. For instance, the firm started with no team, then developed into one main team as staff began to be employed and then as more staff were employed sub teams or departments began to emerge within this:

“We’ve got three little teams. And everyone as a group. You know, pals, colleagues. If everyone’s working on projects that they’re best suited for, then that’s got to work, hasn’t it?” (Participant C)

Not only do staff numbers and relationships develop but staff skills develop in tandem with this, as many members of staff do not have any experience in the optoelectronics field. For instance one technical staff member with no commercial experience develops knowledge of commerce. Staff members themselves often refer to the extent of their knowledge gain throughout their time at the firm with one member of staff highly experienced in their role stating:

“I’ve learnt a lot since I’ve been here (emphasis on a lot). About everything that we do. I’ve learnt a lot about the mechanical engineering side, because I’m doing things now that I’ve never done before” (Participant C)

This knowledge and skill gain develops through external and internal training and experiential learning. However, it is still felt that further training is required and this is supported by the observations whereby ‘lack of experience/knowledge’ and ‘staff mistakes’ were highlighted as important themes. It was evident throughout the interviews that staff are one of the firm’s most important assets, as without their skills there would have been no product development and it would have been difficult to gain outside finance.

“There’s the technical strength of the team, because without that of course then you can’t design the products” (Participant A)

“I think the key one is obviously key staff, so if you haven’t got the right staff in place, they won’t invest” (Participant B)

Staff are also essential in the CEO’s role development because by having staff in place the CEO is enabled more time to attend to other duties. Staff are critical in creating project plans, especially within their own area of speciality. The weekly meeting notes provide support for this as each ‘project manager’ reports back with regard to their specific project.

“Without them, it wouldn’t have developed at all. Because without them it would have been basically just me. And it was impossible for one person to do everything effectively (Participant A)

“They come up with the initial project plan, I modify it. I then control it, but they do all the technical aspects associated with that project” (Participant A)

4.2.6 Software Development

The firm’s use of software increases with staff numbers. For instance, if an electronics person was brought on board then electronic software was purchased *“because they are the only ones who can use them” (Participant A)*. Thus software is a flexible resource and is referred to throughout the interviews as being at the core of the work which the company undertakes. Without this software the firm would not have been able to develop to the position it is at today, as no product development could take place. Each technical employee within the firm needs to utilise some version of software in order to complete their working tasks. As participant E states with regard to optical modelling software:

“Without that, an optical company couldn’t exist”

“You need software, so we have electronic, mechanical, optical design and test software as well as financial packages” (Participant A)

The firm is now in the stages of planning for further software development to coincide with increased sales of their “cash cow” or the commercialisation of their higher technology products suggesting that software is a flexible and dynamic resource.

4.2.7 Systems

At start up there were no official quality systems or procedures and instead they were informally implemented by the owners. As they were highly experienced in doing this and there were no employees then there was no need for them to be official:

“Because I had implemented Quality Systems in the past, then I always had traceability. But not certification” (Participant A)

Once staff numbers increased then quality certification was sought after. As none of the staff members are highly experienced, if experienced at all with quality systems, then the implementation of these procedures develops over time as the staff learn how they should be implemented and as highlighted in the observations they are implemented as and when is needed, meaning this learning process takes time.

“As the team of people have developed, well then of course, we’ve had to have more systems in place” (Participant F)

It is clear that quality systems are utilised in almost every environment with quality documents being utilised throughout the customer chain when potential new products are being assessed, when designs for a customer’s product is being created, and for customer returns. One employee states the quality system *“influences every single employee no matter what they do”*, suggesting it is important to develop properly. These systems also have a positive effect on the firm’s customers, through instilling confidence, and on staff. For instance participant E says *“we can give the customer what he needs and be confident that we’ve given him what he needs because our quality systems in place”* while participant D talks about quality documents enabling the firm to decide *“whether you’re going to run with it”*, with regard to projects. Therefore the systems which the firm has in place influence employees, customers and corporate level decisions. The presence of sales procedures also enables the firm to project a more professional image, while the introduction of a company wide server means that information transfer between staff is even easier. The presence of

specific documentation, in particular, means that staff have a reference from which to “control their functions” (Participant A).

4.2.8 Customer Development and Open Innovation

Open innovation is one of the most important factors that has enabled the firm to develop to the point it is at now. The firm engages in continuous open innovation with their customers and even the firm’s initial technology comes through open innovation. The firm who developed the technology decide to concentrate on their core product offering and hand the patent and technology over to Case A.

“They mothballed the production line and during 2008 offered us the opportunity to pursue that product at nil cost”
(Participant A)

The firm’s suppliers also supply the firm with advice with regard to product development and as such this can be considered a form of open innovation. In a similar timeframe to the firm’s technology being gained the company gains their first customer who is still with them to this date. The firm’s initial customer influences the firm as having a revenue stream makes it easier for the firm to gain finance, finance used for product development, human capital and capital equipment.

“So first thing is whose going to give you any money unless you’ve got an order. So we needed an order to kick this off”
(Participant A)

The company then began searching for customers for their main technology and the firm now has two main customers who are developing products with them. Thus they are constantly engaged in open innovation sharing technical, commercial and market knowledge, capital and test equipment, contacts and finance. The firm wouldn’t be who or where they are today without these companies. Much knowledge sharing has taken place and as participant A highlights “what’s been gained is a knowledge base”, with both this firm and their customer gaining knowledge from the other.

“We’ve loaned them the sphere optics integrating sphere and some of the jiggling” (Participant B)

“With Y we’ve had material resources and support in terms of the specification. And from X they’ve recruited staff up there to support the project internally. So those resources have been available to us” (Participant B)

In order to gain these customers the firm built up a rapport with them prior to entering into a partnership. Throughout the time spent developing the products the collaborative relationship has developed, with the word “*respect*” (Participant A) being highlighted as being of importance. Staff within the firm talk about “*frequent*” (Participant D) interactions with customers with the aim of “*planning routes forward*” (Participant D). The firm’s understanding of their customers’ needs has also developed since the relationship and product development commenced. This understanding of customer needs is an on-going process and is constantly developing and improving.

“At first we understand their needs very little. We may have thought we did, but the more you get to know their markets then you understand the complexities of the situation, both commercially and technically” (Participant A)

These customer relationships are vital as the firm has no major sales revenue apart from customer NRE meaning that customer finance is crucial to the firm, and this continued finance is aided by the relationship.

“Without those relationships we wouldn’t have had the financing from them paying us to develop it that we’ve had to this date. So those companies have been fundamental in maintaining our livelihood” (Participant A)

Ultimately customers enable financial and product development for the firm as well as staff skill development. However, as these products have a long development lag before they are commercialised the firm decided they needed another revenue stream and hence a “cash cow” product was generated. The firm has generated revenue from this product but the customer base is not yet at a high level. It was noted in the observations and not the interviews that the firm also acquires other customers. Many meetings are held with potential customers and some projects are followed through to fruition. The fact that they were not mentioned in the interviews suggests that they are not seen to be as important as the main projects.

4.2.9 Finance

The source of the firms finance changes over time with the initial finance being gained from a bank loan, a personal loan and grant monies. The firm then receives equity finance, further grant funding and a small amount of finance from the firm's first customer. This theme relates back to that of contacts and expertise as it is the CEO's existing contact from a previous company who becomes their first customer. The firms grant funding comes from numerous bodies and is utilised to develop a product prototype, to carry out research and development (R&D) work in general, to file patents and to develop a financial forecast. This is supported by the company documentation in which various financial applications were analysed:

*“We've had grants for jigs and fixtures, capital equipment, for prototype manufacture, to assist in the cost of patents and to assist in the cost of providing a very intense financial forecast”
(Participant A)*

The customers' grants are vital to the firm's survival as *“If the customers weren't paying us to develop the products, then we wouldn't develop them because we couldn't afford to” (Participant A)*, suggesting that the wider economic system has a bearing on this firm's development. The only other product which was developed in order to bring in revenue to the company is not successful, with a lack of sales revenue accruing. The result of this lack of revenue is a stunt in the pace at which the company can grow, due to a lack of resources which the company can acquire. This highlights how important finance is as even though the firm has received hundreds of thousands of pounds worth of finance they still do not have the level of resources needed to grow at a faster rate.

“It's limited our potential growth, because of the fact that with more money, we could have done a lot more” (Participant B)

The owners attempt to reduce costs where possible throughout firm development and this is supported by the observations in which the theme 'bootstrapping' became evident, whereby the firm often uses personal contacts to complete tasks for them free of charge. This again links finance with contacts and employees. Financial management however becomes more formalised over time. In the early stages of the

firm the CEO controlled the finances on spreadsheets. However when equity investment was provided the firm was required to complete monthly management accounts. Eventually an external finance professional was brought in once a month to complete the accounts. The CEO still controls the finances on a daily and monthly basis and discusses this with the CTO. This is supported by the observations in which it was noted that the CEO still analysed the cash flow even though the professional financial accounts were being done.

*“At the end of the day the finances are run by X and myself”
(Participant B)*

“We keep a very close eye on the finances” (Participant A)

Finance is a theme which was highly prominent throughout the interviews, observations and company documentation due to the fact that this firm would not be in existence without it *“The company’s basically living on grants at the moment” (Participant E)*. This finance has thus far been used for a variety of reasons such as to enable the employment of staff, to develop products through research and to purchase capital equipment. It was noted in the observations that grant finance was also used for website development.

“When we reached the point we needed to employ staff, we needed to carry out development work, we needed test kit, at that moment in time we went to Finance Wales” (Participant A)

It is evident therefore that finance is one of the most important resources this firm has. As participant B states *“everything else follows from that....it’s the main resource”*.

4.2.10 Strategy

The firm’s strategy has been constant throughout the firm’s development but is reviewed on a regular basis, as participant A says *“probably every month”*. These regular reviews mean that the business plan is not amended frequently and instead the fluid strategy is manifested in the firms planning, project management and knowledge sharing:

“There was a strategy.....to create a number of key cash cows, which are easy to build and get the revenue turning over. And then alongside that get the products which are non-linear growth which has the potential to be a big sell” (Participant B)

This description of the strategy mirrors the firms aims for a high technology differentiated product which would enable high growth, highlighting the key link between the two; the strategy follows on from the firm’s aims. Strategy also interacts with expertise as it is the owners’ existing expertise which results in them developing this strategy:

“If one came to this industry without any background knowledge then you would tend to think that the way to get into optoelectronics would be to manufacture laser modules.....but there are many, companies doing it and it’s very hard to differentiate”(Participant A)

The strategy develops from an idea on a business plan, to one which is created and reviewed by the owners and is implemented through the collaboration with customers and implementation through employees. The importance of having this strategy is due to the fact that it is contained within a business plan which is shown to finance providers aiding the firm in gaining finance. The strategy was also shown to potential customers in order for them to assess whether the strategy complimented their own. The length of the firm’s customer relationships means that synergy must be established early on. The strategy is also communicated to the employees in order to give them a direction within which to work. The owners create the strategies while it is the staff that implement them on a day to day basis. The CEO describes his role as being needed to *“project the future direction of the company”* while the CTO’s role is to *“control the future technical direction of the company”*. This enables the owners to take some time to plan for the firm’s future while leaving the majority of the management of the business day to day to the staff.

“That strategy can only be enacted if you have the technology and the back-up in terms of the ability to manufacture the product, to control the infrastructure, to control the Operations, to control the Sales & Marketing, and therefore we needed the staff to do that” (Participant A)

Because the firm has a solid strategy they are able to plan their day to day work around this, making it easier for the staff to implement the strategy and as such without this strategy in place there would be less direction within the firm. Each staff member is responsible for a certain area of the firm or a certain project each of which relates back to the firms strategy.

4.2.11 Planning

One factor not included in the preliminary model but which has been found to be important to the firm's development is that of planning. Each type of planning refers to a particular set of developments taking place within the firm. For instance the business plan is evident at start up along with financial planning when start up finance is gained. However this financial planning continues throughout the course of the firm's life as more finance is gained. Project plans are developed when the firm gains customers, while sales planning for the firm's main product develops just prior to gaining customers and when customers are actually gained. Contractual management develops when customers are gained and further along in the relationship when, for instance, exclusive agreements are needed. Short term planning takes place when staff are employed and is highlighted by the weekly meetings which take place. Thus planning is a more complex factor than initially may be thought and is required for each aspect of the firm's development. It could be argued that planning is another term for strategy but they have different levels of meaning. The strategy is to develop high technology differentiated products and lower technology "cash cow" products, whereas planning refers to how they plan to achieve this and to the implementation of the strategy. Planning is referred to more often than strategy and as is highlighted by participant A as one of the most important aspects of a business to master, in order to survive and develop.

"In any high-technology organisation, you have to think 6, 12 months ahead and 3, 5 years ahead. If you don't do that, you're dead in the water, you aren't ever going to get there. It's all a matter of planning" (Participant A)

Many of these forms of planning are referred to in the observations, however there were two other interesting forms which were noted, consisting of back up planning and hypothetical planning. Hypothetical planning is similar to general planning in

that this refers to the firm trying to plan far into the future. Back up planning is similar to financial planning as the back-up plans the firm makes are for finance. Although the firm has both a strategy and planning, the strategy is the more abstract aim while the planning is the manifestation of the strategy in a more concrete form. The aim determines what the firm wants to achieve, the strategy determines how the firm will achieve it at a wide level while the planning is how the firm will achieve it at a more detailed level.

4.2.12 Organisational Structure

The firm's organisational structure changes over the course of the firm's life through the changing of the firm's employee structure, level of authority and firm location. At start up the firm has no company offices and the company is run from the CEO's home address. The firm then acquires one office and then progresses into another company office to accommodate more staff. The corporate side of the firm also develops with multiple shareholders being brought on board. The development of the firm's premises coincides with the gaining of the firm's main customer projects and the employment of staff suggesting that this more professional structure was needed to enable projects to take focus. Thus organisational structure and human capital develop in synergy.

Staff are initially overseen in the early stages of the firm with the CEO being "*forced to micro-manage*". The main reason for this is because most of the staff are inexperienced in their role and as such most of what they are doing is new to them. As participant A states "*if you're stupid enough to ask them to do something for the first time, and not check, well that's criminally insane*". When the owners' begin to gain more confidence in the staffs' abilities then this level of overseeing begins to decrease and delegation increases:

"It probably took a year before I was confident enough to not even look at them anymore" (Participant A)

The increase in delegation and authority of staff enables them to manage the day to day running of the business, becoming increasingly involved in planning, meaning the CEO can attend to more senior duties without the need for constant micro

management. The fact that staff complete project plans for customer projects means that staff implement the firm's strategy, allowing the owners' time to strategize and plan for the future. The staff have authority mainly within their own discipline and are allowed autonomy with regard to day to day tasks. As the staff have developed their skills these project plans are now more precise than in the early part of the firm's life.

“In the early days we used to change it quite dramatically, to be honest, but giving an example of the last one we had from X, we didn't change it at all” (Participant B)

Different levels of delegation then begin to emerge with staff being delegated to by the owners and in turn staff delegating to other staff. As participant A states *“as the company grows, then the delegation starts going down and down”*. The emergence of multiple layers of delegation enables learning, with one of the staff members describing this delegation as *“knowledge transfer” (Participant D)*, as the delegation also involves teaching. The emergence of different departments means that each employee controls their discipline but collectively there emerges *“two teams....one being the engineering room.... Then there's the sort of more day to day commercial managerial team” (Participant E)*. Interestingly this also emerged as a strong theme in the participant observations as observational notes referred to the *“technical office”* and the *“commercial office”* and it was observed that sometimes this 'division' is not always positive with an 'us and them' atmosphere observed, suggesting that this departmentalisation needs to be more carefully managed. Even though there is no official hierarchy apart from that between the owners and the staff there does seem to be an underlying, unofficial hierarchy. For instance there are certain staff that are always delegated to by others, while there are other staff that never have project management control over a project.

“So it just comes from senior to middle management to me” (Participant C)

The unofficial hierarchy within the firm aids in project control and delivery as each staff member has an understanding of their role. The decision making hierarchy of the firm stays quite constant whereby a centralised structure is in place and yet there

are team discussions and decisions with regard to the majority of the product development aspects of the firm, which is likely due to the small staff numbers. This was also supported through the observations and highlights the CEO's participative leadership style. This is corroborated by the CEO himself.

*“The only ones who make decisions at the top end level, is myself and Y. Now that's not to say that the other people are not involved in the discussions which lead to that decision”
(Participant A)*

As staff numbers increase the firm begins to exhibit an increased structure with each staff member having their own role. However, at the same time dual roles emerge. These multiple roles are due to the fact that the firm does not yet have enough employees to enable each person to concentrate solely on their own discipline and highlights the high level of team work needed for the firm to function. The firm also develops working practices with regard to how knowledge is transferred within the firm and how plans are made. In the early stages of the firm when there are only one or two employees knowledge transfer takes place through day to day conversations in the only office *“because everybody tended to be in the same room”* (Participant A). As more staff are taken on board and another office is gained then formal team meetings begin to take place on a weekly basis. From this sub team meetings are held between people who need to work together to achieve a project aim. The development of knowledge transfer from informal to formal enables staff to develop focus and project plans.

4.2.13 Market Analysis and Creation

This theme is interesting due to the nature of the firms marketing and market analysis. The firm's main product is not one which can be marketed by conventional means:

“You don't sell LED multiplexers via leaflets because they are bespoke designs to an individual customer's requirements. So you have to establish this rapport with them, not just sell it as a stock item” (Participant A)

As opposed to marketing the product to a wide audience the firm “markets” themselves, their team, their product and their services to selected potential customers in order to gain collaborative working partnerships. By “market” it is meant that the firm portrays these credentials through presentations, business plans and meetings:

“Because they are design wins. A lot of it is the credibility of the staff on a technical front. Because if they couldn’t see any technical engagement there, they obviously wouldn’t invest with us” (Participant B)

To aid with the portrayal of these credentials the firm also utilises their website with the aim of projecting a corporate image to potential customers. This website development is supported by the observations in which ‘website work’ and ‘branding’ emerged as themes. However, as opposed to marketing in its conventional sense of the term the firm engages more in market research.

“We analyse whether there’s a potential market there, how the product’s differentiated, what’s the price? And that’s assessed before we kick off the project..... So we understand by making things more efficient, more reliable, that actually the markets will be driven by that.....and then feeding that into the technology for these various sectors, we get some differentiation going on” (Participant B)

Market research is conducted both before the project commences and during and is not done because the firm needs to sell their product to the end consumer, but so that the firm is assured that they have the necessary knowledge to create the type of product which their customer requires for their market. A lot of the firm’s market knowledge comes from the companies they have collaborative partnerships with. This was noted in the observations whereby market reports, patent presentations and data sheets were transferred from the alliance company to Case A. This is then communicated to external finance providers in order to try to gain finance.

“If you can’t prove that the market exists and that the product is wanted, then you’re never going to get any finance to move the company forward.” (Participant A)

And is also communicated to customers to further their knowledge with regard to their market. This is also reciprocated highlighting the importance of customers in market analysis and development, and the importance of transfer of knowledge in open innovation. Market knowledge with regard to the firm's products develops in partnership between the company and their customers.

“We will tell X that in the CESS Show some companies demonstrated whatever final lumens on screen with an LED projector. So we will share that sort of information with the customers” (Participant B)

The firm also purposely concentrates on focused markets which they believe are high growth and which will enable the firm to develop further. This reiterates their growth aim and seems reasonable as they *“don't have the bandwidth to support” (Participant B)* diversifying their markets, suggesting that focussing their activities will make best use of the resources they do have. After these markets are discovered and customers found the firm makes clear route to market plans for these products. It is known from the outset that the products developed will be integrated into a customer's product and marketed and sold by the customer. Less marketing is needed as the customers' were looking for new technology prior to the engagement with this company and thus the customer was seeking the company.

“You need to be working, designing with them so it's compatible with their systems. So X as with Y, are the key routes to market. They understand the market, we don't. So we need to work with them to pull the product through. And so that was the marketing strategy.” (Participant B)

The firm conducts more market research than marketing and the only time the firm engages in conventional end consumer marketing is for the “cash cow” product whereby various marketing strategies are utilised. When some of these are not successful the firm begins to use other end consumer sales strategies. From the observations these include sending brochures, attending exhibitions, advertising and cold call marketing. The fact that the firm attempts multiple marketing strategies highlights the need for experience in the most beneficial marketing techniques as opposed to trial and error marketing.

4.2.14 Existing Product Development

The clearest instance of the firm engaging in existing product development is with their laser and “cash cow” product lines, whereby their existing laser module line is given a more universal circuit board and numerous iterations of the “cash cow” product are developed.

“For the temperature monitor? Yes the current one if you go back to the concept prototype, then we are probably on the third iteration” (Participant A)

Due to the fact that there has been a lack of sales from the development of existing products then it is difficult to see how this has aided the firm greatly in their development. It is interesting to note that the firms “cash cow” product is not referred to as much as the LED Multiplexer throughout the interviews supporting that claim that this product is a means to an end.

4.2.15 New Product Development and Innovation

The firm engages in constant new product development as their core technology needs to be developed bespoke to each customer. The firm starts by completing various design iterations according to the customer’s specification, in order to create the most optimum design to move forward. The firm then moves onto the creation of product prototypes which are tested both in house and by the customer, and from this further development work takes place.

“We have produced the prototypes, they’ve tested the prototypes” (Participant A)

This progression of the firms products is clear in the observations, whereby the themes ‘prototype product development’, ‘prototype product creation’, ‘prototype product delivered’, ‘customer test of product’, ‘alliance company requests further work’ emerged. During the development of these products, as more is learnt about the customers’ needs and the technology itself, multiple product lines begin to emerge. For instance, there was one product initially needed for the digital display customer but this has now progressed into three while the medical market has developed from one product to two.

*“It’s been a natural progression. We started off with one project with X. And that’s evolved into 3 products. We started off with one product in Endoscopy, that’s moved into 2”
(Participant A)*

Alongside this multiple patents begin to emerge, highlighting the innovative work which takes place and as participant B states *“When all’s fallen down, right, the IP’s all you have”*. The firm also creates working practices with regard to how new product developments are approached, thus giving staff focus and direction:

“That concept is handed over to the team and the team come up with a model which is viewed at some time in the future by the CTO, and given that he finds it acceptable it is presented to the customer and the customer then pays us to develop it and bring it to market” (Participant A)

Ultimately product development enables the retention of customers and the payment of finance, thus enabling the firm’s survival. However it was found that even though the directors felt they encouraged creativity, the staff felt they were not given enough time to be innovative, thus *“dampening originality” (Participant C)*. Interestingly one of the directors felt that there was lack of a *“killer instinct”* at times. This highlights the differing opinions of staff members from different hierarchies perhaps suggesting the need for better communication.

4.2.16 Overall summary of analysis for Case A

This case demonstrates the early development of a knowledge based firm. From the review of the literature thirteen factors were identified and yet after data analysis fourteen holistic factors affecting the early development of this firm emerged. One other factor; existing product development was not highly influential probably due to the firms stage of development. It became evident that the factors could be split into themes relating to the firm, people and the customer and product. The tables 4.1, 4.2 and 4.3 below summarise the factors and how these have developed over the course of the firm’s life. For some factors three stages of development were found while for others only two stages were found. The factors which were found to only have two

stages of development were either already developed to a high level at start up, such as technical and commercial expertise, or did not develop more than twice throughout the firm's life so far.

Factor	State One	State Two	State Three
FIRM LEVEL FACTORS			
Aspirations	The owners have a growth orientation for the firm along with sub-aims to enable them to achieve their main aim	The firm's aims are communicated to staff and external financial contacts.	Formal mission statements and vision statements are created
Strategy	The firm has a strategy and business plan in place.	The firm continuously reviews this strategy and brings new products on as a result. The strategy is communicated to employees and external finance providers	The owners create the strategy while the staff implements the strategy.
Planning	Business plan is in place and financial planning takes place to gain finance	As the firm gains customers project planning begins to take place along with contractual management and financial planning. Planning of sales channels also begins. Short term planning of day to day activities takes place through team meetings	As the firms products develop, contractual management becomes more complex and financial and short term planning continues
Organisational Structure	The firm has no company offices. The owners are the only shareholders	The firm takes it first office. The amount of shareholders within the firm increases. Staff are overseen early on. Main staff roles are highly specialised but the majority of staff have multiple skills and roles. Working practices are created. There is a mix of centralised and group decision making styles.	The firm takes its second office. Staff are overseen less and are delegated to. Staff begin to delegate themselves. Different departments begin to emerge within the firm
Systems and Software	The owners implement unofficial quality systems themselves	Staff are brought on and quality certification is sought after and gained. Optical software is brought into the company	Quality procedures begin to develop over the course of the firm's life. Further software is brought into the company as and when is needed.
Finance	The firm receives bank finance and personal finance. The firm has some early sales revenue. The CEO handles financial management	The firm receives equity finance and grant finance. The firm's sales revenue is extremely limited and an attempt is made to reduce costs. Monthly management accounts are needed	The firm receives further equity and grant finance. Finance software is brought in along with a professional finance person one day a month. Finances are still handled by the CEO and discussed with the CTO

Table 4.1. A summary of the process of development of firm level factors found to be of influence to case A's development.

Factor	State One	State Two	State Three
PEOPLE ORIENTED FACTORS			
Technical and Commercial Director Level Skills and Learning	The firm has a high level of technical and commercial skills and knowledge at start up via the owner's previous experience. Communication frequently takes place between both areas of specialty.	The directors add to their existing knowledge through open innovation and experiential learning	
Contacts	The firm has a large supply of contacts in all areas; financial, governmental, supplier, customer.	The firm gains new contacts, mostly with suppliers, as well as stabilising their supplier list through trial and error. Firm employees begin to engage with the firms contacts	The firm's relationship with their contacts reaches a high level as the products develop with face to face relationships and rapport
Human Capital Base Employee Skills Staff relationships	The firm has no employees	The firm begins to take on staff. Experiential learning takes place and employees gain new skills and knowledge. Staff relationships begin to forge and team work begins	The firm takes on further staff. Further learning takes place by staff members increasing the knowledge base of the firm further. A close knit team is formed with good employee relationships; team work increases with staff numbers and sub teams are formed.
Management	The owners are the only 'managers' of the firm	The firm takes on its initial employees who manage the firm collectively	

Table 4.2. A summary of the process of development of people oriented factors found to be of influence to case A's development.

Factor	State One	State Two	State Three
CUSTOMER/PRODUCT ORIENTED FACTORS			
Market Analysis and Creation	Market analysis takes place and is in the business plan. Selected markets are targeted for being high growth. A website is created	The firm “markets” themselves to potential customers. Clear routes to market are formed. Market analysis, some of which comes from the alliance companies, continues as the firms main products begin to develop. This allows them to tailor their products to their customers. The “cash cow” product is brought on board and end consumer marketing begins. A new updated website is launched.	Multiple sales strategies are attempted after some fail
Customer Development	The firm has one customer for its mid technology product	The firm gains its two main customers for its high technology product. The firm begins to build a rapport with these companies	The firm begins to gain some customers for its low technology product. The firms relationship with their customers reaches a high level and knowledge sharing is vital
Open Innovation	The firm engages in open innovation and obtains the patent which forms the basis for the firm	The firm engages in constant open innovation with their collaborative partners in order to develop their products further. The firm also engages in open innovation with suppliers	
Existing Product Development	The firm improves their existing mid technology product line	The firm changes their low technology product dramatically. The firm is constantly improving their high technology product line	
New Product Development and Innovation	A generic product prototype is available	The firm develops bespoke designs and prototypes for their customers. These are then tested in house	The prototypes are then sent to the customer to be tested. As a result, further product development takes place and multiple product lines begin to emerge for the same customer. New patents begin to be filed. Differing opinions with regard to staff’s innovative work emerge.

Table 4.3. A summary of the process of development of customer and product oriented factors found to be of influence to case A’s development.

It was evident from the case analysis that the factors progress over time at different rates and to differing degrees. The firm starts with an initial idea, expertise, aim, strategy, a wide array of contacts and a technology. These lead to the gaining of customers, market development, finance and human capital. These enable planning and product development to take place and in tandem with this for organisational, system and software development to take place. The factor ‘external influences’ was

highlighted during the interviews as being important to the firms development as the “recession” played a part in this firm being able to acquire the patent which formed the basis for the firm. However, the aim of this research is to create a useable model and as a result the inclusion of an uncontrollable variable would not be useful.

The majority of the factors progressed through three stages of development. However existing product development only experienced two stages, due to the fact that the company has limited commercialised products. Open innovation only experienced two stages as the firm was immediately well developed in this factor, being created through open innovation. The same applies with technical and commercial expertise, a factor already developed to a high level at start up due to the owners’ previous experience. The management factor only experiences two levels of development due to the fact that the firm is in its early stages, with a small amount of staff, meaning that complex management structures have not yet developed. The main impetus for the changes to each factor can be attributed to customers and open innovation as well as staff and finance.

Generally the firm develops from a start up position to one in which a small close knit team emerges, with increasing customer numbers and initial product development along with more complex organisational structures and informal management functions. Quality and systems develop well along with planning, strategy and aspirations. The firm has far more development to experience but has so far developed well “simply” needing to reach commercialisation to stabilise and grow. It also became evident that some of the factors within the firm are less developed than others and until they are developed further the firm will be unable to grow. For instance the new product development factor goes through three stages of development but the firm’s main product is still not commercialised with a customer and generating revenue. Finance is another factor which passes through three stages of development but the firm is still not financially self-sufficient and relies on grants.

Even though the factors have been separated into three themes consisting of people oriented factors, firm level factors and customer and product oriented factors none of these themes can, in isolation, enable the firm’s growth. It was evident from the case analysis that each of these themes interact in a very complex way and aid each other

in enabling the firm's growth. As has already been highlighted many of the factors within this firm are connected and influence each other, as can be seen by figure 4.1. All factors exert some sort of influence on another factor highlighting that it may not be possible to fully understand firm development without reference to them all.

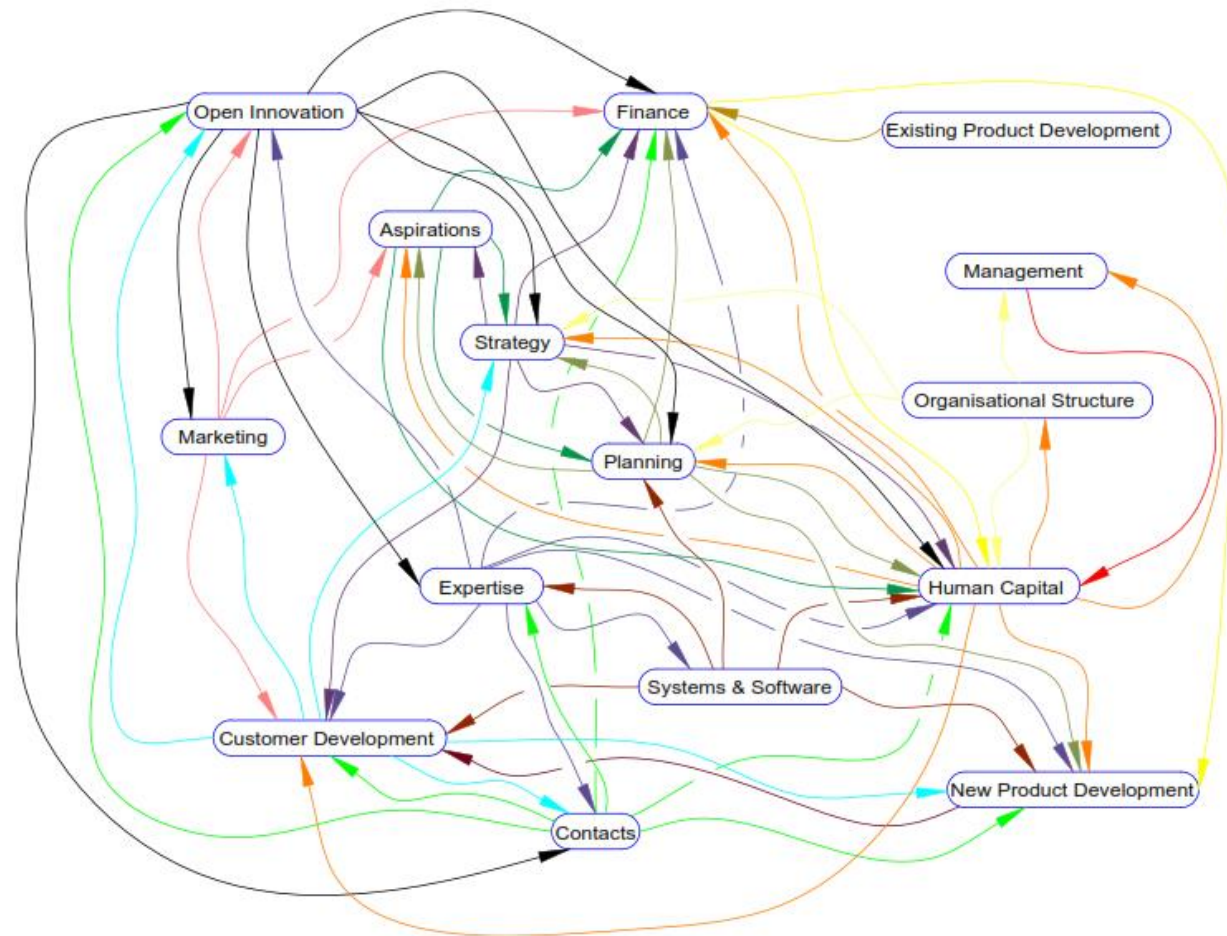


Figure 4.1. The connecting relationships between each factor found to influence the firms development

Figure 4.1 highlights the interwoven nature of the factors affecting the firm's growth. Each coloured line relates to one of the factors. For instance all the yellow lines are stemming from finance while all the green lines stem from contacts, while all the light blue lines stem from customer development. The fact that it is pictorially difficult to make sense of all of these connections highlights the importance of considering all factors in a holistic manner. Without this holistic consideration a full explanation of firm growth is not possible. Certain factors are influenced by a larger number of factors than others. For instance open innovation, aspirations, planning, strategy, new product development and customer development need to interact with a large number of factors in order to exert an influence. Other factors such as contacts and marketing affect factors more often than vice versa; due to the influence they have on other areas of the firm.

In summary the results and analysis of this case study indicate that factors influencing firm growth can be discovered and that their process of development can be mapped. This development is complex and different for each factor, with some factors experiencing more development than others. Ultimately all of the factors interact in a complex way to enable the firm to develop to the stage it is at today.

5.0 Chapter 5: Findings and Analysis Case B

5.1 Case history

Case B was founded in 1997 by one director and since that time has grown considerably to a £10M turnover. The firm specialises in the temperature controlled pharmaceutical services sector and offers a variety of services including clinical supplies, temperature controlled storage, global logistics, QP and GMP consultancy, advanced therapeutic medicinal products and commercial services. The firm originally offered only one service and has grown their service offering considerably over time. The CEO had vast experience in the pharmaceutical services sector field but was more technically oriented than commercially oriented. The CEO views themselves as very much an entrepreneur and as such in 2008 a new CEO was appointed and a management buyout (MBO) took place. This was instigated by the original CEO who no longer felt they could provide the firm with the direction it needed, preferring to work with smaller companies. The new CEO views themselves as very much a strategist and forward thinker capable of guiding the firm to achieve growth. This new CEO also has vast experience in this field and also has experience of growing firms in this sector. Although the firm started as a service firm and still is inherently a service firm they are diversifying into product offerings. Therefore this firm can now be considered as both a product and service firm. The firm is very much a high technology knowledge based firm.

The firm has grown from employing 1 staff member to its current total of 60 staff in various departments. The firm has developed from occupying small buildings to operating from its own purpose built split facility. The firm was initially financed by the one and only director until a small amount of finance was received by an investor. More recently financial contributions have been made by Finance Wales. The firm is based in South Wales on an industrial estate surrounded by many different types of firms. The firm has gone through various growth stages, from stable growth to rapid growth but its rapid growth has occurred since 2008. There are various changes which have taken place within this firm over their 16 year history but many of the original staff members remain at an executive board level or director level. A timeline of the firms key developments are listed below.

1997: Firm is founded

1997: Aim for the firm is to exceed customer expectations thus resulting in an open innovation business model

1997: First staff member is employed

1997: Firm begins to offer its first service

1997-Present: Firm utilises grant funding

1997: The firm gains its first customer

1998: Firms service offering expands so that its main service is that of clinical supplies and temperature controlled pharmaceutical services

1998: First office is acquired

1998: Equity finance is injected into the firm

2004: Key piece of legislation affecting the firms industry is introduced meaning that it is a legal requirement that firms utilise the service the company offers

2004: A large number of quality certifications are gained

2004: Key staff appointments take place

2007: Further key staff appointments take place

2007: Marketing efforts increase substantially resulting in an increase in customers

2008: Debt finance is received for a custom built building

2008: Management Buy Out takes place and a new CEO is appointed

2009: Executive management team building is introduced

2008: The firm acquires larger and more diverse customers

2012: The firm gains further debt finance for the gaining of a second building

2012: An executive management team and a senior management team are appointed

2012: The firm undertakes a review of their processes to bring them in line with growth

2012: Through open innovation the firm focuses on the development of a new product to complement its service offerings

5.2 Analysis Process

The analysis below will follow the same format as that for case A, covering each factors development and influence on the firm. However this analysis is covered in two sections. Section one covers the development under the original CEO while section two covers the development under the new CEO. The narratives that are presented below have been enabled through the coding scheme generated through the analysis process. For each factor there is an associated table of codes which are presented in appendix 7. These tables detail the open codes, axial codes and hierarchical codes which were used to create a time ordered display for each case and which was then used to enable the creation of the narratives.

5.3 Factors: Their Influence and Development

5.3.1 Aspirations

1997 – 2008 (Original CEO)

There were no clear aspirations for the firm at start up with participant A contending that they “*Didn’t have a flipping clue. I didn’t even know.....where I was going*”. Instead the most important aim was to fulfil customer needs and to concentrate on the end goal of patient safety.

*“There was a general plan, but it was very vague. It was basically to meet whatever the customer asked us to do”
(Participant G)*

This suggests that the only aim which the firm needed in the early stages was related to their customers and service level. This seems reasonable as the firm is totally service based and as participant B emphasises “*we are only as good as our last project*”. Aspirations therefore link well with the theme of service development, as it is the firms aspirations for a focus on customer needs which enables them to develop their services in line with customer demands. Even when participant A realises the niche offering of the business there are still no formal aims put in place.

“it was beginning to grow and it got to the point where I thought this looks quite interesting and I started to get involved with clinical trials” (participant A)

There is a realisation that the firm could achieve growth, especially with the introduction of the clinical directive in 2004, but emphasis is still on customer needs and patient safety as opposed to achieving growth per se.

2009 – Present (Current CEO)

The aspirations for the firm become clear and formalised after the appointment of the new CEO. Analysis of the firm’s strategic document suggests that job creation and staff development are some of the ways in which the firm plans on achieving their growth, linking the firm’s aspirations with the firm’s strategy and planning.

“When I joined I thought a 3-5 year timeline for X to get to a £10m turnover” (Participant C)

The aim for staff development fits well with the firm’s ethos as they state *“the biggest thing for us is our staff” (Participant B)*. The implementation of these aims is evident through various types of staff training and cross skill development, thus aspirations result in the development of the skill and knowledge base of the firm. As the firm has formalised aspirations these are now communicated to staff members through company meetings. This takes place to motivate staff by giving them ownership and purpose, enabling them *“to know why their job is going to help the company move forward” (Participant C)*. It also serves to allow the employees a forum in which to voice their opinions with regard to how the firm could achieve their aims, linking the firm’s aspirations with planning and human capital. Aspirations are communicated externally to certain customers to generate synergy between the firm and the customer and to build customer trust, and to finance providers to build confidence in the firm’s aim to develop.

“Clients will quite often want to know what are your future plans, because if we don’t clearly convey that they won’t consider you necessarily for further work” (Participant F)

The firm then develops further growth aims which are communicated through mission and vision statements and strategic documents, giving the firm a focus upon which to make plans.

5.3.2 Contacts

1997 – 2008 (Original CEO)

The firm begins with a small number of contacts in a wide variety of areas ranging from regulatory and government bodies to universities and financial institutions. Networking is described as one of the most important factors influencing the firm's development due to the fact that networking enables the firm to gain customers and contacts in a variety of areas, all of which are utilised to aid the firm. This wider networking stems from an initial government contact highlighting contacts leading to more contacts.

“You get introduced to people, start meeting people, collecting business cards and following up on calls. The WDA funded me going to different meetings quite often, and that was critical to growing the business” (Participant A)

The firm's initial contacts aid the firm in different areas of their development. For example the firm's first customer comes from the directors' previous experience, while the firm's initial staff members come from the directors existing contact pool. Personal contacts are utilised in the firm to aid with the reduction of cash outlay, highlighting the use of bootstrapping. For instance, personal contacts install electricity into the firm's office and create software tools for the firm to use. The firm uses government contacts to provide the firm with additional customer contacts, new customers, market information and advice. Participant A talks with fondness about the Welsh Government due to the confidence and help with they gave them in the early years.

“I started with one of the WDA booklets on biotechnology in Wales and I went through the list... by April I'd managed to get my first cheque in” (Participant A)

“one of the biggest influences, not financially but morally and giving me confidence in doing things was the government” (Participant A)

Good relationships are developed with contacts the firm already has and additional contacts are gained through the owner's networking efforts, with the owner consistently being referred to as the "face of Case B" (Participant F). This is likely due to the small staff numbers meaning that the owner is the company. The additional contacts are gained in the areas of government, finance and customer base and are gained through conferences and government support.

"We started attending conferences overseas, exhibitions, a lot of it funded through Welsh Government sponsored programmes, because we didn't have a lot of cash at that time so we took benefit of everything that was on offer" (Participant A)

The firm's relationships with their suppliers in particular, eventually reach a high level due to the importance the firm places on their role in the delivery of their service to their customers.

"We went up there and spent about 3 hours with George and his gang and explained exactly what we were doing, why it was important.....We built that really close relationship with them" (Participant G)

The firm sticks "with them (suppliers) under hard times" (Participant A), meaning that a trusting long term relationship is developed. This strong relationship means that the firm is seen as a high priority by suppliers, allowing jobs to be conducted at short notice in line with the firms need for flexible delivery of services. Relationships with contacts enable better delivery of service from each contact. For instance good relationships with financial contacts means that financial planning is easier, while good relationships with customers means that communication is easier and service provision runs more smoothly.

2009 – Present (Current CEO)

After the appointment of the finance director, additional staff and the new CEO, the firms contact base begins to grow substantially, due to the fact that these staff have existing contacts from previous job roles. Staff use existing contacts as sounding boards for advice, whilst certain directors become key networkers for the firm. The

new contacts are utilised for a variety of reasons. For instance, the finance director uses his contacts to help the firm gain finance, while another staff member brings with them government contacts. The importance of good relationships with contacts is highlighted particularly by the finance director as their relationship instils them with trust with regard to the firm's prospects.

“because of my previous experience and my relationships with the likes of Finance Wales, the banks and everything else, I probably haven't had to provide as much information as you would have normally” (Participant C)

Meanwhile the use of staff contacts for advice means that contacts are used in a bootstrapping capacity and the fact that the firm is able to gain further resources at no extra cost highlights the influence of the wider network on the firm's development.

“We've had some advice from somebody just recently on a project that we're doing and a lot of advice, I'd say to X what did you do for him, did you spring him from jail or something? Because how is he prepared to do such a lot for us?” (Participant B)

Some of the firm's contact base is utilised purely for customer referrals highlighting the role of contacts in customer development, while the fact that staff now begin to become key networkers highlights the move from an owner facing company to a more team facing company as the firm develops. The firm then utilises university contacts for open innovation linking contacts strongly with the theme of service/product development and with strategy, as it is the firm's strategy which pushes them in this direction. Contacts are one of the most important factors influencing the firm's development, especially its early development and mainly increases in line with employee numbers.

5.3.3 Customers

1997 – 2008 (Original CEO)

The firm gains its first customer very early on via the owner's previous experience. This is possible both because the owner can offer the service straight away and because the customer knows that the owner has experience in this industry.

*“one of the first clients was Y, purely because that’s where the founder came from, and to this day we work with Y”
(Participant C)*

The firm then begins to gain further customers most of whom are small venture capital funded companies in geographically small areas. There is a constant focus on customer needs and frequent customer communication.

“I look back now thinking how on earth did we bring business in? I think it was all about the relationships that we developed with people and it’s a very personable company” (Participant D)

Customer relationships develop further along a personal basis with the CEO describing his customers as *“good friends”*. It is suggested by the interviewees that the reason these relationships were possible was because *“he was doing a lot of the work himself with a few other people”* (Participant B), suggesting that customer relationships may be easier to sustain and develop in small firms. Staff relationships with customers also develop with words like *“personal”* and *“trust”* being used, suggesting that the firm-customer relationship is in an on-going state of development. In the participants’ views, it is frequent customer communication, customer focus and good relationships which is what enables them to gain many of their customers, emphasising the link between customer development and human capital development, as it is through the human capital that these relationships are created. This close relationship means that the customer and the firm are more like joint venture partners as opposed to customer and supplier. The customer suggests services to the firm and the firm suggests services to the customer. This means that due to their relationship both parties are improving upon their particular business.

“the services developed by discussion with clients, you know what do you need and we were often able to develop services specifically for them” (Participant F)

As the firm’s relationship with their customers develops so too does their understanding of their customers’ needs. This is partly due to a formalisation of questions to be asked to the customer during initial contact, and as such customer development links with system development. This development of understanding

enables services to be developed in line with customer needs, highlighting the link between customer relationships and service development. The staff-customer relationship is further developed through the assignment of staff to customers. This engenders feelings of trust and importance in the customers and is an indication of the increasing structure which comes to the firm as it grows.

The firm begins to develop a reputation for good service within the industry and as such gain a high customer return rate and gain new customers through word of mouth referrals. These referrals mean that the firm does not engage in active marketing in the early stages as their customers are their marketers. As the firm does not need to rely on a trial succeeding in order to make money then the firm is able to rapidly increase its customer base as their customers' move from firm to firm starting new trials. Due to the fact that most of the firms customers are small phase I trial companies then there develops a synergy between the customer's growth and the firm's growth. As the customer progresses to more complex trials the firm's service provision develops, more staff are needed and more can be charged for those services.

“the trials have got bigger, the companies have got bigger and as a result we've benefitted from that, so in some respects we've grown up with our clients” (Participant C)

2009 – Present (Current CEO)

After the MBO the firm develops to a point where it is not possible for the new CEO to have a personal relationship with each client. Therefore customer relationships become more dependent on management and employees. The firm develops a strategy related to sales planning and as such begin to diversify their customer base into more geographically diverse areas and to target larger companies as well a higher number of smaller companies. This proves to be the start of an important turning point in the development of the firm as it is from this point onwards that the firm begins to grow substantially.

“Our mix geographically has changed so we've got a bigger mix now in the Far East” (Participant C)

*“We’ve targeted more mature business and tried to target some big blue chip client bases as well. So when you take all of those together, it’s largely what’s driven it from 3.2 to 9.2m”
(Participant C)*

Even though the firm’s customer base is dramatically increasing the firm still maintains a constant focus on customer needs to maintain their reputation for good service. The firm continues to develop good relationships with both new and existing customers and grows in line with their customers. Although close customer relationships are evident these are mainly between project managers and customers highlighting the change in the firm from an owner oriented to a team oriented firm. However, each director is also assigned a certain number of customers to oversee, highlighting the importance to the firm of each customer having key firm relationships. In essence the firms customers enable their growth through an increase in revenue, workload and as such employees, reputation and stability.

5.3.4 Open Innovation

1997 – 2008 (Original CEO)

Although it may appear that the firm does not engage in open innovation this is not the case. The firm’s whole service offering since the firm’s conception has been developed in conjunction with their customers. Without communication with the customer and a focus on developing services to suit customer needs the firm would never have developed to the stage it is at now. The firm also improves their customers’ trials by suggesting new ways of approaching and operating them. Thus the firm aids the customers’ development and the customer enables the firm’s development and both gain new knowledge from the other.

*“It’s just the case of let’s do what the customer asks us to do.
And that’s the way we approached everything” (Participant G)*

*“part of the service is they tell us what they’re trying to do, and then we often get involved in helping them do it in a completely different way from the way they first thought they needed to”
(Participant E)*

2009 – Present (Current CEO)

The firm continues to engage in open innovation with their customers, developing services suited to their needs. Interestingly, after the MBO and in line with the firm's strategy, they begin to search for companies to partner with in the development of a product. The participants express this is in order to make the firm more stable giving them something material to sell. The company the firm is currently working with on this is introduced to them by one of their contacts. This is an instance of true open innovation as the firms will both be working together to develop the product and the joint venture firm will be moving into this firms building. This product is still related to the firm's core service offering and will be complementary to it.

“We're developing a product and some intellectual property, which will potentially allow us to strengthen our brand. But it's complimentary with what we do, it's not something completely different” (Participant B)

It could be argued that open innovation has been one of the most important factors driving this company forward, enabling them to achieve the growth that they have.

5.3.5 Human Capital - Management

1997 – 2008 (Original CEO)

From 1997 to 2004 the firm had approximately five employees with the main contributors' being the owner and the first main employee, acting as the owners 'right hand man'. After 2004 key appointments take place in the areas of business development, operations, project management, finance and quality.

“X kind of had the foresight to realise there was a shift and he started recruiting some key individuals” (Participant D)

The key recruitments which take place link well with the recognition of the business potential and niche. These staff members along with some of the original staff become formal managers within the firm. These managers do not have many staff to manage and instead they manage the general running of the firm, thus they are influential in the firm's early development and aid the owner in its growth.

“at that point X and I were running the company on a day-to-day basis” (Participant D)

The appointment of these managers enables the firm to develop in numerous ways. For instance as there are now key people who are specialists in their particular areas departments are created. Management manage large parts of the firm and enable delegation and higher workloads to be taken on, as Participant E states *“you can’t have one person doing everything, it’s impossible”*. Management also enable more resources to be expended on marketing and customer development. It is at this point that the firm begins to take a more professional approach with regard to marketing and begins a concerted effort to bring in more customers.

“The initial spurt of growth was X coming in and helping to form a business development group with some, well pretty small at first, business development activities” (Participant F)

Managers also enable processes to be created and implemented which have, and will, aid the firm in achieving growth and enable the recruitment of further staff. The quality control manager aids the firm in providing their services, due to the high number of legislations which the firm has to conform to while the finance director *“totally changes the business” (Participant A)*.

“It’s clearly enabled the growth that’s come over the last 5-6 years. And it’s also enabled us to put the processes, get the key staff in place, to sort of take it through the next level of growth over the next 3-5 years” (Participant C)

As Participant F states, without the management team *“the company wouldn’t have been as successful as it is now”*. The participants express how good it has been to relive the early management period of the firm whereby they had more freedom to be creative and had close, team based relationships.

2009 – Present (Current CEO)

Once the new CEO is appointed an MBO ensues and the formal managers and directors become the executive team. As a result a SMT is put in place and a cascade of decision making results, with the executive team delegating to directors, directors delegating to SMT and SMT transferring this information to staff. The appointment

of the SMT is to aid in the reduction of micro management by the directors, allowing them to concentrate on higher level strategic issues. Judging by the participants' responses it is felt the SMT are not taking on a high enough level of autonomy and responsibility. These managerial changes highlight a full development cycle within the company. They initially have high ownership due to low staff numbers, then as staff numbers increase those who have high ownership become managers and yet the growth of the company means they cannot make full use of this ownership and so need to pass it down to lower levels within the firm.

“we had to get more ownership at a lower level which is where the SMT came into it. That's still a new group and that's still not perfect” (Participant F)

5.3.6 Human Capital – Relationships and Team work

All participants described general human capital briefly and concentrated more on managerial human capital and as such this analysis covers both types.

1997 – 2008 (Original CEO)

The firm's first employee is known to the owner and fits the role of both an employee and an advisor, being highly influential in the firm's development. This employee develops new service offerings in conjunction with customers, enables the firm to save money and utilises his personal contacts to aid the firm's development.

“X did an awful lot to build the company” (Participant D)

More staff are employed as the CEO deems it necessary. In these early stages all of the employees have close relationships and high ownership for the firm and their work. These relationships enable better development of team work and better provision of customer service. As participant A states *“it's vital”*... *“if your team doesn't get on well just forget it”*. This closeness is due to the purposeful effort by the CEO to *“fit the characters”* while the ownership stems from the CEO motivating staff with his enthusiasm and by allowing staff autonomy:

“Just letting them say well I could do it this other way and we could improve here. Allowing them freedom was quite important” (Participant A)

Team work takes place in the firm early on when there are a small amount of staff and is needed as there is so much to do with such a small amount of resources. This is aided by the cross skilled nature of staff meaning that each person can help the other when needed. This team work is crucial to the firm's development:

“Development of the team was the success of the business. As a service industry you are all dependent on the last telephone call, or how well the team works together to react to clients' needs.”(Participant A)

This highlights the close relationship between employees and customers and the positive influence this has on service provision. Team work links strongly with the theme of communication and relationships because this team work is natural due to the small amount of staff and the good relationships between them. The fact that the early staff members are eventually promoted to managerial level suggests that staff that have been with the firm the longest are seen to be crucial to the firm's development. It is suggested that these promotions are a natural progression *“because there were more people in the company”* (Participant E), thus highlighting the development of management in line with staff numbers.

The CEO highlights that an 'us and them' culture does begin to develop as more office space is taken on board. However this is only highlighted by him adding credence to the claim that the reason he left was due to the fact he didn't like working with formalised departments and suggests that this may only have been noticed by him. Dedication is exhibited by staff members with them wanting the firm to succeed and develop. This aids in the provision of excellent customer service levels, with employees being available to customers 24/7, and this dedication stems from good staff relationships.

“It was seeing that similar ownership of things. It's not just I come to work and I do the job. If you don't have that it's not going to work” (Participant A)

“I think I had 110% out of these people rather than having 70% or 80%. And they were happy.... if they had to go during the day because there was a problem then fine” (Participant A)

As staff are given a high level of autonomy early then this enables the emergence of certain levels of creativity in staff members which aids in the development of the firms service provision and company image and increases staff confidence. As such the firm develops through team work between owner and staff.

“I’d only been here a fortnight and I said you’re pricing too cheap” (Participant D)

2009 – Present (Current CEO)

After the MBO the firm structure changes and the SMT are introduced into the firm. It is evident that even though an executive team is put in place, with different hierarchical levels resulting, the relationships between management and staff “*is very good*” (participant C). The firm continues to cross skill staff so that there is no need to bring in additional resources and staff continue to be promoted from within with the majority of the SMT being already employed in the firm. The new structure does result in less close relationships between staff members and to counteract this the firm creates a team day for all employees. As such employee relationships become closer as people get used to the new structure of the firm. These employee relationships are of importance as they enable trust and engagement from staff meaning that team work is far more efficient.

“The employee relationships are a lot better and I think they can trust each other to do things now they understand each other’s roles” (Participant D)

“staff are absolutely vital, so we do stuff like sailing day, family days and stuff like that to try and get everybody bonding” (Participant B)

The changing nature of relationships within the firm is highlighted well by Participant E:

“It used to be incredibly close, and then it stretched a bit, as everyone was finding their feet and the managers took off slightly quicker than the ops guys and I think now it’s come back together again”

The importance of a good relationship at the higher levels of the firm is highlighted by all participants as it leads to better team work, more honest and open discussions, more support and a better understanding of the best ways of working with one another, resulting in *“increased productivity”* (Participant B). These strong relationships between the informal executive team were evident in the early stages of the firm but as more people joined this high level in the firm, new team dynamics needed to be forged, meaning relationships became strained. Relationships between the directors however develop to a high level through the use of external team management training and due to the positive outcome of this the same approach is now being utilised for the SMT, to encourage better team work. Relationships are one of the most dynamic factors, having one of the greatest influences on the firm, but being the hardest to manage.

“we’ve had to go through a whole process of executive development straight after the MBO, over a 12-18 month period. That’s made a substantial difference in terms of each of us understanding each other’s strengths, weaknesses, and it has brought us closer together as a team, which has had a massive impact in terms of our productivity” (Participant C)

Team work changes and becomes inter-departmental as the firm develops further. This is needed as it is no longer possible for a small team to accomplish the firm’s goals and a more complex structure is now needed. The SMT should be highly influential but so far this team are not working well together highlighting the need for teams to be given time to familiarise themselves with each other and their roles. Team work within departments is better than team work between departments, suggesting that team work is easier when people are within close proximity to each other with regard to their work tasks. With this increased structure comes uncertainty as certain staff find it difficult to deal with the transition into another level of delegation. This highlights difficulty with loss of control and ownership and some of the difficulties which arise during structural change.

“when you go from 9 to 50 and getting into departments, you get this solo mentality, so people work within their departments and stop communicating with other departments. That’s one of the reasons we’re trying to get the SMT to communicate more and get the departments to work more closely” (Participant C)

A profit share scheme is also created in an attempt to get each department working to their full capacity again, making best use of the firm resources, as opposed to motivating them through close relationships. This change epitomises the development of the firm as it is no longer possible to have close relationships with all employees. This links with the firms aims for staff development and welfare and highlights the value the firm places on their human capital resources.

The firm has gone through a cycle of close relationships and strong team work, to less close relationships and less team work and then back to strong relationships. The level of team work develops in line with these relationships highlighting the link between these two themes.

5.3.7 Expertise

1997 – 2008 (Original CEO)

The firm starts with a high level of technical expertise in the industry, with the CEO previously working in a large pharmaceutical company. The CEO's existing experience aids the firm in many ways. For instance the firm's first customer is the firm the owner previously worked for and customers are gained due to the trust the customer feels after gauging the owners' technical knowledge. The owner also utilises existing contacts for staff recruitment and critically their experience means that services can be offered which are ahead of their time, offered prior to the introduction of key legislation.

*“He can become a QP because of his background and he brought another QP in. So they started to do the sort of clinical services work before the legislation was formally in, so they were at the forefront of it when it was formally law”
(Participant F)*

As the firm employs more staff the technical expertise of the firm develops as most of the staff have appropriate experience. However, there are staff members who have little or no experience as it is felt by the owner that it is more important that the staff fit in with the personality and ethos of the firm, linking back to the importance of staff relationships.

“He was very much is the person the right fit rather than their skills on paper” (Participant E)

As the firm develops further they increase their expertise base with more qualified and experienced staff. Even though the majority of staff members have experience in their roles they still gain new skills and knowledge. One staff member gains an intensive qualification, which enables the firm to develop and grow at a faster rate, while other staff members learn through experiential learning enabling them to grow and develop as managers.

“people skills, business skills I’ve learnt a huge amount” (Participant E)

“there was quite a lot of specialised training” (Participant A)

The firm also ensures that staff are cross skilled in multiple roles meaning that they have a fluid human capital base able to change roles according to the situation. The expertise of the firm develops consistently with the introduction of new staff members. For instance the firm is highly technical until one staff member is brought in who overhauls the firm’s business development. The fact that experienced staff are appointed means that there are more people within the company who can talk to the customer on a technical level, gaining the customers trust. This is important as all the participants’ highlight how the trial is their customers’ lifelong work in some cases. The previous experience of the staff also provides the firm with a variety of contacts and ideas and enables them to develop their quality procedures completing changing their approach to processes. The staff members work together to increase the resources available to the firm and to manage them.

I was able to bring in ideas with respect to quality from a bigger organisation. I brought in more mature systems that helped the company initially” (Participant F)

2009 – Present (Current CEO)

The staff appointed after the MBO provide additional experience and skills aiding the firm in its development. For instance the current CEO has experience of growing a company previously, which is stated as bring instrumental in enabling this firm’s

growth, while many staff members provide the firm with contacts in the areas of finance and government. One staff member is described as the key networker in the company, utilising contacts in various areas to aid the firm, while some staffs experience enables them to gain finance and aids in the MBO.

“what that taught me was a) managing people, b) growing a facility and that’s what we’ve replicated here in a way. Because when I came we were turning over about £3.5m, and now we’re turning over just short of £10m” (Participant B)

“My previous life gave me access to a huge network of funders, which helped me pull together a great team to do the MBO and to raise funding as we needed it” (Participant C)

5.3.8 Finance

1997 – 2008 (Original CEO)

Finance is an area in which the firm develops strongly on a number of levels. The firm starts with initial owner investment and has a small cash flow from the firm’s first customer. However, the firm’s initial financial situation means that the firm is in a continual effort to reduce their costs through bootstrapping, such as utilising internal staff as opposed to outsourcing office maintenance and by utilising their own personal equipment.

*“we picked up a couple of second hand chest freezers”
(Participant G)*

“the reason I was in an office in Port Talbot, it was 50p a square foot as opposed to £3.50 a square foot in Bridgend. I brought my own desk down, carpet and PC and it was basically zero capital outlay” (Participant A)

When the firm does receive equity funding this is vital in supplying the firm with equipment needed in order to provide their services. The owner’s view on grant funding is that it should only be used when necessary and as the firm has a good supply of customers early on it is never needed. This highlights the effect of the owner’s perspective on the firms financing opportunities. However this is conflicted by the fact that the firm does utilise small grants for external market reports. Thus grant monies are used but not to a high level. Even though the firm does not obtain a lot of grant monies, any they do attain are used to aid the firm’s development well:

“Both of those revolved around recruiting people so I think that one was 11 people, this one was about 26 people to recruit. Which if you add the maths up, that’s 37 people and where I said we were about 9 people, and we’re up to 55 now. Those two grants contributed to that” (Participant C)

The firm’s finances are managed very informally by the owner, the first employee and by a part time finance person and finance software is brought into the firm early on.

“the invoicing was done with X and Y screaming at each other once a month. There was no formal keeping a track of anything, they’d get to the end of the month and then try and remember what they’d done” (Participant E)

As the firm’s customer base grows rapidly the owner acknowledges additional help is needed and as such external accountants are employed. The fact that the firm develops healthy internal revenue with most of the firms finance being “*earned by the company*” means that the firm is able to bring in resources such as human capital quite easily. However the firm is partly reliant on the customers’ financial situation as their customers receive grants in order to be able to carry out the trials which this firm is providing a service for.

“When I first became involved with X, it was very much, start-up or virtual companies who were funded by private equity or venture capital funding” (Participant B)

Therefore the firm is somewhat reliant on the state of foreign economies and governments, which explains why the firm wanted to diversify their customer base to companies less reliant on funding. The firm also begins to aid their customers in reducing their costs by suggesting new ways in which services could be offered, highlighting the link between customer finance and service development.

2009 – Present (Current CEO)

The firm then moves on to acquire debt funding in order to build their custom built premises but still finances itself mainly through internal revenue. Without the funding for these structural movements the firm would not be in the position it is

today, with a strong brand, good image and organisational structure. The firm appoints a finance director to the company who had already been dealing with the firm's finances through an accountancy firm. After the MBO the firm introduces "formal budgets" (Participant B) for different departments and takes another round of debt funding for the MBO and the gaining of a second building.

"We are on our third round with Finance Wales, because we had some debt to build this building, then we paid back the original debt, took a second loan out to do the MBO and then took a third one to do the new building" (Participant C)

The appointment of the finance director means that the way in which finance was managed changed dramatically and results in the firm gaining more funding and in the smooth transition of the MBO. A focus on cost reduction ensures the firm always makes best use of their chargeable resources while the use of formal budgets highlights another level of delegation and authority taking place, with the need for finances to be managed by multiple personnel.

5.3.9 Strategy

1997 – 2008 (Original CEO)

The firm's aims relate well to the firm's strategy as the firm begins with no aims and as a result has no strategy. An informal strategy is only created as the firm develops and the CEO begins to realise what the company could achieve. This is predominantly focussed upon geographical customer diversification and is held in the CEO's mind as opposed to being a written document or communicated to other staff.

"We're going to capture so much percent of the Israeli market. We want to focus on the West Coast of USA. And maybe develop the other biotechnology cluster around Boston" (Participant A)

This firm's initial informal strategy influences the firm's marketing efforts and results in them attending conferences at set locations. These conferences lead to contacts which lead to customers, highlighting direct results of the firm's strategy. The CEO states that the informal strategy was constantly reviewed by the firm, which is

interesting as the employees convey that the strategy was not communicated to them. This suggests that even though strategy related issues were discussed it was not communicated that these were the firm's strategies. Or perhaps the employees perceived them as being 'here and now' issues as opposed to strategic issues. This is supported by one directors statement "*I suppose at that time I never really thought about strategy, it was more about here and now*" (Participant D). This relates well to informal communication as it is suggested that there is no need for formal communication of aims as they "*were small enough to just sit round the table and say what are we doing*" (Participant A). Thus the influence of strategy on the firm is complex, with it influencing the firm informally and being implemented easily. However, the firm's strategy was communicated to external sources such as the government, resulting in them receiving advice which is suited to their overall strategy:

"We had regular meetings with the main contact to the Welsh Government to let them know what we were doing because then they would know how to channel any information they had our way" (Participant A)

2009 – Present (Current CEO)

The biggest change in the firm's strategy develops after the MBO in which formalised strategies are put in place which are clearly communicated to employees. In monthly meetings a review takes place of where the company is in relation to the strategy suggesting that the strategy is in a constant state of review.

"When he took the decision to bring X in and step out, then the company tried to attempt a more structured strategy and communication of that throughout the business" (Participant C)

The communication of the firm's strategy takes place in order for the employees to gain ownership and purpose within the firm. This clear communication of strategy is supported by the firm's strategic document which they use to create "*goals*" and "*objectives*" (Participant B). Thus the concept of strategy relates closely to that of planning. The firms strategy has five core points and is centred upon marketing and brand development, customer and staff development, service and product development, all related to the key strategic goal of long term growth. These strategic

goals are created in line with the firm's realisation of the importance of a sales pipeline and customer diversification. The fact that the firm develops strategic plans relating to different sectors of the firm means that key objectives can be set up in line with these, again linking strategy strongly with planning. For instance the aim for new services results in the firm looking for new service areas to expand into, the aim for a product line leads the firm to a joint venture while the aim for brand development leads to splitting of services, website development and an increase in marketing.

“we did formulate a plan, which is around brand development, marketing activities and business development” (Participant C)

The firm's strategy becomes more complex and detailed through the creation of short, mid and long term strategies and highlights the firm's aim to achieve further sustained growth. Prior to the MBO the firm's strategy is not formalised and not clearly communicated whereas after the MBO the firm's strategy is created by the executive team and is approved by the board and implemented by the SMT. The need for more time to focus on strategic issues at a senior level leads to a new management structure within the firm, linking management structure with strategy development. It is the future plan of the firm for the SMT to eventually create the strategy which will be approved by the executive team, highlighting strategy linking with planning. The firm's short, mid and long term strategies enable the creation of plans with regard to how these strategies will be achieved and who will be involved in implementing them. The creation of individual and departmental objectives aids in this strategic implementation as lower and higher level strategic aims are met through the efforts of the whole firm. Thus the implementation of strategy relates to the development of organisational structure and delegation; as more hierarchical layers are appointed the strategic decision process becomes more complex and the implementation of the firm's strategy is carried out to differing degrees at different levels.

“The strategic aim and objectives haven't changed. But the annual and quarterly objectives that we have to meet to hit that, we are constantly keeping under review and having that focus helps” (Participant B)

5.3.10 Planning

1997 – 2008 (Original CEO)

At the start of the firm there are few formal plans as there are no aims or strategies against which to make plans. As the CEO begins to understand what the company needs to move forward financial planning begins to take place. This financial planning becomes more detailed and professional through the appointment of a finance director. Financial planning takes place to make the business more profitable and sustainable and enables the firm to make better use of their financial resources.

“we started trying to level our income off, because it would come and go like a yoyo” (Participant G)

Although it may be argued that planning is encompassed under strategy they influence parts of the firm differently. The gaining of customers results in project planning taking place in order to achieve their customers’ needs. This project planning links with the theme of service development as the firm begins to charge for this service. This theme of project planning is evident as being one of the most influential forms of planning which the firm undertakes, meaning that customer projects can be completed, customer communication is maintained and customer service levels kept to a high standard.

“Project managers are absolutely vital for us” (Participant C)

“they project plan their own projects. They’d work with the client base and they then make sure it fitted into the resources we had” (Participant B)

2009 – Present (Current CEO)

When the MBO takes place individual and departmental objectives are put into place. In line with this the firm begins to think seriously about the importance of business development and sales planning. This forward sales planning links well with the period in which the firm achieves high growth suggesting that this form of planning is one of the most influential to the firm’s development. As such the firms planning is critical to the achievement of their strategy.

“I think that was the realisation that business doesn’t wander in of its own accord. You’ve actually got to go out there and find it and you’ve got to know what you’ve got and what’s coming in” (Participant B)

The firm begins to plan its future staff intake and what roles and skill gaps need to be filled. This staff planning is evidenced by the firm's focus on 'staff-job fit' whereby staff have moved from their original job into another job to which they are more suited. Staff planning results in the appointment of the SMT, a business development director, the planning of training for staff, process developments and marketing personnel and ultimately enables the firm to make the best use of their resources. The firm also appoints more project managers and the marketing of this service becomes more direct.

5.3.11 Organisational Structure

1997 – 2008 (Original CEO)

Knowledge transfer is conducted informally in the early stages as all staff are located within the same building. Informal communication takes place, which links with the theme of team work and good employee relationships as it is this informal knowledge sharing which aids in these relationships’.

“When we started we literally would be in the room together so you’d overhear all the conversations, so you’d know exactly what was going on” (Participant A)

It is apparent from the interviews that the early staff members preferred this informal communication as relationship, team work and processes were easier as a result. When the staff discuss their multiple roles they talk about them with passion, expressing they did whatever needed to be done to make the firm prosper. This highlights the importance of staff working together to achieve the firm’s aims, linking human capital with the theme of team work. These multiple roles ensure that the firm’s resources are being used to their highest efficiency.

“When you’re 10-12 people everyone’s doing all sorts of jobs, you all know what’s going on, when you get an enquiry in everyone jumps on it and deals with it as a tight team” (Participant D)

Delegation and staff autonomy is high with staff only overseen when they are first employed, in order for them to learn the general way in which the firm is operated. Due to the high level of delegation the staff authority increases substantially.

"They were thrown in the deep end, I defined the job they had to do and let them carry on" (Participant A)

Staff members have multiple roles and cross over in skills but distinct parts of the firm emerge meaning that new staff members are recruited into each specific area, thus making each department larger. Even though the firm is beginning to develop more structure there are still a limited number of people within the firm. The eventual specialisation of staff roles is something which some staff find frustrating as the speed at which others can do their previous tasks is longer. Therefore loss of control and ownership is evident. However, this specialisation does have a positive effect as it enables a clear and focused way in which to achieve the firms aims, with each staff member 'playing' their part.

"They've certainly become more specialised.....as you grow, you need a little bit more definition into people's roles, otherwise it's going to lead to a lot of confusion." (Participant D)

Departments then become more formalised and new departments are created with the introduction of more staff and structure meaning communication and knowledge transfer becomes more difficult. Staff are not all located in the same room, as a new purpose built building is created, and as such internal team meetings begin to take place and become more formalised. As the firm develops further and gains more customers additional key appointments are made to the board of directors and staff roles become more specialised as more staff are employed. Staff roles then begin to be changed into those into which they are more suited suggesting that although a formalised structure is beginning to form, this is still flexible. As the firm has grown the skill sets that are needed have developed and as such staff dynamically change in synergy with the changing firm.

*“being able to grow but move people around as the business grows. To make best use of people’s skills I guess”
(Participant E)*

2009 – Present (Current CEO)

There is a turning point for the firm when the MBO ensues with formal managers and directors becoming the executive team. The firm begins to concentrate more on their operations department with one staff member changing roles to become the operations director. Other staff members also change roles in order to fit them with a role more suited to their skills. Due to the increase in customers the firm takes on another building. As more customers and staff are brought on board communication and knowledge transfer becomes even harder and the firm introduces whole company meetings and a SMT.

“as the business started to grow we sort of identified the need for a senior management team.....to guide the business in a coherent manner” (Participant F)

With the development of different hierarchical levels come meetings within each hierarchical level. This links well with the theme of planning, as these meetings are used to plan the firms work and delivery of objectives and acts to highlight the difficulty in company wide communication as the firm grows. Communication then takes place of staff roles to avoid confusion over who should be undertaking what task and again links back to the firm’s process development. When the firm takes on a second building this makes communication and knowledge sharing more difficult.

The firm goes through cycles with regard to their knowledge sharing capabilities starting very strongly, then declining, then improving with improved processes, then declining with splitting of staff and then eventually improving again. This relates to the theme of process development as the firm realises that their processes are not adequate for the number of staff that they have. It is apparent that staff members are not enjoying the split sites as they prefer the closeness of communication afforded by close proximity. As such as the firm grows they begin to realise the importance and difficulty of knowledge management. They realise that knowledge needs to be spread to all relevant people within the firm, that each staff member needs to have the adequate knowledge to complete their job and that training processes cannot be

implemented unless the departmental head has all the relevant knowledge. This points to a general theme of “multiple people needing information as the firm grows”. The reason this has become an issue is because the firm grew steadily under the former CEO but when the new CEO was appointed the firm began to grow rapidly and therefore the firm’s knowledge management and processes need to be brought into line with this.

“We’re trying to change so that information flows out, rather than people having to come in to get it” (Participant B)

The firm’s organisational structure change is accompanied by changes in knowledge transfer and firm location suggesting that these are themes which develop together.

5.3.12 Marketing

1997 – 2008 (Original CEO)

The firm begins with a very informal approach to marketing and market research. Market analysis is conducted prior to attending conferences but is usually undertaken by government bodies. The firm’s initial marketing effort via attendance at conferences is suggested by government bodies, highlighting the influence of contacts on the firm’s marketing. It is the attendance at these conferences which leads to customer enquiries and revenue for the firm initially. There is no formal marketing plan in place as the firm gains customers through word of mouth marketing, reputation and a high customer return rate. It is emphasised that the firm was operating, and still is operating, in a growing market sector and with the introduction of the directive the firm was in an excellent position to take advantage of this. The rate at which the firm gains customers means that any marketing which took place may give the firm too much work.

“We never had sales force for years, it was all word of mouth and the clients were the best sales force you could have” (Participant A)

The firm does create a website which is government funded, but due to the time at which this was created it is quite static. In line with a key member of staff being recruited the firm begins to engage in various types of marketing, conducted along a

trial and error basis. The firm improves upon their existing marketing documentation making it more professional and branded. The firm's website is dramatically overhauled and a marketing plan is put in place that mainly focuses upon conference attendance. As the firm gains more staff and begins attending more conferences more effort is put into internal market analysis mainly conducted through "*internet searches*" (Participant A). External market analysis does still take place but is combined with internal analysis. The improvement of the firms marketing documentation and website, in conjunction with the firm's levels of service all aids in the development of a professional image, which aids in the gaining of customers. The firm continues to attend conferences but the owner starts to take staff members with him and to exhibit at these exhibitions, aiding in the development of a more professional image.

"X and another BD manager came in and they really started to increase awareness of websites and marketing literature and conferences and whatnot to expand the company name"
(Participant F)

2009 – Present (Current CEO)

After the MBO the firm begins to exert more resources into market analysis and marketing after a realisation of the importance of business development. Market analysis is conducted and adverts and articles are placed in relevant magazines. An effort is expended into branding with a new logo and website and differentiation of services. This is all done in an attempt to make it easier for customers to understand the services offered by the firm, in order to increase enquiries.

"Recently they rebranded everything so they've taken the service offerings and made that clearer. Website is probably the key place that clients come from. Conferences, making sure you know which of the conferences in which countries to be in. And that's probably the biggest change is the range of countries we now go to for those" (Participant E)

Market analysis continues to be conducted both internally and externally and the firm begins to engage in social media marketing. The introduction of the firms marketing plan means that the firm now has a focus with regard to their efforts in gaining new customers as is centred upon diversifying the customer base.

“The marketing plan back when I started was more about conferences and countries whereas we now look at the web, we look at the social media sites, we look at publications in addition to conferences, exhibitions” (Participant C)

Although the marketing plan is communicated to staff within the firm, there is no formal written plan as the firm sees no need for one as they use their strategic document as their working document. The firm’s market research is communicated to the firm’s finance providers. However this is not shared in as much detail or as frequently as would occur in other firms due to the finance director’s previous experience and contacts.

5.3.13 Systems and software

1997 – 2008 (Original CEO)

At start up the firm’s working procedures are basic as the firm has no sales procedures and only a small amount of official documentation. The owner however has experience in document management and so implements this early on. In the early stages quality procedures and certifications begin to be introduced as these are vital in the industry in which the firm operates. They eventually prove vital in gaining customer orders after the introduction of the key directive. As the firm grows the amount of quality procedures begins to increase:

“When the company was first established, they were storing drug products and there was very little accreditation a company could achieve for that role. So they did gain ISO 9001 accreditation. Then a key piece of legislation came in in 2004 and from that point on X had to become licensed by the MHRA, and that’s far more important than the ISO accreditation, but we’ve kept the ISO just because clients like it and it’s a good quality tool” (Participant F)

This increase coincides with the employment of a full time quality person who brings far more robust procedures’ to the firm. The employment of a full time business development person means that the firm introduces sales procedures, while the introduction of further staff means that the firm’s documentation begins to increase. The procedures and documentation increase in line with employees suggesting that these are linked. This documentation not only aids the firm’s administration but also

enables a more professional image to be supplied to customers. Software is brought into the firm early on but is limited to finance software and one database package

2009 – Present (Current CEO)

After the MBO and due to an increase in staff and a clear aim for staff development the firm introduces complex training plans which ultimately aid in increasing the knowledge base of the firm. Software is constantly developed, becoming more complex due to the firms needs and an increase in technology. The software enables certain areas of the firm to run more efficiently and affects each department.

“We used to have Sage financial, but we put in April 2010, Sage 200 which is an MRP system. That drives the entire process financials. Because you book all your purchase orders in, generate sales orders, generate invoices, logs people’s time, gives you profitability. So that’s absolutely vital” (Participant C)

There is a key focus on process improvements, needed due to the increase in employee numbers highlighting the link between these two themes. From the excerpt below it is obvious to see that systems affect all areas of the firm and that the firm is in a constant state of ‘catch up’ trying to get their processes in line with their growth.

“we’re making sure the process is right. So we’ve said as a business we’ve got 11 core processes and we’re trying to process map those 11 processes and put improvements in place” (Participant F)

5.3.14 Service Development

1997 – 2008 (Original CEO)

The firm starts with one service related to the transport of pharmaceutical drugs, which the owner believes will be the focus of the business. Not long after another service is added involving the storage of drugs. Eventually through advice given by contacts and through the owners own realisation of the niche which was developing, additional services begin to be added.

“back when X set it up back in 1997 it was purely around logistics” (Participant C)

“I realised you could actually work on temperature sensitive clinical trials products, because I knew how to handle them. And particularly -80. And didn’t seem like anybody else knew how to do it, I thought oh OK” (Participant A)

The provision of these services develops with the pricing structure changing, initial customer query documentation being brought into place, and the way in which the service is provided improving. The improvement sometimes comes from staff suggestions to customers, highlighting that service provision was moulded to the customers’ needs. The firm constantly improves their services through the introduction of new technology and new processes.

“We started charging for destruction, for reconciliation, we started putting those in as a fixed cost, or an hourly rate on it” (Participant F)

The service development which takes place during the firm’s life has one of the greatest impacts on the firm’s growth. The change of business focus is one of the events which leads the firm on the path to growth. The increase in services and the improvement in the way in which these are provided all mean that more customers are gained and that a high reputation ensues. These service improvements would not be possible without the human capital of the firm or without the firm’s customers, highlighting the link between these factors. It is also the niche of the service itself which seems to have aided greatly in enabling the firm to achieve a strong customer base.

2009 – Present (Current CEO)

After the MBO the firm begins to consider new complementary services which they could offer to their customers. This links well with the theme of strategy as it is within their strategy to offer complementary services. In line with the firms market and brand focused strategy the firm decides to split its services into separate offerings, which are communicated via the website and marketing efforts. This is done in an effort to make their service provision simpler to their customers. The fact that the firm is trying to offer new services, some of which are related to new innovative services suggests that they are market leaders in their field. This is supported by the fact that the firm is one of the first to recognise the niche market

which they operate in and the way in which they can stay one step ahead of the competition. The firm continually improves their services through process and technological development and through staff training. The current focus on the development of a product for sale highlights the firm's focus on becoming more sustainable and although this is in too early a stage to impact the firm so far this appears to be something which will catapult the firm's growth yet again.

5.4 Summary and conclusion

During the review of the literature thirteen factors were identified as being potential influencers of firm development. Through the data analysis, fifteen factors emerged as exerting some sort of influence on the firm, however certain factors exerted more influence after the appointment of the current CEO, while others exerted more influence prior to this. This highlights how different factors become of importance at different phases of the firm's development.

This case demonstrates the complexities inherent in firm growth in the modern economic era. What is interesting is that the firm goes through various 'stages' or 'spurts' of growth. This is supported by the participants and by the company documentation. The firm is formed in 1997 and grows steadily in the first year or two. In the year 2000 the firm experiences a growth spurt which then steadies off. In 2004 a new directive is introduced which makes this firm highly specialised and due to this the firm grows further. In 2008 the firm sees another high growth phase and in 2013 the firm is now entering its next stage of growth. These growth stages can be seen in tables 5.1, 5.2 and 5.3. The main growth stages correspond to infrastructure changes and staff changes, with the changes sometimes preceding growth and other times occurring after growth has occurred. It was also possible to split the factors into those relating to the firm, people and the customer/service, and as such tables 5.1, 5.2 and 5.3 below are split according to these themes.

Factor	State One Start Up	State Two Early Development	State Three Purpose Built Building	State Four New CEO	State Five Infrastructure and Management Development	State Six Latest Developments
Firm Level Factors						
Aspirations	There is no clear aspiration for the firm at start up	The owner realises the niche of the business and that it has growth potential. Aims however are related to patient safety and customer service		Clear corporate aims are developed after the appointment of the new CEO. The firm begins to communicate their aims internally and externally	The firm plans for further growth and vision and mission statements are generated.	
Strategy	The firm has no strategy in place.	An informal strategy is generated which is reviewed constantly, although informally. There is still no clear communication of strategy or objectives, apart from to the government		The MBO brings a formalised strategy. Short, mid and long term strategies are generated. There is clear communication of the firm's strategy and objectives. The executive team create the strategy which is approved by the board.	The creation of the SMT means that the strategy is communicated to them to implement within their departments. The strategy enables the firm to plan their day to day work activities through their objectives.	
Planning	There is no real planning as there are no aims or strategies.	Project plans begin to be put in place for customers. Financial planning begins to take place.		Planning becomes more formalised through the introduction of individual objectives and departmental objectives. Sales planning and staff planning begins to occur. Financial planning becomes even more formalised.	The SMT begin to take over the general planning of day to day tasks.	
Organisational Structure	The firm starts off with one small premises and a very small amount of equipment	They then relocate to larger premises and then take additional premises. The amount of equipment the firm has begins to increase. Departments are created and staff have multiple roles	Staff begin to change roles and staff roles become more specialised. Internal team meetings begin to take place and meetings become more	A formalised operations department is put in place. Staff begin to change roles again. As directors are appointed and staff numbers increase directors are	They then take another additional premise. The executive team delegate to the directors who then delegate to the SMT. The SMT then implement the firm's objectives.	The SMT is gradually given more authority and autonomy but still need sign off from the exec for big decisions. The firm

		within the firm. There is a high level of delegation to staff early on. The staff are overseen but do manage the firm. The staff authority increases substantially. The firm starts off with informal communication as they are all in the same office	formalised. They then build a custom built building The CEO decides he wants to leave the firm	hands on and micro manage. As more staff are brought on communication becomes even harder.	However this is still a work in progress.	starts to have different sets of meetings for different groups of people. Communication begins to take place of staff roles.
Systems and Software	The firm has a small amount of quality procedures. The firm uses only a small number of software packages	The number of quality procedures which the firm has increases with incoming legislation. Documentation and procedures develop well. The firm's use of software increases. Training plans are put in place.			The firm is undergoing an overhaul of their processes. Training plans begin to develop further	
Finance	The firm has initial owner investment and a small cash flow. The firms finances are managed informally but finance software is brought in. The firm continually attempts to reduce its costs.	The firm receives equity funding but finances itself mainly through revenue. Finances begin to be managed by external accountants.	The firm receives debt funding. A finance director is appointed.			The firm creates budgets for departments.

Table 5.1. A summary of the process of development of firm level factors found to be of influence to case B's development.

Factor	State One Start Up	State Two Early Development	State Three Purpose Built Building	State Four New CEO	State Five Infrastructure and Management Development	State Six Latest Developments
People Oriented Factors						
Expertise and Learning	The owner has previous experience in this field and has a high level of technical knowledge which aids the firm.	The technical expertise of the firm develops as more staff are brought on board. Their previous experiences aid the firm. Staff begin to gain new skills within the firm sometimes through experiential learning. Staff are sent on training and graduates are brought in.		More staff are brought on board whose experience aids the firm further. The firm's technical and commercial base develops with more staff. Further staff are sent on training.		
Contacts	The firm has a small number of contacts in various areas which are utilised in order to aid in the firms early development.	Good relationships with contacts develop. More contacts are gained in a variety of areas through the owners networking efforts. Relationships with suppliers begin to develop to a high level.		The firms contact base grows substantially as more staff are brought on who have existing contacts. Contacts begin to provide customers through referrals.	University contacts begin to be utilised	
Human Capital Staff relationships and Team Work	The firm has one employee	Staff are brought on board as and when is needed. All the employees have extremely close relationships. Staff opinions are asked for and staff are involved in decisions. Staff are cross skilled and the importance of staff fitting in with the personality of others is crucial. Staff are dedicated and the CEO motivates staff with his enthusiasm. Team work takes place between the small amount of staff.	More qualified staff begin to be brought on board who have experience in their areas. Staff within the firm are promoted. The CEO motivates staff by giving them the freedom to be creative. Team work begins to increase as more staff are brought on board	Staff numbers increase further and the close employee relationships become less close. The importance of staff fitting their job becomes important.	Good employee relationships begin to develop again.. The firm tries to motivate staff through profit share schemes and through supporting staff. Relationships between the directors begin to develop. There exists a good relationship between management and staff. Relationships between the SMT begin to develop but the SMT are not working well. Team work takes place	

					between departments where necessary and team work takes place between directors	
Management		Key people begin to be appointed to the firm	Further key appointments are made.	Further key appointments are made and a quick management buyout ensues. An executive team is appointed.	A senior management team is appointed.	The SMT is gradually given more authority and autonomy but still need sign off from the exec for big decisions.

Table 5.2. A summary of the process of development of people oriented factors found to be of influence to case B's development.

Factor	State One Start Up	State Two Early Development	State Three Purpose Built Building	State Four New CEO	State Five Infrastructure and Management Development	State Six Latest Developments
Customer/Product Oriented Factors						
Market Analysis and Creation		The firm engages in a small amount of market analysis. There is no formal marketing plan in place and no marketing is conducted. The firm has a basic website. The firm communicates their market research to finance providers	The firm begins to exert more resources towards market analysis and marketing and a marketing plan is put in place. The firm engages in general marketing which is conducted along trial and error line. The firm begins to develop a professional image and a good reputation within the industry.	The firm realises the importance of BD and the pipeline and their marketing increases. The firms marketing plan develops further. The firm continues to improve upon their website. The firm begins to develop their brand		
Customers	The firm gains their first customer.	The firm gains further customers. The CEO develops close relationships with each of his customers. There is a constant focus on customer needs and good	Customer relationships develop further as staff are assigned customers to work with. There is a high customer return rate.	The customer base begins to diversify into larger companies in more geographically diverse areas.		

		customer communication. An understanding of the customers' needs develops throughout the course of the projects.	The firm's customers begin to grow and in turn so does the firm.			
Open Innovation		The firm engages in open innovation with its customers as they work with customers to constantly develop their services			The firm engages in open innovation with a university spin out to develop a product which can be patented.	
New/Existing Service Development	The firm starts off with one service	The firm develops their second service. The firm's service provision develops. The firm constantly improves the services they offer		The firm considers and introduces more services. The service offering is split to make it easier to understand. The firm constantly improves the services further	The firm begins to move into the product area and develops a prototype product	

Table 5.3. A summary of the process of development of customer and product oriented factors found to be of influence to case B's development.

Some factors have two levels of development while others have, three, four, five or even six. This is due to the fact that some developed continuously throughout the firm's life while others simply did not go through many phases of development, while others were already developed to a high level at start up and so there was less development to take place. The gaps which are evident in the tables indicate a phase in which the development of the factor stayed constant. It is the more complex factors which experience the most amount of levels of development. For instance organisational structure experiences six levels of development due to the number of changes which take place within the firm. Human capital, another complex factor, experiences five levels of development. It is also these factors i.e. staff and infrastructure or organisational structure changes that initiate the firm's biggest developments, highlighting how important these factors are. It is also evident that certain factors experience a lull in their development, seeming to remain stable while other factors develop and then "catching up" with them as it were. The fact that all of the factors develop through multiple stages over the firm's more than decade long history highlights the dynamic nature of these factors and the complex ways in which they impact the firm.

Generally the firm develops from a small start up with a small amount of finance and staff members, to one which has a close knit team characterised by close relationships and where customers begin to increase in numbers and eventually stabilise, to one in which the customer base has grown considerably, large management changes take place and relationships become strained, to one in which relationships recover, large organisational changes take place and then firm again achieves considerable growth.

Even though the factors have been split into those consisting of people oriented factors, firm level factors and customer and product oriented factors it was evident that not one theme could enable growth in isolation. Each of these themes influences each other and highlights the holistic nature of the firm's development, as can be seen by figure 5.1. This points to the interconnected and complex nature of this firm's development. Each factor influences the firm through its interaction with other factors highlighting how this firm's development can only be understood by

reference to each of them. Each of the factors progress over time at different rates and to differing degrees.

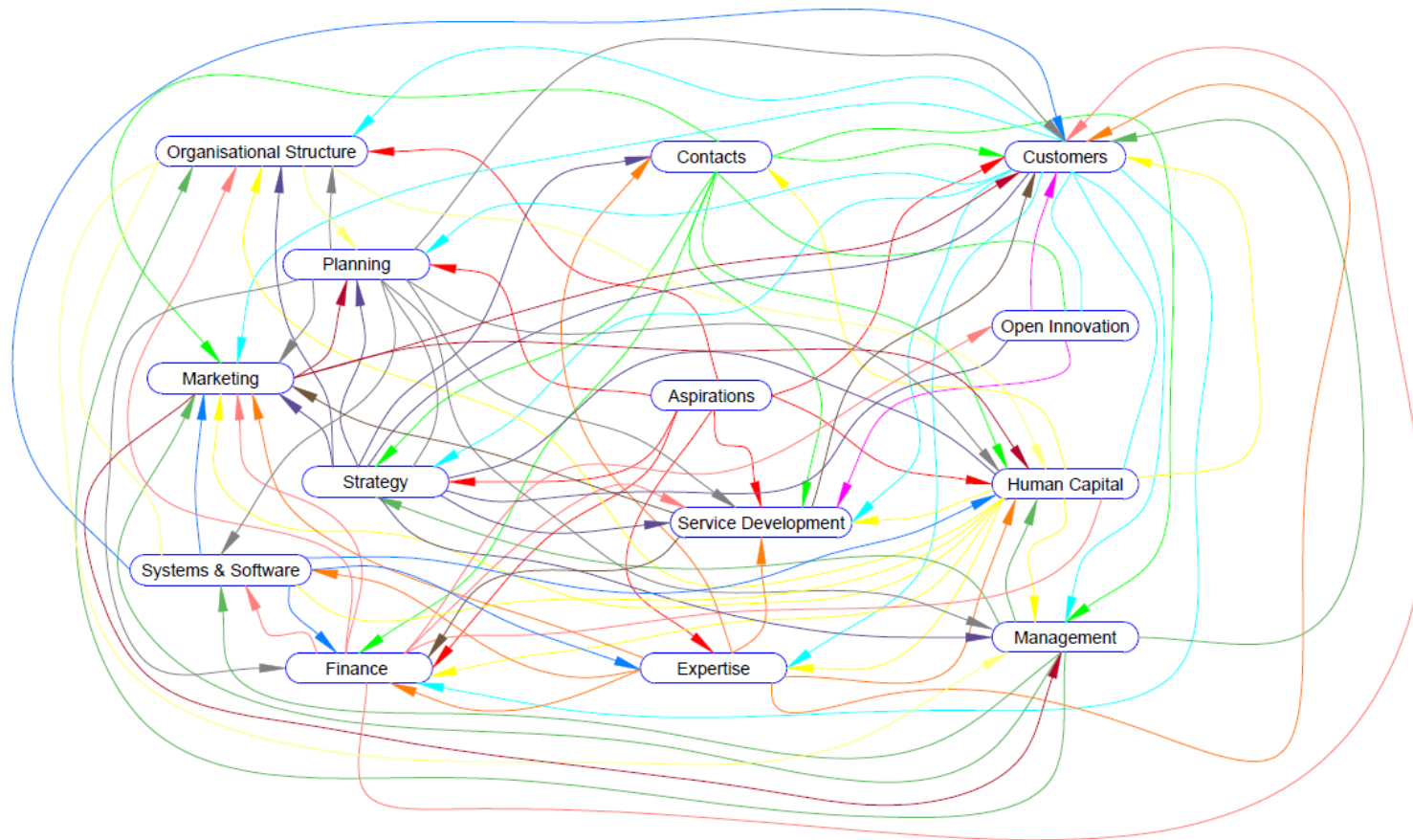


Figure 5.1. The connecting relationships between each factor found to influence case B's development

The diagram shown in figure 5.1 highlights the interwoven nature of the factors affecting the firm's growth. Each coloured line relates to one of the factors. For instance all the yellow lines are stemming from human capital, while all the green lines stem from contacts, while all the light blue lines stem from customer development. The fact that it is pictorially difficult to make sense of all of these connections highlights the importance of considering all factors in a holistic manner. Without this holistic consideration a full explanation of firm growth is not possible. Certain factors are influenced by a larger number of factors than others. For instance human capital, management, service development and customer development among others need to interact with a large number of factors in order to exert an influence. Other factors such as contacts, aspirations and open innovation affect factors more often than vice versa; due to the influence they have on other areas of the firm.

In summary the results and analysis of this case study indicate that factors influencing firm growth can be discovered and that their process of development can be mapped. This development is complex and different for each factor, with some factors experiencing more development than others. Ultimately all of the factors interact in a complex way to enable the firm to develop to the stage it is at today.

6.0 Chapter 6 – Comparative Analysis

6.1 Introduction

This chapter will take the within case analysis and develop a cross case insight of the process of development of each factor and the ways in which these act to influence firm growth. The comparative analysis will compare two firms at different stages of growth in order to analyse the communalities and variances between them, in the hope of developing a model and theory of how high growth is achieved, the implications of which will be discussed in chapter 8. At the end of the discussion of each factor a combined process of development table will be generated and an analysis will take place of the level to which each factor needs to be developed to in order for high growth to occur. These levels will be highlighted in bold in each table.

6.2 Comparative Analysis

6.2.1 Comparative Analysis of aspirations

The development of the aspirations of each case is strikingly different but ultimately similar. Case A begins its life with a clear and focused growth aim while Case B begins with a vague aim for the firm and an almost altruistic aim for its customers. However, both firms develop clear aspirations which are communicated both internally and externally, it just so happens that this occurs at different points in each firms life. The reasons for these differences may be due to the fact that case B was owner financed whereas case A was majority equity financed. Therefore equity participation may have forced case A to develop this factor at a faster rate. The reasons as to how and why this factor influences each case are very similar. For instance, aspirations are used in both firms to create plans as to how these aspirations should be achieved, through the creation of sub-aims. These sub-aims are stipulated in the strategic documents of each firm but again case A develops these far faster than case B. In both cases the aims are communicated internally and externally to ensure staff synergy and ownership and purpose, while communication to finance providers aids both firms in developing trust with their financial institutions. Thus

aspirations do more than just give the owner a ‘dream’ to work towards, they enable planning, focus and ownership throughout the firm.

Combined process of development

If the process of development of aspirations for both firms is compared, then it is possible to piece together the lower and higher levels of development from each firm to produce a combined process of development table, shown in table 6.1. By analysing when growth was achieved by case B it is possible to see the minimum level which the factor needs to be developed to for growth to occur. Case A starts its life at level three and therefore this factor is highly developed at start up, whereas case B starts its life at level one and therefore is not well developed in this factor at start up.

When case B achieved steady growth they had reached level two of development. However prior to achieving high growth case B were at level three suggesting that a clear and focused aim aided in this development. After achieving this high growth case B then went on to develop further growth aims with new plans for achieving these, suggesting that aspirations and plans need to be continually developed to give the firm focus and drive.

	Level One	Level Two	Level Three	Level Four	Level Five
Aspirations	There is no vision for the firm	A vague aim for the firm develops	Clear growth aims are developed which are widely communicated	The firm plans for further growth and vision and mission statements are generated	

Table 6.1. Combined process of development for aspirations

6.2.2 Comparative analysis of technical and commercial expertise

Both firms experience very similar development of technical and commercial expertise with both firms having a high level of expertise at start up, interestingly in both cases due to the owner/s previous working experience. The main difference is that case A has both a CEO and a CTO, whereas case B has only ever had a CEO. This original CEO in case B was inherently technical and as such had to gain their

commercial expertise during the firm's development, learning from their human capital and being aided by the government.

The owners existing expertise is used by both firms to gain customers, utilise existing contacts and to develop products and services. This means that less essential resources need to be expended in both firms in order to gain contacts in these areas and that good relationships with these contacts are already established, meaning that they are used by both firms to influence the firm's growth.

Case B is able to utilise even more prior experience when the new CEO is appointed and when senior management personnel are appointed, who use their existing expertise to aid the firm further. This highlights how important new resources are in bringing further resources to the firm. Case A does utilise its human capitals' existing expertise but as the majority of its staff do not have prior expertise they are not yet developed to the same stage as case B.

Expertise is developed in the same way by both firms, through experiential learning, the existing expertise of their human capital, the development of human capital through training and through open innovation with customers and suppliers. The owners in both cases highlight the increase in their personal knowledge and skill base throughout the firm's development. In both firms this expertise gain is used for further product/service development, to gain customers and for the development of processes.

One interesting difference is that in case B the firm's human capital progresses to a point where their expertise is extremely influential to the firm. In case A however, perhaps due to the early nature of the firm, it is the owners' expertise that is the most influential. This suggests that in the early stages of a firm's life the owners' expertise is the most important whereas as the firm develops, takes on more staff and has a more complex organisational structure the expertise of human capital becomes vital.

Combined process of development

The combined process of development table shown in table 6.2 is almost "half a story" as both firms were highly developed on this factor at start up, even if only in

one area. Other firms may well start on a lower level of development with only a low level of technical and commercial expertise present. However even if this was this case it can be assumed that the expertise would develop in the same way as it has done for the two firms that are the focus of this research. As such in the table below there is an “assumed” lower level of development, taken from Klofsten's (2010) model. Klofsten analysed start-up firms and found this was the lowest level of development a firm could be at for this factor.

Case B managed to achieve steady growth at level two and achieved high growth while at level three. However this does not necessarily mean that level three needs to be achieved for high growth to occur. It may be that high growth could have been achieved at level two but that other factors needed to develop further to actually enable the growth. By analysing what both firms used their expertise for when they were at level two it is possible to see that this expertise was used to develop products and services and as such at this level the factor was capable of aiding the firm in achieving growth.

	Assumed Level One	Level Two	Level Three	Level Four	Level Five
Technical and Commercial Expertise	Necessary business and technological expertise is lacking	A good level of technical and commercial skills develops	Firm wide technical and commercial expertise develops to a high level through activities such as the recruitment of staff, experiential learning and open innovation		

Table 6.2. Combined process of development for technical and commercial expertise

6.2.3 Comparative analysis of management

Case A and B both develop their early management in very similar ways, and it is not until case B had been in existence for over five years that a change in development compared to case A can be observed. Both firms start with no management apart from the owner/s of the firm, but when initial employees are appointed it these people become instrumental in managing the firm.

These employees who manage the firm in both cases enable delegation and planning and aid in the day to day running of the firm by managing each aspect which aligns

with their speciality. Case A has not yet progressed beyond this point due to the quantity of employees it has. However there is a vast difference in case B's development after this point as a formal, functioning management team is put in place. This management team is vital to case B's development enabling the creation of departments and the development of quality, processes and business development. After case B has achieved growth the management still develops, with a second tier management team being appointed to allow for directors to concentrate on strategic issues. This suggests that growth may result in a more complex structure being needed to enable continued strategic focus and due to an increased workload.

Combined process of development

By comparing the firms with the combined process of development table shown in table 6.3 it is possible to determine that, as would be expected, both firms were at level one at start up and were therefore at a low level of development for this factor. At the time case B was achieving steady growth this factor was developed to level two and yet when they achieved high growth they were at level three. This does not necessarily mean that level three needed to be achieved for high growth to occur. By analysing what the management at level two enabled the firm to achieve, such as progression of business development, increase in customers, processes, quality and marketing, then it is reasonable to assume that this level of management was strong enough to support growth. Even though the introduction of a corporate management structure was followed by high growth it would appear that this aided in the support of growth once it was achieved as opposed to being instrumental in causing it. Case B's process of development after this point indicates what development occurs after growth, enabling it to be sustained.

	Level One	Level Two	Level Three	Level Four	Level Five
Management	The owner/s are the only 'managers' of the firm	Initial employees are taken on who manage the firm collectively	Further key appointments are made and a more corporate management structure is put in place	A second tier management team is appointed	

Table 6.3. Combined process of development for management

6.2.4 Comparative analysis of Human Capital

Both firms begin with no employees, and take on a small number gradually over time. In case B, as would be expected, they continue to employ more staff as they grow and currently stand at 60 employees as opposed to case A's 9. Both firms develop extremely close relationships in the early stages and cite this as being vitally important, even using the same terminology to describe them. Both cases express that without close staff relationships the firm would not be able to survive and prosper and highlight similar reasons as to why these relationships are of importance, such as encouraging better team work and knowledge sharing, both of which aid product and service development and customer development. The main reason both firms experience closeness of relationships is due to the fact that both firms choose staff to fit the company and the team, as opposed to choosing them purely based on their experience.

The interesting difference emerges when case B begins to achieve growth and relationships suffer due to the changing structure of the firm. These relationships then recover once employees become familiar with the 'new' firm structure. The importance case B places on relationships is evident when it is considered that they exert a high amount of resources on team days and relationship training, something which they have the financial capital to be able to do. Both firms highlight the importance of staff in the development of the firm as they enable work to be delegated and dispersed.

Team work in the early stages of both firms is very similar and is described by both CEO's as being vital to the firm's product and service development. In both cases team work is aided by the strong relationships described previously. Team work also goes through a similar process of development for each firm with team work increasing with staff numbers. The main difference is that when case B achieves growth team work becomes more complex due to the different departments and hierarchical levels which are in place, meaning that inter-departmental team work is needed. However the need for more complex team work means that team work becomes more difficult highlighting the issues which firms may encounter after growth has been achieved.

Combined process of development

Table 6.4 details the combined process of development of the firms. At firm conception, as would be expected, both cases are at a low level of development with regard to their human capital. Case B achieves steady growth at level two and achieves high growth at level four. This suggests that during growth relationships are not of great importance, perhaps due to the fact that there are so many other factors in development. It does suggest however that close relationships are important to build the foundations for growth to be achieved with both cases stating that close employee relationships were of utmost importance during the early stages of the firm's life suggesting that for growth to be achieved level three needs to be attained.

	Level One	Level Two	Level Three	Level Four	Level Five
Human Capital/ Management	The firm has no employees	Staff begin to be taken on, relationships forge and team work begins	Further staff are taken on and a close knit team is formed with good employee relationships; team work increases with staff numbers	Staff numbers increase further and staff relationships become more distant	Good employee relationships begin to develop again. Team work now takes place within and between departments

Table 6.4. Combined process of development for human capital/management

6.2.5 Comparative analysis of contacts

Both cases start with a differing variety and quantity of contacts; case B begins with a small amount whereas case A begins with a large amount; however both develop their number of contacts to reach a point where they both have a wide variety of contacts in a host of different areas. Both firms utilise their contact base regularly and their contacts are instrumental in their development. For instance both firms utilise existing contacts to gain their first customer, initial staff members and new contacts and utilise staff contacts to provide the firm with contacts which are used in a bootstrapping capacity.

The main difference between the two cases becomes evident when relationship development with contacts is analysed. Case A begins with a large supply of contacts and as such has a good existing relationship with many of them, whereas case B takes time to develop a good relationship with their contact base. Both cases however

develop strong relationships with suppliers as it is these contacts which are vital to product and service development. Case B continues to add to their contact base through the appointment of specialised staff members and networking, whereas case A feels that they do not need to extensively network as they have a large enough contact base. It may be that as case A employs more staff members with experience that their contact base will continue to increase as case B's has. Another difference between case A and B is that case B develops to the point where staff members become the main networkers for the firm, whereas in case A the owners are still the main networkers. This suggests that networking along with management and workload is something which must be more firm centred as opposed to owner centred as the firm grows.

Combined process of development

By analysing the combined process of development table shown in table 6.5 it is possible to ascertain that at start up case B was at level one of development, whereas case A was at level two. When case B was at a steady stage of growth they were at level two whereas when they achieved high growth they were at level four, suggesting that high growth is aided and supported by the wider network surrounding the firm. However by analysing what the firm's contacts were used for when at level three (as described above) then it is possible to see that at this level of development the factor was capable of aiding the firm in its growth. It just so happens that just prior to growth the firm was continuing to gain more contacts.

	Level One	Level Two	Level Three	Level Four	Level Five
Contacts	The firm has a small number of contacts which are utilised in order to aid in the firms early development.	New contacts are gained in a variety of areas	The firm's relationship with their contacts reaches a high level as the products and services develop with face to face relationships and rapport	New contacts are continually added meaning that the firms contact base reaches a high level with a high variety of contacts in a high variety of areas.	

Table 6.5. Combined process of development for contacts

6.2.6 Comparative analysis of strategy

Case A begins with a very clear and formalised strategy whereas case B begins with no strategy in place. Case A places a greater emphasis on a formal strategy in the early stages, which may be due to the fact that case A are equity funded and as such need to move towards an exit urgently whereas case B do not. Eventually after a new CEO is appointed, case B reaches the same level of development as case A, with a formalised strategy being created which is communicated internally and externally.

However case B then develop further than case A with the creation of different hierarchies and departments responsible for the implementation of different parts of the firm's strategy, allowing time for higher level management to concentrate purely on strategy creation. This suggests that this is something which case A may eventually encounter, as although their strategy is implemented by staff, the directors cannot concentrate solely on strategy creation. Case A has also not yet reached the stage of case B whereby short, mid and long-term strategies are officially documented.

What is similar is that both firms do use their strategies, be they formal or informal, to plan their day-to-day activities even if they are not consciously aware of it. For instance case A uses their strategy to plan work related to their technology, while case B implements their strategy by concentrating on marketing and networking to gain new customers. Case A does use their strategy to create goals and objectives far earlier than case B, but case B do eventually reach this stage. Both cases are also able to use their strategy to their advantage, for instance case B is able to gain targeted advice from the government while case A's strategy aids in gaining of finance. Both firms also communicate their strategy to their customers in order to generate confidence in their abilities and in order to ensure firm and customer aims are similar.

Combined process of development

By analysing table 6.6 it is possible to see that case B begins on a low level of development, level one, whereas case A begins with the majority of level three in place. Interestingly case B achieves steady growth while at level two, while high

growth is not achieved until level three suggesting that for high growth to be achieved a clear strategy is needed against which plans can be made.

	Level One	Level Two	Level Three	Level Four	Level Five
Strategy	There is no strategy in place.	An informal strategy is generated	The firm creates a formalised strategy and business plan and there is clear communication of the firm's strategy and objectives.	Organisational changes mean that there is more time for higher level strategic thinking and strategy decisions can be cascaded down the firm	

Table 6.6. Combined process of development for strategy

6.2.7 Comparative analysis of organisational structure

Both firms start off with none or only one company premises. Case A progresses from here to the point where a relatively well functioning structure is in place, whereby staff have a good degree of autonomy and have specialised roles, but are also cross skilled, and whereby departments begin to emerge. Case B develops along the same lines in the same amount of levels (1-3). However case B then progresses further whereby a highly functioning structure is in place, with different hierarchical levels, functional non-overlapping roles, multiple layers of delegation and well established departments, all of which enables top management to focus upon strategic planning as opposed to strategic implementation.

Staff Roles

In case A staff need to be overseen for far longer than in case B due to the fact that the majority of case B's employees have experience in their role whereas this is not the case in case A. When case A is eventually able to allow their employees to be autonomous they are utilised for delegation and this also applies in case B whereby staff complete tasks which aid the firm in its development. This high level of autonomy aids staff in managing the firm highlighting the firm's organisational structure affecting management, which in turn affects resources and outputs. An interesting difference between case A and case B is the fact that case B eventually changes staff roles to those to which they are more suited, from for example business development to operations. This highlights how organisational structure can impact on the firm's resources, as the most appropriate staff manages the resources they are

best suited to. This flexible structure is implemented because the people best suited to certain roles change with growth.

Departments

Case B has developed to the point where there are multiple functioning departments, whereas case A still has informal departments which only contain one or two members of staff. However, even this informal departmentalisation aids the team in having more fluid working processes. Case B's progression suggests that as case A develops further more formalised departments will be created which will aid working processes further. Interestingly there are staff members in both cases who find this departmentalisation to be divisive, suggesting the need to consider the impact structure has on firm relationships. Related to this departmentalisation case A is still in the position whereby staff need to have overlapping roles meaning that staff members cannot concentrate fully on their discipline only. Case B however develops to the point where there is far less, if any, overlapping roles even though staff are still multi-disciplinary. This suggests that as case B developed, specialisation occurred but team work was still viewed as vital. This specialisation has an impact on the firm's resources by ensuring that all staff have a clear focus with regard to how their role impacts the firm.

Decision-Making

Both cases begin with a mix of centralised and group decision making styles and as case B progresses further this is still the case, but only in reference to the same group of people. Therefore decision-making does become centralised but involves the informal management that were evident in the firm early on. In both firms this mix of decision making styles influences the firm by ensuring knowledge sharing is fluid and that staff have high ownership for the firm. Case B is currently attempting to move to a decentralised style through the appointment of the SMT.

Knowledge Sharing

Both cases begin with a very informal style of knowledge sharing, communicating through general conversation and this aids in forming staff relationships which are important to the development of the firm. Case B highlights how the informal nature of communication aided in team work, ensuring whatever needed to be done was

done, and a similar ethos can also be seen in case A. Case A does develop internal formal meetings at a faster rate than case B which may be due to personal choice with regard to how aims and objectives should be communicated and may link with the fact that case A developed formalised plans and strategies before case B. An interesting issue also occurs in case B when different buildings are gained and hierarchical levels put in place, resulting in communication becoming increasingly difficult.

Combined process of development

Table 6.7 details the combined process of development of both firms. As would be expected both firms begin on level one and thus the factor is only developed to a low level. Case B is able to achieve steady growth at level two but only achieves high growth at level four. After this high growth is achieved case B gradually progresses to level five suggesting that this level of development is required to manage and sustain growth but not to enable it.

	Level One	Level Two	Level Three	Level Four	Level Five
Organisational Structure	The firm has no company offices. The owners are the only shareholders	The firm takes its first office and a very small amount of equipment. Communication is informal and staff roles are specialised but there is a high degree of role overlap.	The firm takes on more premises. Staff are overseen less and have a good level of autonomy. Formal internal team meetings begin to take place. Departments begin to be created.	A corporate structure develops. Staff roles become specialised with little overlap and additional departments created.	A multi-layer corporate structure develops with different levels of management. Delegation flows downwards throughout the managerial levels and communication becomes more complex

Table 6.7. Combined process of development for organisational structure

6.2.8 Comparative analysis of finance

Both firms begin with some sort of financial injection but there then develop substantial differences between the two. For instance, case B is able to sell their services quickly and so revenue is brought into the firm early on and increases. Equity funding is received once but is extremely small. Case A on the other hand is

predominantly R&D based and as such cannot rely on internal revenue and instead is funded through external finance, such as grants and equity. Thus both firms continue to receive finance to support the firm but in very different ways. Both firms use their initial financial injections for similar uses such as for capital equipment, premises and human capital and begin with a low level of revenue via one customer. The major difference between the cases is that case B is able to increase its sales revenue quickly whereas case A cannot. This revenue means they are able to bring in resources such as human capital quite easily, whereas case A's lack of finance reduces the resources at their disposal and stunts growth. Finance appears to have been less of an issue to case B whereas case A are almost totally dependent on grants. Both firms do utilise grants although case A does this to a far greater degree than case B. This is probably due to the revenue differences between both cases, differing perspectives of owners and due to the R&D nature of case A, meaning that more financial aid is required. Case A's product development involves far higher costs than case B's service development meaning that commercialisation is far harder. In both cases grant money is utilised for marketing, although the majority of case A's grants are utilised for product development, software and capital costs whereas case B is able to fund its service development and capital costs mainly through internal revenue. Both firms highlight how important grants have been to their overall development. In its later stages case B does gain multiple rounds of debt finance from Finance Wales in order to fund premises development, which couldn't have been accomplished without these funds. As both cases are within a close geographical area, it is the same finance provider who supplies both cases with their external finance.

Basic financial software packages are introduced into the firms quite quickly which in case B was likely due to the increasing levels of sales and in case A was likely due to the increasing complexity of the financing of the company. Both cases employ bootstrapping activities early on in the firm's development and both progress to the point where they are in a continual effort to reduce everyday costs and use the same bootstrapping activities often involving 'favours' by family or friends or using personal or second hand equipment.

Financial management in both cases is also very similar up until the point when case B begins achieving substantial growth. Until this point both firms progress from handling financial management themselves, to appointing external accountants. However just before growth and after it case B's financial management becomes far more complex with the appointment of a finance director and the introduction of formal budgets for departments. These changes result in further finance for the firm and ownership by second tier management.

Combined process of development

Table 6.8 details the combined process of development of both firms. Both cases began on a low level of development, level one. When case B achieved steady growth they had progressed to level two, yet when they achieved high growth they were at level three. This suggests that in order for high growth to occur the firm needed a high amount of finance to enable structural, organisational and human capital development.

	Level One	Level Two	Level Three	Level Four	Level Five
Finance	The firm has a small amount of start-up finance. Finance is managed informally and there may be some use of finance software.	The firm's finance increases through loans, grants or revenue. External accountants begin to manage the firm's finances.	The firm's revenue and financing reaches a high level. A finance director is appointed.	The firm creates budgets for departments.	

Table 6.8. Combined process of development for finance

6.2.9 Comparative analysis of marketing

Case A begins by conducting far more market analysis than case B, which may link to the fact that case A begins with a clear focus and aim and therefore case A knows where to focus their research whereas case B does not. This difference can also be attributed to industry differences with case A needing specialist knowledge of their customers industry, whereas in case B their customers industry is their industry. However, case B does gradually begin to exert a small amount of resources towards market analysis which is mostly externally provided. The use of external market analysis is also evident in case A whereby they utilise their customers' knowledge, thus highlighting the influence of external knowledge on both cases. Both firms are

also operating within growth sectors, something which may have aided case B in its development and which may aid case A.

The main difference between the market research conducted in both cases is the reason for which it is gathered. In case A it is used to identify customers, to generate more knowledge with regard to their customers' needs and to aid in product development. Case B however only conducts market research in order to identify customers. This is due to the fact that case A has a small amount of customers who offer a high return, whereas case B has a large amount of customers who collectively offer a high return. This market research is widely communicated to staff, customers and finance providers in case A and aids in the gaining of finance, whereas in case B it is only occasionally communicated to finance providers. This is again likely to be due to the differences in each cases financial backing, customer base and product and service offering. It would be assumed that there would be differences in each case due to the fact that case A works directly with customers to develop products, whereas case B sells an existing service to a customer. However, both firms utilise their customers for marketing purposes with both utilising their customers to discover market needs and wants and tailoring their products and services to this.

Neither firm conducts marketing in their early stages as both cases "market themselves" through networking and their existing contacts and expertise. For case B there is less of a need for marketing as their customers are their marketers. As case A has not yet commercialised a product with a customer this is not possible and they must rely on internal marketing. Case A also implements a website early on which is continually upgraded. Case B does reach this stage but much later, with this difference likely being due to the era in which each firms were formed. Case A and B both increase their traditional marketing efforts over time but this is for different reasons. Case A begins marketing for its peripheral "cash cow" product which does not align with their main business, whereas case B focuses on the marketing of their core competences. Case A therefore diverts some of its resources from the "marketing" of its main products whereas case B doesn't. This links with the financial situation of each case as case A needs a "cash cow" product whereas case B does not. Despite these difference both firms go through a phase of 'trial and error' marketing in order to determine the best course of action to market their offerings.

The main difference is evidenced by the fact that case B attends conferences in their industry sector very early on and gains a good reputation quickly due to the speed at which they are able to start selling their services. This is not possible for case A due to the length of product developments and a lack of finance for expensive marketing options such as conferences. With regard to the planning of their marketing case A still does not have a marketing plan in place while case B only develops a marketing plan much later on in their development, suggesting that in both firms this was not a priority. Case B's marketing efforts are significantly aided by the introduction of a directive forcing their customers to require their services highlighting the impact which external circumstances can have.

The main differences between the cases become evident as case B develops further. Case B continues attendance at conferences, thus developing its reputation further and also develops a strong brand and sales pipeline by exerting an increasing amount of resources on business development and marketing. Case A is not yet at this stage of its development, although they have begun branding exercises. In general marketing is highlighted as creating an "initial growth spurt" for case B with further marketing resulting in high growth, whereas for case A market analysis appears to be of more importance. This is due to the fact that until they commercialise a product they cannot fully market themselves.

Combined process of development

Table 6.9 details the combined process of development of both firms. Both cases start on level of development one, meaning this factor is not highly developed. Case B achieves steady growth at level two but does not achieve high growth until level three. Level four is implemented after growth is achieved. This suggests that in order to generate high growth business development was important and that once this growth had been achieved focus could be changed to creating a stable and long-lasting brand.

	Level One	Level Two	Level Three	Level Four	Level Five
Marketing	There is no formal marketing plan in place and no marketing is conducted. The firm engages in a small amount of market analysis.	The firm begins to exert more resources towards market analysis and marketing.	The firm products/services gain market acceptance. The firms marketing efforts reach a high level and there is a clear focus on business development and sales pipeline.	A marketing plan is created and brand development takes place.	

Table 6.9. Combined process of development for marketing

6.2.10 Comparative analysis of customers

The development of both cases' customer base is similar with each firm gaining their first customer through the owners existing contacts. The main difference is that case B's first customer is directly related to its service offering whereas case A's is not and serves only to bring a small amount of revenue into the company to aid in gaining finance. This difference is due to the speed at which both firms can offer their services/products. Both firms then move on to gain a small amount of niche customers which are important in both firms due to the finance which they provide, in case B a healthy cash flow and in case A finance to fund development work.

Both cases then develop close relationships with each of their customers with knowledge sharing and frequent communication being vital. It is these relationships which aid in product and service development for both cases. The main difference is that case A's customer interactions relate to planning technical and commercial development routes, whereas case B's is more related to service support. In case B staff members or the owner develop one to one relationships with their customers, whereas in case A it is more the case that every staff member develops a relationship with the main customers. This difference is due to the fact that case A's product development requires a focused team collaboration whereas case B does not.

Case B develops a high customer return rate which is possible due to the fact that the services they offer can be required on multiple occasions and due to the fact that their customer base moves from company to company thus bringing in new but also return work. Case A however is highly reliant on a small set of R&D projects and therefore

no product has yet been commercialised, meaning no return work can be generated. Even though new R&D projects are conceived with the same customers these have still not yet been commercialised. These differences mean that case B experiences growth in line with their customer base, whereas case A has not reached this stage.

The key difference between the cases is that case B moves on to diversify their customer base and to grow their customer base further. This is possible as the firm now has a stable core customer base and so is able to concentrate more efforts on expanding this. The firm also has the increase in resources such as human capital and finance in order to support this growth. Case A on the other hand needs to commercialise their R&D projects with their two main customers before they will have the resources needed to focus on diversification for their main product line and customer growth. Case A does attempt to diversify its customer base for its peripheral “cash cow” product but this is not widely successful and they may need to focus more on their main customer base than their peripheral customer base.

Combined process of development

Table 6.10 details the combined process of development of both firms. At start up, as would be expected, both firms are at a low level of customer development and begin at level one. Case B achieves steady growth while at level two but only achieves high growth when level four is reached, suggesting that growth can be achieved with a small customer base but that in order to reach the next level diversification must occur. However there is an interesting difference, as for case B to achieve a high growth in revenue they need to have a large amount of customers, whereas case A’s projects are worth potentially millions and as such they only need a small amount of projects to succeed to achieve substantial revenue growth. However, for a firm to achieve stable and continued high growth then the firm does need to diversify its customer base as case A is highly reliant on two customers whereas case B has a large amount. This suggests that the following needs to be added to level four “the quantity of the firm’s customer base reaches a point whereby it is providing stable high revenue to the firm”.

	Level One	Level Two	Level Three	Level Four	Level Five
Customers	The firm gains their first customer	The firm's customer base begins to increase and so too does the firm and the customers understanding of what needs to be supplied. Customer relationships begin to develop	The firms relationships with their customers reach a high level and knowledge sharing is vital	The firms customer base begins to diversify and the quantity of the firms customer base reaches a point whereby it is providing stable high revenue to the firm	

Table 6.10. Combined process of development for customers

6.2.11 Comparative analysis of open innovation

Both firms engage in open innovation with their customers and although case A's open innovation may be more explicit, case B would not have been able to develop without the open innovation they engaged. Open innovation in both firm's results in product and service development tailored to customer needs and in knowledge and skill development. In case A this open innovation leads to capital equipment share, market and technical knowledge and contacts, whereas in case B open innovation leads to internal service development. Case A does engage in open innovation more quickly than case B, with open innovation resulting in the formation of the company. Case B engages in open innovation with its customers only, whereas case A engages with both customers and suppliers. This is due to the R&D nature of case A's product development. Recently case B entered into a collaboration to develop a tangible product highlighting the continued resources expended on open innovation. The main difference between the two cases is that case A's business model is to be continually involved in open innovation, whereas for case B open innovation is not at the core of their business model but proves vital in enabling their growth.

Combined process of development

Table 6.11 details the combined process of development of the firms. Case A starts immediately on level three, the highest level of development quickly whereas with case B open innovation develops soon after start up. However not all firms will enter into open innovation so quickly and as such these cases present the top end of the spectrum. Therefore it has to be assumed that there is also a lower level of development of this factor which was simply not shown in these cases. This assumed

lower level is shown in the table below. Case B is able to achieve steady growth and high growth while at level three.

	Assumed Level One	Level Two	Level Three	Level Four	Level Five
Open Innovation	The firm does not engage in open innovation with any external company	The firm engages in open innovation with external customers/suppliers	Open innovation results in improved outputs for the firm		

Table 6.11. Combined process of development for open innovation

6.2.12 Comparative analysis of new and existing product/service development

Case B begins with a service which can be offered straight away, albeit only one. Case A on the other hand, due to the nature of the company, only has a generic product prototype which then has to be bespoke designed to customer needs. This means that case B can offer services for sale straight away whereas case A has a far longer product development time. Case B is able to develop further to offer additional services and is able to begin changing and improving those services they already offer. This change in services more suited to market need is one of the reasons for their growth. Once case B has a defined service offering they begin more clear marketing of these services and then progress to the point where they are developing a product offering. Case A's process of development is completely different and involves moving from working with customers on design, to various design iterations, to in house and customer testing, to further R&D work, to the filing of patents. Therefore for case A it is difficult to quickly move from one product development to another whereas case B can add more services to their portfolio relatively easily and quickly.

Case A does engage in constant existing product development but in a different way to case B. For instance case A improves their existing lower technology peripheral products but as these do not bring in substantial revenue to the company these changes do not impact on the firm greatly. Their main high technology product is constantly improved through new innovation but this is not the improvement of a product which is commercialised and as such is part and parcel of their R&D work. Case B's existing service development is far more successful and aids in the keeping

and gaining of customers. The importance of new and existing product/service development for both cases is the fact that it enables income to be generated.

Combined process of development

Table 6.12 details the combined process of development of the firms. Both firms begin with some sort of product/service offering, even if it is basic, and yet it cannot be assumed that all firms would start on this level of development. Some firms may begin with no product/service offering and develop one at a later date. As such the following needs to be added to level one, “even if this is only in its concept stage”. Case B achieves steady growth while at level two and high growth while at level four.

	Level One	Level Two	Level Three	Level Four	Level Five
Service/Product Development	The firm has a basic service/product offering even if this is only in its concept stage	The firm develops products and services often involving prototypes and in house testing. There is a constant improvement of existing offerings	Customer testing of the firms product may take place and multiple product/service lines emerge for the same customer	Products/services are developed to a high level in which they are well established and where there is widespread customer acceptance and take-up. New products/services continue to be developed	

Table 6.12. Combined process of development for service/product development

6.2.13 Comparative analysis of planning

Case A engages in formalised planning through the creation of business and financial plans more quickly than case B who start with no plans in place. This is likely to be due to the difference in start-up finance with Case A needing these plans in place to gain equity finance whereas case B does not. Both firms do however develop project plans in relation to the services/products which they are providing for their customers and in both cases this project planning is essential to the project development, enabling each case to make the best use of its resources. Case B does eventually develop financial planning with both firms using this to ensure cash flow is sufficient. Case B’s financial planning eventually becomes far more complex than

that of case A due to a high increase in revenue and the appointment of a financial director. Case B also develops staff planning enabling them to take on appropriate staff, train staff and aiding in delegation.

The main difference is that case A's planning needs to be more complex in its early stages with plans for sales channels, contracts and day to day R&D activity planning. Case B on the other hand is able to function with only project planning and financial planning suggesting that early planning is linked with the complexity of product/service offering. Case B does eventually develop sales planning and this becomes crucial, enabling them to focus upon gaining more customers. Case B also develops their human capital planning, which enables them to make best use of their resources, whereas case A is not yet at this stage. In case B individual and departmental objectives are created and eventually day to day planning is delegated to second tier management, again allowing focus between departments and higher level strategic thinking to take place. This suggests that as case A grows they will need to progress to more formalised and structured planning procedures for staff. Planning enables both cases to implement strategies and focus their activities.

Combined process of development

Table 6.13 details the combined process of development of both firms. Both cases begin on a low level of development and both could be placed at level one. Case B achieves steady growth while at level two and achieves high growth while at level three, suggesting that high level planning is needed in order to control the firms resources needed for growth. Level four is implemented in case B after high growth has been achieved and is instrumental in sustaining it. Case A are currently at level three.

	Level One	Level Two	Level Three	Level Four	Level Five
Planning	There is a low level of planning, if any	Planning begins to be implemented in order to aid product/service development and cash flow.	Planning becomes more complex involving every area of the firm from financial, to sales, to day to day planning	Planning becomes more formalised through the introduction of individual objectives and departmental objectives.	

Table 6.13. Combined process of development for planning

6.2.14 Comparative analysis of system and software development

Both cases implement quality processes early on, be they official or unofficial, and then progress to develop a larger quantity of certified quality procedures. It is also apparent in case A that quality procedures improve in their implementation over time as staff become accustomed to the procedures. This was not apparent in case B due to the high experience of case B's human capital. Both firms highlight the importance of quality procedures to the everyday functioning of the firm and in the gaining of customers. In both cases quality processes are used by everyone in the firm in all departments, highlighting their benefits in enabling the development of structure. Quality processes related to the implementation of documentation aids both cases in the development of a more professional image. Case B does develop more quality procedures than case A and this is likely due to their growth and due to the fact that their industry stipulates what procedures they need. Both cases also utilise software packages early on in their development with the main difference being that case A's software appears to be far more vital to its development than case B's. For instance software is needed by every technical employee in order for product development to occur, whereas for case B it is needed more for support than being required to actually offer all the services.

The key difference between the cases becomes evident when case B achieves growth as they realise that their processes are not suitable for their stage of development. As such effort is expended in trying to keep processes in line with growth, as the firm is constantly playing catch up.

Combined process of development

Table 6.14 details the combined process of development for both firms. Both cases begin on a low level of development, starting at level one. Case B achieves steady growth while at level two but does not achieve high growth until it reaches level three. Level four is not implemented in the firm until after the firm has achieved growth suggesting that this level is a consequence of growth, enabling it to be sustained but not created.

	Level One	Level Two	Level Three	Level Four	Level Five
Systems and software	The firm has a small amount of unofficial quality procedures	The firms quality procedures begin to increase and relevant software packages are brought into the company	Quality procedures are implemented to a high level and the firms use of software increases	The firms processes begin to develop to a high level appropriate to their growth	

Table 6.14. Combined process of development for systems and software

6.3 Summary and Conclusion

The above analysis has compared the process of development of each case resulting in combined process of development tables for each factor. During the analysis it has been highlighted that there are key similarities and differences between each case, that are important to consider in order to generate one unified model. As such, and due to the large number of factors which have been analysed, table 6.15 details these key similarities and differences.

Factor	Similarities	Differences
Aspirations	The reasons why the factor exerts an influence and the similarity in the eventual development of the aspirations.	The speed at which the factor develops.
Expertise	The state of technical expertise at start up, the reasons why the factor exerts an influence and the way in which the factor begins to develop.	The most influential source of the technical and commercial expertise and the state of commercial expertise at start up.
Management	The importance of early human capital who act as managers of the firm as opposed to managers of departments.	The progression of the factor by case B
Human Capital	The importance of relationships and of human capital in general	The changing state of team work and relationships as the firm progresses
Contacts	The ways in which contacts are used to aid the firm	The level to which the factor is developed at start up, the speed at which relationships with contacts are developed, the differing emphasis on networking and the development of who is the main networker for the firm.
Strategy	The eventual communication of the strategy and the way in which it influences the firm	The speed at which a formal strategy is developed and the progress of one case to a more complex strategic decision making and implementation structure

Organisational Structure	The way in which knowledge is shared early on and the influence this has on the firm and the early decision making processes.	The speed at which each case develops with regard to each of the themes, the progression of case B as compared to case A especially with regard to departmentalisation, staff roles, decision making and premises.
Finance	The use of external finance, the initial development of financial management, the similar and continued bootstrapping efforts employed by both cases.	The level of grant monies utilised, the level of internal revenue generated by each firm, the progression of financial management by case B.
Marketing	The initial lack of marketing plans, the use of trial and error marketing, the use of external market knowledge and the early type of marketing used.	The early use of market analysis, the influence marketing has on the firm, the reasoning for conducting market analysis, the level of communication of market analysis, the use of word of mouth marketing, the focus of marketing efforts (core competencies or peripheral), funds available for marketing, the influence of external forces (i.e. directives), the increase in marketing over time and the importance of market analysis vs. marketing.
Customer Development	The speed at which the first customer is gained, the amount of knowledge sharing between firm and customer, the development of good relationships with customers, the existence of niche customer bases early on and the reasoning for customer importance	The diversification of the customer base by case B, who in the firm interacts with customers, growth in line with customers by case B and the diversion by case A into new customer areas
Open Innovation	The influence open innovation has on the firm	The speed at which open innovation is engaged in, who the cases engage in open innovation with and the implicit/explicit nature of open innovation
New/Existing service/product development	That an initial service/product can be offered by both firms and the reasons why product/service development is influential	The speed at which services/products are geared to customer needs, the speed of commercialisation of products/services, the range of products/services offered, the process of product/service development and the level of existing product development.
Planning	The influence of planning on the firm and the importance of project planning and sales planning	The speed at which initial planning is implemented, the existence of staff planning in case B, the complexity of financial planning in case B and the speed at which complexity of general planning in case A

		occurs.
Systems and software	The implementation of unofficial quality procedures early on, the increase in procedures over time, the influence of quality procedures on the firm	The complexity of case B's quality procedures compared to case A's, industry differences in quality procedures needed, the ease of quality implementation by staff, the importance of software to the firm, the difficulty of implementing appropriate procedures as the firm develops

Table 6.15. Summary of the similarities and differences between the cases for each factor

As can be seen in table 6.15 there are many similarities and differences which were found between both cases. As such it is important to distil the general ways in which they are similar and different in order to determine whether or not together they combine to enable the creation of a useful firm growth model. Both cases are similar with regard to:

1. The factors found to have been of importance to firm growth
2. The development of the factors.
3. The reasoning as to why each factor had an influence on the firm. In the majority of cases this was due to the effect that one factor had on another e.g. aspirations influencing strategy. Even though a comparison of which factors influenced other factors may highlight slight differences between both cases this is due to the fact that case B has developed further than case A and as such factors will have slightly different influences.

As well as general similarities there are many direct similarities between the cases with regard to many of the factors, which is very important in highlighting that two firms at different stages of development can progress towards growth in exactly the same way. For instance in both cases the management of the firm was initially undertaken by the owner before staff began to manage the firm as a team. With regard to staff relationships both cases describe their importance using the same terminology, stating that you can “forget it” (i.e. firm development) without these strong bonds. Even external relationships are the same in both cases with customers being deeply involved through open innovation and knowledge sharing. It is these types of similarities which have enabled a combined process of development table to be formed for each factor forming a story of firm growth and development.

However there were also differences between the cases which are also important to consider. It is these differences and how they can be explained that will determine whether or not the resultant model is useful in explaining firm growth. The main differences were:

1. The speed at which the factors developed
2. The fact that case B progressed beyond case A with regard to all factors in order to achieve and sustain growth.
3. The level of development which some factors started at. For instance case A could be on level two at start up while case B could be on level one.
4. The details which are likely to be different for every firm such as source of funding, expertise, types of marketing used etc. All of these types of differences covered in the analysis above can be accounted for by the fact that:
 - a. The cases are operating in differing industries
 - b. There are different personal opinions of the directors
 - c. Both firms started in a different era of technology
 - d. Both firms have reached different stages of development
 - e. And both cases had staff with vastly different levels of experience.

The fact that the speed of development of factors was different as well as the fact that each case started some factors at different levels of development suggests that the resultant model cannot be rigid. Therefore the model must not assume that all firms are identical but rather that they follow similar developmental paths. However the fact that there are so many striking similarities between the cases and the fact that their process of development can be mapped in similar ways despite these differences means that the resultant model highlights that firm growth can be ultimately simplified into one model. The differences that were found between the cases would be expected and highlight that firm development is extremely dynamic, meaning that a rigid model that does not allow for different speeds of development and different starting development levels will not fully explain firm growth. The fact that there were both similarities and differences found for every single factor highlights the complex nature of firm development and yet the fact that the factors found to exert an influence were the same is extremely encouraging. This suggests

once again that firm growth must be considered holistically and that consideration of a wide variety of factors is essential. Figure 6.1 highlights a comparison of the connecting relationships between each factor found to have been of importance in the analysis of both cases. The green arrows indicate relationships found to be evident in case A while the red arrows indicate relationships found to be evident in case B. This figure highlights in pictorial format the similarities and differences that exist between the two firms that have just been discussed.

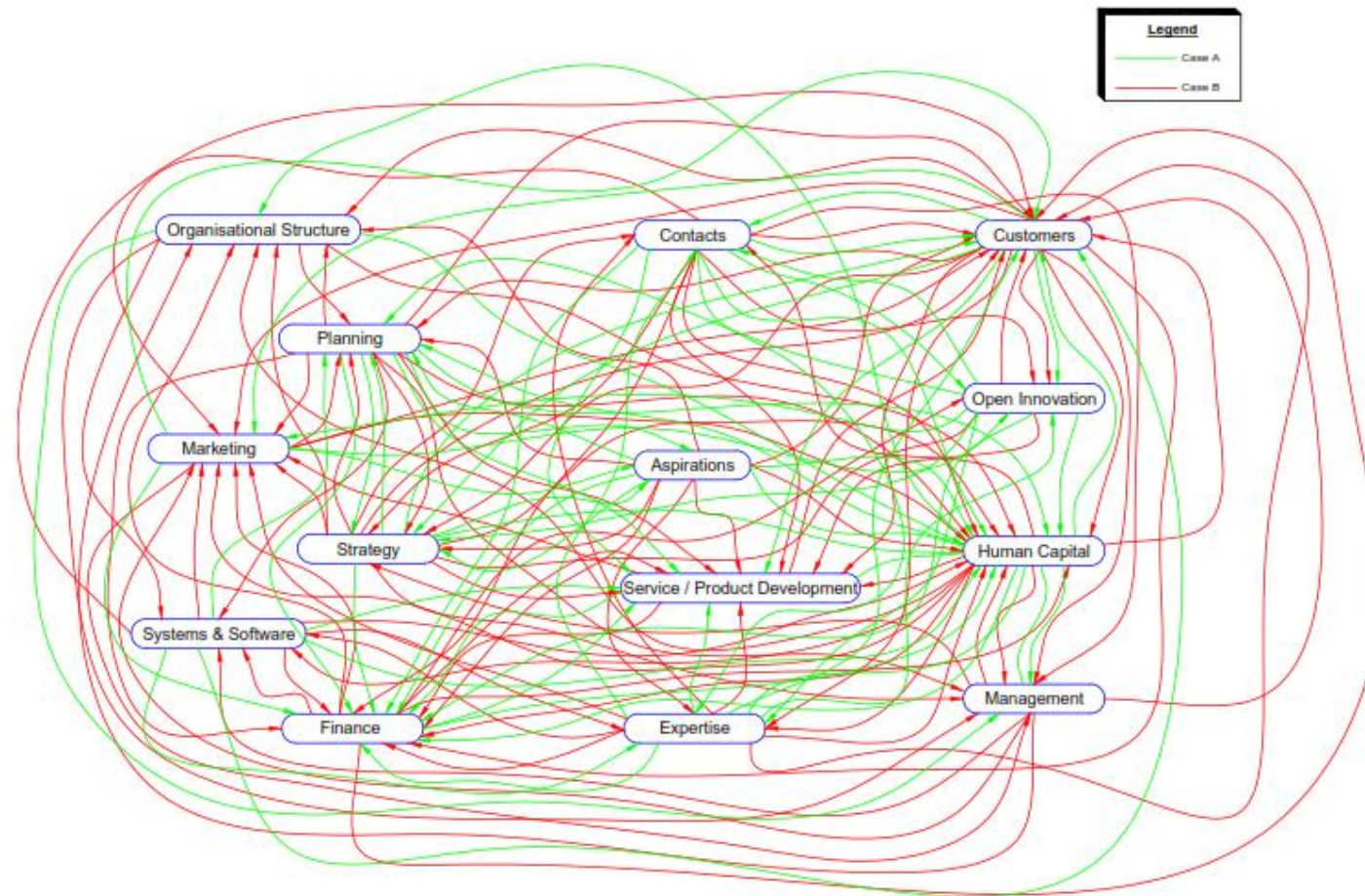


Figure 6.1. A comparison of the connecting relationships between each factor found to have been of importance to both cases development

7.0 Chapter 7: The creation of a Growth Platform Model

7.1 Combined growth platform model

Ultimately the comparison of both cases allows the creation of a model detailing overall development from an early stage to a high growth stage. Chapter two detailed the conceptual model created through the review of the literature and highlighted the limitations of previous research, which are unable to identify exactly which factors are of importance for growth, why this is the case, what their relationships are, how these develop over time and to what level these need to be developed to for this growth to occur. Table 7.1 addresses these limitations.

The model presented in table 7.1 builds upon Klofsten's (2010) model in which three levels of development were identified for each factor. Klofsten defined these levels as low, intermediate and high. This analysis finds that the development from start up to a growth stage involves up to five levels of development. As with Klofsten's model these are defined as low, intermediate and high. However their definition is more complex than that in Klofsten's model, due to the fact that different factors progress through a differing numbers of levels.

Definition of the different levels of development

Factors progressing through five levels of development experience low, intermediate low, intermediate, high and high two. Factors progressing through four levels of development experience low, intermediate low, intermediate and high. Factors progressing through three levels of development experience low, intermediate and high.

Low – The factor is in its initial development phase and is at its starting point of existence

Intermediate Low – The firm has begun to develop the factor to a more functional and effective state

Intermediate – The firm has developed the factor further to the point where an essential step towards a highly developed factor has been taken

High – The factor is extremely well developed

High Two – The factor may be forced to go through another development stage due to a change in organisational structure or management. The factor is developed to a high level but in a different way than at stage one.

The reasoning for having two types of intermediate and high development is because some of the factors were found to progress through complex stages of development. For instance some factors took more development stages to reach the fully intermediate stage (intermediate), as they experienced a stage of development between this stage and the low stage. Some factors experienced a level of development beyond the high level, purely due to a substantial change in the organisation. As such these five developmental stages highlight the complex development which takes place along the path to high growth and the fact that some factors can experience more development stages than others.

	Low	Intermediate Low	Intermediate	High	High Two
Aspirations	There is no vision for the firm	A vague aim for the firm develops	Clear growth aims are developed which are widely communicated	The firm plans for further growth and vision and mission statements are generated	
Technical and Commercial Expertise	Necessary business and technological expertise is lacking		A good level of technical and commercial skills develops	Firm wide technical and commercial expertise develops to a high level through activities such as the recruitment of staff, experiential learning and open innovation	
Management	The owner/s are the only 'managers' of the firm	Initial employees are taken on who manage the firm collectively	Further key appointments are made and a more corporate management structure is put in place	A second tier management team is appointed	
Human Capital	The firm has no employees	Staff begin to be taken on, relationships forge and team work begins	Further staff are taken on and a close knit team is formed with good employee relationships; team work increases with staff numbers	Staff numbers increase further and staff relationships become more distant	Good employee relationships begin to develop again. Team work now takes place within and between departments
Contacts	The firm has a small number of contacts which are utilised in order to aid in the firms early development.	New contacts are gained in a variety of areas	The firm's relationship with their contacts reaches a high level as the products and services develop with face to face relationships and rapport	New contacts are continually added meaning that the firms contact base reaches a high level with a high variety of contacts in a high variety of areas.	
Strategy	There is no strategy in place.	An informal strategy is generated	The firm creates a formalised strategy and business plan and there is clear communication of the firm's strategy and objectives.	Organisational changes mean that there is more time for higher level strategic thinking and strategy decisions can be cascaded down the firm	
Organisational Structure	The firm has no company offices. The owners are the only shareholders	The firm takes its first office and a very small amount of equipment. Communication is informal and staff roles	The firm takes on more premises. Staff are overseen less and have a good level of autonomy. Formal internal team meetings begin to take	A corporate structure develops. Staff roles become specialised with little overlap and additional departments created.	A multi-layer corporate structure develops with different levels of management. Delegation flows downwards

		are specialised but there is a high degree of role overlap.	place. Departments begin to be created.		throughout the managerial levels and communication becomes more complex
Finance	The firm has a small amount of start-up finance. Finance is managed informally and there may be some use of finance software.	The firm's finance increases through loans, grants or revenue. External accountants begin to manage the firm's finances.	The firm's revenue and financing reaches a high level . A finance director is appointed.	The firm creates budgets for departments.	
Marketing	There is no formal marketing plan in place and no marketing is conducted. The firm engages in a small amount of market analysis.	The firm begins to exert more resources towards market analysis and marketing.	The firm begins to develop a professional image and a good reputation within the industry. The firm's marketing efforts reach a high level	A marketing plan is created and brand development takes place. There is a clear focus on business development and sales pipeline.	
Customers	The firm gains their first customer	The firm's customer base begins to increase and so too does the firm and the customers understanding of what needs to be supplied. Customer relationships begin to develop	The firm's relationships with their customers reach a high level and knowledge sharing is vital	The firm's customer base begins to diversify and the quantity of the firm's customer base reaches a point whereby it is providing stable high revenue to the firm	
Open Innovation	The firm does not engage in open innovation with any external company		The firm engages in open innovation with external customers/suppliers	Open innovation results in improved outputs for the firm	
Service/Product Development	The firm has a basic service/product offering even if this is only in its concept stage	The firm develops products and services often involving prototypes and in house testing. There is a constant improvement of existing offerings	Customer testing of the firm's product may take place and multiple product/service lines emerge for the same customer	Products/services are developed to a high level in which they are well established and where there is widespread customer acceptance and take-up. New products/services continue to be developed	

Planning	There is a low level of planning, if any	Planning begins to be implemented in order to aid product/service development and cash flow.	Planning becomes more complex involving every area of the firm from financial, to sales, to day to day planning	Planning becomes more formalised through the introduction of individual objectives and departmental objectives.	
Systems and software	The firm has a small amount of unofficial quality procedures	The firms quality procedures begin to increase and relevant software packages are brought into the company	Quality procedures are implemented to a high level and the firms use of software increases	The firms processes begin to develop to a high level appropriate to their growth	

Table 7.1. The growth platform model (bold highlights the level to which the factor needs to be developed to)

The growth platform model detailed above highlights the key levels to which each factor needs to be developed to in order for growth to be achieved. However it is also important to summarise the reasons as to why these factors need to be developed to these levels and whether it is easy or difficult to develop to these levels (ease of development is based upon the amount of time and resources which each case had to exert on the achievement of these levels and the issues they encountered) and the reasoning as to why this is the case.. This information stems from the individual and comparative case analyses presented in chapters 4, 5 and 6 and is vital in making the model not only descriptive but also explanatory. This information is provided in table 7.2 and adds to the practicality of the model. It is the mixture of description and explanation that suggests the model has practical and academic implications, implications discussed in chapter 8.

	Key Level of development to enable growth:	Why this level?	Easy to develop to level:	Difficult to develop to level:	Why is it easy/difficult to develop to these levels?
Aspirations	Intermediate	Development to this level enables clear plans to be put in place for the achievement of the aspirations, aids in the gaining of finance and enables synergy between case and staff and case and customer.	All levels		This factor is one of the easiest to develop to all levels as it can be achieved with nothing else in place, even prior to firm conception.
Technical and Commercial Expertise	Intermediate	Development to this level enables product/service development, thus ensuring cases meet the technical and commercial requirements of the customer. A good level of technical and commercial expertise also means contacts are held in each area which improves the expertise of the firm further.	All levels		This factor is relatively easy to develop as the firms conception is based on owner expertise. Even though case B did not begin with a high level of commercial expertise this was relatively easy to attain.
Management	Intermediate Low	Development to this level enables foundations to be formed to support growth once it occurs and ensures that key business functions are operational and in a position to grow.	Intermediate Low	High	It is evident in both cases that it is relatively easy to reach level two. Each case exhibits no problems in the appointment of initial informal managers who manage the firm collectively. Even the progression from this to a formal management structure was easily attained by case B as the informal management became the formal management. However case B does experience issues while at levels three and four.
Human Capital	Intermediate	Development to this level enables key foundations to be formed to enable growth. For instance close knit human capital enables product/service development, good customer relationships and a high level of team work.	Intermediate	High Two	In both cases this factor was relatively easy to develop to level three due to the fact that in both firms human capital were appointed according to their fit with the firm and other employees, meaning that foundations were laid for good relationships early on. However levels four and five highlight the issues which can be faced in the progression of the team. This is the only factor which experiences a regression in its development from good highly functioning relationships, to

					distant relationships with difficult team work, back to even better relationships and team work.
Contacts	Intermediate	Development to this level means that contacts are used to aid in delivery of products/services by providing advice, finance and equipment. The high number of contacts with which good relationships have been formed mean that the contacts can affect many areas of the firm from expertise, to product/service development, to human capital, to finance.	All levels		In both cases this factor was relatively easy to develop as networking was key, but developed faster in case A than case B probably due to the high number of contacts case A started with.
Strategy	Intermediate	Development to this level results in a clear focus for the firm which can be used to plan day to day activities, meaning that growth is more focused and formalised.	Intermediate	High	In both cases this factor was easy to develop to level three but took a lot longer to develop in case B than A. Case B did experience issues in progressing to level four as this involves the good progression of other factors.
Organisational Structure	High	Development is needed to this level because this highly functional organisational structure aids staff in the management of the firm's resources and outputs, which in turn aids in the firms development. The structure enables focus but also a functional team to develop, whereby each management member has their own role, resulting in a fluid delivery of service/product and image.	Intermediate	High Two	Level three is reached by both cases quite easily but at level four and five case B experience issues such as a feeling of loss of ownership, changing job roles, confusion and difficulty of delegation due to, among other things, a general opposition to the structure change. Thus the higher levels are achievable but create problems which need to be overcome.
Finance	Intermediate	Development is needed to this level because this high level of finance enables structural, organisational and human capital development as well as	Intermediate Low	High	Both cases develop to level two relatively easily while level three involves the progression of other factors such as customers and products. Levels three and four involve a good organisational

		product/service development.			structure and well received product/service offering and as such is more difficult to attain a high level in than other factors.
Marketing	Intermediate	Development is needed to this level because the high level of marketing and the development of a reliable image means that more customers can be gained at a faster rate, while the focus on pipelines and business development means customers are sought after continuously. In conjunction with the development of other factors the firm now has market acceptance.	Intermediate Low	Intermediate	The achievement of level three is difficult as a high level of resources need to be focused upon its development, such as human capital, finance and planning and due to the fact that market acceptance takes time.
Customers	High	Development is needed to this level because there is now wide spread customer acceptance of the firm and its offerings and a large enough range of customers to enable growth but also to sustain it.	Intermediate	High	The development of this factor to level four is difficult as it takes time to develop a fully functional service/product offering and only when this is achieved can customers enable growth.
Open Innovation	High	Development to this level is needed because for open innovation to aid growth it needs to be resulting in outputs for the firm which can be sold. The lower levels of development aid the firm and set a good foundation by providing important skills and knowledge but in order to result in growth an output is needed.	Intermediate	High	The development to level three is difficult as it is directly aligned with the level of development of the firms products/services, customers and marketing.
New/Existing Product/Service Development	High	Development is needed to this level because for high growth to occur there need to be products/services for sale which are widely accepted into the marketplace and which are continually developed to meet changing market needs.	Intermediate	High	The development of this factor to level four is perhaps one of the most difficult as it involves many resources being needed to enable the full development and commercialisation of the firm offerings. For instance other factors such as expertise, human capital, planning and finance need to well developed.

Planning	Intermediate	Development to this level is needed because the complex planning enables all the resources within the firm to be managed and dealt with in a focused and coherent way.	Intermediate	High	The development of this factor to this level is not difficult as it simply involves good organisation and aims to be in place.
System and Software Development	Intermediate	Development to this level is needed because a high level of procedures and systems aids in the smooth running of the firm, and aids the firm's resources, such as human capital and product development, in functioning to a high level. A good level of software can be used by the firm's human capital as a tool to aid them in providing their products/services.	Intermediate	High	The development of this factor to level four is difficult as it involves implementation of processes which are aligned with the firm's growth. Case B are finding this alignment difficult and therefore difficult to progress through.

Table 7.2. A summary of the key levels of development, reasoning as to why this is the case and the ease or difficulty of achieving this

What does the combination of the development of these factors to these levels result in? – A growth platform

A growth platform is a state in which the firm has achieved substantial growth in revenue to enable it to develop from an early development stage to the point where it is sustainable and providing growth and employment for the community. The fact that it took case B over ten years to reach the growth platform is evidence of how difficult it is to achieve.

7.2 Model Summary

The model highlights each individual factor which together combine to enable firm growth. The process of development of each factor is detailed, highlighting the different levels of development that each factor can experience. The identification of the core level to which each factor should be developed to in order for growth to occur is of critical importance, as this has been neglected in the literature. The finding of the interconnecting relationships between each factor is a testament to the complex ways in which each factor exerts its influence. The model encompasses all areas of the firm from people and relationships, to vital resources and management structures, to products/services. Various resources are needed, these are managed by people within the firm, this is aided by delegation, organisational structure, system development and knowledge transfer and these allow the development of products and services. Each factor interacts with the others and develops over time to enable the firm to achieve growth. From the analysis conducted it is possible to determine that all the factors are required in order to enable high growth to be achieved. Each factor is connected in some way and there is no one factor which is more important than the other as without the combination of their development none of them would impact the firm enough to enable growth.

The factors can be split into those which are internal (expertise, human capital, management, aspirations, strategy, planning, organisational structure, systems and software, new and existing product/service development and marketing) and which are external (finance, customers, contacts, marketing and open innovation). The majority of factors are internal meaning that they are managed and developed within the firm, while the external factors involve interaction with people outside of the

firm. The internal factors however are influenced by the external factors again highlighting that all factors are essential for growth to occur.

By analysing the model it is evident that not all of the factors have the same number of levels of development. This is because in the case studies analysed some of the factors simply went through less stages of development than others. The majority of the factors have four levels, while it is the more complex factors that have five levels: human capital and organisational structure, while there are only two factors which have only three levels: expertise and open innovation. The factors which have only three levels simply need to go through less development to reach a highly functioning state. All of this means that the difference between two levels for different factors is not the same and that the levels do not necessarily correspond to the same time frame in the cases history. Each factor can take a different amount of time to develop, need to be developed to different levels and be easier or more difficult to develop than others.

Interestingly it took case B a few years to progress through each level of development i.e. they started on level one, then two to three years later reached level two and so on. This is evident for the majority of the factors, especially those which had four levels of development, obviously the factors with less or more levels developed more slowly or more quickly. In general however this highlights the high length of time required for a growth platform to be achieved. The fact that case B has developed beyond some of the levels which need to be attained in order to achieve the growth platform suggests that some of the top levels indicate what occurs when a firm is attempting to sustain and support its growth. These factors include systems and software, finance, planning, marketing, organisational structure, strategy, human capital, management, expertise and aspirations.

7.3 Model Theory

The comparison of the two cases has highlighted that although differences in the development of each firm are evident there are also key similarities. The main similarities are with regard to the factors found to be of importance, how each factor influences firm development and the ways in which each factor interacts with

others. These similarities all point to a coherent way in which to explain how firm growth is achieved. The multitude of factors identified can be split into three themes which highlight how their overall interaction with each other results in firm growth. These three themes are resources, mediating factors and outputs and this section will summarise each theme in turn.

Resources

In both cases it was evident that there were a certain number of factors which it was essential the firm achieved an inflow of to enable a foundation to be formed for growth to be able to develop from. They are essentially the building blocks of the firm, from which all else develops, and which enable the firm to begin its development from a start-up position. Surprisingly in both cases the resources which were identified were the same and consisted of:

1. Aspirations
2. Finance
3. Human Capital
4. Management
5. Expertise
6. Contacts
7. Open Innovation
8. Customers
9. Software

These factors were identified in both cases as being resources due to the fact that each one was used by the firm to strengthen it, to aid in its development and to enable more resources to be brought on board e.g. aspirations and human capital leading to finance. They each serve a key purpose in taking the firm forward from its start-up position. The resources are the first building blocks to the firm's development and the firm could not function without them. For instance, without finance there would be no staff, while without staff there would be no product/service development. These resources cover people, both internal and external, technology and products and strategic level factors.

Even though each case experienced differences with regard to the speed of development of each resource, due to their developmental stage, they ultimately

developed towards the same goal and the factors influenced each firm in similar ways. The complex developmental processes which each of these resources go through highlights their dynamic nature and yet there is a “sweet spot” of development at which point they are at their most influential to firm growth. In order to form a base for achieving high growth and development a firm must achieve a mixture of “sweet spots” for each resource.

Without these resources neither case would have been in a position to develop, as all of these resources aid in the creation of mediating factors and enable the creation of outputs for the firm, which results in an increase in revenue and staff, and as such growth. New resources are continually added to the firm through the development of each resource and the impact of each resource on another e.g. contacts providing further knowledge which impacts the firm’s expertise. It is the interconnected nature of each resource that aids in the achievement of firm growth.

The impact of these resources on two firms who are at very different stages of development highlight that resources are consistently of importance and will constantly be in a state of development. These resources are generated both internally and with external help and as such it is not possible to separate the firm from its external network. The interaction of both internal and external is of vital importance to resource development. Many of the resources identified are intangible and thus highlight how difficult it can be for them to be identified and controlled. Aspirations, contacts, customers, open innovation, human capital, management, expertise and learning are all intangible assets while finance and software are tangible assets. Therefore the majority of a firms resources are intangible, which may be due to the fact that these firms are highly knowledge based. However the use of the research methods employed in this research means that the influences of these less easily observable factors have been discovered. Certain resources were identified explicitly by the interviewees as enabling the firm’s growth, such as finance, human capital and expertise, while some of the more abstract resources were more implicitly highlighted, but during analysis were discovered to have equal importance to the firm’s development. For instance the more abstract concept of intra-organisational relationships is vital to these firms, while contacts and open innovation exert some of the most direct influences on the firm’s growth. These intangible resources interact

with the tangible resources to enable them to develop i.e. human capital relationships affecting finance and product/service development. This again highlights that one factor cannot be considered without reference to the others.

The resources are in a continuous state of development and it is this development which aids each factor in influencing the firm's growth. For instance without continual development of the firm's human capital and expertise the firm would be in a less advantageous position from which to develop products and services. This highlights the dynamic nature of the resource base. Some of the resources highlighted influence the firm directly while others influence other factors, which influence others, in a chain like cycle. The majority of the resources exert both indirect and direct effects on the firm's development. However it is this constant linking of the resources which means that no one resource could enable the firm's development without the others.

The comparative analysis highlights that resources are in a constant state of change and fluidity throughout a firm's life. In particular the human capital and managerial resources are the most complex. The model demonstrates how long it can take to develop certain resources to a highly effective level and how difficult some of these resources can be to sustain during various growth phases. Resources are continually added to throughout firm development with some resources completely changing from their state at start up to their growth state. Each resource has had a complex effect on other resources and factors, thus enabling the firm's growth.

Resources play an important part in a firm's development during all stages of its life being just as influential, if not even more so, during and after growth, than they were at start up. This suggests that resources are a dynamic tool which not only lay the foundations for the firm's development and growth but also propel further development and growth at later stages. The way in which each individual resource influences the firm is complex as these resources have both direct and indirect effects on each other. The resources don't impact each other in a simple way and instead link in a chain like fashion to each other. To explain the influence of one involves a consideration of all others in a cyclical manner.

Mediating Factors

It also became apparent that in each case these resources were not enough to enable firm development and certain factors emerged which were used to mediate other factors and manage the resources. These mediating factors consist of:

1. Organisational Structure
2. Strategy
3. Planning
4. Systems
5. Marketing
6. Human Capital
7. Management

These factors all relate to the management of the firm and its resources and without them the firm's resources would not be able to function to a high level. Again a mixture of certain "sweet spots" of development emerged to enable the mediating factors to aid in firm growth. These mediating factors may not directly influence growth but do so indirectly through their influence on other factors such as resources, other mediating factors and output factors. Therefore their influence on the firm may be less obvious unless the whole firm system is analysed. For instance, organisational structure does not have a direct influence on growth but it aids in the flow and effectiveness of human capital and product development. The resource factors and the mediating factors could not develop without the other. An important point to note is that in both firms these mediating factors were created by the resource factors thus highlighting how the resources are the building blocks of the firm while the mediators can be considered as the cement which holds them together.

The factors human capital, management and software are both resources and mediating factors. For instance the knowledge and skill of the employees' aid in the development of the firm's products while their management skills aid in the running of the firm. However they also mediate all other resources and outputs. For instance the human capital aids in finance applications and in managing the open innovation which the firm engages in. They also mediate the development of the firm's products and innovation.

Each of the mediating factors detailed previously serve to aid in the development of the firm's resources and to enhance the impact of the resources on the firm. The mediating factors go through their own developmental process and have an impact on the firm even if this is not direct. For instance organisational structure affects team relationships which affect productivity. The mediating factors not only influence the resources, they also influence each other and the output factors. Without these mediating factors the development of the firm's resources would not occur and the production of outputs would not result.

The complex nature of the firm's resources and their dynamic nature means that these mediating factors are a crucial part of the firm's development. The resources would be unable to develop and be utilised effectively were the mediating factors not present. The main role of the mediating factors is to support the resources in their development and as such resources cannot be considered without reference to mediating factors.

Output Factors

None of the resources or the mediating factors will, by themselves, enable the firm to achieve high growth. In order to do this outputs are required which are saleable and which ultimately are what is used to increase the firm's revenue and human capital. These output factors consist of:

1. New and Existing Product Development
2. Open Innovation

Open innovation is both a resource and an output as it is used to aid the firm's product development and is also a saleable resource for the firm. Again in order to enable the firm's development these output factors need to hit their "sweet spot" of development. These output factors enable further resources to be brought into the firm and so the resource > mediating > output cycle continues. This explains how growth is a continuous process and can continue over many years in different spurts. Output factors are highly influenced by mediating factors and resource factors. What became evident was that the resources in both firms influenced far more factors directly than did the output factors and this is because output factors are exactly that, an output, and as such tend to result in finance and employees and influence the firm through those. In a similar analogy to that used previously, if the resources are the

building blocks of the firm and the mediating factors are the cement holding them together, then the outputs enabled by this are the completed house. Without these outputs the firm cannot be complete.

All of the resources and mediating factors detailed previously culminate in the production of outputs which the firm can sell and which characterise the firm as a whole. As such there are far less output factors than mediators or resources. For instance the market analysis which the firm undertakes leads them to new and existing product development while human capital and management enable the strategy to be enacted. Again, as was the case with the mediating factors, the influence they have on the firm is less tangible than others. Their influence is important but comes through their saleability which leads to further effects on other factors and to further development by other factors. All factors exert an influence on the output factors and the output factors are ultimately the core of the firm's survival and growth. However without the interaction between the outputs, the mediating factors and the resources no factor would be able to develop and result in the firm's growth.

Open innovation can be considered as both a resource and an output for the firm. Engaging in open innovation means that the firm gains knowledge, resources and contacts, while it also means that the firm is developing a product with a partner that will eventually bring in revenue and sales. It is the resources which exert the most influence on other factors, while the mediating factors play more of a supportive role and the output factors are affected by other factors more often than affecting factors themselves.

7.4 Comparison to other models and theories of firm growth

The next section will compare the research to existing models and theories of firm growth as well as to research on certain individual firm growth factors. This is essential in order to understand what this research adds to existing knowledge.

Klofsten's Business Platform model (2010)

The research builds upon the work of Klofsten (2010) and concludes that the process of development of a firm can not only be discovered for early stage firms but also for high growth firms. The holistic nature of the model developed in this research is in keeping with the basis of the business platform model, with this research also positing that it is the combination of all factors which enable growth. Interestingly this research identified that most factors had four levels of development, one higher than that of Klofsten's model. This would be expected as to achieve high growth firms need to go through additional phases of development. This however, contradicts Klofsten's position that it is rare for any of the factors to develop any further past the business platform model levels. This difference could be attributed to the age differences of the firms which both models stem from, with the growth platform case companies being older. The fact that, in this research, not all factors had the same number of levels of development highlights the complexity of the process of development of growth as opposed to Klofsten's early development.

The finding that one of the factors regressed and then recovered is different to Klofsten's findings but this is likely due to the complexity of the factor, that of human capital, and due to the fact that it regressed during a later stage of firm development, a stage Klofsten did not analyse. The fact that the high growth case at the centre of this research only achieved a growth platform after ten years makes sense as Klofsten states that the business platform model must be achieved within three years. Therefore, the development from the business platform to the growth platform takes time. Klofsten's finding that different factors can develop at different rates was also confirmed in this research by both cases. This adds support to the development of process-based models as opposed to static or stringent models that are unable to explain the development of firms in reality (Garnsey et al, 2006; Levie and Lichenstein, 2010; McCann, 1991).

The similarity in the basic theoretical explanation for both the business platform and the growth platform identified in this research is likely due to the fact that both models are based upon Penrose's (1959) theory of the growth of the firm and the resource based view. Both models view firm development as being based on an

inflow of resources and management of these resources. As the growth platform model should almost be an extension of the business platform model the theoretical similarity is essential. McKelvie and Wiklund (2010) argue that firm growth research suffers from the wide range of theories posited to explain growth suggesting that similarities are essential if we are to create a unified and widely accepted firm growth model.

The key differences between Klofsten's model and the growth platform model are that there are differences between the key resources and the mediating/management factors and there is the addition of output factors in the growth platform. This is likely due to the different definitions each model gives to resources and the differing relationships found between all the factors in the case studies that lead to the creation of both models. The important point is that both models stem from the same theoretical underpinnings and these explain both models. The fact that there are differences in the resources and management factors could be attributed to the differing stages of firm development which each model analyses, perhaps suggesting that different resources and management functions are important depending upon the firms focus. Each level of the growth platform model also contains more description than Klofsten's model, something which was purposely done to overcome some of limitations suggested to be evident in the business platform model.

Interestingly there are a number of factors identified in this research that were not identified in Klofsten's research. These are human capital, management, finance, systems and software, strategy, planning and open innovation. Open innovation has likely been identified in this model and not in Klofsten's due to the fact that it is a relatively recent phenomenon (Chesbrough, 2003a). Some of the other factors Klofsten encompasses briefly in other cornerstones. In this model, however, they have been assigned as factors in their own right due to the ways in which they influence firm development. The other factors not identified at all by Klofsten may be due to the fact that certain factors are only of importance when aiming for high growth. Klofsten also posits that finance is not of great enough importance in attaining a business platform to be assigned as an individual cornerstone, instead encompassing it under contacts, whereas this research identified that financial capital and financial management were of great importance to both cases at early and later

stages of their development. This may be attributed to the fact that Klofsten's case studies were conducted in the early 1990s while the present case studies were conducted in the 2010s. It is widely accepted that finance is of crucial importance to business development (Carpenter and Peterson, 2001; Inderst and Mueller, 2009; Kitching et al, 2011). The growth platform model also disagrees with Klofsten's position that some factors are difficult to develop even if enough time and resources are in place. This research found that it was exactly the time and resource effort required which determined how difficult or easy a factor was to develop.

Penrose's (1959) theory of the growth of the firm

The findings from this research confirm many of Penrose's findings but importantly add new insight to create a fresh perspective on Penrose's theory. It is confirmed that the firm is a bundle of productive resources which are controlled by the administrative hierarchy and which combine to produce goods for sale (Penrose, 1959), as this is exactly the explanation for the findings that is being posited here.

The key new insight that this research provides is detailed information with regard to which resources, management and outputs are vitally important, why this is the case and how they develop over time. Although Penrose's theory has been highly influential in academic circles, it has not been able to be practically disseminated as Penrose did not create a coherent model from her theory and ultimately did not clearly identify the process she was referring to. This research however has added to this body of knowledge, providing the detail needed to explain and support Penrose's theory, clearly identifying the process of development. Penrose posits that firms can have differing amounts of resources whereas this research argues that firms must have the correct mix of certain resources, developed to specific levels in order to achieve growth. Thus this research provides more detail with regard to each factor found to have been of importance.

Penrose also argues strongly for the importance of material resources and while this research did find that material resources were of importance to firm growth it also found that intangible resources were just as important and that it was the combination of the two which gave the firm the best chance of development. Unlike other models of firm growth (Barringer et al, 2005; Baum et al, 2001; Klofsten, 1992) this research

accords with Penrose's argument that it is the outputs which the resources and management of these resources enable which is ultimately what enables the firm's growth.

Penrose focuses on the importance of management within the firm and while this research accords with its importance it does highlight the crucial overlap between early human capital and informal management and later more formal management. This research also provides support for Penrose's less widely researched claim which highlights the importance of team relationships, as it was found that this was one of the most important resources used by both cases enabling good product/service provision and knowledge sharing. The finding that human capital in particular experience a regression due to lack of familiarity of the new team structure evident due to growth adds weight to Penrose's view that firms are constrained when management do not have experience working together. Penrose also argues that management are crucial in spotting opportunities for the firms resources whereas this research found that although owners are crucial in this process it is also informal managers, human capital in general and customers and suppliers who are now involved in this process. This could be due to the emergence of the open innovation business model (Chesbrough, 2003a; Curley, 2013). The finding that the resources identified in this research were utilised for numerous purposes within the firm accords with Penrose's suggestion that resources can be recombined in different ways for different reasons.

This research also highlights changes which have taken place with regard to economy and technology since Penrose's theory was created and adds new insights more relevant to the modern economic era. The key factor relating to this was that of open innovation which was clearly highlighted in both cases as being vital to their development. This research also highlights the importance of inter-firm relationships which are of importance for similar reasons as Penrose's intra-firm relations. Another factor, that of contacts, which relates to external supply of resources was also not considered as influential by Penrose whereas in this research it was one of the most important factors influencing each case. Clearly this research adds to Penrose's theory through its inclusion of externally oriented factors and thus highlights that the boundaries of the firm can now become more blurred. This research also accords

with Penrose's argument for the importance of learning within the firm but highlights that this learning can come from within the firm but also externally to it. External resources provide knowledge, contacts, tangible equipment and finance. Penrose's theory was generated based upon case studies of large manufacturing firms and therefore the current research provides insight into the applicability of her claims in product/service/knowledge based SMEs. As highlighted above this research accords with many of her principles but also offers slight amendments to them in light of current economic, societal, industry and technological times, especially with regard to intangible resources.

The resource and knowledge-based views

The key insight which this research provides with regard to the resource and knowledge based views is through the identification of exactly what resources and knowledge are important to a firm's development, why this is the case and how these develop over a firm's life. This is an important distinction from resource and knowledge based views which only state types of resources which are of importance. The identification of critical "sweet spots" for each resource in this research also suggests that resource based research needs to analyse resources from a process based view in order to understand how these resources influence growth. This identification also enables more direct and focused advice to be given to firms than the RBV's principles allow. Similarly to Penrose's (1959) view this research found that no-one resource was of primary importance but rather it was the combination of them which aided firm growth. Resources are defined in these findings based upon Wernfelt's (1984) definition of a resource as being anything that can provide the firm with a strength or a weakness. However in this research a resource is defined as anything which can be used by the firm to its advantage.

This research does disagree with some of the RBV claims such as the fact that resources need to abide by certain principles in order to be a resource. This research discovered that a resource didn't necessarily need to be rare, or hard to imitate in order to aid the firm but instead needed to reach a certain level of development in order to aid the firm. As such this research argues that level of development is more important than uniqueness to the firm.

Importantly the research findings accord with Barney and Arikan (2001) who suggest that the firm needs things other than resources in order to achieve growth. A key insight is derived from the factors open innovation, human capital, expertise and contacts which highlight that resources can also be gained from external sources, something which Storbaka and Nenonen (2009) feel is lacking from existing research. The importance of external resources suggests the resource development in the modern firm relies on involvement in a quadruple helix of relationships involving customers, universities, government and the SME is question. This research found that these externally acquired resources are often shared resources between two entities and as such there is less of a threat from engaging in this resource sharing behaviour. This research provides a new perspective, slightly different to that of the RBV in that the RBV describes resources in the context of strategic advantage and competitiveness whereas this research provides an analysis of these resources in the context of firm growth.

The majority of the resources identified in this research, excluding external resources, are also identified in Penrose's (1959) theory, suggesting that this research provides a vital synthesis between the two theories. This research also adds to the knowledge of the applicability of the RBV to knowledge based SMEs and highlights that the RBV is of importance to an explanation of firm growth but that certain additions need to be made to the RBV in order for it to explain firm growth in the current climate. For instance this research found that intangible resources are of vital importance to knowledge based firms and are crucial in aiding the firm in achieving growth. Relationships in particular enable the emergence and development of new resources the firm can use to aid its growth. This research adds insight to the KBV by highlighting how important external sources of knowledge are to the firm's development but also accords with some of its ideas, such as the importance of knowledge to product development and the importance of integrating knowledge. This research highlights how the combination of the KBV and the RBV is of importance in adding to the explanation of firm growth. Knowledge is vital but must be combined with other resources in order to exert an influence.

Stage models

The concept of the model developed in this research adds to the body of literature on stage models of growth by providing more detail and practical information as to how firm growth is achieved. Stage models attempt to explain firm growth through distinct stages whereas the model presented in this research focuses on individual variables and their development over time, allowing identification of firm progress with regard to each variable. This research argues that it is important to move away from an analysis of stages of overall firm development, to an analysis of factor development essential for particular phases of a firm's life. Stage models allude to how certain factors should be developed but never fully explain this in enough detail and do not cover a wide enough range of factors. If this research had taken a stages approach then the findings would likely have created yet another stages model, with differing stages to those previously found. This is because, as this research highlights, firms develop differently at different rates. Approaching firm growth from a process based factor approach enables identification of similarities in process of development, without the stringent need for these to be in the same order, at the same speed. This process based approach also enables a micro analysis of firm growth, thus resulting in a more detailed analysis of why each factor is of importance. This research found that the relationships between each factor were critical, with each having an influence on another. This is somewhat neglected in stage model approaches, which focus more on identifying stages to the detriment of what enables firms to reach those stages. Thus this research enables an understanding of the underlying processes that enable firm development to a growth stage.

The key distinction of this research from that of stage models is its focus on people, relationships and aspirations, as it therefore takes into account human thought and action. Importantly the model in this research also accepts that not all firms will follow the same process of development in the same order, some firms may skip levels totally. Ultimately this research extends stage models of growth by not only presenting a descriptive model of how firms grow but also theory and explanation as to why this growth is achieved. This research accords with Levie and Lichtenstein's (2010) argument that firms are in a dynamic state of change throughout their lives and as such cannot be prescribed to any stage model.

This research does however accord with some of the factors/crises that stage models identify as being of importance. For instance Churchill and Lewis (1983) identify organisational structure, finance, systems, human capital, strategy and management as developing during their five stages. Eggers et al (1994) identify planning, vision and communication. The insight this research provides into these factors is their process of development, their relationships and the fact that many more factors were discovered to be of importance. For instance stage models do not often consider technology, products, relationships and aspirations and there appears to be no stage model which incorporates open innovation. In fact stage models tend to ignore external resources and influences on the firm as well as the influence of intangible resources. This research however found that each of these was of importance to enabling firm growth.

In this section it is also important to compare this research with that of Levie and Lichtenstein's (2010) dynamics states approach to firm growth. The research accords with their general proposition that it is resources that create outputs for the firm and yet offers a different explanation for firm development. This research found that the firm develops constantly and that this was not driven by an explicit consideration of a business model or the environment but was rather a natural progression that the firms experienced on their path to growth. This research provides a more useful insight into how and why resources enable firm growth and also highlights the additional factors encompassed under mediating factors and output factors, which must accompany the resources to enable firm growth.

Growth variable models

The model developed in this research was a combination of a stage model approach and a growth variable approach. The findings add knowledge to the growth variable model field due to its focus on process as opposed to static variables. The majority of growth variable models provide a list of factors influencing firm growth, whereas this research is able to identify them and track their development over time in order to also explain why they influence growth and how they need to be developed for growth to occur. As such this research is able to add new knowledge to extant literature through the discovery of the importance of the interaction of factors that are subsumed into three themes; resources, mediating factors and output factors.

Importantly, this research provides support to the majority of growth variable research due to the factors that were found to influence growth. For instance this research accords with Barringer et al's (2005) findings of the importance of experience, aspirations, inter-organisational relationships, employee development and training and customer knowledge and Baum et al's (2001) findings of the importance of motivation, competences and strategy. This research covers a range of holistic factors and as such is able to confirm a wide scope of research in this field, while also adding to its knowledge especially through the consideration of the linkage of the factors.

When comparing this research to Baum et al's (2001) research it is evident that there are differences. Baum et al (2001) concentrate on the direct and indirect effects of the entrepreneur on firm growth whereas this research was able to identify that there are many more factors than just the entrepreneur from which these interactions stem. For example Baum et al (2001) argue that the entrepreneurs' motivation and skills enables the strategy to be implemented whereas this research would suggest that human capital, management, finance, marketing, customers, open innovation and many more factors combine to enable strategy development. Thus this research highlights the complexity of interactions between factors and suggests that previous models have been too narrow and simplistic and have thus failed to highlight this.

It was argued in the literature review that many growth variable quantitative models are only able to account for a small percentage of variance in growth, such as Davidsson's (1991) research. This research provides some explanation as to why this may be the case. Quantitative research is unable to analyse intangible variables, such as relationships, open innovation, contacts, aspirations, networks, supply chains and the relationships between each of these in enough depth and as such neglect to consider a whole host of variables which this research has discovered interact with tangible variables to affect firm growth. This interaction is not always obvious and suggests that focus should be changed to initial in-depth qualitative research, able to gain information on these interactions, which is then followed by wide spread quantitative research. Many of these models also identify factors associated with growth and not the factors which lead up to and enable growth. This research

however identifies these factors and also traces their development before, during and after growth. The research also overcomes some of the limitations of growth variable models by incorporating a large number of factors found to have been of importance in previous research. It is therefore able to be compared to many different models and studies of firm growth and acts to create the type of holistic modelling called for by Davidsson et al (2007). Some of these models are also conceptual and are not empirically tested. As the model in this research stems from in depth case studies it has more grounding in firm growth in reality. This research adds to the growth variable literature by not only identifying factors of importance but by also generating an explanation of how they are used together to enable firm growth.

The main issue with growth variable models in general is that although they identify factors which may be associated with firm growth they do not provide enough detail for these models to be used to aid firm owners or policy makers in reality. The model generated in this research however was created with this practicality in mind, detailing the process of development of each factor, and the level of development needed for growth to occur and as such could now be tested to examine its usefulness to firms in reality. This research also analyses firm growth from an individual, firm and environmental level, something that is suggested by Poon et al (2006) to be lacking in the firm growth literature. This is important due to the increasing importance of the quadruple helix concept (Curley, 2013), open innovation (Chesbrough, 2003a) and individual firm determinants (Smallbone and Wyer, 2012).

It is evident therefore that the combination of Penrose's theory and the resource and knowledge based views is possible and is warranted while the combination of stage model themes and growth variable model themes is also required in order to generate clear explanation and description as to how firm growth is achieved.

7.5 Comparison with extant literature on individual firm growth determinants

Management

The findings provide insight as to when exactly management is of greatest importance to the firm's development, with the findings suggesting that informal management is crucial to initial growth, that this informal management later develop

into formal management and that formal management are crucial during and after growth. Thus early ‘managers’ aid early firm development and later firm development. The key insight gained is that the presence of these early “managers” is enough to enable firm growth, without the need for a formal management team. Thus the research confirms the importance of management to growth (Smallbone et al, 1995; Churchill and Lewis, 1983; Penrose, 1959) but adds insight into how the firm is managed up to, during and after growth. Extant research misses this crucial linkage and tends to concentrate on owners in small firms and formal managers in growing firms.

Interestingly previous research has found managerial leadership to be of importance whereas in this research mutual relationships were highlighted as being of importance while leadership was not. The research suggests that in knowledge based firms relationships are what drive communication, commitment and knowledge sharing. This is similar to Xue et al’s (2011) findings of the importance of team cohesion and empowering leadership, with the difference being that this research took place in an actual firm setting and that this research found that this empowering leadership stemmed from the team not from one person.

Human capital and Management

Human capital is rarely considered in models of firm growth and as such this research is useful in providing a context in which to place human capital in conjunction with its linkages with other factors. In agreement with existing literature, human capital was found to be one of the most important factors influencing firm growth (Barringer et al, 2005; Holtzman and Anderberg, 2011).

The biggest insight which this research provides is the reasoning as to why it is so important i.e. supports knowledge sharing, team work, the implementation of strategy and planning, the provision of products and services, the development of products and services and the development of almost every aspect of the firm from marketing to quality. Human capital was found to have the most relationships with other factors.

Importantly, as highlighted in existing literature, this resource was one that was ever evolving through learning and the key finding was that relationships' were the key foundation to this. The finding that managerial relationships were of importance was somewhat more pronounced than in other research. In both cases it was these relationships, be they before, during or after growth, which had one of the greatest influences on the firm thus providing more credence to the importance of team climate (Hulsheger et al, 2009) and cohesion (Ensley et al, 2003). Thus, unlike extant research, the research was able to identify to what level human capital needs to be developed to in order for growth to occur and this was found to be linked closely to a close-knit team relationships.

By utilising a process based approach, it was possible to discover the cyclical nature of human capital relationships, something which is not highlighted strongly in the literature. This cyclical nature is important due to the influence these relationships have on the firm. The research is also able to provide insight into how knowledge is acquired in growing firms and how this knowledge is utilised, insight called for by Durst and Edvardsson (2012). Durst and Edvardsson argue that qualitative research is needed in order to bridge this knowledge gap in which more is known about knowledge implementation, perception and transfer. The research discovered that knowledge is acquired through open innovation, contacts, human capital, management, expertise and through relationships and is utilised through team structures and through the influence of mediating factors such as organisational structure and systems and software.

Contacts, Open Innovation and Customers

This research confirms much of the literature which finds that networks and contacts are of importance for firm growth (Birley et al, 1991; Macpherson and Holt, 2007; OECD report, 1996; Zhao and Aram, 1995). There is however disagreement as to whether strong or weak ties are most beneficial for firms (Burt, 2000; Rowley et al, 2000), with this research finding that strong ties were crucial for firm growth. The stronger the relationship with any contact the more beneficial they are to the firm through the trade of useful resources. The findings suggest that it is essential for networks to continually develop as they are based on very dynamic actors, people, a finding supported by Hoang and Antoncic (2003).

External networks are critical and as such the firm must blur its boundaries at times in order to gain resources needed for growth. This suggests that it is not possible in the modern knowledge based society for firms to work as an isolated unit. There was no one contact type that was the most important but instead firm growth was aided by the resultant combination of all of them from a wide range of settings confirming research that highlights the need for firms to have a broad contact base (Ritter and Gemunden, 2003).

There is relatively little research on open innovation in comparison with the other factors, especially in relation to its existence in small firms. Therefore, this research provides important information with regard to how open innovation is used to impact the firm, what other areas of the firm this factor interacts with and vice versa and importantly how relationships and contacts are the key drivers of open innovation. This research highlights how small firms can effectively engage in open innovation even if this is not explicitly intended. This factor cannot be separated from the customer factor or the contact factor as open innovation would not exist without them. Again no other model of firm growth includes open innovation factor yet this research highlights how this is one of the most important factors influencing firm development.

This research accords strongly with Hoang and Antoncic's (2003) statement that the entrepreneur and the firm must be considered in their social context. This research provides insight into this networking system in light of developments such as open innovation (Chesbrough, 2003a) and the quadruple helix concept (Curley, 2013). There is not much research which focuses on these links, especially in terms of process and relationships between factors. The crucial insight of this research is to what level open innovation and contacts need to be developed to in order for growth to occur, with a high level of good quality contacts being needed, along with outputs created from open innovation.

This research compliments the majority of research conducted on the importance of customers to growth, with relationships being of great importance (Barringer et al, 2005; Reuber and Fischer, 2005). The main contribution of this research to this area

is in its analysis of how exactly the customer provides benefit to the firm, analysis considered to be lacking in the literature by Storbacka and Nenonen (2009). It was discovered that customers are vital to the development of open innovation that aids in providing the firm with a multitude of resources which it otherwise may not have. Customers and the firm essentially trade resources and as such for the time they are working together blur their boundaries. Relationships were found to be key to enabling this blurring and to managing it. The research suggests that in a knowledge based society it is crucial to research contacts, customers and open innovation in harmony with one another as they develop closely together to influence the firm's growth. It has been suggested that knowledge is lacking as to how customer involvement and knowledge transfer takes place in firms (Matthing et al, 2004). However this research shows that the knowledge provided by customers to the firm takes place through planning, systems, human capital and management and thus centres around mediating factors which are needed to handle this knowledge exchange.

Strategy

The findings suggest that strategy is in a dynamic state of change and development throughout the firm's life often beginning very informally, and that strategy is most effective when has developed to the point where it is formalised, clear and communicated throughout the firm. Thus, analysing strategy at one point in time does not add knowledge as to how firms can be best supported to reach a highly functioning strategic base. It was discovered that it was more important that a strategy is created with the ultimate aim of growth as opposed to what type of strategy is created and implemented. This is in contrast to the majority of strategy literature related to firm growth which focuses more on the optimal strategy which should be implemented (Baum et al, 2001; Cooper, 1993; Porter, 1980) and supports Smallbone et al's (1995) analysis that there is no one specific strategy which is best for growth. What is more important is what this strategy enables the firm to achieve through the gaining of resources, the management of resources and the production of outputs. Thus focus needs to shift from the best strategy to advocate to the best ways in which strategy can be used by the firm.

Organisational structure

The literature tends to research organisational structure according to structure type categories, such as centralised (Meijaard et al, 2005) and decentralised (Caruana et al, 2002) and debate then takes place as to which is the most useful to achieving firm growth and whether or not a decentralised structure follows a centralised one (Miller and Friesen, 1984). However, this research discovered that organisational structure is in a dynamic state of change and cannot be subsumed into two general descriptions. As the study highlights, organisational structure is one of the most fluid areas of the firm and as such needs to be analysed over time. As opposed to creating two states of organisational structure this research has highlighted five. Organisational structure needs to be in a constant state of development and change as different situations call for different approaches which the firm has to adapt to. The crucial insight of this research is to what level organisational structure needs to be developed to in order for growth to occur, namely a highly functioning structure with departments and key functions.

Marketing

This research strongly supports previous findings that it is communication with customers and networks which are a vital part of a firms marketing (Borg, 2009; Gardner et al, 2000). However it was found that this exerts more of an influence in the early stages of the firm when less formal marketing is conducted and that as the firm grows more formal marketing is conducted through brand awareness and marketing media.

Interestingly both firms do appear to use an effectual marketing process (Sarasvathy, 2001a) using factors such as previous expertise and contacts to build a market, with their network being particularly important in this. However a key finding was that marketing acted as a mediator to the resources within the firm and also aided in the production of the firms outputs. Thus it is marketing's relationship with and impact on other factors and vice versa which ultimately ensures that marketing is vital for the firm's growth and development. The inclusion of this factor in this model is particularly important, as the majority of growth models do not consider it.

The research confirms Carson et al's (2002) contextual marketing concept as it was found that both firms conducted different marketing based upon industry norms and customer requirements for instance and as such were influenced by their context. However as similarities were found in how the marketing of both firms developed in general then this suggests that contextual marketing takes place based around similar firm developments.

7.5 Conclusion

Among the many ideas which have emerged from this chapter the interrelated influence of resources, mediating factors and output factors is of particular interest and may represent a new way of looking at firm growth and development. The key way in which the resources exert an influence on the firm's growth is through their effect on other resources. Mediating factors on the other hand exert their influence through their management of and effect on other resources, thus allowing resource factors to develop and be used effectively. Meanwhile output factors influence the firm's growth by enabling them to have saleable products and services which create new resources to initiate the cycle of resources-mediators-output once more. It became evident that no one factor could alone result in firm growth but rather a complex interaction of resources, mediating factors and output factors was needed. Many of the factors identified were intangible and the development of all the factors was complex. However, sweet spots of development were discovered and it is these sweet spots and their interactions with each other which are of vital importance to adding new knowledge to the firm growth literature.

The research adds to the existing literature with regard to theories and models of firm development as well as to individual research streams focussing on individual firm growth factors. Ultimately the comparison of this research with the existing literature highlights that it is not just possible, but a key requirement that theories and models are combined to form one growth model and theory, as this is the only way that a unified growth theory and practical model will be created. The research provides support for existing research as well as adding to the knowledge base. The next chapter will now analyse the key contributions that this research makes and the

implications for both theory and practice, as well as recommendations for future research.

8.0 Chapter 8 - Conclusions and Implications

8.1 Introduction

This chapter is the culmination of the journey that has been taken place through chapters 2 to 5, the purpose of which was established in chapter 1. Chapters 4, 5 and 6 in particular have enabled an understanding of the narratives presented. There are a number of key contributions which this research makes, from the identification of the key factors influencing firm growth, to the identification of the level to which factors need to be developed to in order to enable growth. Importantly the combination of these insights has resulted in the creation of a growth platform model. The finding that each factor influences other factors in complex ways and the identification of the reasoning as to why and how each factor exerts an influence has resulted in the creation of a theory with which to explain the model and to explain how firm growth is ultimately enabled. The resultant model and theory stem from a combination of key firm growth theories with more recent phenomenon and highlight that a multi-level theoretical approach is needed in order to explain firm growth. This chapter will now summarise the key insights gained and will consider the implications of the research for practitioners, policy and for future research.

The research aim was to develop a growth platform model which would detail the essential factors needed in order for a firm to develop from an early stage of development to one in which it has grown and is providing wealth and employment to the local community. From this a number of specific research questions arose:

1. What are the essential factors needed in order for a firm to achieve high growth?
2. How do these factors progress over time within the firm?
3. How do these factors enable this growth?
4. To what level does each factor need to be developed to in order for this growth to occur?

8.2. Conclusions from the research

8.1.2 Contributions to knowledge

1. Identification of the key factors influencing firm growth

Analysing firm growth from a process oriented viewpoint and the utilisation of a grounded theory methodology has resulted in a new explanation for the firm growth phenomenon, which has its roots in various key theoretical perspectives. In answering the research question “*what are the factors which enable a firm to achieve high growth?*” it was found that there are fifteen factors which together act to enable high growth to be achieved. These are aspirations, finance, human capital, customers, management, expertise, contacts, open innovation, software, organisational structure, strategy, planning, systems, marketing and new and existing product/service development. These factors relate to people, both internal and external, corporate level factors and product/customer related factors and thus are multi-level. The fact that many of the factors were found to be intangible highlights the nature of firms in the modern economic climate, suggests some reasoning for the low level of explained variance in quantitative research and as such emphasises even more the need for qualitative based research.

It has been discovered that the key factors needed for high growth to occur can be identified, meaning that more targeted research and policy decisions could now take place. The research provides a base for generating cumulative firm growth research as opposed to the fragmented research approach currently evident in the literature. This research therefore suggests that although firm growth is complex and difficult to research, with each firm experiencing firm growth in different ways, there are similarities which can be discovered and which allow for the seemingly random nature of firm growth to be understood and to be made clear. As such academics and policy makers must be prepared to research a wide range of factors at different levels of analysis.

Although none of the factors solely enable growth there are some factors which are worthy of discussion with regard to the contribution to existing knowledge which

they make. For instance the finding that open innovation is vital to the development of both product and service firms and acts in a quadruple helix innovation setting, suggests that this is a phenomenon which must be researched in SMEs. The use of open innovation means that the firms' boundaries are more blurred than ever before and as such this must be explored further. There are complex issues surrounding open innovation such as relationship and contract management and yet these are things which the SMEs in this research excelled at. This is the first process oriented growth model to incorporate open innovation and appears to be one of the few which analyses the interaction of open innovation with a wide range of other factors. These findings therefore provide an important base from which further research can be conducted.

Another finding which is important to discuss is the importance of planning and its separation from strategy in both firms in this research. Existing literature tends to consider both of these together and yet this research shows that to practitioners these are very different and aid the business in very different ways. Although strategy is important to the practitioners in these firms their planning is what is used daily to aid the firm in its development. As such it is important that planning and strategy are researched separately in order that more information can be provided to both policy makers and practitioners with regard to the best forms of planning and how firms can be assisted in this.

The clear similarities between both firms in terms of the early management of the firm by staff is also of importance, suggesting that SMEs are a dynamic unit whose staff act together to enable the firm to achieve growth. Further research is needed into this development and it suggests that policy makers need to consider the training of SME employees as vital, as these people are crucial to firm development and are the future management of high growth firms. Interestingly this research found that relationships between staff were of vital importance, enabling team based working and decision making, increasing productivity. Leadership did not emerge in either firm to be of great importance and this may be due to the participative leadership styles exhibited by both firms. The key finding was that good relationships create mutual respect and knowledge sharing which meant that leadership was far less explicit and that the team exhibited empowering leadership collectively, as opposed

to individually. Thus it may be that in the modern firm, characterised by open innovation, networking and blurred boundaries, that traditional leadership does not work and that team based relationships are what enable this open innovation and blurred boundaries to have a positive effect on the firm.

2. Identification of the process of development of each factor and that the level to which they need to be developed to in order for growth to occur can be discovered

The use of a qualitative research approach, as opposed to the dominant quantitative approach often used in firm growth research and modelling, has enabled the mapping of how the key factors for firm growth develop over time. In answering the research question “*how do these factors develop over time within the firm?*” it was found that they went through multiple development cycles throughout the firms’ life with some factors having more development cycles than others. This means that the difference between two levels is not the same for all factors, emphasising the individual development which each factor experiences. This emphasises the need for process oriented modelling which is both descriptive and explanatory, as opposed to cross sectional research which would not capture some of these developmental levels. Some factors were easier to develop than others, while one even regressed and then recovered. The full development of each factor was spread over a long period of time, again highlighting the need for longitudinal research as opposed to cross sectional. A detailed review of how each factor develops over time can be gained from reviewing the model presented in chapter seven. The findings suggest that for theory and model development qualitative research is initially crucial, as this is the only way in which to unearth the complexities inherent in firm growth.

The key discovery was that through the mapping of the development process of each factor it was possible to pinpoint the “sweet spot” of development which each factor needed to reach to enable firm growth. Each factor needed to reach its required level of development prior to growth occurring. This means that more targeted research and policy decisions can take place, while also aiding practitioners in self-analysis. This process mapping is exactly what is currently missing from extant literature, but which is what enables the similarities in firm growth to be observed and analysed. This also enables more detailed knowledge to be generated with regard to each

individual factor than is currently evident in the literature, with suggestions as to the approach this research highlights future research should now take; for individual analysis see the comparison to existing literature in chapter seven.

3. Identification of the level to which each factor needs to be developed to in order to enable firm growth and why this is the case

The analysis of the interaction of all of the factors has enabled the creation of a theory to answer the research question “*how do these factors enable the firm to achieve growth*” while the process oriented research approach, in combination with research of firms at different stages of development has enabled an answer to the key research question “*to what level do these factors need to be developed to in order for growth to occur?*”.

To achieve growth the firm needs:

- An input of a high enough level of finance to fund the firms product/service development in order to enable it to reach commercialisation and to enable a sufficient number of staff to be employed to manage the firm and undertake key tasks. This level of finance may be different for each firm depending on their industry. Financial management needs to be undertaken to a high level so that the finance is used to sustain the firm.
- A high enough number of staff that enable the firms resources to be managed and who have good relationships to aid in team work and knowledge sharing.
- A small number (one relating to each department of the business e.g. business development, operations, product development) of key managerial staff who are able to bring new resources to the firm such as contacts and who are able to manage the firm as a collective.
- A high enough level of expertise in the area from directors and key managerial members. Enough technical expertise is needed to undertake product development and enough commercial expertise is needed to ensure products are market ready.
- A wide network of contacts in a variety of areas (contacts in the areas of finance, government, suppliers, customers and informal contacts) who can be called upon to aid the firm in its development by providing advice, finance, knowledge and equipment.

- Relationships in place with external companies/customers who are used to develop commercialised products/services
- A wide enough range of customers to enable a steady supply of revenue, with whom a high level relationship is evident
- Relevant software in place to aid in product/service development
- Clear growth aspirations in place which are widely communicated
- A highly functioning organisational structure in which clear roles are in place in order to aid in the day to day running of the firm and its resources
- A clearly defined strategy which is widely communicated in order to provide something upon which to focus the firms resources
- Functional plans in place which influence each area of the firm again in order to provide goals upon which to focus the firms resources
- A high level of quality systems in place (quality systems relating to each aspect of the firm and the departments) which aid the firms resources, such as human capital and product development, in functioning to a high level.
- Market acceptance for the firms products/services with a high focus on business development aiding the resource ‘customers’
- Commercialised products which are established and which have widespread customer acceptance. New products/services and constantly being created
- To engage in open innovation in order to aid in product/service development

As discussed in detail in chapter 7 these factors can be characterised as resources, mediating factors or output factors. The resources must all be developed to a level where they are providing the firm with the foundations needed from which growth can stem, enabling product/service development, firm development and staff development. The mediating factors must be developed to the level at which they are supporting the resources and outputs in functioning to a high level, while the output factors must be developed to the level at which they are providing the firm with revenue and new resources. It is the interaction of these resources, mediating factors and output factors which enable growth. This finding is important as it suggests that there is a pattern in the way in which factors influence growth, meaning that more structured research and policy decisions could take place focussing on these interactions. The majority of firm growth research identifies which factors may be of

importance and some research suggests how these factors influence growth but there is a distinct lack of integrative research which also analyses relationships and provides an explanation as to how factors enable growth. The theory developed through this research suggests a new context in which to research and place firm growth variables and as such provides a base from which further research can stem. Again the finding that growth is enabled by external factors such as open innovation and networking emphasises the need for the consideration of blurred company boundaries practically, in research and in policy. The finding that resources, mediating factors and output factors were in a constant state of development and that it was this development which enabled firm growth emphasises that firm growth is a dynamic process meaning that variables cannot be considered statically. Certain factors exerted their influence directly while others exerted their influence indirectly highlighting the importance of the analysis of relationships in firm growth research. Importantly the resources, mediators and outputs act in a cyclical nature explaining why firms are in a constant developmental stage no matter what their age.

In chapter two it was highlighted that although it was possible to determine which factors may influence a firm's growth, it was not possible to determine how these factors develop over time, how exactly they combine to influence firm growth and to what level they need to be developed to in order for growth to occur. **As such the key overall contribution of this research to knowledge is that it is possible to create a growth platform model detailing at what point a firm will achieve high growth and what factors are crucial to this development, as well as creating a theory of how and why these large number of factors combine to enable firm growth – it is the alignment of specific resources, mediating factors and output factors which enable high growth.**

8.3 Implications of the growth platform model for policy makers

The fact that high growth firms are rare and yet account for a large proportion of employment (Anyadike-Danes et al, 2013; Autio, 2005; Bravo-Biosca and Westlake, 2009; Storey, 1994) is a testament as to why they need to be researched thoroughly. Knowledge into this area of high growth firms then provides important information

to apply to small firms in general (Barringer et al, 2005) and as was shown in chapter two, small firms are now at the forefront of policy decisions and economic development (Carter and Jones-Evans, 2012; Holzland and Friesenbichler, 2007). However, these policy decisions are often not widely successful (Bennett, 2008; Bennett, 2012; Storey, 1994) suggesting that they are targeting the wrong aspects of small firms in order to aid them in their development. What businesses require in reality is often very different from that which policies provide. Many business policies have tried to focus on certain industries, or firms of a certain size without really providing the targeted support in the correct places (see chapter 2 for a wider discussion).

As there is a lack of research which traces the development of high growth firms (Davidsson et al, 2007; Delmar et al, 2003; Dobbs and Hamilton, 2007; Garnsey et al, 2006; McKelvie and Wiklund, 2010), the factors which are required in order to enable them to grow and why this is the case means that policy introductions are not based upon in-depth knowledge of how firms really achieve growth in reality. This research begins to overcome this problem through the use of an in-depth case study approach. This means that detail is gained with regard to each factor influencing growth, meaning that new insight can be gained to make policies which are grounded in the concept they are attempting to control.

The theory and model developed during this research suggests that policy decisions should be more focused on providing holistic advice, guidance and support in each of the factors highlighted in the model. For instance, individual support should be provided on networking, marketing, recruitment and planning, along with every other factor, but this individual support should be given with the holistic nature of the firm and its resources, mediators and outputs always in mind. Finance in particular is an area in which small firms should be given support as the findings of this research suggest that this is one factor which can cause significant problems for firm development.

The best way for policy makers to ascertain what areas firms need assistance with and how they provide this support would best be ascertained by using the growth platform model to chart a firm's current development. If practitioners and support

bodies did this in conjunction with each other then it would be possible to determine how to support the firm to enable them to develop each factor to the level dictated to be required in the model. For instance, if on review a firm is discovered not to have a growth strategy in place a suggested support mechanism would be to support the firm in developing a growth oriented strategy. The model would also provide information as to which areas the firm is well developed in and therefore where less support is needed. This would mean that support would be targeted and tailored slightly to each firm, overcoming the problem of generic one size fits all policies. Thus not only would policy makers gain an understanding of how to support firms in their development to high growth but small business owners would gain an insight into how to explicitly assess their firm and implement improvements for firm development.

As well as one to one support this research suggests that small firms could be aided by the introduction of focussed networking groups, team building and relationship training. Firms would also be aided through the offering of financial aid for the implementation of systems and software and through the giving of focused advice and guidance with regard to, for instance, the financial planning of a growing firm. The self-assessment of firms coupled with one to one support and also region wide training and advice would enable small firms to be better able to plan for, strive for and achieve growth.

The finding of the importance of open innovation and the triple/quadruple helix to the case firms suggests that this is something which policy makers need to encourage and invest in. This will automatically improve the resource base of many firms through the sharing of resources and knowledge. This could be encouraged through network groups and seminars and would benefit from UK wide government support.

8.4 Implications of the growth platform model for practice

As policy decisions are designed to have an impact on practice (European Commission, 2009), it is important to consider how the model could be used in reality. Again the greatest influence this model could have on small businesses in practice is through the use of the model for reflection and self-assessment, as has

been done with Klofsten's (1992) business platform model. Small business owners can use the model to track their firm's progress on each factor to date and then compare this with the level required in order to achieve high growth. From this, practitioners could implement changes, or keep the status quo, according to what the model dictates. For instance if a practitioner found they had a low level of staff who were not sharing knowledge as was needed then they could work towards bringing more staff on board and ensure staff fit with the firm's ethos in order to encourage good relationships and team work. If they found that they currently did not delegate, they could begin delegation of tasks to aid informal and formal management in coordinating the firm. If they found that they currently had a niche customer base they could begin to look at diversifying this. If staff have multiple overlapping roles with no focus they could begin to set up core functions and departments, and so on.

In order for practitioners to focus their firm on the path to high growth there needs to be a conscious awareness of where the firm currently stands and where they need to go. This model would provide this focus to practitioners and when used in conjunction with support bodies would enable more targeted support. The model could be used for self-assessment by a wide range of firms, from start-up firms, to early stage firms, to firms on the cusp of growth to those firms who have already achieved growth. This is because the model tracks development from start up to not only a growth stage but beyond a growth stage.

Firm owners would also be able to differentiate their resources, from their mediators from their outputs and thus gain a better overall understanding of how each part of their firm could combine to influence the firm's development. In comparison to other models this growth platform model would not only point firms to areas in which they should focus but also explain why this is needed. The finding of the importance of open innovation and the quadruple helix concept suggests that firm owners need to be prepared to blur their boundaries in order for the transfer of resources to aid firm growth and for outputs to be created. The implementation of a model such as this into a training programme such as LEAD Wales would also enable SME owners and managers to track their progress against other businesses and thus discuss this with their peers, enabling them to gain further insight into practical experiences of firm growth.

8.5 Implications for further research

As reviewed in chapter three the methodology for this research consisted of in-depth case studies which included semi-structured interviewing, participant observation and analysis of company documentation. This methodology was purposely chosen in order to allow for process oriented data to be generated and thus a process oriented model to be created. Chapter two identified that the creation of models through the use of this process-oriented approach is rare with only Klofsten (2010) using this method. The creation of models aimed for practical use was also found to be rare and there was criticism of research for the lack of holistic modelling. Although this research has remedied these problems and has provided new contributions to existing theories as well as developing an explanation of firm growth there is further research which needs to take place.

It would be advised to take the model and conduct further qualitative research in order to see if the model fits with a wider range of high growth firms. The use of this in-depth qualitative research would provide further support to the model created in this research. A longitudinal approach would also be beneficial in order to track a firm's development according to the model in real time. Another interesting avenue would be to conduct both qualitative and quantitative research on the model and high growth firms with the aim of developing a generic questionnaire type document which could be disseminated more widely and more quickly than the self-assessment model developed in this research.

Although this research provides useful information as to the relationships between each factor, more detailed information would arise from research concentrating only on these relationships. A mix of qualitative and quantitative analysis could take place analysing the direction of relationship and direct versus indirect effects. This would further the literature with regard to each individual factor and would also aid business owners and policy makers in understanding in depth the relationships between different areas of the firm. This research highlights that it is essential that further research focuses on holistic growth factors as opposed to factors related to specific areas and that an effort is made to further investigate the interconnected

effects of factors on each other. It is only through this understanding of how each factor interacts with another that a true understanding of firm growth will be gained. This has been achieved in this research but further research would provide more supporting evidence as to why each factor is of importance.

This research also advocates the use of multiple but complimentary theories and models to be used as a basis for the development of new knowledge. This research has been able to integrate Penrose's (1959) theory, the resource based view, the knowledge based view and stage and deterministic model principles and further research could act to further confirm this integration. The research concentrates on high technology/knowledge based firms and as such it would be fruitful to firstly attempt to study the model in the context of more high technology/knowledge based firms. Research could then expand the model in other areas in order to see if firm growth models should be specific to industries.

Yet another avenue would be to take the growth platform model to the next level, as this research did with Klofsten's (2010) research. For instance a model could be created which purely details the progress needed to develop from a high growth position to a long term stable high growth position. Each model could then be disseminated to firms depending upon what their goals are e.g. if the goal is for early development follow Klofsten's (2010) model, if it is for growth follow the growth platform model.

Future research could also further investigate specific findings of this research such as the importance of early informal management, the importance of staff relationships, the importance of open innovation and the influence of planning on the firm. These are often neglected and yet this research has shown that they are crucial in the firm development process. Further exploration of the topics identified in this section would further contribute to the academically and practically important firm growth phenomenon. Of particular interest would be open innovation and networking and the extent to which firms need to blur their boundaries in order to make full use of these factors.

This research identifies that firm growth is enabled through a combination of resources, mediating factors and outputs in a cyclical fashion. As a result further research is needed in order to identify if the same themes are identified in other firms and whether the same factors are encompassed under them. An interesting investigation would also be to apply the model to low growth and high growth firms in order to see if the high growth firms conform to the model while the low growth firms don't. The practicality of the model could then be tested by helping low growth firms implement practices working towards the growth platform model while analysing whether or not implementing these changes result in the growth of the firm.

8.6 Conclusion

Extant research provides a wealth of information with regard to firm growth variables and a multitude of different models and theories have been generated to accompany these. However, these are often quantitative in nature and are rarely aimed for practical use and are often explanatory in nature. In quantitative research a large amount of variance is often left unexplained, while there is also a distinct lack of process oriented research. A lack of integrative modelling and theory development is evident. However the approach taken in this research, namely a qualitative process oriented case study approach has meant that the complex phenomenon of firm growth has been found to be explainable through the creation of a process oriented firm growth model and accompanying theory. There are "sweet spots" of development to which a large number of key factors need to be developed to, in order for growth to occur. The key to understanding how these factors enable firm growth is through an understanding of their relationships and thus influences on each other, meaning that the growing small firm cannot be considered with an analysis of only one factor at one level. Analysis needs to take place at the firm level, individual level and network level as it is these interactions which enable firm growth. This research advocates the study of firm growth factors holistically and dynamically as opposed to researching these factors statically at one point in time.

Through the consideration of a number of different theories and models the resultant model and theory generated through this research stem from existing literature.

However this research is also able to extend these through its consideration of factors which are now relevant in the modern knowledge based economy, factors which have never before been so important or influenced the firm to such an extent. Basing the model on one currently used in practice means that it is both descriptive and explanatory, meaning that it could be used to aid practitioners as well as policy makers and academic researchers.

The key findings of this research include the identification of the factors influencing firm growth, the mapping of how these develop over time, the identification of the level to which they need to be developed in order for growth to occur and the resultant explanation as to how these combine to enable firm growth, which is namely the vital link between resources, mediating factors and output factors acting in a cyclical nature. Thus the research has made contributions to the firm growth literature and yet there are additional advances to be made in order to further understand the complex phenomenon of firm growth in the modern economic era. The importance of research into high growth knowledge based firms has already been highlighted and is needed to give support to the many firms who are at an early stage of development, looking for guidance and resources in order to aid them in growth. This research is a vital step in the right direction towards providing answers to fundamental questions in the firm growth literature and the theoretical and conceptual modelling literature and also provides fresh insights into new directions for firm growth research. However there are additional advances to be made and if economic recovery and employment development is to take place firm growth is surely a research topic that is worthy of further analysis.

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Appendix

Appendix 1 – Briefing Letter

Dear CEO,

I am currently undergoing a three year PhD project for which I will be conducting the majority of the research during 2012. The supervisor for this research is Professor Dylan Jones-Evans.

Please see a brief outline of the research aims below:

Brief of Research Aims

The purpose of this research is to develop a model which can be used by business practitioners, academics and policy makers to track a firm's development against factors thought to be crucial for the growth of a company to occur. It is hoped that business owners will be able to assess in which areas they need to improve upon in order to achieve growth and what exactly it is that they need to be aiming for. It is hoped that policy makers would be able to use the model to assess in which areas they could provide more help to small businesses in order to enable them to grow.

The main objectives will be to identify which factors are crucial for firm growth to occur, how these develop over time and to what level these need to be developed to before growth will occur.

In order to achieve these research aims in-depth case studies need to take place of high growth high technology companies which will involve interviews and analysis of company documentation. It is hoped that these interviews and analysis of company documentation will enable to researcher to discover how the firm has achieved their growth. As such I am hoping that you will agree to allow me to interview you and other members of your firm. The interviews will cover many aspects of the firm, including people, products, corporate decisions and network wide influences.

Further information as to what would be expected of you is contained in the consent form included with this letter. If you would like any further information please do not hesitate to contact me, although more information will be provided to you, if you agreed to participate, through a first informal meeting.

I hope that you will be interested in assisting me in this endeavour to develop a tool which will be useful for emerging high technology companies.

Yours faithfully,
Samantha Yandle (Researcher)

Appendix 2 - Consent Form

Participation Consent Form

Title: The development of a growth platform model for knowledge based SME's

Researcher: My name is Samantha Yandle and I am currently undergoing a full time PhD with the University of Wales, Newport while working full time at an SME based in South Wales.

Purpose of data collection: The purpose of this research is to understand which factors and developmental processes are needed to achieve high growth.

Type of data collection: Data will be collected through interviews which will be recorded via a Dictaphone should permission be given. Analysis of company documentation will also take place should permission be given.

Length of time involved:

Interviews

This will vary depending upon who is being interviewed. Interviews with firm owners/CEOs and CTOs will take approximately four hours. However, this interview will be cut into two separate interviews each approximately two hours long. If a different schedule is more suitable timescales will be changed to accommodate the company. Interviews with managers will take approximately four hours which will be spilt into two two hour time periods. Participation in these interviews can be withdrawn at any time.

Analysis of company documentation

This will vary depending upon how accessible the documents are. However, once the documents have been supplied to myself this will take no more of your time. Permission will be sought for analysis of all documents and if permission is not given these documents will not be used.

Voluntary Participation: Participation in the research is entirely voluntary and participation can be withdrawn at any time. Information gathered will be used purely for research purposes.

Confidentiality: Any information which is requested to be kept confidential will be. However, as a result of the research certain information will be included in the thesis which will be publicly available.

Anonymity: An agreement will be made with yourselves as to which information is appropriate to publish in the thesis and which is not. For instance if you would rather the company name was not mentioned then this will be adhered to.

Participant's involvement in reviewing transcripts and reports: After each interview the conversation which took place will be typed and analysed. The analysis of this information will be included in the thesis and an agreement will be made with yourselves prior to the research as to which information you would like to review.

Benefits for participants: Through the interviews participants will be able to reflect on their business growth and the factors involved in this. This may well enable participants to consciously consider factors of which they may not have been previously aware. The analysis of the data will also enable the participants to gain an in-depth external analysis of the factors which enabled their business growth and will result in a company history analysis as such.

I am giving my consent for data to be used for the outlined purposes of the present study. All questions that I have about the research have been satisfactorily answered.

I agree to participate:

(Participant's Name)

(Date)

(Participant's signature)

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Appendix 3 – Development of interview questions (notes)

1. **ASPIRATIONS** – interviews with owners and core members of the team. Perhaps also observation. The aim is to see what their aims and dreams are for the firm i.e. is it for the firm to grow, to stay steady and provide a good enough means of income. **WHY?** – Previous research has suggested that companies in which the owners and core team members are motivated to make the company grow are more likely to actually grow. The majority of firms do not wish to grow and as such this cornerstone will probably be the one that will be the most essential as it is likely to be developed first.
2. **MANAGEMENT AND LEADERSHIP**- interview with owners and managers and team to assess their competence? You want to see how the managers plan and manage resources. You want information from the team to see how well they think they do this. You want information from the owners as to how much responsibility they delegate, the structure of the firm, what is their leadership style, does this improve employees' motivations, does it influence their development etc. **WHY?** – Previous research has suggested that having a competent management team is essential in the growth of this firm. This is because they are delegated to by the owner and as such coordinate and implement the firm's strategy. As you can see this cornerstone is closely linked in with other cornerstones. This is the cornerstone that most research suggests needs to be developed over time but which is essential when high growth begins to occur.
3. **TECHNICAL AND COMMERCIAL EXPERTISE** - interviews with owners and core team members with regard to their expertise and experience. Perhaps this may involve analysis of company documentation. Your aim is to see if they have a background in the area, if they have high technical expertise in the area which they use in developing products and marketing and whether they use this in order to make the company grow. You want to know whether they have the commercial skills to take the products from prototype to market and how they do this and if it affects their growth. **WHY?** – Previous research has suggested that high technology companies are often lacking in commercial expertise yet this is essential in order to make the company successful. Research has suggested that technical expertise is of obvious importance in order to develop the product and assist customers and commercial expertise is essential in order to determine how to take products to market and how to generally run a firm.
4. **STRATEGY** - Interviews with owners and core team members with regard to their growth strategy. Analysis of company documentation e.g. business plans. The aim is to see if they have a strategy specifically for growth and whether this is communicated to everyone. What effect do they think this has on the growth? **WHY?** – Previous research has suggested that companies need a growth strategy which the whole team must be aware of. This does not necessarily need to be written down but I believe it usually will be as VCs need this in order to invest. Having this growth strategy or vision means that coordination can take place around it and resources brought in to support it.

5. **CONTACTS** - Interviews with owners and core team members. Want to know how many they have, how useful they are to their growth, how they found them etc. This includes relationships with suppliers and with general informal contacts. Analysis of company documentation e.g. approved suppliers list. **WHY?** – Previous research has suggested that high growth companies excel at networking and using every contact they have to assist the company in growing. This may be contacts with financial institutions, suppliers, customers, people in the trade, friends etc. In my personal experience at X I believe this is one of the most important cornerstones we have.
6. **CUSTOMER RELATIONSHIPS** - Interviews with owners/new business development people with regard to how many customers they have, the kinds of relationships they have with them, how long they have had them, the quality and quantity of these. Analysis of documentation perhaps and interviews with customers. **WHY?** – it is obvious that for a company to achieve high growth they will need customers – previous research has suggested that it is important in the early development of the firm to get customers who are stable. Previous research has also shown it is important to expand your customer base and to ensure that you are not reliant on just one customer in order to grow.
7. **EXISTING PRODUCT DEVELOPMENT** - Interviews with owners with regard to what they do with existing product lines e.g. how many do they sell, to who, do they try to sell more of the same to new customers or a variation. Do they ever revamp the look and feel of it. Trying to see how important existing products are to growth. May involve looking at documentation. I believe this includes the market analysis. **WHY?** – Previous research has suggested that firms need to improve on their existing products and attempt to sell more of it to the same people or sell it to new people. You need to concentrate on what you currently have as well as everything else.
8. **NEW PRODUCT DEVELOPMENT - INNOVATION** – Interviews with owners and managers with regard to how many new products they develop, how they choose them, what is involved in the R&D etc. Analysis of documentation like new product introduction forms. Trying to see how they innovate and why and how this affects growth. I believe this includes the market analysis. **WHY?** – Previous research, especially with regard to high technology companies has suggested that firms need to produce new innovate products in order to compete. This needs to be aligned with what you are currently doing and what resources you have.
9. **OPEN INNOVATION** - Interviews with owners and perhaps the joint venture partner. Want to know how many they have, what type, how they got

into it, how it helps etc. WHY? – Research has shown that in the modern economic climate companies are working closely with each other in order to develop new innovations. I feel this is likely to be more evident in high technology companies as they have complex products which may require support from others.

10. FINANCE - Interview with owner with regard to where they got their finance from and how and when. This will involve analysis of documentation. Also may want to know what the finance is used for e.g. mostly R&D or existing products. WHY? – Research has shown that for high technology companies especially finance is of the utmost importance for R&D etc. Most high technology companies need this finance in order to start product development, take on employees, etc. Most companies employ bootstrapping techniques until they get this finance.

11. ORGANISATIONAL STRUCTURE AND SYSTEM DEVELOPMENT- Interviews with owners and managers with regard to the development of their structure. Who does what, does everyone know what each other does, key functions, how was the structure set up, when. How has this aided growth. Want to know what systems they developed prior to growth, why, what influence did this have on the firm, is it important in order to achieve growth? WHY? –previous research has shown that as a firm develops they need to change their structure and begin to delegate more, they need to ensure they have a management team and processes in place to support their future development.

12. HUMAN CAPITAL AND INTRA ORGANISATIONAL RELATIONSHIPS - Interviews with owners, managers and team members with regard to the employees knowledge and skills and how these affect growth, do they invest in training them, are they critical to the firm. Also want to know what the employee's relationships are like and how this affects their growth e.g. do they share knowledge, help each other, learn from each other etc. WHY? – Previous research has alluded to the fact that team members share knowledge and learn from each other. I believe that team interaction and this sharing of knowledge progresses your resources and aids in the generation of new ideas.

13. MARKET ANALYSIS AND CREATION – Interviews with owners, managers and sales and marketing staff with regard to their market generation and analysis. I want to know if they generate new markets or tap into existing ones, why do this do this, is marketing important to their development, if so why and what types are important etc. WHY? – previous research suggests that high growth companies tend to create new markets or target gaps in the market as opposed to following the crowd. I feel it will be interesting to see what marketing techniques they are using as it can be difficult to market high technology products. It will also be interesting to see if they use social media as a tool.

Appendix 4 – Interview Instrument Example CEO (interview sheet one of three)

Introduction

If you could just start by telling me a little bit about how the firm started?

General Questions

Factors leading to growth

Q: What are the factors which have led to the company's development so far?

PROMPT:

- Which have been the most important?
- Why do you think these factors have been important?
- Can you describe how these have enabled you to develop to the point you are at now?

NB: Note down the factors they mention and then return to them at the end of the interview and if they say ones you have not thought of say you mentioned X factor earlier can you tell me more about this.

Firm Capabilities and Resources

Q: What have been the most important firm capabilities which have enabled you to develop to the point you are at now?

PROMPT:

- Why have these been of importance?

Q: How have emerging opportunities to develop the firm been spotted?

PROMPT:

- By whom?
- Could you give me an example?

Q: What have been the most critical decision making points which have enabled you to develop to the point you are at now?

PROMPT:

- Who has been involved in these?

Q: Have you faced any problems throughout the firm's development?

PROMPT:

- When?
- How were these overcome?

Growth Aspirations

Q: What was your aspiration for the firm when the firm first started?

PROMPT:

- What steps did you take in an attempt to achieve these aspirations? Can you give me an example?

Q: Have your aspirations for the firm developed from start up to the present day?

PROMPT if they say yes:

- In what way?
- Why do you think they changed?
- What influence has this had on the firm?

Q: How committed have you been in achieving these aspirations?

PROMPT:

- Can you give me an example (of your commitment)?

Q: Were these aspirations for the firm communicated to others within the firm?

PROMPT:

- To who?
- Through what medium – speech, written documents? Can you give me an example?
- When did you begin communicating the aspirations to them?
- Why did you communicate this to them?
- What was the result of you communicating the aspirations to them?

Q: Were these aspirations communicated to people external to the firm?

PROMPT:

- To who?
- Through what medium – speech, written documents? Can you give me an example?
- When in the relationship were these aspirations communicated? Why did you communicate this to them?
- What was the result of you communicating the aspirations to these people?

Q: Overall, did you have a growth orientation for the firm at start up?

PROMPT

- Did this develop in intensity over time? Why?

Technical and Commercial Expertise (of owner, shareholders, CEO and CTO)

Section Two: Technical Personnel Experience

Q: What was X's experience when you first started the firm?

PROMPT:

- Had they worked within the same industry before?
- Had they worked within the same role?
- Had they owned a firm before?

Q: Has this experience aided the firm?

PROMPT:

- How?
- Can you give me an example?

Q: What were X's key skills when he/she first started the firm?

PROMPT:

- What were these skills used for? Can you give me an example?
- What field was their knowledge in?
- What qualifications did they have?

Q: Has X developed any new skills whilst in the firm?

PROMPT:

- What are these?
- How did they develop them?
- What were they used for?

Q: Has X developed any new knowledge bases whilst in the firm?

PROMPT:

- What are these?
- How did they develop them?
- What were they used for?

Q: Did X have any commercial knowledge when they first started the firm?

PROMPT:

Yes:

- To what extent?
- Has this multi-disciplinary knowledge developed over time since start up?
How?
- Was it important they have these multi-disciplinary skills? Why?
- Can you give me an example of when both sets of skills were used?

Q: What was your experience when you first started the firm?

PROMPT:

- Had you worked within the same industry before?
- Had you worked within the same role?
- Had you owned a firm before?

Q: Did this experience aid the firm?

PROMPT:

- How?
- Can you give me an example?

Q: What were your key skills when you first started the firm?

PROMPT:

- What were these skills used for? Can you give me an example?
- What field was your knowledge in?
- What qualifications did you have?

Q: Have you developed any new skills whilst in the firm?

PROMPT:

- What were these?
- How did you develop them?
- What were they used for?

Q: Have you developed any new knowledge bases whilst in the firm?

PROMPT:

- What were these?
- How did you develop them?
- What were they used for?

Q: Did you have any technical knowledge when you first started this firm?

PROMPT:

Yes:

- To what extent?
- Has this multi-disciplinary knowledge developed over time since start up?
How?
- Was it important you have these multi-disciplinary skills? Why?
- Can you give me an example of when both sets of skills were used?

No:

- Did you develop technical skills later on?
- Did this affect the firm's development? How?

Section Seven: Shareholder Personnel Experience

Q: What shareholders have you had from start up to the present day?

PROMPT:

- When were these people brought on board?
- Why were these shareholders chosen?

Q: What was the experience of the shareholders?

PROMPT:

- Had they within the same industry before?
- Had they worked within the same role?

Q: Has this experience aided the firm?

PROMPT:

- How?
- Can you give me an example of an instance when this experience has aided the firm?

Section Eight: Shareholder Personnel Skills

Q: What were the shareholders key skills?

PROMPT:

- What were these skills used for? Can you give me an example?

Q: Have you ever gained any additional technical or commercial knowledge from people not employed within the firm?

PROMPT:

Yes:

- From whom?
- How did you gain these?
- When did you gain these?
- What were these additional skills used for?

No:

- Why?

Section Four: Leadership

There is a continuum of leadership styles from fully participative to fully autocratic. (Participative = decisions are made as part of a group, autocratic = all decisions made by the leader)

Q: How would you describe your leadership style in the early stages of the firm?

PROMPT:

- Can you give me an example
- How has this leadership style developed over time up until the present day?
Can you give me an example?

Human Capital supply and Intra-Organisational relationships

Q: How has the human capital base of your firm developed over time from start up to the present day?

PROMPT:

- I.e. in numbers, expertise, level of specialisation.
- Why did it develop in this way?

Q: In general what experience did your employees have when they started at the firm?

PROMPT:

- Did most of them have experience in this industry?
- Had they worked in similar roles before?

Q: How has this experience aid the firm?

PROMPT:

- Can you give me an example?

Q: In general what skills did your employees have when they started at the firm?

PROMPT:

- Did they have technical or commercial knowledge?
- Did they have any specialised knowledge? In what areas? Can you give me an example?
- What qualifications did they have?

Q: What have these skills been used for?

PROMPT:

- Can you give me an example?

Q: Have the employees' developed any new skills whilst in the firm?

PROMPT:

- How?
- Has their skill development been important to firm development? In what way? What were these new skills used for?
- Have the employees participated in any training? When did this training start? Why did you offer training?

Q: Can you describe how the skill set of your employee base has developed over time? (started off with only one role e.g. electronics guys but now have software guys too)

PROMPT:

- CLARIFICATION – has the skill set of your employees diversified as more people were brought on board?
- Why has it needed to develop like this?

Q: Can you describe how the multi-disciplinary nature of staff roles has developed over time from start up to the present day? (I mean did they go from having multiple roles to specialised roles?)

PROMPT:

- Have the staff roles become more specialised over time?
- What influence has this had on the firm's development?
- Can you give me an example of why and when these different skills have been needed?

Q: Overall how important have the employees been to the firm's development?

PROMPT:

- Why?
- What have their day to day roles consisted of? Why have these been important?

Q: Have you found it difficult to gain any of your employees?

PROMPT if yes:

- Which ones?
- Did this have any effect on the firm's development? What?
- Have you been unable to achieve certain things due to the lack of employees?

Section Two: Team Relationships

Q: In the early stages of the firm would you say that employees had to follow strict guidelines or were they allowed to be creative with regard to their work?

PROMPT:

- Can you give me an example?
- Why were they encouraged to do this?

Q: As the firm has developed has this changed?

PROMPT:

- Can you give me an example?
- Why would you say it has developed like this?

Q: Were regular team meetings held in the early stages of the firm?

PROMPT:

- What content was discussed?
- What was their purpose?
- To what extent was knowledge shared?
- What did these meetings result in?

- How have these team meetings developed over time from the early stages to the present day? In quantity? In quality?

Q: How has the level of team work which has been required developed from start up to the present day?

PROMPT:

- Can you give me an example of when team work was required?
- Why has it been required?

Q: Can you describe how the relationships between employees have developed from start up to the present day?

PROMPT:

- Were their interactions formal or informal?
- Were they friendly with each other?
- What benefits arose from these relationships?
- Can you give me an example of when these relationships were used to the firm's benefit?

Q: Can you describe how the level of knowledge sharing between employees has developed over time from start up to the present day?

PROMPT:

- Can you give me an example?
- Why did they need to do this?
- Did they share more knowledge as time went on or was it fairly consistent?

Section Three: Knowledge Management

Q: How was knowledge managed in the early stages of the firm?

PROMPT:

- Who was involved in managing it?
- What influence did this have on the firm's development?
- How has knowledge management developed over time from start up to the present day?

Management and Leadership

Q: Would you say that you currently have managers within the firm?

PROMPT:

- If they say yes the employees are managers then ask the below questions
- What managerial titles do they have?

Q: From start up to the present day has the management team ever created new resources for the firm?

PROMPT:

- Can you give me an example?
- When were the new resources created?
- What were they used for?

Q: Can you describe how the extent to which the management are involved in planning has developed from start up to the present day?

PROMPT:

- How did this aid the firm?
- Can you give me an example of an instance when they got involved in planning?
- Did they both create plans and implement them?
- Did they get involved more or less as time went on?

Q: Can you describe how the managements level of authority has developed from the time they started to the present day?

PROMPT:

- What did they have authority over?
- Can you give me an example?
- Why were they given this authority?
- Were they given more or less authority as time went on? Can you give me an example?

Q: Can you describe what the most important tasks for management were when they first started?

PROMPT:

- Why were these so important?

Q: What were the most important tasks for management as the firm began to grow?

PROMPT:

- Why were these so important?

Contacts

Q: Can you describe how your level of networking has developed from start up to the present day?

PROMPT:

- Can you give me an example?
- Why have you engaged in this networking?
- What influence did it have on the firm's development?

Q: Did you accumulate most of your contacts whilst in this firm or before?

PROMPT:

- How did you gain them?

Q: Have the employees ever provided additional contacts for the firm to utilise?

PROMPT:

- Which employees?
- What kinds of contacts?
- How did they know these people?
- What were these contacts used for?
- What was made possible as a result of it?

Q: What personal contacts have you had from start up to the present day which have been utilised by the firm? (By personal contacts I mean family and friends)

PROMPTS:

- What were they utilised for? Can you give me an example?
- When?

Q: What key informal business contacts have you had from start up to the present day which have been utilised by the firm? (By informal business contacts I mean contacts you had who you may have provided advice but who you did not do business with)

PROMPT:

- How did you obtain these contacts? When?
- What were they utilised for? When? Can you give me an example?
- How would you characterise your relationship with these people?
- How frequently did you interact with these contacts? What was the nature of this interaction?
- What resources did they supply you with?
- How did these relationships develop over time?
- What resources did you supply these contacts with?
- How did the number of informal business contacts you had develop over time?

Q: What key supplier contacts have you had from start up to the present day which have been utilised by the firm?

PROMPT:

- How did you obtain these contacts? When?
- What were they utilised for? When? Can you give me an example?
- How would you characterise your relationship with these people?
- How frequently did you interact with these contacts? What was the nature of this interaction?
- What resources did they supply you with?
- How did these relationships develop over time?
- What resources did you supply these contacts with?
- How did the number of supplier contacts you had develop over time?

Q: What key financial contacts have you had from start up to the present day which have been utilised by the firm?

PROMPT:

- How did you obtain these contacts? When?
- What were they utilised for? When? Can you give me an example?
- How would you characterise your relationship with these people?
- How frequently did you interact with these contacts? What was the nature of this interaction?
- What resources did they supply you with?
- How did these relationships develop over time?
- What resources did you supply these contacts with?
- How did the number of financial contacts you had develop over time?

Q: What key government contacts have you had from start up to the present day which have been utilised by the firm?

PROMPT:

- How did you obtain these contacts? When?
- What were they utilised for? When? Can you give me an example?
- How would you characterise your relationship with these people?
- How frequently did you interact with these contacts? What was the nature of this interaction?
- What resources did they supply you with?
- How did these relationships develop over time?
- What resources did you supply these contacts with?
- How did the number of government contacts you had develop over time?

Q: What key contacts have you had with Universities from start up to the present day which have been utilised by the firm?

PROMPT:

- How did you obtain these contacts? When?
- What were they utilised for? When? Can you give me an example?
- How would you characterise your relationship with these people?
- How frequently did you interact with these contacts? What was the nature of this interaction?
- What resources did they supply you with?
- How did these relationships develop over time?
- What resources did you supply these contacts with?
- How did the number of university contacts you had develop over time?

Q: From what staff members did the majority of the contacts originate from?

PROMPT:

- Yourself? Managers? Employees?

Q: Have you had any contacts that would assist you in achieving your aims without any monetary exchange?

PROMPT:

- How did this help the firm?
- How did you gain these contacts?

Q: Are there any other contacts that have been utilised by the firm up until now, who we have not discussed?

PROMPT:

- How did they influence the firm?

Appendix 5 – List of company documentation requested

Business Plan
Mission Statement
Vision Statement
Financial Investment applications
Grant Applications
Patents filed
Minutes of meetings
Quality Documents
Organisational Structure Diagrams
Sales documents
Market Reports
Marketing material

Appendix 6 – List of all codes for case A (Open codes, conceptual codes and hierarchical codes)

Aspirations

Aims	Hierarchical Coding
High tech product aim	
Aiming for exit strategy	
Investors aiming for exit strategy	
Aim for high margins	
Growth aim	
Aim of differentiation	
Aim for job creation	
Communication of aims to staff	Firm Aims
Communication of aims externally	Communication of aims

Technical and Commercial Expertise

Technical and Commercial expertise	Hierarchical Coding
CTO technical expertise	CTO expertise
CTO research expertise	
CTO commercial experience	
CTO company sector experience	CTO experience
Existing CEO financial experience	CEO experience
CEO Director level experience	
CEO company sector experience	
CEO experience as CEO	
Commercial and operational CEO skills	CEO expertise
CEO commercial and technical knowledge	
CEO management qualifications	CEO expertise
Importance of technical knowledge	Importance of technical knowledge

Contacts

Contacts	Hierarchical Coding
Utilising existing contacts	
Utilising university contacts	
Utilising new contacts	
Utilising personal contacts	
Utilising staff contacts	Utilising contacts
Networking	Creating New contacts
Staff provide contacts	
Increase in contacts	
Contacts lead to contacts	
Supplier rapport	Relationship with contacts
Close interaction with contacts	
Supplier advice	
Contact advice	
Supplier issues	
Importance of suppliers	
Suppliers stabilising over time	
Specialist suppliers	Types of contacts
Bank contacts	
Government grant contacts	
University contacts	
Financial contacts	
Key suppliers	Contacts not in close proximity
Contacts not in close proximity	

Management and Organisational Structure

Organisational structure	Hierarchical Coding
No company offices	
Office space acquired	Office space development
Staff overseen early on	
Moderate level of staff authority	
Staff create project plans	
Staff authority	
Overseeing staff	
Staff authority increasing	
Staff autonomy	
Staff project manage	
Staff report back to owners	
Staff planning increases	Staff authority development
Delegation of design	
Delegation to staff	
Delegation to staff increasing	
Staff delegating	Levels of Delegation
Hierarchy of staff	
Different departments emerge	
Increasing employee structure	
Individual roles	
No formal hierarchy	Organisational development
Centralised decision making structure	
Group decisions	Decision making structure
Team discussions	
Multiple shareholders	
Observer to the board	Corporate Development
Idea creation by CTO	
Technical sign off	
Idea verification by CEO	
CEO project manager	Working Processes
Staff heavily involved in planning	
Staff manage the business	Staff level of involvement

Knowledge transfer	Hierarchical Coding
Team meetings	
Informal knowledge transfer	
Formal team meetings	
Knowledge sharing increasing	
Sub team meetings	
Transfer of information between staff	
Staff teaching staff	Knowledge transfer development
Knowledge sharing customer-firm	
Customer-firm capital equipment share	Customer-firm transfer
Vertical information flow	Vertical information flow

Human Capital and Relationships

Employees	Hierarchical Coding
Technical staff needed	
Commerical staff needed	
Manufacturing staff needed	
Electronics staff needed	
Staff numbers increasing	
Owners sole employees	
First employee	
New employee	
	Employee Base Development
Importance of staff relationships	
Good employee relationships	
Staff relationships developing	
Importance of staff trust	
Close team	
Importance of good working atmosphere	
Staff feeling of division	Staff relationships
Staff industry experience	
Staff experience	
Previous experience aiding firm	
Lack of industry experience	
Lack of experience/knowledge	Staff experience
Team work	
Team work increasing	Team work development
Multi skilled staff	
Technical and commerical staff skills	Staff skill sets
Highly skilled staff	
Multiple staff roles	
Specialist staff roles	
Specific type of employee wanted	Specific type of employee wanted
Staff create new resources	Staff create new resources
Importance of staff	Importance of staff

Learning	Hierarchical Coding
Experiential learning	
Staff knowledge gain	
Staff skill development	Staff development
Staff educational training	
Internal staff training	
Staff external training	Staff Training
Firm becomes more knowledgeable over time	Firm becomes more knowledgeable over time

Systems and Software

Documentation and systems	Hierarchical Coding
Quality procedure development	
Quality procedure implementation	
New product procedures	
Quality documents	
Manual quality control	
Plan for system development	
Rigid procedures early on	
Quality certification	
Quality process develops over time	
Sales procedures	
Company wide server	
Importance of quality systems	Quality Development
Software use increasing	
Software use	Software Development
Strict employee guidelines	Strict employee guidelines
Staff feeling lack of quality process	Staff feeling lack of quality process

Customer Development

Customers	Hierarchial Coding
Gaining of customers	
First customer	
Customer enquiries	
	Customer Development
Close customer contact	
Close working with customers/ collaborative partners	
Importance of customer trust	
Increasing knowledge of customer needs	
Consideration of customer needs	
Customer relationship developing	Customer Relationship Development
Customer specifications	Customer Documentation
Customer grant aid	Customer grant aid

Open Innovation

Open innovation	Hierarchial Coding
Open innovation	Open Innovation
Open innovation - Customer	

Finance

Finance	Hierarchial Coding
Start up finance	
Owner finance	
Equity finance	
Grant aid	
Importance of finance	Types of finance
Importance of customer finance	
Small sales revenue	
Early sales revenue	
Lack of sales for FM	Sales Revenue
CEO financial management	
Manual finance systems	
Monthly management accounts	
Finance software	
External finance person	
Financial management	
Attempt to reduce costs	
Raising finance	Finanical Management Development

Strategy and Planning

Planning	Hierarchical Coding
Financial planning	
Planning	
Business plan in place	
Project plans	
Short term planning	
Contractual management	
Communication of strategy to employees	Types of planning
Communication of strategy externally	Communication of Strategy
Strategy in place	
Constant review of strategy	
Owners create strategies	
Staff implement strategies	
Focus of activities	
Two main projects	Specialisation
	Sales planning
Internal justification of projects	Internal justification of projects

Market Analysis and Creation

Marketing and market analysis	Hierarchical Coding
Communication of market research externally	Communication of market research externally
Focused markets	
Rare industry	
Importance of market knowledge	
Market research	
End customer marketing	
Marketing attempts	
Website creation	
Website development	
Multiple sales strategies	

Existing and New Product Development

Products	Hierarchical Coding
New patent	
Developing IP position	
Original patent	
Product development	
Product prototypes	
Customer testing of prototypes	
In house prototype testing	
Bespoke design	
Design iterations	
Multiple product lines emerge (change to multiple products for one customer emerge)	
Long development work	
Lack of finished product	
Product close to coming to market	Product Development
Product line diversification	
Cash cow	
Cash cow gone to market	
Disruptive technology	Product Diversification
Importance of technology	Disruptive technology
Existing product line development	Importance of technology
	Existing product line development
Mark two products planned	Mark two products planned

Appendix 7 – List of all codes for case B (Open codes, conceptual codes and hierarchical codes)

Aspirations

Aims	Hierarchical coding
Communication of aims to staff	Communication of aims
Communication of aims to customers	
Communication of aims to finance providers	
Lack of communication of aims	
Further growth aim	Firm aims
Growth aim	
Aim for job creation	
Aim for staff development	
No clear vision for company early on	Firm vision
Clear vision for company	
Targeted growth	

Contacts

Contacts	Hierarchical Coding
Regulatory contacts	Types of contacts
Business development contacts	
Financial contacts	
University contacts	
Social media contacts	
Gaining new contacts	
Joining networks	Gaining new contacts
Staff good at networking	
Owner main networker	
Contact base built up in firm	Utilising Contacts
Utilising existing contacts	
Utilising government contacts	
Utilising personal contacts	
Utilising University contacts	
Contacts used for advice	
External expertise used	
Contacts providing customers	
Good relationships with contacts	
Supplier relationships develop	
Importance of networking	Relationship development

Customers

Customers	Hierarchical coding
First customer	Customer Development
Customer numbers increasing	
Customer base spread	
Customer diversification	
Small customers	
High reliance on one customer base	
Customer trust	
Close customer relationship develops	
CEO-customer relationship becomes less personal	
Good customer communication	
Staff assigned customers	Customer relationship development
Understanding of customer needs develops	
Focus on customer needs	
High customer return rate	
Customer grows so does firm	Customer-firm development
Synergy between customer and firm	
Recession affects customers	
Niche customer base	

Open Innovation

Open innovation	Hierarchical coding
Open innovation	Open innovation

Human Capital – Management

Organisational Structure – Functions	Hierarchical coding
Recruitment of BD director	
Recruitment of Finance person	
Recruitment of new CEO	
Recruitment of BD	
Recruitment of key people	
Directors appointed	
Recruitment of IT person	Recruitment of key people
Creation of departments	
Creation of senior management team	
Creation of an executive team	
Development of departments	
Development of corporate structure	
Development of Operations department	
Development of hierarchy	Corporate structure developing
Formal managers appointed	
Owner is manager	
Management enabling staff development	
Management enabling process development	
Management enabling growth	Managerial base development
Staff change roles	
Staff roles become more specialised	
Role confusion	
Multiple staff roles	Staff Role Change
Former CEO distances himself	
Quick management buy out	
CEO wants to leave firm	
CEO taken it as far as he can	
Participative leadership style	CEO development
Off site BD	

Human Capital, Relationships and Team Work

Employees	Hierarchical coding
Creation of team day	
Importance of staff relationships	
Employee relationships developing	
Good employee relationships	
Extremely close relationships early on	
Relationships become less close	Employee relationship development
Staff experience	
Qualified staff	
Skill set of firm becomes more educated	Staff skills
Importance of staff	
First employee is advisor	
Staff opinions asked for	
Staff involvement in decisions	
Staff ownership early on	Staff Involvement
Staff promotion	
Staff cross skilled	Staff role development
Motivating staff	
Dedicated staff	Psychological development
Importance of staff fit	
Importance of staff-job fit	Importance of fit

Relationships	Hierarchical coding
Good relationships between management and staff	Development of intra-organisational relationships
Family culture	
Developing relationships between SMT	
Developing relationships between directors	
Us vs them culture developing	

Team work	Hierarchical coding
SMT not working well as a team	Development of team work in general
Team work between directors	
Team work between departments where necessary	
Team work	

Staff Numbers	Hierarchical coding
Staff numbers 10-25	Development of staff numbers
Staff numbers 0-10	
Staff numbers 50	
One owner	
Staff numbers increasing	
Small staff numbers	
First employee	
Staff brought on as needed	

Expertise

Expertise	Hierarchical coding
Previous experience aiding firm	
Owner experience	
Technical expertise	

Learning	Hierarchical coding
Staff gaining new skills CHRON	Staff skill development
Development of commercial and technical skills CHRON	
Experiential learning CHRON	
Staff training CHRON	Staff Training
Further training needed	
Introduction of graduate schemes CHRON	

Finance

Finance	Hierarchical coding
Fundraising	
Grant aid	
Initial owner investment	
Equity investment	
CHRDN	
Revenue as funding	
Debt funding	
CHRDN	Types of finance
Small cash flow early on	
Company has bad debts	Financial Problems
Finances managed by external accountants	
Need for financial management help	
Informal financial management	
Financial software	
Creation of budgets	
Part time finance person early on	Financial management development
Attempt to reduce costs	
Customers receive grant monies	

Strategy

Strategy	Hierarchical coding
Executive team responsible for strategy	
Board approve the strategy	
Strategy enabling planning	Strategy Implementation
No formal strategy	
Informal strategy	
Initial strategy for the company	
Formal strategy created	
Development of mission and vision	
Strategy reviewed	Strategy development
Marketing focused strategy	
Short term strategy	
Mid term strategy	
Long term strategy	Types of strategy
Clear communication of strategy to employees	
No clear communication of strategy	
Formal communication of objectives	
Informal communication of objectives	
Communication of strategy to government	Communication of strategy

Planning

Planning	Hierarchical coding
Departmental objectives	
Individual objectives	Business Planning Development
Planning of day to day tasks	
Sales planning	
Staff planning	
Priority planning	
Project plans	
Plan for further growth	
Plan for foreign offices	
Financial planning	Types of planning
Recognition of business needs	
Realisation of business potential	
Realisation of business niche	Entrepreneurial planning
Plans dictated by customers	
Plan for further recruitment of BD	

Organisational Structure

Organisational Structure - Functions	Hierarchical coding
Recruitment of BD director	
Recruitment of Finance person	
Recruitment of new CEO	
Recruitment of BD	
Recruitment of key people	
Directors appointed	
Recruitment of IT person	Recruitment of key people
Creation of departments	Corporate structure developing
Creation of senior management team	
Creation of an executive team	
Development of departments	
Development of corporate structure	
Development of Operations department	
Development of hierarchy	
Formal managers appointed	
Owner is manager	Managerial base development
Management enabling staff development	
Management enabling process development	
Management enabling growth	
Staff change roles	
Staff roles become more specialised	
Role confusion	Staff Role Change
Multiple staff roles	
Former CEO distances himself	
Quick management buy out	CEO development
CEO wants to leave firm	
CEO taken it as far as he can	
Participative leadership style	
Off site BD	

Delegation and Authority	Hierarchical coding	
High level of delegation in finance department		
Delegation needed		
High level of delegation early on		
Delegation from board to exec		
Delegation from exec to SMT		
Directors hands on early on		
Directors micro managing		
SMT implement objectives		Development of delegation
High level of executive authority		Development of authority
Staff authority increases early on		
Staff manage firm initially		
SMT autonomy		
SMT given more authority		
SMT need sign off from exec		
Staff overseen early on		
Staff allowed to be creative		
Management become more involved in planning		

Premises and Equipment	Hierarchical coding
Custom built building	Development of premises
Additional premises	
Reocate to larger premises	
First small premises	
Small amount of equipment	Equipment Development
Equipment increasing	

Knowledge Transfer	Hierarchical coding	
Informal communication		
Departmental team meetings		
SMT team meetings		
Whole company meetings		
Management and staff 1:1 meetings		
Management and exec team meetings		
Communication becomes harder		
Knowledge Management difficulties		
Multiple people need info as firm grows		
Board-exec group discussions		
Communication of staff roles		
Formalised meetings		
Knowledge sharing		Development of communication

Market Analysis and Creation

Marketing	Hierarchical coding
External marketing research	
Increase in market analysis	
More investment in marketing	
Travelling salespeople	
Targeted marketing	Formal Marketing Development
No formal marketing plan	
Small amount of market analysis	
Marketing plan	
Marketing plan develops	
Start attending conferences	
Website development	
Word of mouth marketing	
Press marketing	
General marketing	
Trial and error marketing	Types of marketing
Social media marketing	
Importance of image	
Developing reputation	
Brand development	Development of Image and Brand
Developing professional image	
Importance of BD and pipeline	
Market leaders early on	
Growing market sector	
Communication of market analysis to finance providers	

Software and System Development

Documentation and Systems	Hierarchical coding
Regulated industry	
Company audited frequently	
Importance of documentation	
Importance of quality procedures	
Strict procedures	Importance of quality
Lots of quality procedures	Quality Development
Amount of quality procedures increasing	
Procedures basic early on	
Systems need improving	
Development of processes	Process development
Problems with training systems	Training system development
Training plans in place	
Training system develops	
Development of sales procedures	Sales Procedure development
No sales procedures	
Manufacturing software	Software development
Development of software use	
CRM software	
ERP software	
New directive drives business	
Importance of documentation	
Initial documentation	

Service Development

Service Development	Hierarchical coding
First service	
Second service	
New services	
Consideration of new services	
Splitting of services	Increase in services
	Service Development
Suggesting needs to customers	
Service provision develops	
Constant improvement of services	
Developing service with customer	
New product	
Proof of concept developed	Product development

